SEPA Supplemental Environmental Impact Statement
ADDENDUM

for the

Revised 47º North Major Site Plan Amendment Proposal

prepared by

City of Cle Elum,
Planning Department

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Chapter 1
SUMMARY

CHAPTER 1
INTRODUCTION & SUMMARY

1.1 Introduction

Prior Permitting & Environmental Documentation

This SEIS Addendum is the third environmental document prepared by the City of Cle Elum, as lead agency, pursuant to the State Environmental Policy Act (SEPA), for proposed development of a Master Site Plan for a site generally referred to as the Bullfrog Flats/Urban Growth Area (UGA) property. In 2002, an Environmental Impact Statement (EIS) was prepared to evaluate annexation by the city and development by Trendwest Resorts (now New Suncadia) of the approximate 1,100-acre site. That EIS evaluated five development alternatives. The preferred Master Site Plan (EIS Alternative 5) was approved by the city subject to numerous conditions; a Development Agreement was also approved. Trendwest did not proceed with development.

In 2020, Sun Communities acquired the Bullfrog Flats property and submitted an application to modify the approved master plan and to develop the site with a different mix of land uses. A Supplemental EIS (SEIS) was prepared to evaluate Sun Communities' proposal in 2020 (Draft SEIS) and 2021 (Final SEIS). The SEIS updated information about background conditions, including information relevant to the approved Master Site Plan (Alternative 5), and compared the impacts of Sun Communities' modified master plan proposal to the approved master plan. In 2022, Sun Communities withdrew its original application and continued to evaluate plans for development of the property. The Applicant provided updated information to the city about its revised proposal and that information is the basis for the analysis in this Addendum.

SEPA Addendum

This document is an Addendum to the *47º North Master Site Plan Amendment Final SEIS* (2021); it documents and evaluates impacts associated with the Revised 47º North Master Site Plan Amendment (Revised Proposal). The Addendum updates and adds information about the alternatives, impacts, and mitigation measures identified in the prior SEIS in light of the changes in the Revised Proposal. Pursuant to the SEPA rules, an Addendum is appropriate when a proposal has been modified but the impacts of the changes are within the range of impacts and alternatives identified in existing environmental documents (WAC 197-11-600(3)(b)(ii)).

The Revised Proposal is substantially similar to the project evaluated in the SEIS (Alternative 6) in most respects. Proposed changes are the impetus for and the focus of the

reevaluations in this Addendum. The most substantial changes in the Revised Proposal include the following:

- addition of 50 units of affordable, multi-family housing. The units would be constructed and maintained by the Applicant and dispersed on the project site. A condition of approval adopted in 2002 required the developer to dedicate a 7.5-acre site to the city, which would be developed for 50 units of affordable housing and maintained by a third party developer;

- incorporation of the 25-acre, 150,000-square foot commercial center into the Revised Proposal. The commercial center was not part of the original Sun Communities Master Site Plan proposal. Although the SEIS considered future, possible development of the commercial center by a different property owner as speculative, it nevertheless evaluated future development to provide a complete picture of possible cumulative impacts; and

- a change in the timing of development of the Master Site Plan to affect an earlier buildout of the overall project — 2028 for residential and RV uses, and 2031 for the commercial center.

Other differences between the SEIS Proposal (SEIS Alternative 6) and the Revised Proposal include minor changes to the mix of land uses in the commercial center, but no change in the total amount of commercial development; and minor changes to some details of the site plan, such as the location of types of on-site parks. The amount of open space provided in the Revised Proposal has been increased. All on-site roads, parks, and utilities would now be owned, constructed, and maintained by the Applicant rather than the city.

Information about existing conditions, particularly regarding transportation, public services, and fiscal conditions, has been updated to reflect any new information about impacts or changes in background conditions that have occurred since publication of the SEIS and that could affect previous conclusions. The Addendum reevaluates and compares potential impacts accordingly.

All SEPA elements of the environment evaluated in the SEIS have been reconsidered in light of the Revised Proposal. As documented in the Addendum, changes in impacts relative to those identified in the SEIS are incremental in nature and are within the range of impacts and alternatives considered in the prior environmental documents prepared for or bearing on the Revised Proposal. No impacts that are significantly different in type or degree have been identified.

The reader should note that the Addendum is focused on comparing the impacts of the Revised Proposal to the 2020/2021 Master Site Plan amendment that was evaluated in the SEIS (SEIS Alternative 6). That is the function and focus of an Addendum as defined in the SEPA Rules. The context of the prior SEIS, however, was to compare the 2020/2021 Sun

Communities master plan proposal to the approved Bullfrog Flats Master Site Plan evaluated in the original/2002 EIS (Alternative 5). To avoid unnecessary repetition, the Addendum refers to and summarizes information contained in the SEIS that is being reevaluated, including that related to Alternative 5 (the preferred master plan in the 2002 EIS), but it does not repeat the prior analysis. Together, the three environmental documents prepared for the various proposals and alternatives for development of the site provide a thorough disclosure and comparison of significant impacts and measures to mitigate those impacts.

The Addendum is organized similarly to the SEIS. **Chapter 1** is an introduction and summary of the Revised Proposal, identified impacts, and mitigation measures. Mitigation measures include any new measures applicable to the Revised Proposal. **Chapter 2** describes the Revised Proposal in detail. **Chapter 3** contains the updated environmental analysis. **Appendices** include technical reports and memoranda for engineering/utilities, transportation, fiscal impacts, and for elements of the natural environment. Note that the Yakama Nation Cultural Resource Program prepared an analysis of the portion of the site proposed for the commercial center. That report has been submitted to the Department of Archaeology and Historic Preservation and the conclusions are summarized in the Addendum; however, state law does not permit disclosure of the full report.

1.2 Site Area

The Revised Proposal site is approximately 889 acres in size, about 65 acres larger than the site under SEIS Alternative 6 (and 211 acres smaller than the approved 2002 Bullfrog Master Plan site). The difference in site area under the Revised Proposal is due to the addition of the commercial property to the eastern part, addition of open space to the southern part, and removal of the municipal recreation center property from the northern part (previously dedicated to the City) and a road dedication from the southern part of the site (see **Chapter 2** for details).

1.3 Revised Proposal & SEIS Alternatives

The Revised Proposal is Sun Communities' current (2023) proposal for the 47° North site. Two alternatives were studied in the SEIS: SEIS Alternative 5, the Approved Bullfrog Flats Master Site Plan (the No Action Alternative), updated to reflect current conditions and regulations; and SEIS Alternative 6, the proposed 47° North Master Site Plan Amendment (the Applicant's proposal at the time). Highlights of the Revised Proposal and SEIS Alternative 6 are shown in **Table 1-1.** A detailed description of the Revised Proposal, including significant differences between the prior and current proposals, is contained in **Chapter 2** of this SEIS Addendum.

Table 1-1
SUMMARY COMPARISON - SEIS ALTERNATIVE 6 & REVISED PROPOSAL

Land Use	SEIS Alternative 6	Revised Proposal
Residential	• 150.1 ac. • 707 residential units ○ 527 single family units ○ 30 multi-family units ○ site for future affordable housing	• 144.9 ac. • 757 residential units ○ 527 single family units ○ 30 multi-family units ○ 50 affordable housing units
RV Resort Sites	• 145.5 ac. • 627 RV sites	• 125.8 ac. • 627 RV sites
Active Parks	• 19.5 ac. ○ public adventure center, private amenity centers, private parks	• 20.0 ac. ○ public trailhead park, private amenity centers, public parks
Open Space	• 477 ac. (58% of site)	• 553 ac. (62% of site)
Cemetery Expansion Site	• 13.0 ac.	• 13.0 ac.
Municipal Recreation Center Site	• 12.0 ac.	• N/A, dedicated to City
Commercial	• 25.0 ac., not part of project ○ 150,000 sq. ft. of possible grocery, retail, restaurant, medical office uses	• 25.0 ac., part of project ○ 150,000 sq. ft. of possible grocery, retail, restaurant, office uses

Source: Sun Communities, 2022.

1.4 Impacts

This subsection includes a summary of the key impacts that would potentially result from construction and operation of the Revised Proposal and SEIS Alternative 6. **Table 1-2**, below**,** provides greater detail on the significant impacts of the SEIS Alternatives. Note that this summary information is not intended to be a substitute for the complete discussion of each element that is contained in **Chapter 3** (and the SEIS) and should not be relied on by readers to make judgements about the completeness or sufficiency of the discussion in the Addendum. Overall, differences between the Revised Proposal and SEIS Alternative 6 and their respective impacts are minor.

Summary of Key Impacts

The Addendum's conclusions about impacts of the Revised Proposal are highlighted below; note that impact comparisons are relative to SEIS Alternative 6.

Natural Environment

The Revised Proposal would result in:

- less grading and associated potential for erosion and sedimentation;

- no significant impacts to geologic hazards, mostly because development would be located outside of these areas (same as SEIS Alternative 6)
- less impervious surface area and potential for pollution and other impacts on surface and groundwater;
- no direct impacts to water resources, including the Cle Elum River and on-site wetlands and their buffers (same as SEIS Alternative 6);
- adequate water supply through existing water rights to serve the project (similar to SEIS Alternative 6); and
- a larger percentage of the site maintained in open space.

Land Use /Visual Change

The Revised Proposal would result in:

- conversion of a vacant, largely forested site to urban mixed-use development; this change is consistent with its location in the Cle Elum UGA and mixed-use zoning, and almost identical to SEIS Alternative 6;
- no significant land use conflicts considering the proposed layout of land uses, proposed open space and buffers incorporated into the site plan, and existing physical barriers within and adjacent to the site; overall, similar to SEIS Alternative 6;
- similar density/intensity of residential and commercial development;
- development of an RV resort, almost identical to SEIS Alternative 6;
- construction activities could be visible or noticeable from surrounding roadways but would occur over a shorter buildout period;
- views of on-site development and visual change would be limited or blocked by preserved vegetation and topography, similar to SEIS Alternative 6;
- new light sources occurring onsite, including the RV resort, particularly during the peak visitor season, similar to SEIS Alternative 6; and
- new light sources onsite that would be limited or obscured by preserved vegetation and topography and implementation of Dark Sky provisions, similar to SEIS Alternative 6.

Public Infrastructure, Services, & Facilities

The Revised Proposal would result in:

- slightly more additional permanent population than SEIS Alternative 6 but less than SEIS Alternative 5; the same temporary RV visitor population as Alternative 6;
- incrementally greater demand for public services and associated facilities (police, fire/EMS, emergency dispatch, hospitals, and schools) compared to SEIS Alternative 6 due primarily to an incrementally larger permanent population; as with SEIS Alternative 6, the RV visitor population would not impact schools; as with SEIS Alternative 6, mitigation agreements should be pursued with service providers to address probable deficiencies;
- similar reduction as for SEIS Alternative 6 in potential construction-related traffic impacts, such as the number of truck trips, due to the manufacturing of homes offsite and less grading/hauling);

- an increase in traffic volumes and congestion on area roadways requiring improvements to certain intersections (similar to SEIS Alternative 6); and
- demand for water, sewer and solid waste service, exceeding water and solid waste facility capacity (similar to SEIS Alternative 6).

Economic & Fiscal Conditions

The Revised Proposal would result in:

- an estimated 400 new permanent and seasonal employees at the commercial development and RV resort at full buildout of the Revised Project, similar to SEIS Alternative 6;
- an estimated cumulative net general revenue surplus of $2.7 million for the City of Cle Elum by year 2031 (buildout), plus a cumulative $5.3 million in restricted revenues; and
- as with SEIS Alternative 6, costs would exceed revenues for certain of the special districts if tax revenues alone are considered, but user charges, intergovernmental revenues or other sources comprise a substantial portion of special district revenues and have historically been scaled upward to balance costs; shortfalls would be addressed through mitigation agreements, where appropriate.

Table 1-2
IMPACT SUMMARY TABLE

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.0 EARTH		
• SEIS Alternative 5 would result in approximately 403 acres of clearing onsite. • SEIS Alternative 5 would require approximately 644,000 CY of cut and 420,000 CY of fill. • All on-site areas classified as erosion, steep slope, and landslide hazard areas would be located outside developed areas. Low risk of liquefaction during seismic events, as well as the risk of coal mine hazard and subsidence of underground mine workings.	• SEIS Alternative 6 would result in approximately 315 acres of clearing onsite. • SEIS Alternative 6 would require approximately 351,000 CY of cut and 310,000 CY of fill. • Impacts to geotechnical hazards (erosion, steep slope, landslide, seismic, and coal mine) would be similar.	• Impacts to earth, including geotechnical hazards, would be similar to or less than SEIS Alternative 6 and less than SEIS Alternative 5.
3.0 WATER QUANTITY & QUALITY		
• Clearing and grading operations could result in erosion and sedimentation of surface water runoff, and could also deliver fine sediments, accidental spills of petroleum products, and/or construction waste to the Cle Elum River by way of the underlying alluvial aquifer. • Sufficient water rights are available to serve SEIS Alternative 5, as well as full buildout of Suncadia, and significant impacts to water supply are not anticipated.	• Less potential for erosion and sedimentation, and other pollution of surface waters because there would be less clearing and development onsite. Temporary stormwater management would comply with current regulations. • Like SEIS Alternative 5, sufficient water rights are available to serve SEIS Alternative 6 and Suncadia. However, the fewer residential units and reduced commercial development that would result in less domestic water use.	• Impacts to water quality and quantity would be similar to or less than SEIS Alternative 6 and incrementally less than SEIS Alternative 5 due to less impervious surface area. • Sufficient water rights are available. Incrementally greater domestic water use than SEIS Alternative 6.
3.0 PLANTS, ANIMALS, & WETLANDS		
• A total of 524 acres (48% of the site) would be retained in largely forested open space under SEIS Alternative 5 • The 2020 SEIS identified a new wetland (Wetland 6). SEIS Alternative 5 site plan would impact Wetland 6 and its buffer. • SEIS Alternative 5 would result in the displacement of wildlife and wildlife habitat within development areas but would not substantially affect threatened, endangered, sensitive or priority wildlife species.	• A total of 477 acres (58% of the site) would be retained in largely forested open space under SEIS Alternative 6. • SEIS Alternative 6 would result in no direct impacts to wetlands and their buffers. • Like SEIS Alternative 5, SEIS Alternative 6 would result in displacement of wildlife and habitat, but would not substantially affect endangered, threatened, sensitive or priority wildlife species.	• A total of 553 acres (62% of the site) would be retained in open space under the Revised Proposal. • There would be no direct impacts to wetlands and their buffers. • Impacts to wildlife and habitat would be similar to or incrementally less than SEIS Alternatives 5 and 6.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.0 AIR QUALITY		
• Demolition and construction would generate dust and emissions from construction activities over the 30-year buildout. • Tailpipe emissions would be the major source of air pollution under SEIS Alternative 6. • SEIS Alternative 5 would generate approximately 44,753 metric tons of CO_2e per year by 2037 and 72,368 metric tons of CO_2e per year by 2051. The GHG emissions increase would be only a small fraction (0.04%) of total statewide annual GHG emissions and no single project emits enough GHG emissions to solely influence global climate change.	• Dust and other emissions would occur at a reduced level compared to SEIS Alternative 5 due to fewer residential units and a shorter buildout period. • Tailpipe emissions would be the major source of air pollutants but are anticipated to be less than SEIS Alternative 5. • SEIS Alternative 6 is estimated to generate less GHG emissions, 35,719 metric tons of CO_2e per year by 2037, and would represent a slightly smaller percentage of statewide annual GHG emissions.	• Air quality impacts would be similar to SEIS Alternative 6 and incrementally less than SEIS Alternative 5, primarily due to project traffic. • Tailpipe emissions would be the major source of air pollutants but are anticipated to be less than SEIS Alternative 5 and slightly more than SEIS Alternative 6. • The Revised proposal would generate less GHG emissions than SEIS Alternative 6, and a similar amount of emissions as SEIS Alternative 6.
NOISE		
• The primary source of operational noise would be vehicle traffic on local roadways. Increases in noise levels would range from one to four dBA (below WSDOT's threshold of 10 dBA). Noise levels exceeding WSDOT's threshold of 66 dBA were modeled to occur at two residential receivers and the existing cemetery. Residential and business park uses would also generate noise. • Temporary increases in noise from construction equipment and vehicle traffic and could result in temporary localized impacts to adjacent land uses.	• Vehicle traffic would be the primary source of noise; the differences in modeled noise between SEIS Alternative 6 and Alternative 5 would be negligible. Increases in noise from proposed land uses would be less than SEIS Alternative 5 due to less development. • Construction noise and any associated impacts on adjacent land uses would be less than SEIS Alternative 5 due to less onsite construction and faster buildout.	• Noise impacts would be similar to SEIS Alternative 6 and incrementally less than SEIS Alternative 5, primarily due to less project traffic.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.1 LAND USE		
• SEIS Alternative 5 would convert the existing undeveloped, largely forested site to a mix of intensive urban residential uses (1,334 housing units) and business park uses (950,000 sf). Development of 10 acres of commercial uses is also possible.	• SEIS Alternative 6 would convert the site to a mix of urban residential (707 housing units) and commercial uses (potential 150,000 sq. ft. on an adjacent site by a different owner) and an RV resort (627 sites); total development would be substantially less than SEIS Alternative 5.	• Total development would be incrementally greater than SEIS Alternative 6 and significantly less than SEIS Alternative 5. The Revised Proposal would include 50 additional residential units, the same number of RV sites, and the same amount of commercial development as SEIS Alternatives 6. Affordable units would be provided and dispersed on-site, compared to provision of land for future development for SEIS Alternative 5 or 6. Residential density would be similar to SEIS Alternative 6.
• Residential density would be 6.0 DU/acre.	• Residential density with 4.9 DU/acre, lower than SEIS Alternative 5.	• Residential density would be less than SEIS Alternative 5, and similar to SEIS Alternative 6.
• The site layout, open space/buffers, and existing physical barriers within and adjacent to the site under SEIS Alternative 5 would limit conflicts with adjacent land uses.	• Land use conflicts are not anticipated due to the proposed site layout, the amount and location of open space/buffers, and existing physical barriers within and adjacent to the site.	• Land use conflicts are not anticipated.
• New residents under SEIS Alternative 5 would create additional demand for goods and services, which could cause pressure for off-site commercial development.	• Compared to SEIS Alternative 5, the smaller permanent and seasonal population together would generate less demand for goods and services; potential development of commercial uses adjacent to the site would absorb some demand and diminish pressure for commercial development off-site. •	• The Revised Proposal would generate demand for goods and services, similar to SEIS Alternative 6 and less than SEIS Alternative 5.
3.1 RELATIONSHIP TO PLANS & POLICIES		
• Development under SEIS Alternative 5 would be generally consistent with relevant Washington State, Kittitas County, City of Cle Elum, and neighboring city/town (e.g., Roslyn, Ronald, South Cle Elum) plans, policies, and regulations.	• Development under SEIS Alternative 6 would be generally consistent with relevant Washington State, Kittitas County, City of Cle Elum, and neighboring city/town plans, policies, and regulations.	• Similar to SEIS Alternative 6, development under the Revised Proposal would be generally consistent with relevant plans, policies, and regulations.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.2 AESTHETICS/LIGHT & GLARE		
• The primary visual impact would be the conversion of forested area to residential neighborhoods and commercial uses. Vegetated buffers on the perimeter of the site would minimize visual impacts from surrounding areas. Development would be most visible from higher vantage points.	• Impacts would be similar to SEIS Alternative 5 in type but lesser in degree due to preservation of greater open space. The proposed site layout, preserved vegetated buffers, existing landforms, and distance to development would avoid or minimize visual impacts from surrounding areas. Development would be most visible from higher vantage points.	• Visual impacts under the Revised Proposal would be similar to SEIS Alternative 6 and less than SEIS Alternative 5.
• New light sources would be introduced to the site (including building and landscape lighting, and additional lights from vehicle traffic) and would increase the amount of visible light during the evening hours. Vegetated buffers and other mitigation (e.g., Dark Sky provisions) would minimize lighting impacts.	• New light sources would occur on the site but would be less than SEIS Alternative 5 due to less development. Vegetated buffers and other mitigation would minimize lighting impacts.	• Lighting impacts would be similar to SEIS Alternative 6 and less than SEIS Alternative 5.
3.3 HOUSING, POPULATION, & EMPLOYMENT		
• Under SEIS Alternative 5, the following approximate housing, population, and employment would be generated by buildout in 2051: – 1,334 housing units – 2,809 permanent residents – 1,900 employees (mostly from business park)	• Under SEIS Alternative 6, the following approximate housing, population, and employment would be generated by buildout in 2037: – 707 housing units – 1,489 residents – 400-425 employees – 627 RV sites and a conservative, hypothetical "proxy" population of 941 is used to estimate some types of impacts (see section 3.7).	• Under the Revised Proposal, the following approximate housing, population and employment would be generated by buildout: – 757 housing units – 1,579 residents – 400-425 employees – 627 RV sites; a conservative, hypothetical "proxy" population of 941 is used to estimate some types of impacts (see section 3.7).
• A 7.5-acre site would be set aside for dedication and future development of affordable housing by others under SEIS Alternative 5. The housing under SEIS Alternative 5 is expected to largely be market rate.	• An approximate 6.8-acre site would be set aside for development by others of future affordable housing. Based on preliminary estimates, housing would be financially accessible but would not be considered affordable to local residents earning 60% or less of area Median Household Income.	• 50 affordable housing units would be integrated and dispersed on-site with the Revised Proposal.
• Construction of SEIS Alternative 5 would occur through a combination of local and non-local construction which would result in some workers moving to the area temporarily and/or permanently. The largest demand for construction workers	• Demand for local construction workers would be less because housing would be constructed offsite and assembled onsite, and less overall development would occur onsite and be developed in a shorter period.	• Demand for local construction workers would be similar to SEIS Alternative 6 but less than SEIS Alternative 5 because housing would be manufactured off-site.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
would occur during the first five years of construction.		
3.4 HISTORIC & CULTURAL RESOURCES		
• 23 cultural resource sites were identified in the project area in the 2002 Cle Elum UGA EIS. Most of the sites are located in the lower third of the site that would be reserved for open space, while development would occur in the upper two thirds of the site. A conservation easement would also protect areas adjacent to the Cle Elum River.	• The same areas would be preserved in open space and protected by an easement.	• Identified resource sites would be contained in open space areas and protected by an easement.
• Potential impacts to known cultural resources under SEIS Alternative 5 are not expected to be significant because on-site archaeological sites identified in 2002 have since been determined to be not eligible for listing on the National Register of Historic Places (NRHP) or Washington Historic Register (WHR).	• Like SEIS Alternative 5, potential impacts to cultural resources are not expected to be significant because known archaeological sites that are located onsite have be determined to be not eligible for listing on the NRHP or WHR.	• Similar to SEIS Alternatives 5 and 6, potential impacts to cultural resources are not expected to be significant.
• Unidentified cultural resources could potentially be inadvertently impacted or destroyed with site development under SEIS Alternative 5.	• Like SEIS Alternative 5, unidentified cultural resources could be impacted or destroyed by site development under SEIS Alternative 6.	• Similar to SEIS Alternatives 5 and 6, unidentified cultural resources could be impacted by site development.
3.5 PARKS & RECREATION		
• Increased population under SEIS Alternative 5 would result in increased demand for park and recreation facilities in Cle Elum and the site vicinity. A range of recreational facilities would be provided onsite to help meet demand, including: parks, trails, a neighborhood clubhouse, lake, and two soccer fields.	• Demand for parks and recreation facilities would be less due to fewer permanent residents. Resort visitors to the RV resort would also contribute to increased demand but resort facilities would absorb a portion of demand. A range of recreational facilities would be provided onsite, including: parks, trails, an adventure center, and two recreation amenity centers. These facilities would meet or exceed Comprehensive Plan targets.	• The Revised Proposal would contain incrementally greater population and demand for parks and recreation facilities compared to SEIS Alternative 6, but less than SEIS Alternative 5. Onsite recreational facilities would be similar to SEIS Alternative 6 and would meet or exceed the Comprehensive Plan targets.
• During development of SEIS Alternative 5, non-local construction workers could choose to live in local RV campgrounds, which would reduce the number of sites available for recreational users.	• Less development overall and less on-site construction would reduce the potential for construction workers to live in local RV campgrounds.	• The potential for construction workers to live in local RV campgrounds would be less than SEIS Alternative 5 and similar to SEIS Alternative 6.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.6 TRANSPORTATION		
• SEIS Alternative 5 would result in temporary construction-related traffic impacts over the 30-year buildout period. Based on estimated grading, 200 to 400 trucks per month would be generated to haul grading materials.	• SEIS Alternative 6 would result in temporary construction-related traffic impacts over the 17-year buildout period. Based on estimated grading, including the commercial center, approximately 200 trips per month would be generated to haul grading materials.	• The temporary construction-related traffic and impacts of the Revised Proposal would be similar to SEIS Alternative 6 and less than SEIS Alternative 5 and would occur over a shorter (8-year) development period.
• SEIS Alternative 5 would generate 1,826 net new weekday trips at buildout.	• SEIS Alternative 6 would generate 1,225 net new weekday (Friday) trips at buildout and 13 fewer Sunday trips.	• The Revised Proposal would generate 1,302 net new weekday (Friday) trips at buildout and 26 additional Sunday trips.
• SEIS Alternative 5 would increase traffic volumes and congestion on area roadways; this is an unavoidable effect of urban development.	• Like SEIS Alternative 5, SEIS Alternative 6 would increase traffic volumes and congestion on area roadways.	• Like SEIS Alternatives 5 and 6, the Revised Proposal would increase traffic volumes and congestion on area roadways and intersections.
• The following study intersections are anticipated to operate at non-compliant LOS during the weekday summer PM peak hour by 2037 with future Baseline (without the project) conditions, and continue to operate at non-compliant LOS with SEIS Alternative 5: – #8 – Ranger Station Rd / Miller Ave / W 2nd Street (SR 903) – #11 – Douglas Munro Blvd / W 1st Street – #12 – N Pine Street / W 1st Street – #13 – N Stafford Ave / W 2nd Street (SR 903) – #15 – N Oakes Ave / W 2nd Street (SR 903)	• The same study intersections are anticipated to operate at non-compliant LOS during the weekday summer PM peak hour by 2037 with future Baseline conditions and would continue to operate at non-compliant LOS with SEIS Alternative 6.	• The same study intersections that operate at non-compliant LOS with future Baseline conditions would operate at non-compliant LOS with the Revised Proposal.
• The following study intersections are anticipated to operate at non-compliant LOS during the weekday summer PM peak hour by 2037 as a result of the additional traffic generated by SEIS Alternative 5: – #2 – Bullfrog Road / I-90 WB Ramps – #3 – Bullfrog Road / Tumble Creek – #7 – Denny Ave / W 2nd Street (SR 903) – #9 – N Pine Street / W 2nd Street (SR 903)	• The following study intersections are anticipated to operate at non-compliant LOS during the weekday summer PM peak hour by 2037 as a result of the additional traffic generated by SEIS Alternative 6: – #1 - Bullfrog Road / I 90 EB Ramps – #3 - Bullfrog Road / Tumble Creek – #7 - Denny Ave / W 2nd Street (SR 903) – #9 - N Pine Street / W 2nd Street (SR 903) – #15 - N Oakes Ave / W 2nd Street (SR 903)	• The same intersections that operate at non-compliant LOS during the summer weekday PM peak hour under SEIS Alternative 6 would also operate at non-compliant LOS with the Revised Proposal. The same intersections would operate at non-compliant LOS during summer Friday PM peak hour and summer Sunday PM peak hour with SEIS Alternative 6 and the Revised Proposal.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
– #15 – N Oakes Ave / W 2nd Street (SR 903) – #17 – Pennsylvania / 2nd Street – #21 – Pennsylvania Ave / N 1st Street (SR 903) in Roslyn – #30 – SR 903 / Site Access Connector Road Additional study intersections would operate at non-compliant LOS during the Friday and Sunday summer PM peak hour as a result of project traffic.	– #21 - Pennsylvania Ave / N 1st Street (SR 903) in Roslyn Additional study intersections would operate at non-compliant LOS during the Friday and Sunday summer PM peak hour as a result of project traffic.	
	• During the weekday summer PM peak hour, all evaluated roadway sections are anticipated to operate at compliant levels of service. • During the Friday summer PM peak hour, two evaluated roadway sections would operate at non-compliant levels of service: – W 2nd Street (SR 903) west of N Oakes Ave – W 2nd Street (SR 903) west of N Stafford Ave • During the Sunday summer PM peak hour, three evaluated roadway sections would operate at non-compliant levels of service: – I-90 Westbound Off-Ramp (Exit 84A) – W 2nd Street (SR 903) west of N Oakes Ave – W 2nd Street (SR 903) west of N Stafford Ave	• During the weekday summer PM peak hour, all evaluated roadway sections are anticipated to operate at compliant levels of service. • The Revised Proposal would result in the same non-compliant roadway sections during the Friday and Sunday summer PM peak hour as SEIS Alternative 6.
• Increased traffic volumes on area roadways from SEIS Alternative 5 could result in moderate increases in accident rates; however, no study intersections were identified as high accident locations.	• Like SEIS Alternative 5, traffic volumes on area roadways due to SEIS Alternative 6 could result in moderate increases in accident rates. No high accident locations were identified.	• Like SEIS Alternatives 5 and 6, traffic volumes on area roadways could result in moderate increases in accident rates. No high accident locations were identified.
• New trails and sidewalks (not quantified) would be provided throughout the site and would connect with off-site trails.	• Includes an approximate 6-mile network of non-motorized trails and sidewalks would connect with off-site trails.	• Includes an approximate 6-mile network of non-motorized trails and sidewalks.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
3.7 PUBLIC SERVICES		
• SEIS Alternative 5 population would generate demand for several public services: police, fire/emergency medical, medical dispatch, hospital, and schools. Effects would occur during the construction and operation phases.	• SEIS Alternative 6 would generate less demand for public services generally, due to fewer permanent residents, less commercial development, and a shorter buildout period.	• Demand for public services would be similar to SEIS Alternative 6 and less than SEIS Alternative 5.
• SEIS Alternative 5 population would generate the following approximate need for additional public services staff at buildout in 2051, based on the project's population[1] and de facto levels of services: – 8.9 police officers (City Police Dept.) – 1.8 paid full-time firefighters (City Fire Dept.) – 5.4 EMTs and 6.6 paramedics (Hospital Dist. No. 2 Medic 1) – 0.6 physicians, 4.8 APCs, and 3.6 RN (Hospital Dist. No. 2 clinics in Cle Elum) – 1.0 physicians, 0.2 APCs, and 6.0 RNs (Hospital Dist. No. 1 in Ellensburg) – 0.9 dispatchers (KITTCOM) – 25.4 teachers based on 376 additional students (Cle Elum – Roslyn School Dist.)	• SEIS Alternative 6 population would generate the following approximate need for additional public services staff at buildout in 2037, based on the project's population and de facto levels of service. (Refer to the updated discussion of de facto population- based service standards and estimated RV proxy population in Addendum Section 3.7.): – 7.7 police officers (City Police Dept.) – 1.6 paid full-time firefighters (City Fire Dept.) – 4.7 EMTs and 5.7 paramedics (Hospital Dist. No. 2 Medic 1) – 0.5 physicians, 4.2 APCs, and 3.1 RNs (Hospital Dist. No. 2 clinics in Cle Elum) – 0.9 physicians, 0.2 APCs, and 5.2 RNs (Hospital Dist. No. 1 in Ellensburg) – 0.8 dispatchers (KITTCOM) – 15.5 teachers based on 229 additional students (Cle Elum – Roslyn School Dist.)	• The Revised Proposal would generate the same or fractionally greater approximate need for public services staff at buildout, based on the project's population and de facto levels of service. (Refer to the updated discussion of de facto population-based service standards and estimated RV proxy population in Addendum Section 3.7): – 8.0 police officers (City Police Dept.) – 1.6 paid full-time firefighters (City Fire Dept.) – 4.9 EMTs and 5.9 paramedics (Hospital Dist. No. 2 Medic 1) – 0.5 physicians, 4.3 APCs, and 3.2 RNs (Hospital Dist. No. 2 clinics in Cle Elum) – 0.9 physicians, 0.2 APCs, and 5.3 RNs (Hospital Dist. No. 1 in Ellensburg) – 0.8 dispatchers (KITTCOM) – 15.8 teachers based on 234 additional students (Cle Elum– Roslyn School Dist.)
	• Alternative approaches to determining level of service are discussed in Section 3.7.	• Alternative approaches to determining level of service are discussed in Section 3.7.
3.8 UTILITIES		
• At buildout, average daily treated water demand would range from 0.31 to 0.50 MGD. The City Water System would require the following improvements to serve the project together with other approved/vested projects: – New filtration train in the Water Treatment Plant	• At buildout, average daily treated water demand would range from 0.17 to 0.36 MGD. The same improvements to the City Water System would be required as under SEIS Alternative 5.	• At buildout, average daily treated water demand under the Revised Proposal would range from 0.18 to 0.38 MGD. Improvements to the City Water System would be the same as for SEIS Alternatives 5 and 6.

[1] Assumes that all the residential units are primary homes.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
– New Zone 3 finished water pump – New Zone 3 reservoir storage		
• At buildout, monthly wastewater flow would range from 0.26 to 0.30 MGD. The City Wastewater Treatment Plant (WWTP) has adequate capacity to serve the project.	• At buildout, monthly wastewater flow would range from 0.21 to 0.23 MGD under SEIS Alternative 6. The City WWTP has adequate capacity to serve the project.	• At buildout, monthly wastewater flow would range from 0.20 to 0.24 MGD. The City WWTP has adequate capacity to serve the project.
• SEIS Alternative 5 would generate approximately 2,900 tons of solid waste per year at buildout. Improvements to the Cle Elum Transfer Station could be required.	• SEIS Alternative 6 would generate approximately 2,218 tons of solid waste per year at buildout. Improvements to the Cle Elum Transfer Station could be required.	• The Revised Proposal would generate approximately 2,343 tons of solid waste per year at buildout. Improvements to the Cle Elum Transfer Station could be required.
3.9 FISCAL & ECONOMIC CONDITIONS		
• Operational economic impacts of SEIS Alternative 5 would include increased employment opportunities, higher potential personal income, lower unemployment, and new business commerce.	• Operational economic impacts under SEIS Alternative 6 would be similar to SEIS Alternative 5 and are expected to be positive.	• Operational economic impacts would be similar to SEIS Alternative 6 and are expected to be positive.
• Development of SEIS Alternative 5 business park uses would increase permanent employment by approximately 1,900 new employees at full buildout.	• Development of SEIS Alternative 6 (including future commercial development and the RV resort) would result in approximately 400 new permanent and seasonal employees at full buildout.	• Development of the Revised Proposal would result in approximately 400 new permanent and seasonal employees from the commercial development and RV resort at buildout, similar to SEIS Alternative 6.
• SEIS Alternative 5 would net positive revenues to the City of Cle Elum over the course of the project and at full buildout.	• SEIS Alternative 6 would generate net positive revenues to the City, but fiscal surpluses would be lower than those with SEIS Alternative 5. The possible commercial development could generate small fiscal shortfalls in earlier years while the residential and RV resort could generate fiscal shortfalls post buildout.	• The Revised Proposal would generate net positive revenues to the City at buildout: $2.7 cumulative net surplus in general revenues and $5.3 million in restricted revenues. Fiscal surpluses would be lower than those with SEIS Alternative 5.
• Costs could exceed tax revenues for other public service purveyors However, the affected districts primary sources of revenues include charges for service, intergovernmental revenues, and/or other sources, and these revenues could be scaled-up to meet demand as they have historically. Mitigation may or may not be required.	• Costs could exceed tax revenues for other service purveyors under SEIS Alternative 6 if tax revenues alone are considered, similar to SEIS Alternative 5. However, the affected districts primary sources of revenue include charges for service, intergovernmental revenues and/or other sources, and these revenues could be scaled-up to meet demand as they have historically. Therefore,	• Costs could exceed tax revenues for other service purveyors under the Revised Proposal, similar to SEIS Alternatives 5 and 6. If tax revenues alone are considered However, the affected districts primary sources of revenue include charges for service and intergovernmental revenues, and these revenues could be scaled-up to meet demand as they have historically. Therefore, mitigation may or may not be required.

SEIS Alternative 5 (2002 Approved Master Plan)	SEIS Alternative 6 (2020 Proposal)	Revised Proposal (2023)
• Mitigation agreement with service providers would address potential shortfalls, as feasible.	mitigation may or may not be required. • Mitigation agreements would be executed with service providers to address potential shortfalls, as feasible. Monitoring provisions should be included to verify assumptions and estimates and to track actual demand, as appropriate.	• Mitigation agreements would be executed with service providers to address potential estimated shortfalls, as feasible. Monitoring provisions should be included to verify assumptions and estimates and to track actual demand, as appropriate.

1.4 Mitigation Measures

No new significant adverse impacts would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the *Final SEIS.* See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Earth

Required Mitigation Measures

- Infiltration facility setbacks from steep slopes would comply with requirements outlined in the 2019 Ecology Manual. Specifically, the 2019 Ecology Manual requires that infiltration ponds be set back from the top of a slope of 15% or steeper at a distance equal to or greater than the height of the slope. The 2019 Ecology Manual allows for lesser or greater setbacks where a comprehensive site assessment concludes that the alternate setback is justified based on the site conditions. Slopes in excess of 15% exist on the ~~adjacent 25-acre~~ commercial property ~~and on the municipal/community recreation center site~~. Siting of infiltration facilities in this area would consider the slope setback requirements of the 2019 Ecology Manual.

Water Quantity & Quality

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- Sufficient water rights are available from New Suncadia to supply water for proposed development of the 47° North site.~~ and the adjacent 25-acre property.~~

New Suncadia and Ecology signed an agreement in December 2015 regarding how they would use their water rights and their mitigation obligations, including putting water rights into Ecology's Trust Water Rights Program and transferring water rights to the City of Cle Elum. The transfer of water rights to the City is pending as of this writing.

Plants, Animals & Wetlands

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- With respect to overall fish and wildlife habitat, the project would include and be bound by those provisions in the Cooperative Agreement between Trendwest (now New Suncadia), Washington State Department of Fish and Wildlife (WDFW), and the Yakama Nation that apply to potential cumulative impacts from the Suncadia resort and development of the 47° North ~~and adjacent 25-acre property~~. Mitigation actions by others could include the City of Cle Elum enforcing use and access restrictions in designated areas, especially within the Cle Elum River open space, to minimize disturbance to fish and wildlife during mating and breeding seasons.

Air Quality/GHGs

Proposed Mitigation Measures (Included in the Project)

- Single family and some of the multi-family residences under ~~SEIS Alternative 6~~the Revised Proposal would consist of manufactured housing, which research has shown can result in reduced construction-related GHG emissions compared with stick-built houses.

Land Use

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres (58% of the site) should be retained in open space, including critical areas such as the Cle Elum River, wetlands, and steep slopes.~~ A total of approximately 553 acres of open space (62% of the site) would be part of the project, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way. Existing easements are in place to protect the River Corridor Open Space and Managed Open Space in the western portion of the site. These easements would be retained by New Suncadia or transferred to the Applicant (Sun Communities).

Required Mitigation Measures

- Development of the commercial center would maintain the 50-foot-wide platted buffer adjacent to the SR 903 right of way. ~~would be maintained with possible commercial development on the adjacent 25-acre property.~~

Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)

- Note: The Bullfrog Flats approval required conveyance of a useable area of 7.5 acres to the City of Cle Elum, or another public or non-profit entity approved by the City, for development of a minimum of 50 affordable housing units. The 50 housing units were not counted towards the 1,334-unit cap for the Bullfrog Flats project. The parcel or parcels were required to be identified and conveyed prior to approval of the 250th residential housing unit. The Revised Proposal includes development and dispersal of 50 affordable housing units within the project in lieu of dedication of land. The existing condition would be deleted or modified.

- Note: A current development condition applicable to the Bullfrog Flats site only permits small-scale retail uses that would serve the convenience needs of residents and employees to be included on the commercial site. Retail uses would be limited to 10% of the floor area of the commercial development, and no individual retail use would contain over 5,000 sq. ft. Primary entrance to the retail uses would not be allowed from SR 903 or Bullfrog Road. The approved Bullfrog Flats project also includes 75 acres/950,000 sq. ft. of business park uses. The Revised Proposal includes an approximate 150,000-square foot commercial center (retail, restaurant and office uses) on a 25-acre site with vehicle access from SR 903, and no business park uses. Approval would require modification or elimination of the current limitations.

Aesthetics

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres of the site would be preserved as open space, including natural open space, Managed Open Space, River Corridor Opens Space, wetlands and their buffers, and power line easements~~. A total of approximately 553 acres of open space, including undeveloped open space (including community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the amended Master Site Plan.

Required Mitigation Measures

- The 50-foot-wide platted buffer adjacent to the SR 903 right-of-way would be maintained in conjunction with proposed commercial development ~~on the adjacent 25-acre property~~. As feasible, and accounting for the need for signage, entry visibility, and similar design considerations, the existing forested vegetation in this area could be retained to partially screen the development and help maintain a natural, forested entry to the City of Cle Elum.

Housing, Population, & Employment

Proposed Mitigation Measures (Included in the Project)

- ~~The estimated monthly mortgage payment for the proposed single family housing could be affordable to city residents, based on 60% of the city's and county's 2018 Median Household Income (MHI) and dedication of 30% or less of a household's monthly gross income to housing and utilities. This affordable housing would be located onsite throughout the proposed residential development.~~ Note: Fifty (50) affordable housing units would be integrated into the multi-family portion of the development. These affordable housing units would be developed and maintained by Sun Communities, but it is assumed that they would be managed by a public or non-profit entity approved by the city.

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- ~~Access, water, and sewer would be constructed, consistent with development standards, up to the affordable housing parcel boundaries, as with every other parcel in the Master Site Plan.~~ Note: The Revised Proposal includes provision of affordable units by the Applicant in lieu of dedication of a site for future development of those units by others; the acreage shown in SEIS Alternatives 5 and 6 as being dedicated to the city for affordable housing development would be retained as undeveloped open space. The existing requirement would be duplicative of the proposal, therefore, and would be deleted or modified depending on the City Council's action on the Revised Proposal. It is also noted that the adopted Bullfrog Flats Development Agreement makes the city responsible for providing sewer and water to the affordable units; the Addendum identifies and evaluates the incremental demand for utilities associated with those units so impacts can be mitigated by the appropriate party.

- ~~Sun Communities, as successor to New Suncadia, would be given the option in a new or updated Development Agreement to assist in the selection process for potential owners/developers of the affordable housing parcel.~~ This condition is no longer relevant since the affordable housing would be integrated into the master plan's residential area and not located on a separate site.

- A minimum of 150 residential dwelling units, not including the 50 possible affordable housing units, would remain rental units and a covenant would be recorded on the property to ensure this condition continues for 20 years. Note: This requirement would be met by the Revised Proposal. All proposed 180 multi-family housing units would be leased/rented; some of the single family housing would be leased/rented as well. A covenant may or may not be recorded to ensure this condition.

Required Mitigation Measures

- A housing policy in the 2019 City Comprehensive Plan (H-1.9) requires that affordable housing be provided in projects with more than 20 units. The Revised Proposal would exceed this requirement by providing 50 affordable housing units in the multi-family area onsite.

Approved Bullfrog Flats Conditions of Approval Not Included in the Proposal

- ~~A useable area of 7.5 acres is required to be conveyed to the City of Cle Elum, or another public or non-profit entity approved by the city.~~ Note: Under the Revised Proposal, a separate area for affordable housing would not be conveyed to the city because this housing would be developed by the Applicant and integrated within the multi-family residential area onsite.

- The existing supply of affordable housing in Upper Kittitas County should periodically be monitored and inventoried, and as necessary advocated for, to help ensure that a continuous supply of housing is affordable for those earning the wages paid at the Suncadia resort. Note: This requirement does not appear to be necessary for the Revised Proposal given the reduced scale of housing and employment compared to the approved Bullfrog Flats project.

- The existing labor pool should be actively recruited, hired, and contracted with to minimize in-migration employment and associated housing impacts. Note: This condition may not be relevant to 47º North since construction labor demand would be considerably less than for Bullfrog Flats due to the inclusion of manufactured housing and its construction offsite.

Cultural Resources

Proposed Mitigation Measures (Included in the Project)

- ~~When the 25-acre property contemplated for future commercial use is proposed to be developed, a field investigation of the property should be conducted~~.

- The Applicant has voluntarily committed to pursue a Memorandum of Understanding (MOU) with the Yakama Nation regarding the protection of Cultural Resources on the 47º North project site. The Cultural Resources analyses in the SEIS and Addendum do not identify any direct impacts to resources located on the project site. In addition, the defined open space corridor adjacent to the Yakima River is subject to a pre-existing formal agreement that protects cultural and environmental resources within the defined open space. Notwithstanding these conclusions, the Applicant understands and appreciates that the Yakama Nation defines "cultural resources" more broadly than archaeological artifacts, and that this broader definition encompasses the larger context of historical activities and environmental conditions, and potential future indirect and

cumulative effects on soils, water, fish and wildlife from development. The Applicant, therefore, agrees to pursue an MOU with the Yakama Nation that will address the potential to monitor construction activity proximate to culturally sensitive areas of the site, will consider protocols to ensure ongoing protection of the site's environmental resources, and any other issues of mutual concern to the parties.

Required Mitigation Measures

- In the event that ground disturbing or other activities result in the inadvertent discovery of archaeological deposits, work would be halted in the immediate area and contact made with DAHP and Yakama Nation CRP. Work would be halted until such time as further investigation and appropriate consultation is concluded. See *Final SEIS* Appendix B for details on protocols for inadvertent discoveries.

Parks & Recreation

Proposed Mitigation Measures (Included in the Project)

- ~~A total of approximately 477 acres of open space, including the Natural, Managed, and River Corridor Open Space areas, perimeter buffers, wetlands and their buffers, and on-site power easements, should be included in the project~~. A total of approximately 553 acres of open space, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the project.

- ~~Three public trail parks totaling 1.5 acres and two Community Trail Parks totaling 1.0 acres should be provided.~~ A Trail Head Park totaling 6.0 acres, public trail parks totaling 2.0 acres, and private parks/pocket parks totaling 1.0 acres would be provided.

- ~~An approximate 6-acre adventure center open to residents and the public should be provided.~~

- ~~Two private recreational amenity centers totaling 11 acres should be provided, one in the RV resort and the other in the residential area.~~ Private recreational amenity centers totaling 11 acres would be provided in the RV resort and residential area.

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- A 12-acre parcel would be dedicated to the city for future construction of a municipal (community) recreation center. This requirement has been satisfied. The municipal recreation center site and funding have already been dedicated to the city and the site is not part of the site of the Revised Proposal.

Transportation

Overall, the significant adverse impacts on transportation that would occur from the Revised Proposal are consistent with those identified in the *Final SEIS*. Additionally, no new off-site mitigation measures are required for the Revised Proposal. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Table 1-3 identifies potential mitigation measures at the 11 study intersections that are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour conditions in 2025, 2031, or 2037 due to 'Baseline' conditions or the Revised Proposal project traffic. These are the same intersections that were forecast to operate at non-compliant levels with full buildout of SEIS Alternative 6 in the same years and peak period.

As in the Final SEIS, **Table 1-3** also identifies two different approaches to calculating pro-rata shares to fund the identified mitigating improvements. Method A (Solely Developer Responsibility) and Method B (Shared City/Developer Responsibility) are both presented. The alternative methodologies, which reflect different principles of engineering practice and SEPA policy, are discussed in greater detail in **Appendix C**. The pro-rata shares identified in **Table 1-3** have been updated to reflect the updated 'Baseline' traffic volumes at the six study intersections on Bullfrog Road, the updated trip generation of the Revised Proposal, and incorporation of the commercial parcel into the project.

As described in the Final SEIS, the specific form of mitigation, the pro-rata share cost of the mitigation, and the timing of the improvements will be evaluated and discussed by the Applicant, the city, and affected agencies and jurisdictions, including WSDOT, Kittitas County, and the City of Roslyn. The selected mitigation improvement for each affected intersection, pro-rata share methodology, and timing of the mitigation will be incorporated into conditions of approval and a new or updated Development Agreement between the Applicant and the City of Cle Elum. Improvement needs and mitigation will also be addressed in subsequent updates to the appropriate jurisdiction's transportation plans and capital improvement programs.

Table 1-3
SUMMARY OF MITIGATION MEASURES AND PRELIMINARY ESTIMATED PRO-RATA SHARE – REVISED PROPOSAL

Off-Site Study Intersection	Estimated Year Improvement Required (Forecast LOS)	Potential Improvement to Mitigate Weekday PM Peak Hour LOS Deficiency [1]	Estimated Pro-Rata Share			
			METHOD A [2]		METHOD B [2]	
			Background Share [3]	47° North Share (Revised Proposal)	Background Share [3]	47° North Share (Revised Proposal)
IMPROVEMENTS NEEDED FOR '"BASELINE"'/BACKGROUND CONDITIONS						
#2 – Bullfrog Road / I-90 WB Ramps [5, 6]	2037 (LOS D)	Compact Roundabout	n/a	n/a	82.9%	17.1%
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903)	2025 (LOS E)	Restrict Northbound and Southbound Left-Turns	68.7%	31.3%	68.7%	31.3%
#11 – Douglas Munro Blvd / W 1st Street	2025 (LOS E)	Signalization[9]	94.4%	5.6%	94.4%	5.6%
#12 – N Pine St / W 1st Street	2025 (LOS D)	Compact Roundabout	95.5%	4.5%	95.5%	4.5%
#13 – N Stafford Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout [10]	74.7%	25.3%	74.7%	25.3%
IMPROVEMENTS NEEDED FOR CONDITIONS WITH REVISED PROPOSAL [4]						
By Year 2025:						
#7 – Denny Ave / W 2nd Street (SR 903) [7]	2025 (LOS D)	Restrict Northbound Left/ Southbound-Left Turns	n/a	100%	64.1%	33.9%
#9 – N Pine Street / W 2nd Street (SR 903)	2025 (LOS F)	Compact Roundabout	n/a	100%	69.9%	30.1%
#15 – N Oakes Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout	n/a	100%	78.4%	21.6%
By Year 2031:						
#1 – Bullfrog Road / I-90 EB Ramps	2031 (LOS F)	Compact Roundabout	n/a	100%	77.2%	22.8%
#3 – Bullfrog Road / Tumble Creek Dr [6]	2031 (LOS F)	Refuge/merge lane on Bullfrog Rd	n/a	100%	78.0%	22.0%
#21 – Pennsylvania Ave / 1st Street (SR 903)	2031 (LOS E)	All-Way Stop	n/a	100%	84.9%	15.1%
By Year 2037: [5]						
N/A[8]	--	--	--	--	--	--

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; LOS results with mitigation are included in **Table 3.7-6**. WSDOT preference is a roundabout which is assumed unless identified otherwise.
[2] Estimated pro-rata share for 47° North is preliminary and will be adjusted based on a future Monitoring Program. The pro-rata share for Method A would be the full responsibility of 47° North for any improvements needed with the Revised Proposal. The pro-rata share for Method B would be shared between the background traffic and the Revised Proposal project traffic.
[3] Share of future traffic volumes associated with 'Baseline'/background traffic growth, excluding Revised Proposal.
[4] Mitigation not triggered by 'Baseline' conditions but triggered by traffic generated by Revised Proposal.
[5] The Revised Proposal is anticipated to be built out by 2031. Thus, the pro-rata share for Method A would not be applicable for intersection #2 which is estimated to be non-compliant in 2037 under the 'Baseline' scenario.
[6] Non-compliant by Year 2037 with SEIS Alternative 6 in the *Final SEIS*.
[7] Reported as non-compliant by Year 2031 with SEIS Alternative 6 in the *Final SEIS*.
[8] No additional intersections would operate at non-compliant levels of service by 2037 with the Revised Proposal.
[9] The City has plans to install a traffic signal at intersection #11.
[10] The City has plans to install a compact roundabout at intersection #13.

To assist in identifying the type of appropriate improvements for study intersections that require mitigation and are within WSDOT's jurisdiction (i.e., SR 903 and Bullfrog Road at I-90 interchange), Intersection Control Evaluations (ICE) have been performed and technical reports have been submitted to WSDOT. Criteria addressed in the ICE documents include LOS operations, safety, right-of-way acquisition, engineering criteria and feasibility, and context for sustainable design. WSDOT has stated its preference for construction of compact roundabouts rather than traffic signals on SR 903.

Mitigation Measures for 'Baseline' Conditions

As shown in **Table 1-3** five study intersections are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour 'Baseline' conditions (without the Revised Proposal). The City of Cle Elum has recently received grant funding to install a full traffic signal at study intersection #11 (Douglas Munro Boulevard /W 1st Street) and a compact roundabout at intersection #13 (N Stafford Avenue / W 2nd Street (SR 903)). However, no improvements are currently identified at the other three study intersections by the City of Cle Elum or WSDOT.

Potential improvements to mitigate non-compliant LOS at the other three study intersections under future weekday summer PM peak hour 'Baseline' conditions are identified in **Table 1-3** and include a compact (single-lane) roundabout or left-turn restrictions.

For the five intersections where improvements would be needed based on forecast 'Baseline' conditions, the 47° North project would contribute a pro-rata share towards intersection improvements because some additional traffic would be added by the project even though it would not trigger the improvement.

Mitigation Measures for Revised Proposal

As shown in **Table 1-3**, six study intersections are anticipated to operate at a non-compliant LOS due to the Revised Proposal in either 2025, 2031, or 2037 during the summer weekday PM peak hour in addition to those that are non-compliant in the Baseline (without project) condition.

Potential improvements to mitigate non-compliant LOS at the six study intersections under future weekday summer PM peak hour conditions with the Revised Proposal are identified in **Table 1-3** and include a compact (single-lane) roundabout, all-way stop control, roadway widening to add refuge/merge lanes, or left-turn restrictions.

The 47° North project would complete the intersection improvements or contribute a pro-rata share.

Mitigation Measures Identified in the SEIS Addendum vs in the Final SEIS

The Final SEIS identified the same 11 off-site study intersections included in **Table 1-3** that are forecast to operate at non-compliant LOS in future years 2025, 2031, or 2037 without or with full buildout of 47° North during the weekday summer PM peak hour.

The key differences between **Table 1-3** and the Final SEIS are:

- #2 – Bullfrog Road / I-90 WB Ramps is anticipated to operate at a non-compliant LOS under future 2037 'Baseline' conditions instead of with SEIS Alternative 6 conditions.
- #3 – Bullfrog Road / Tumble Creek Drive is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2025 instead of 2031.
- #7 – Denny Avenue / W 2nd Street (SR 903) is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2031 instead of 2037.

Intersection LOS with Mitigation

To test the effectiveness of identified improvements, intersection LOS was evaluated with implementation of potential improvements identified in the updated analysis. These improvements would mitigate the 11 study intersections and two site access intersections that are anticipated to operate at non-compliant LOS under future weekday summer PM peak hour conditions. LOS analysis results for weekday, Friday, and Sunday summer PM peak hour conditions in 2031 with the Revised Proposal are summarized in **Table 1-4**.

As shown in **Table 1-4**, the potential improvements identified at the 11 off-site study intersections and two site access intersections are expected to improve conditions to compliant LOS at all intersections during the weekday and Friday summer PM peak hours. During the Sunday summer PM peak hour, the potential improvements are expected to improve conditions to compliant levels of service at the majority of intersections, with the following exceptions:

- #7 – Denny Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #8 – Ranger Station Road / Miller Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #9 – N Pine Street / W 2nd Street (SR 903): as a compact roundabout, the off-site intersection is anticipated to operate at LOS E under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #30 – SR 903 / Main Access Road: as a compact roundabout, the site access intersection is anticipated to operate at LOS F under the Revised Proposal in 2031 during the Sunday summer PM peak hour.

Table 1-4
FUTURE YEAR INTERSECTION LOS SUMMARY WITH MITIGATION – REVISED PROPOSAL

Location	Potential Improvement to Mitigate Weekday LOS Deficiency [1]	Weekday PM Peak Hour				Friday PM Peak Hour				Sunday PM Peak Hour			
		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation	
		Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]
Off-Site Study Intersection:													
#1 – Bullfrog Road / I-90 EB Ramps [6]	Compact Roundabout	2031	Project	A	9.6	2025	Project	B	11.7	2037	Project	A	9.1
#2 – Bullfrog Road / I-90 WB Ramps [5, 6, 7]	Compact Roundabout	2037	'Baseline'	A	5.4	2031	'Baseline'	A	8.6	2037	Project	A	5.2
#3 – Bullfrog Road / Tumble Creek Dr [7]	Refuge/merge lane on Bullfrog Rd	2031	Project	C	20.1	2037	Project	C	18.6	2031	Project	D	34.5
#7 – Denny Ave / W 2nd Street (SR 903) [6, 8]	Restrict Northbound Left/ Southbound-Left Turns	2025	Project	C	16.1	2025	Project	C	18.7	2025	Project	**D**	**28.5**
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903) [6]	Restrict Northbound Left/ Southbound-Left Turns	2025	'Baseline'	C	18.8	2025	'Baseline'	C	22.5	2025	'Baseline'	**D**	**26.2**
#9 – N Pine Street / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	7.7	2025	Project	B	11.5	2025	'Baseline'	**E**	**56.6**
#11 – Douglas Munro Blvd / W 1st Street	Signalization[3]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#12 – N Pine St / W 1st Street	Compact Roundabout	2025	'Baseline'	A	7.4	2025	'Baseline'	A	8.1	2025	'Baseline'	A	7.6
#13 – N Stafford Ave / W 2nd Street (SR 903) [6]	Compact Roundabout [4]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#15 – N Oakes Ave / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	3.7	2025	Project	A	3.9	2025	'Baseline'	A	5.9
#21 – Pennsylvania Ave / 1st Street (SR 903) [6]	All-Way Stop	2031	Project	C	20.5	2031	Project	C	22.5	2031	Project	B	14.5
Site Access:													
#28 – Bullfrog Road / RV Access Road	Compact Roundabout	2031	Project	A	10.0	2031	Project	C	19.6	2025	Project	D	31.8
#30 – SR 903 / Main Access Road	Compact Roundabout	2025	Project	B	17.3	2025	Project	C	32.8	2025	Project	**F**	**>100**

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; WSDOT preference is a roundabout which is assumed unless identified otherwise; DASHES indicate LOS was not evaluated because improvements are funded and planned by the City.

[2] LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard.

[3] The City has plans to install a traffic signal at intersection #11.

[4] The City has plans to install a compact roundabout at intersection #13.

Site Access Mitigation Measures

The Revised Proposal would include new on-site roadways and intersections at its two access points with Bullfrog Road and its single access onto SR 903 (public roads). All on-site roads would be private and would be constructed and maintained by 47º North. The facilities would be constructed to City of Cle Elum standards, or standards that may be included in a new or updated Development Agreement. The Revised Proposal would also ensure that design of the new on-site roadways meets minimum requirements for emergency vehicle access and school bus access.

Based on the results of the weekday PM peak hour LOS analysis documented in Table 3.6-2 in **Appendix C** and the forecast LOS with proposed mitigation at the site access documented in **Table 1-4**, the traffic control at the new 47° North site access points on Bullfrog Road and SR 903 is proposed as follows:

- **#28 – Bullfrog Road / RV Access Road:** Proposed mitigation is a compact (single-lane) roundabout. (Note that this intersection was reported to operate at a compliant level of service in the Final SEIS*,* thus this is a new mitigation measure.)
- **#29 – Bullfrog Road / Main Access Road:** is anticipated to operate at complaint LOS during the weekday summer PM peak hour in 2025 and 2031 with the Revised Proposal as a side street stop-controlled intersection with the Main Access Road being stop-controlled.
- **#30 - SR 903 / Main Access Road:** Proposed mitigation is a compact (single-lane) roundabout.

Other Mitigation Measures

Other mitigation measures related to traffic monitoring, construction management program, and trail system and sidewalks still apply with the Revised Proposal and are consistent with mitigation measures in the *Final SEIS.* A complete list of mitigation measures is included in **Appendix F.**

Public Services

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- Mitigation measures for each public service provider would include execution of a separate mitigation agreement, where feasible, and a program to monitor actual calls for service, actual revenues and expenses, for affected providers. The program would, to the maximum extent possible, strive to time expenditures to when revenues are available and strive to time capital expenditures to when the jurisdiction has sufficient capacity to issue bonds for the improvements and sufficient tax revenue to service the debt. The program would also rely on shortfall mitigation payments to address any identified fiscal impacts, where applicable.

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- Monitoring would track the number of service calls to affected providers at reasonable intervals to allow comparisons of actual and estimated calls and impacts. Any mitigation requirements would be adjusted accordingly to reflect actual impacts. Outreach and coordination between the Applicant and affected service providers is underway and is anticipated to result in mitigation agreements that will address impacts that are attributable to the Revised Proposal. Executed agreements will be included in a new or updated Development Agreement, if available.

- Site development would follow the Land Stewardship Plan (LSP) that is used for Suncadia, which includes provisions for fire-wising (e.g., thinning small trees, cutting limbs, raking debris and other fuel-reduction techniques to help prevent fires) during operation of the project. The LSP would be reviewed and updated, as necessary.

Required Mitigation Measures

- Roadway design would conform with applicable requirements for vehicular access, including roadway width, adequate turning radius, fire hydrant access, provisions for vehicle back up, and weight bearing capacity to provide adequate emergency access to site.

- A secondary access would be provided when more than 30 single- or multi-family units are built, in accordance with the International Fire Code (IFC) to provide emergency access to the site.

Utilities

Required Mitigation Measures

Solid Waste

- ~~The Applicant would contribute a pro-rata share to construct improvements to the solid waste transfer station, consistent with the Kittitas County Solid Waste Management Plan (SWMP) Amendment for the Trendwest (now New Suncadia) Master Plan Resort and UGA (November 2000). The Applicant would handle all construction debris, separate re-cyclable materials, and otherwise handle all of its solid waste and household hazardous waste consistent with the requirement for such handling in the Kittitas SWMP. The same requirements would apply to the adjacent commercial development property, based on pro-rata share.~~ Kittitas County Solid Waste will be consulted to determine the basis for any mitigation requirement and whether the 47° North development is responsible to mitigate impacts, and for its proportional contribution to improvements to the Cle Elum Transfer Station and the Ryegrass Landfill. Kittitas County supports its solid waste program through tipping fees (91%) and grants; project-based mitigation may not be applicable.

Fiscal Condition

No new, significant or materially different fiscal impacts would occur from the Revised Proposal and no additional mitigation measures are recommended.

The mitigation measure identified below is updated to provide additional considerations relating to fiscal monitoring; monitoring was recommended in the Final SEIS and would similarly apply to the Revised Proposal.

City of Cle Elum

- The fiscal monitoring consultant will need the following information to assure that all taxes due to the city are properly reported and collected:
    - **Property Taxes**. The consultant will need information from the county assessor that detail new construction value and assessed value for all 47° North tax parcels.
    - **Sales Taxes.** The city will have to work with the Washington State Department of Revenue to request individual tax reports for businesses and households. If these data are not available to the fiscal monitoring consultant due to data privacy restrictions, the consultant will have to work with publicly available retail sales data to apportion city receipts to 47° North.
    - **Utility Taxes.** Due to the mix of utility providers, the consultant will have to work with publicly available utility tax data to apportion city receipts to 47° North.
    - **Real Estate Excise Taxes.** The consultant will need information from the county assessor to summarize real estate transactions within 47° North.

Other Service Purveyors

- The Applicant should, and has committed to, pursue mitigation agreements with the affected service providers to address fiscal impacts, if any, resulting from increased service demands attributable to the Revised Proposal.

Chapter 2
DESCRIPTION OF THE REVISED PROPOSAL

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DESCRIPTION OF THE REVISED PROPOSAL

2.1 Background

Introduction

The *47° North Revised Master Site Plan Amendment Proposal* (Revised Proposal) is based on pre-application discussions and information and the revised formal application prepared by Sun Communities. The Revised Proposal incorporates some focused revisions to the project that was previously evaluated in the 2020/2021 SEIS. The principal features of the Revised Proposal include:

- 757 residential units, including 50 affordable housing units that are integrated into the project being developed by Sun Communities;
- 627 Recreational Vehicle (RV) sites:
- a150,000-square foot commercial center that is integrated into the project being developed by Sun Communities
- 553 acres of open space;
- private amenity centers and other recreational facilities, and public and private parks; and
- a 13.4-acre expansion of the Cle Elum Cemetery.

Approved Bullfrog Flats Master Site Plan & Development Agreement

The Master Site Plan approved for the 1,100-acre Bullfrog Flats property in 2002 provided for the construction of 1,334 dwelling units (including 810 single family units and 524 multi-family units), a 75-acre/950,000-square foot business park (including a limited amount of small-scale retail use), and 524 acres of open space. It also provided for the dedication of several properties for public uses including:

- 35 acres for expansion of the Cle-Elum Roslyn school site;
- 12 acres for expansion of the city water treatment plant;
- 12 acres for a municipal (community) recreation center;
- 10 acres for expansion of the Cle Elum Cemetery; and
- 7.5 acres for the construction of 50 affordable housing units.

The Bullfrog Flats Master Site Plan was approved by the city in 2002 subject to numerous development conditions. Approval followed review pursuant to SEPA and preparation of an EIS for the Cle Elum Urban Growth Area (UGA), annexation, and adoption of Planned Mixed Use zoning for the property. A Development Agreement between the city and New Suncadia, also adopted in 2002, details the obligations of both parties and specifies the standards and conditions that will govern development of the property.

Other than the dedication of properties to the School District and the city in the early 2000s, and approval by the city of a Short Plat in 2007, no actions had been taken to implement the approved Master Site Plan until recent activities relating to the sale of the property.

47° North Master Site Plan Amendment & SEPA Review

In 2019, New Suncadia informed the city that they had entered into an agreement to potentially sell approximately 824 acres of the Bullfrog Flats site to Sun Communities, while retaining ownership of approximately 25 acres of the property for future development of a commercial center. Sun Communities indicated that they would be proposing revisions to the approved Master Site Plan to reduce the number of residential units and to add a Recreational Vehicle (RV) resort component. They renamed the planned project "47° North".

Based on initial project information submitted to the City of Cle Elum, the city concluded that the proposed revisions to the approved Master Site Plan would constitute a "major amendment", as that term is defined in the Development Agreement. As lead agency pursuant to the State Environmental Policy Act (SEPA), the city determined that a Supplemental Environmental Impact Statement (SEIS) should be prepared to update the 2002 Cle Elum UGA EIS, as necessary, to reflect the changes that have occurred since the original approval and to evaluate the proposed revisions to the project. The 47° North Master Site Plan Amendment Draft SEIS was published in September 2020, and the Final EIS in April 2021. Two alternatives were analyzed in the SEIS: SEIS Alternative 5 – Approved Bullfrog Flats Master Site Plan (No Action), which was updated to reflect current background conditions; and SEIS Alternative 6 – Proposed 47° North Master Site Plan Amendment. Fifteen elements of the environment were evaluated in the SEIS.

In December 2021, Sun Communities acquired all 889 acres of the Bullfrog UGA properties from New Suncadia, including the 25 acres that New Suncadia had intended to develop as a commercial center. In February 2022, the Cle Elum City Council gave its consent to the transfer of the rights, responsibilities, and obligations under the Bullfrog UGA Development Agreement to Sun Communities. Sun Communities is now preparing to submit a revised application to modify the approved Master Site Plan which incorporates some focused revisions to the project that was evaluated in the SEIS. Because the revised application could possibly result in some impacts that were not identified in the SEIS, the city has determined that the project revisions will require further SEPA review.

To make an appropriate determination, the city reviewed the nature and extent of the likely revisions to the proposal communicated by Sun Communities, the type and magnitude of anticipated impacts, and the analysis contained in the SEIS. Based on this review, the city concluded that an Addendum to the SEIS is an appropriate SEPA document to use to evaluate impacts associated with the Revised Proposal. Per WAC 197-11-600(4)(c), an Addendum is appropriate when a proposal has been modified, but the changes would not

result in probable significant adverse impacts that are not within the range of impacts and alternatives analyzed in an existing environmental document. As noted in the Introduction to this Addendum, the city has reviewed the prior SEIS and determined that it is directly relevant to the present proposal; pursuant to WAC 197-11-600(4)(a) and 197-11-630, therefore, the city is adopting the SEIS for purposes of environmental review for the Revised Proposal and providing additional information about impacts in this Addendum. Although the SEPA Rules do not require a comment period for an Addendum, the city has decided to make it available for public review and comment.

Following is a detailed description of the *47° North Revised Master Site Plan Amendment Proposal*. The Revised Proposal is compared to SEIS Alternative 6.

2.2 Project Location

The 47° North property is located in the southwestern portion of the City of Cle Elum, generally bounded by I-90, Bullfrog Road, SR 903, and the city cemetery (see **Figure 2-1**, Regional Map, and **Figure 2-2**, Vicinity Map).

The Revised Proposal site is approximately 889 acres in size, about 65 acres larger than the site under SEIS Alternative 6 (and 211 acres smaller than the approved 2002 Bullfrog Master Plan site). The difference in site area under the Revised Proposal, compared to SEIS Alternative 6, is due to the addition of the commercial property to the eastern part, addition of open space to the southern part of the site, and removal of the municipal recreation center property from the northern part and a road dedication from the southern part of the site (see **Figure 2-3**, Boundary Map – Revised Proposal)

2.3 Revised Proposal

Overview

Sun Communities' stated vision for 47° North is to provide housing that is financially accessible for both local and public service employees, and an RV resort component that will incorporate high development and infrastructure standards. The vision for 47° North will be guided by the revised Master Site Plan and will be implemented based on project-specific conditions of approval, a revised Development Agreement, and site-specific development permits approved by City of Cle Elum.

The Proposed Actions and approvals for the Revised 47° North Project continue to include:

- Major Amendment to the Bullfrog Flats Master Site Plan (City of Cle Elum);
- Revised Development Agreement between the city and the Applicant;
- Subdivision and/or Boundary Line Adjustment approvals (City of Cle Elum); and
- Local, state, and federal permit approvals required for construction and development of the project.

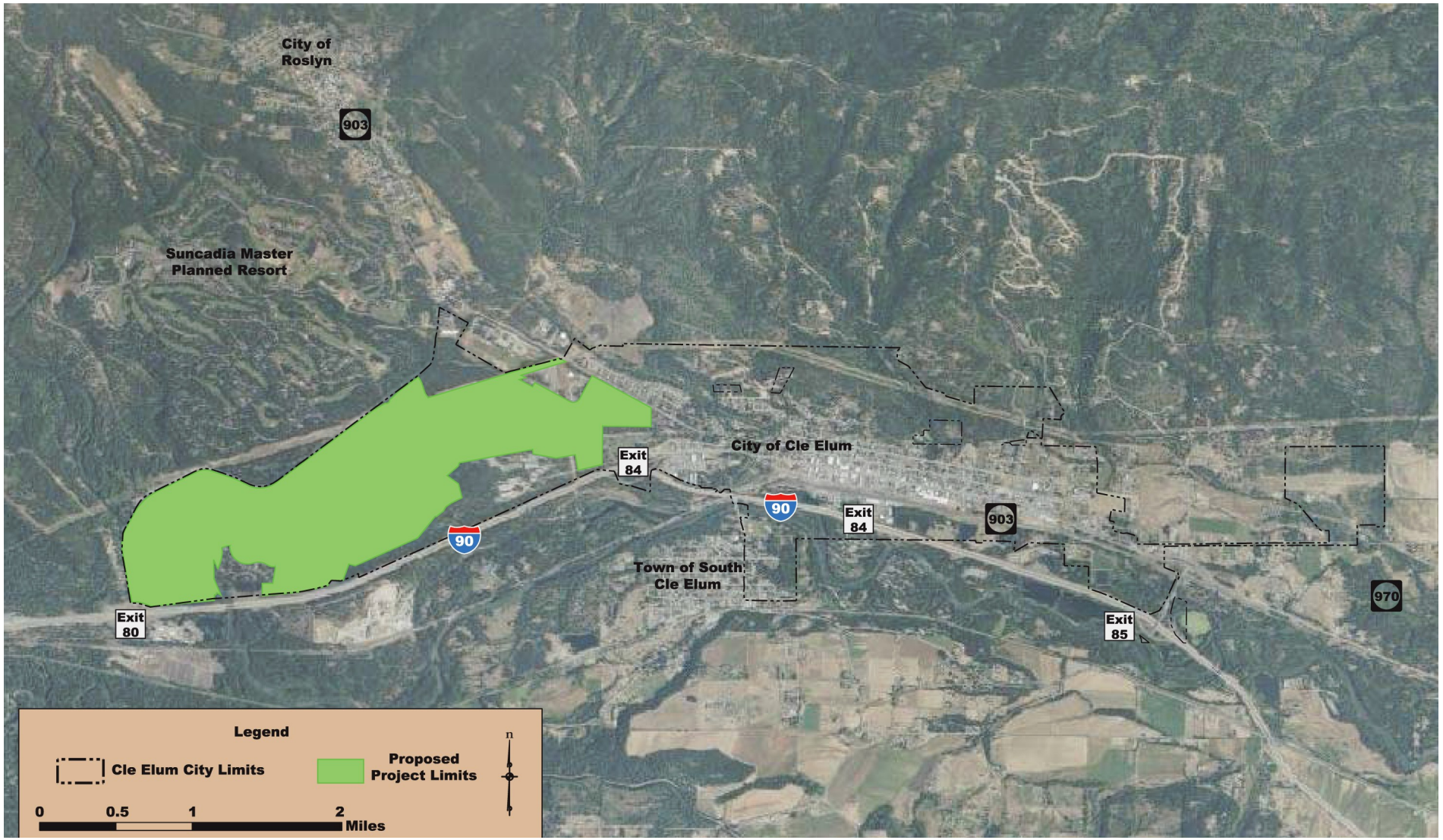
Note: This figure is not to scale

North

Source: Google Maps and EA Engineering, 2020.

Figure 2-1
Regional Map

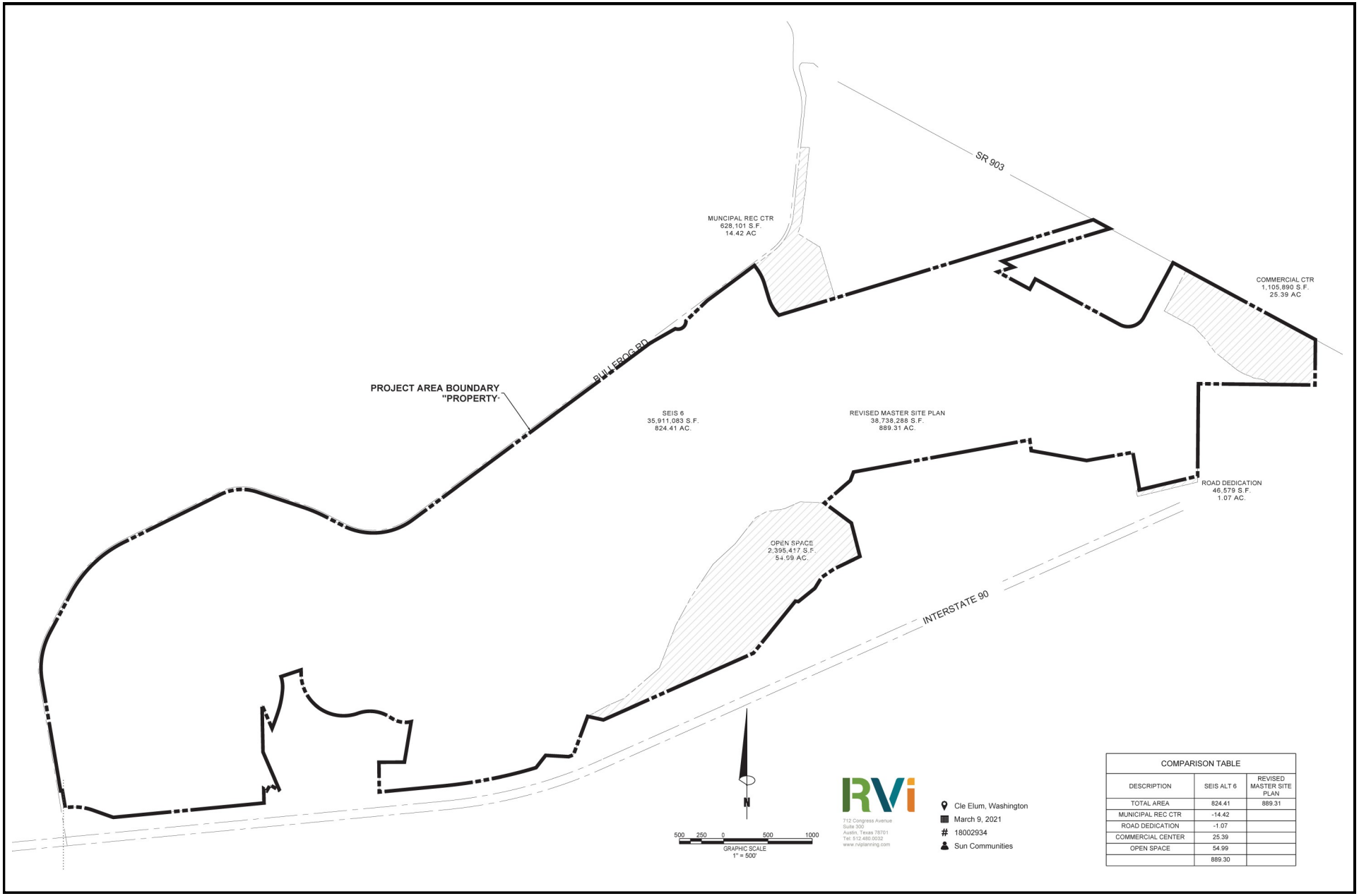
EA Engineering, Science, and Technology, Inc., PBC



Source: ESM Consulting Engineers, 2023.

Figure 2-2
Vicinity Map

EA Engineering, Science, and Technology, Inc., PBC



Source: Atwell, LLC.

EA Engineering, Science, and Technology, Inc., PBC

H-03

Figure 2-3

Site Boundary Map

Proposed Development

The Revised Proposal incorporates the Applicant's proposed revisions to the approved Bullfrog Flats Master Site Plan. It features development of a mix of residential, RV resort, commercial, and open space/recreational uses on the 889-acre site (see **Table 2-1** and **Figure 2-4**, Master Site Plan – Revised Proposal). Key changes to the Revised Proposal compared to SEIS Alternatives 6 include:

- inclusion of 50 affordable housing units, dispersed in the project's multi-family areas. It was previously assumed that environmental review for the development of these units would occur separately;
- inclusion of the 25-acre commercial property in the project and development of a mix of retail, restaurant, and office uses as part of the master plan. This use was previously evaluated as a separate project that would be developed in the future by a different property owner;
- removal of the 12-acres dedicated to the city for a municipal recreation center from the master plan site. The City of Cle Elum and New Suncadia implemented an agreement that provided for transfer of title to the recreation center site and provided payments to support construction of a facility. Therefore, the municipal recreation center property is not part of Revised Proposal. Separate environmental review will be conducted by the city as development plans are prepared;
- addition of approximately 55 acres of undeveloped open space that was formerly categorized as Reserve area under SEIS Alternative 5 (this area was not within the SEIS Alternative 6 site area); and
- a different development phasing plan with anticipated buildout of all land uses by 2031.

Residential Uses

Single Family

Construction of the proposed single family housing is scheduled to begin in 2023 and be completed in 2028 (see the *Development Schedule* later in this Project Description for details). A total of 527 single family residential units would be developed on 116.7 acres[1] in the eastern portion of the site, the same number of units on less area than under SEIS Alternative 6 (see **Table 2-1** and **Figure 2-4)**. The single family neighborhoods would be in the same general locations as under SEIS Alternative 6. However, the single family neighborhood to the southwest of the commercial center under SEIS Alternative 6 would become multi-family housing under the Revised Proposal. The single family residential units would be situated on approximately 5,500 to 7,000-square foot lots. At buildout, the net density in the single family area would be 6.4 dwelling units/acre, slightly more dense than SEIS Alternative 6.[2]

[1] The 116.7 acres represents gross acreage.

[2] Net density is calculated based on net acreage, calculated as gross acreage with a 25% allowance for roads and utility rights of way.

Table 2-1
LAND USE SUMMARY COMPARISON –
SEIS ALTERNATIVE 6 & REVISED PROPOSAL

	SEIS Alternative 6		Revised Proposal	
	Acres	**Units**	**Acres**	**Units**
Residential Uses				
Single Family	124.7	527	116.7	527
Multi-Family	18.6	180	28.2	180
Affordable Housing	6.8	---[1]	---[2]	50[3]
Subtotal	**150.1**	**707**	**144.9**	**757[3]**
Non-Residential Uses				
RV Resort Sites & Amenity Ctr./Community Park[4]	150.5	627	130.8	627
Residential Amenity Centers[5]	6.0		6.0	
Trail Head Park	6.0[6]		6.0	
Commercial Center	(25.4)[7]		25.4[8]	
Subtotal	**162.5**	**627**	**168.3**	**627**
Other Uses				
Municipal Recreation Center Site	12.2		---[9]	
Cemetery Expansion Site	13.4		13.4	
Connector Road	9.5		9.5	
Subtotal	**35.1**		**22.9**	
Open Space				
Undeveloped Open Space[10]	436.1		513.7[11]	
Wetlands/Buffers	3.4		3.4	
Power ROW	37.2		36.1	
Subtotal	**476.7**		**553.2**	
TOTAL	**824.4**	**1,334**	**889.3**	**1,384[3]**

Source: Sun Communities, 2020 and 2022.

Note: any mathematical discrepancies are due to rounding.

[1] A 6.8-acre affordable housing site was reserved; however, development of these affordable housing units was not part of the project under SEIS Alt. 6 and was assumed to occur in the future by the city of another party.

[2] The proposed affordable housing units are included in the multi-family area and not in a separate portion of the site.

[3] Fifty (50) affordable housing units are part of the project under the Revised Proposal. The analyses in the Addendum shows results with and without these units.

[4] The RV resort amenities include 5.0 acres of amenities, the same amount as SEIS Alt. 6; these amenities would be mixed throughout the RV resort under the Revised Proposal.

[5] The residential amenities include amenity center(s) totaling 6.0 under SEIS Alt. 6 and the Revised Proposal.

[6] The 6.0-acre Trail Head Park was the Adventure Center under SEIS Alt. 6.

[7] The Commercial Center property was not part of the Master Site Plan but possible development was analyzed under SEIS Alt. 6.

[8] The Commercial Center property is now part of the Master Site Plan.

[9] The Municipal Recreation Center has been dedicated to the city and is not part of the site under the Revised Proposal.

[10] The Undeveloped Open Space includes community/recreation open space (e.g., public trails, one 1.0-acre public trail park, and 1.0-acre of private community parks); stormwater open space; and steep slope areas their buffers under the Revised Proposal. SEIS Alt. 6 would have the same types of Undeveloped Open Space, except there would be three 0.5-ac. public trail parks and two 0.5-acre private community parks under SEIS Alt. 6.

[11] The Undeveloped Open Space includes a 55.0-acre parcel in the southern portion of the site that has been added to the property under the Revised Proposal.

Source: Atwell, LLC.

Figure 2-4

Revised Proposal Master Site Plan

EA Engineering, Science, and Technology, Inc., PBC

Sun Communities retains ownership of the underlying land in all its projects, and the company leases individual home sites to home purchasers and renters (see Draft SEIS – Chapter 2 for details on Sun Communities' residential lease/ownership structure). Individual lots may be platted or un-platted and demarked using other techniques.

The single family housing units would average from 1,000 square feet to 2,000 square feet in size, would not exceed 20 feet in height, and, according to the Applicant, would be designed in an architectural style that is intended to compliment the rural mountain character of the area. All the units would be manufactured or modular housing (see Draft SEIS – Chapter 2 for details on the residential design and construction).

Multi-family

Construction of the proposed multi-family housing is scheduled to begin in 2023 and be complete in 2027 (see the *Development Schedule* discussion later in this Project Description for details). A total of 180 multi-family residential units would be developed in two areas totaling 28.2 acres[3] in the northeastern portion of the site, the same number of units as SEIS Alternative 6 but with some of the units located in an additional area to the southwest of the commercial center (see **Table 2-1** and **Figure 2-4**). The multi-family housing is planned to consist of tri-plexes, each on 8,000-square foot lots, or multi-story apartment buildings. At buildout, the net density in the multi-family area, including the affordable housing (see below), would be 11.0 du/acre, slightly less dense than SEIS Alternative 6.[4]

The multi-family units would average from 600 to 1,200 square feet in size, the buildings would not exceed 50 feet in height, and would be designed in an architectural style that is intended to complement the rural mountain character of the area. The units would be a combination of manufactured units, conventional stick-built, and stacked modular units (see Draft SEIS – Chapter 2 for details on the residential design and construction).

Affordable Housing

Construction of the proposed affordable housing is scheduled to begin in 2023 and all the affordable housing units would be ready for lease in 2027 (see the *Development Schedule* discussion later in this this Project Description for details). Fifty (50) affordable housing units are part of the project under the Revised Proposal; the units would be integrated and dispersed within multi-family neighborhoods rather than being a distinct development area. This housing would be developed and maintained by Sun Communities. The technical analyses in this SEIS Addendum analyze the project with and without these units to highlight the environmental effects of the additional units.

Under SEIS Alternative 6, a 6.8-acre property located in the southeastern portion of the site was reserved for dedication to the City of Cle Elum for future development of affordable housing; this area is now open space under the Revised Proposal. No specific development

[3] The 28.2 acres represents gross acreage.
[4] Ibid 3.

was proposed or assumed on the affordable housing property in the SEIS and potential affordable housing units were not included in the unit calculations for SEIS Alternative 6 or evaluated in the SEIS. Note that the 2002 Development Agreement stipulated that the 50 affordable units assumed to be developed by others on the 6.8-acre site did not count towards the limit of 1,334 approved housing units.

Non-Residential Uses

RV Resort Sites & Amenities

Construction of the RV resort element of the Revised Proposal is scheduled to begin in 2023 and be completed in 2027 (see the *Development Schedule* discussion later in this Project Description for details). The RV resort would feature 627 sites located on 130.8 acres in the central portion of the site, the same number of RV sites as SEIS Alternative 6 but on a smaller site area (see **Table 2-1** and **Figure 2-4**). The easternmost portion of the RV resort would feature traditional pull-through and back-in RV sites, as well as various forms of "glamping"[5]. The westernmost portion may be limited to glamping, including the potential for placement of park models[6] and/or airstreams. Other uses in the central and western areas would be focused on recreational facilities and would include a mix of indoor and outdoor recreation amenities, such as parks, playground, trails, sport courts, dog parks, mountain bike trails, and indoor and outdoor gathering space.

Five (5)+ acres of amenity areas would be mixed throughout the RV resort, rather than concentrated in one location, as was the case with SEIS Alternative 6. There would also be a welcome center with check-in kiosks at the RV resort entrance. Multiple comfort stations, a maintenance facility, and various sport courts would also be located throughout the resort. The proposed recreational buildings under the Revised Proposal would vary from 4,000 to 11,000 square feet in size, would not exceed 50 feet in height, and would be designed in an architectural style that is intended to compliment the rural mountain character of the area. The RV resort buildings would be conventional stick built (see Draft SEIS – Chapter 2 for details on the RV resort design and construction).

Sun Communities would own all the buildings and sites in the RV resort and would lease the sites. The average stay for the typical guest of the RV resort is expected to be three to four days. Seasonal passes to the RV resort would be sold with the stipulation that the site could be occupied a maximum of nine months of a calendar year. There would be no permanent

[5] Glamping is a term that blends glamorous and camping. Glamping is defined in the industry as a style of camping with resort-type amenities, and units may include yurts, safari tents, and airstream trailers, and is typically more luxurious than "traditional" style camping.

[6] A park model RV (PMRV) is a unique trailer-type RV that is designed to provide temporary accommodations for recreation, camping, or seasonal use. These units are designed and built to be used for recreational/camping purposes only. They are not meant to be affixed to the property in any way, they do not improve property values in any way, and they are neither designed nor intended by their manufacturer to be used as a permanent residence. Most PMRV owners (67%) locate their unit within several hours of drive time from their primary residences and use them for weekend getaways. Some owners may use them as a seasonal/temporary get-away to escape more extreme weather. (Source: Recreation Vehicle Association.)

residents living at the RV resort (see Draft SEIS Chapter 2 for details on the RV resort lease/ownership structure).

Residential Amenity Centers

Two amenity centers totaling approximately 6.0 acres would be located in the northern part of the residential areas under the Revised Proposal, the same amount as under SEIS Alternative 6 but in different locations (see **Table 2-1** and **Figure 2-4**). The recreational amenity centers would include: combined clubhouse and fitness building, pool, playground, sport courts, recreation lawn, and maintenance facility.

Trail Head Park

The approximately 6.1-acre Adventure Center in the northern portion of the site under SEIS Alternative 6 would be a public park and trail head (Trail Head Park) under the Revised Proposal (see **Table 2-1** and **Figure 2-4**). This park would likely include a bathroom and small parking area and could also feature a concession area for equipment rentals, mini golf, and an adventure course.

Commercial Property

A 25.4-acre property in the eastern part of the site is proposed to be developed as a commercial center (see **Table 2-1** and **Figure 2-4**). Construction of the commercial center is scheduled to begin in 2023 and would be completed in 2031. The commercial site was not part of the site or included in the SEIS Alternative 6 master plan. However, hypothetical future development of the property was studied in the SEIS to understand the potential impacts of this development.

Development assumptions for the commercial center under the Revised Proposal and SEIS Alternative 6 are listed in **Table 2-2**. As shown, the total potential development under the Revised Proposal and SEIS Alternative 6 would be the same (150,000 square feet); however, the mix of commercial uses would differ somewhat.

Table 2-2
COMMERCIAL DEVELOPMENT ASSUMPTIONS –
SEIS ALTERNATIVE 6 & REVISED PROPOSAL

Potential Development	Development Assumptions	
	SEIS Alt. 6	Revised Proposal
Grocery Store	45,000	50,000
Retail	25,000	56,000
Restaurant	20,000	24,000
Medical Offices	60,000	0
Office	0	20,000
Total Potential Development	**150,000**	**150,000**
Developable Area (not constrained by critical areas)	18 acres	18 acres

Source: New Suncadia, 2020, 2022.

Specifics on the commercial building design and construction under the Revised Proposal are not available at this time.

Other Uses

Cemetery Expansion Site

As with SEIS Alternative 6, a 13.4-acre area to the west of Laurel Hill Memorial Cemetery would be reserved to expand the cemetery.

Connector Road / Main Access Road

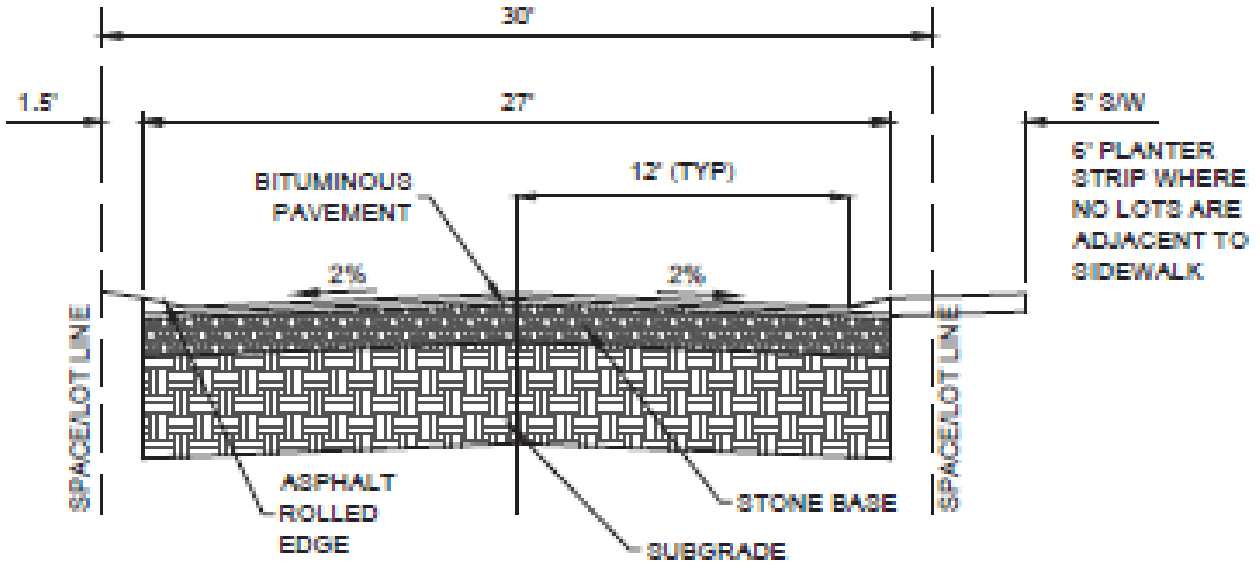
Under the Revised Proposal, the "Connector Road" included in SEIS Alternative 6 (occupying approximately 9.5 acres) would be modified and designed as the "Main Access Road". This series of local/neighborhood roads would function to connect the residential areas onsite to the commercial area that is now part of the site and would provide access between SR 903 and Bullfrog Road. The access point to the Main Access Road from SR 903 would be southeast of its location under SEIS Alternative 6. The current proposal for this road includes two 12-foot travel lanes, an asphalt rolled edge, and a 5-foot sidewalk on one side of the road (or a 6-foot planter strip where no lots are adjacent to the sidewalk; see **Figure 2-5**, Main Access Road Cross-Section). The Main Access Road would be privately constructed, owned, and maintained by the Applicant.

Open Space

A total of 553 acres (62% of the site) is proposed to be retained as open space, which is comprised of undeveloped open space (including community/recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, more open space than under SEIS Alternative 6 (see **Table 2-1** and **Figure 2-4**). The greater amount of open space under the Revised Proposal and the larger overall site area is largely due to the addition of approximately 55 acres of open space along the southern site boundary.

Undeveloped Open Space

The undeveloped open space would include the following categories of open space described under SEIS Alternative 6: Natural Open Space, Managed Open Space, and River Corridor Open Space (see Draft SEIS – Chapter 2 for details on these open space categories and the related covenants and conservation easements). The Natural Open Space, Managed Open Space, and River Corridor Open Space areas would feature different types of recreation facilities. Consistent with adopted covenants and easements, the least intensive types of facilities would occur in the River Corridor Open Space.



TYPICAL CROWN ROAD CROSS SECTION FOR PRIVATE RESIDENTIAL MAIN ROAD

NOT TO SCALE

NOTE: SPACE/LOT LINES ARE ILLUSTRATED FOR DELINEATION OF SPACE AREA, THESE LINES WILL NOT BE PLATTED AND ARE PROVIDED FOR TYPICAL SPACE LAYOUT ONLY.

Source: Atwell, LLC.

Figure 2-5

Main Access Road Cross Section

EA Engineering, Science, and Technology, Inc., PBC

Wetlands and their Buffers

Three wetlands and their buffers, a total of 3.4 acres in area, are located in potential development areas in the RV/glamping area. Like SEIS Alternative 6, these wetlands/buffers would be protected pursuant to city regulations. On-site wetlands and their buffers along the Cle Elum River would be protected as well.

Powerline ROW

A total of approximately 36.2 acres of open space associated with two powerline easements is present onsite. Like SEIS Alternative 6, the vegetation in these easements, and trails proposed in the easements, would be maintained in accordance with the power company's requirements.

Parks

Public and private parks included in the Revised Proposal are described below.

Public Trails Parks

Two public trail parks would be provided under the Revised Proposal: one 1-acre park (approximate) to the east of the Managed Open Space and a 6-acre Trail Head Park (approximate) adjacent to Bullfrog Road, in the location of the Adventure Center under SEIS Alternative 6 (see the description of the public Trail Head Park under *Non-residential Uses* earlier in this Project Description). SEIS Alternative 6 included three 0.5-acre public trail parks. The public trail parks could include gathering areas with seating, fitness/exercise equipment, informative signs, etc.

Community Parks

Two private community parks, each approximately 0.5-acre in size, were included in the residential area under SEIS Alternative 6. Under the Revised Proposal, 1-acre of private park space would be provided around the residential amenity centers and several small pocket parks would be included in the residential areas.

Trails

Like SEIS Alternative 6, an approximately 6-mile-long network of trails and sidewalks would be provided throughout the site, including hiking/biking, and equestrian paths (see **Figure 2-1**). While no golf course is included in the project, paths for golf carts, made of asphalt or a compacted semi-impermeable material such as gravel, would be provided. The trails used for pedestrian, equestrian, and mountain biking would be composed of compacted aggregate, natural materials, or similar materials. The sidewalks would be constructed of asphalt. These trails would generally be located around the periphery of the proposed development, and would connect to on-site development, as well as to existing off-site trails in several locations (e.g., to the trails in Suncadia to the north, the Coal Mines Trail to the northeast, and the Horse Park to the south). Sidewalks would also be provided along one side of the Main Access Road connecting SR 903 and Bullfrog Road.

All trails constructed by Sun Communities in the development and open space areas onsite would be owned and maintained by Sun Communities. Horse trails or specific riding courses that would be used for access for the Horse Park may be permitted in the open space areas if approved by Sun Communities. These trails would be constructed and maintained by the Horse Park.

Development Schedule

Below is a summary of the proposed phasing plan and schedule for the Revised Proposal. This phasing plan is approximate and could be modified in response to economic and market conditions.

- **Phase 1 (2023 – 2025):** single family, multi-family, and affordable housing; RV/glamping; and commercial center under construction
- **Phase 2 (2025 – 2027):** single family, multi-family, and affordable housing; RV/glamping; and commercial center under construction
- **Phase 3 (2027 – 2028):** single family housing and commercial center under construction
- **Phase 4 (2028 – 2031):** commercial center under construction

As shown, it is anticipated that proposed development of the Revised Proposal would occur over an approximately nine-year period, starting in 2023, and ending in 2031. Buildout of the residential and RV/glamping areas would occur by 2028, and the commercial center by 2031.

For comparison, under SEIS Alternative 6, buildout of the RV/glamping sites and residential areas was also expected to occur by 2028. For analysis purposes, the SEIS assumed the off-site commercial property would be fully developed by 2037.

Clearing, Grading, & Impervious Surface Areas

Proposed development would require clearing of approximately 333 acres (37% of the site), the same amount as SEIS Alternative 6. The clearing limits would extend to the appropriate critical area buffers/setbacks, in particular the area of regulated slopes.

Proposed grading would match natural topography as much as possible. Grading for the Revised Proposal would include approximately 260,000 cubic yards (cy) of cut, and 233,000 cy of fill, less than under SEIS Alternative 6. Fill material, utility backfill, and road base would be imported from approved off-site sources.

With proposed development, approximately 129 acres (15% of the site) would be covered in impervious surfaces (e.g., rooftops, roadways, sidewalks, and parking areas), less than under SEIS Alternative 6.

Residents/Employees

It is assumed that the proposed construction of 527 single family, 180 multi-family residential units, and 50 affordable units would add a total of approximately 1,579 new, full-time residents to the City.[7] Refer to the SEIS for additional discussion of residential housing

There would be no permanent population associated with the RV sites. However, several sections of the Addendum and the SEIS (e.g., Public Services and Utilities), estimate an equivalent or "proxy" population that is used for purposes of analysis.

The employees generated during construction would be similar to SEIS Alternative 6. The manufactured homes would be built in factories off-site – likely located in the Pacific NW – involving an approximate total of 90 to 130 employees over buildout of the project. An additional estimated 607 local construction jobs would be generated to assemble the homes and construct the other recreational buildings on site. Additional indirect construction jobs would be generated in the local area as well.

At full buildout of the Revised Proposal, it is estimated that Sun Communities would employ from 30 to 35 full time employees in the RV resort and residential areas, as well as an additional 70 to 90 seasonal employees during the peak RV resort season (anticipated to occur from June through August) at 47° North.[8]

The commercial development is estimated to generate approximately 300 employees at buildout in 2031, the same as SEIS Alternative 6.[9]

Site Access & Circulation

Like SEIS Alternative 6, one access point would be provided from SR 903 (an access point for the single/multi-family housing and the commercial center), and three access points would be provided from Bullfrog Road (a second access for the single/multi-family housing, and primary and secondary entrances for the RV resort). Access to the Trail Head Park would be directly from Bullfrog Road. (See **Figure 2-4.**)

The internal roads within the development areas onsite would be privately owned and maintained by the Applicant.

Emergency Access Road

The proposed access points and on-site access roads under the Revised Proposal would provide emergency access based on the 2021 International Fire Code (IFC), subject to confirmation by the City Fire Chief. Although not required, to enhance public safety for other neighborhoods in the Cle Elum area, the Revised Proposal would include an

[7] Average occupancy and household size are based on U.S. Census Bureau, 2016-2020, American Community Survey, 5-year estimates.
[8] Resident and employment figures are based upon similar sized developments owned and managed by Sun Communities.
[9] Employees were estimated by ECONorthwest based on commonly accepted assumptions.

emergency access road from the RV resort area that would extend to the southern site boundary (see **Figure 2-4**). The city and the Horse Park could continue this road offsite through the Horse Park and connect to Douglas Munro Boulevard. SEIS Alternative 6 included an emergency access from the RV resort, as well as a second emergency access road from the affordable housing site. Given that the affordable housing site would not be developed as a separate area under the Revised Proposal (the affordable housing would be integrated in the multi-family area), an additional emergency access road would not be provided from this area.

Utilities

Water

Like SEIS Alternative 6, water service for the project would be provided by the City of Cle Elum. Proposed single- and multi-family development, the RV resort, and the commercial center would be part of a private Group A water distribution system owned by Sun Communities and operated and maintained by a state-approved entity. Water mains would connect to the nearest available points of connection. The commercial center would be served by the existing 8-inch diameter City supply line.

All the non-residential buildings would include sprinkler systems in case of fire, as required by the City code. Fire hydrants would be provided throughout the residential areas. It is anticipated that a portion of the following landscaped areas would be irrigated: around both the RV and residential amenity centers and selectively throughout the RV resort. The single- and multi-family residential areas could also be irrigated, depending on the landscaping selected.

The city's water system would require improvements to serve the Revised Proposal. The Applicant would contribute a pro-rata share to construct the improvements to the city's water system required to serve the project, including: a filter train in the water treatment plant, a finished water pump in Pressure Zone 3, and a reservoir in Pressure Zone 3.

Sewer

Like SEIS Alternative 6, sewer service for the project would be provided by the City of Cle Elum. Proposed single- and multi-family development, and associated amenity centers, would be served by private 8-inch diameter gravity sanitary sewer mains that would be owned, operated, and maintained by Sun Communities.

The proposed RV resort would be served by private 8-inch diameter gravity sanitary sewer mains that would be owned, operated, and maintained by Sun Communities. The gravity sewer mains would connect to proposed sewer lift stations that would pump the flows via the force main to the existing 18-inch diameter sewer main. The commercial center would be served by public 8-inch diameter gravity sewer mains that would be owned, operated, and maintained by the City of Cle Elum.

The City Wastewater Treatment Plant has sufficient capacity to serve the Revised Proposal.

Stormwater Management

Stormwater management during construction and operation of the Revised Proposal would be similar to SEIS Alternative 6 (see the summary below).

During Construction

During construction, temporary stormwater management measures would be implemented to prevent erosion/sedimentation and the transport of pollutants from the site to downstream water resources. These measures would follow the Best Management Practices (BMPs) and requirements of the Construction Stormwater Pollution Prevention Plan and the currently active National Pollutant Discharge Elimination System (NPDES) Permit (No. WA0052361).

During Operation

A permanent stormwater management system would be installed onsite, in accordance with the 2019 Department of Ecology *Stormwater Management Manual for Eastern Washington*. A site-specific hydrologic model previously developed for both Suncadia and the 47° North site was used to design the 47° North system. Stormwater runoff from the developed site would generally be collected in catch basins or roadside water quality swales and directed to water quality and infiltration or detention facilities (depending on the soils) via pipes or conveyance swales. Sheet flow dispersion would also be used for stormwater runoff water quality and flow control for single family and RV resort areas that abut open space and slope away from the developed areas at a maximum slope of 15%. Overflow routes would be provided for all proposed stormwater facilities.

Solid Waste

Solid waste collection for the proposed development would be provided by Waste Management of Ellensburg or its successors. The waste would be hauled to the Cle Elum Transfer Station prior to transport to the Greater Wenatchee Land Fill in Douglas County for final disposal. The Transfer Station is reported to be near capacity and improvements would be required to accommodate the Revised Proposal. The Applicant would contribute a pro-rata share to construct improvements to the solid waste transfer station.

Energy

Electricity and natural gas service for the proposed development would be provided by PSE via extensions of existing facilities.

(See Section 3.9, **Utilities**, and **Appendix B** for details.)

Chapter 3
NEW INFORMATION & ANALYSIS

CHAPTER 3
AFFECTED ENVIRONMENT, IMPACTS, ALTERNATIVES, MITIGATION MEASURES & SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Introduction / Overview

The following provides an overview of the general content and organization of each section within **Chapter 3**. It is intended to help orient the reader to the discussion of alternatives, impacts, and mitigation measures.

This document is an SEIS Addendum (i.e., an Addendum to the Final SEIS (2021) for the *47º North Master Site Plan Amendment*), and **Chapter 3,** therefore, updates and adds information about the alternatives, impacts, and mitigation measures identified in the prior *SEIS* and SEIS Alternative 6 relative to the changes included in the Revised Proposal. The focus of this chapter is to identify and compare those impacts, and any new or modified mitigation measures. In general, changes to the Revised Proposal and differences in impacts identified in the Addendum are incremental in type and degree and are not significant.

Below is further description of the content and organization of the sections in **Chapter 3**, and some key assumptions for the alternatives and their analysis.

Site Area

In the 2002 Cle Elum UGA EIS, the original EIS for the project, development was proposed on a 1,100-acre site known as Bullfrog Flats. In the SEIS, development of SEIS Alternatives 6 was proposed on an 824-acre portion of the site called 47° North. SEIS Alternative 6 also evaluated hypothetical development on an adjacent 25-acre property to the east but not part of the 47º North proposal at the time.

The Revised Proposal site studied in this Addendum is approximately 889 acres in size. The difference in site area is due to adding the commercial property to the eastern part of the site and open space to the southern part of the site and removing properties in other portions of the site (e.g., for the municipal recreation center).

Details of the Revised Proposal are included in **Chapter 2**.

Methodology

The analyses conducted for this Addendum generally use the same methodologies as those used in the SEIS. However, where new data was available and other reasonable methods of

analysis were identified, these were employed in the Addendum analyses, as appropriate, including the following.

- **Housing/Population/Employment**
  - updated census data,
  - updated housing value information,
  - updated cumulative impact project permit counts, and
  - new demographic information on RV resort users.
- **Cultural Resources**
  - a new cultural resources survey of the commercial center property, including a pedestrian survey and auger probes.
- **Public Services**
  - updated information from the housing/population/employment analysis,
  - new information on calls for Medic One emergency service,
  - new information on sports and recreation-related incidents and calls for hospital emergency department services,
  - updated analysis of police service impacts (based on the ICMA method by the Police Department),
  - updated analysis of impacts to schools (based on updated student generation rate, grade level percentage information, and enrollment information from the School District),
  - additional analysis of hospital districts service impacts (based on existing and future staffing information provided by Kittitas Valley Hospital Districts), and
  - additional analysis of emergency dispatch service impacts from the RV resort (based call data provided by KITTCOM).
- **Transportation**
  - updated counts and future baseline traffic volumes at selected study intersections,
  - updated trip generation using the latest edition of the ITE Manual,
  - additional analysis of road corridor level of service,
  - additional analysis of the effects of project-specific mitigation measures on the road system, and
  - updated analysis of pro rata shares to mitigate identified improvements.
- **Utilities**
  - updated utility demand assumptions and utility capacity information.
- **Fiscal Conditions**
  - updated information from the public services analysis and other changes to the Revised Proposal.

Affected Environment

Chapter 3 updates existing conditions on the 47° North site and in the surrounding area since publication of the Draft SEIS in 2020, as appropriate.

EIS Alternatives

The proposal analyzed in the SEIS was SEIS Alternative 6; the current proposal is the Revised Proposal and that is the focus of the Addendum. The sections in **Chapter 3** (e.g., Section 3.1, **Land Use**) focus on the impacts of the Revised Proposal in comparison to SEIS Alternative 6, noting the incremental differences in impacts and their significance. Where informative, SEIS Alternative 5 (the approved 2002 Bullfrog Flats Master Site Plan) is also noted for comparison purposes.

Phasing/Study Years

Development of the Revised Proposal is anticipated to start in 2023 and be completed in 2031. Buildout of the residential and RV/glamping areas would occur by 2028, and the commercial center by 2031. For comparison, under SEIS Alternative 6, buildout of the RV/glamping sites and residential areas was also expected to occur by 2028; the commercial property (which was not part of the project at that time) was assumed to be fully developed by 2037.

The SEIS Addendum analyzes one or more of three development years – 2025, 2031, and 2037 – depending on the element being studied (e.g., Transportation analyzes all three years), as described below:

- **Year 2025** represents near-term development of the initial project phases of the Revised Proposal and SEIS Alternative 6 (e.g., residential and RV/glamping uses). Year 2025 is used primarily for analysis of transportation and fiscal impacts.
- **Year 2031** represents full buildout of the Revised Proposal, including the commercial center. Note that the RV and residential components of the Revised Proposal are anticipated to buildout in 2028. For SEIS Alternative 6, 2031 is an interim year, at the approximate mid-point of buildout; commercial uses included in this alternative would continue to develop until 2037. Therefore, 2031 includes buildout of SEIS Alternative 6 residential and recreational uses plus additional increments of commercial use and background growth.
- **Year 2037** represents a future year consistent with the current planning horizon of City of Cle Elum and Kittitas County Comprehensive Plans. No further development of the Revised Proposal would occur after 2031, but background growth would continue during this period.

Construction Impacts

For most of the elements of the environment (e.g., land use, aesthetics, parks and recreation, public services, and transportation) the analysis of the construction impacts from the Revised Proposal is not substantially different from the analysis of the SEIS

alternatives. The same type and amount of development would occur in a more compressed construction time frame but would result in no significant difference in impacts. The construction impacts under the Revised Proposal on numerous elements of the environment -- earth, water resources, plants, animals, & wetlands, and utilities -- also would not differ substantially from the SEIS Alternatives.,

Mitigation Measures

Compared to SEIS Alternative 6, no new significant adverse impacts on the elements of the environment would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures for the Revised Proposal identified in **Chapter 3** include some revisions to the language of measures listed in the Final SEIS and are intended to clarify and help identify processes for implementing the measures. There are no substantive additions or changes to the mitigation in the Final SEIS, however. The mitigation measures listed in **Appendix F** will serve as a basis for conditions that could be imposed through the review process for the proposed Major Modification and a revised Development Agreement.

Below is a description of the different categories of mitigation (e.g., proposed, required, other possible).

- **Proposed Mitigation Measures (Included in the Project)** reflect several types of measures. There are measures that the Applicant has preliminary proposed; that are included or implicit in the revised Master Site Plan contained in the pre-application materials submitted to the city; that are based on measures included in the SEIS and adapted to reflect the Revise Proposal; and/or are above and beyond the "Required Mitigation Measures" described below. This category of measures also includes certain conditions of approval from the 2002 Bullfrog Flats Development Agreement, which were developed to mitigate the environmental impacts of the Bullfrog Flats Master Site Plan as identified in the 2002 Cle Elum UGA Final EIS and through the approval processes for the project. These conditions are summarized in the mitigation measures, some verbatim and others paraphrased for the sake of simplicity.

  Because substantial time has passed since the Development Agreement was executed, a lack of complete documentation, and changes in the proposal, the rationale or need for certain of the conditions or some specific requirements is not clear. Also, certain of the conditions no longer apply because they have been performed (e.g., certain properties have already been dedicated to the city). Therefore, only identified conditions of approval that clearly appear to pertain to the Revised Proposal, and which the Applicant has preliminarily agreed to include in, or are implicit in, the revised project, are listed in this summary; modifications that are considered appropriate to reflect the changes in the Revised Proposal and the updated analysis in the Addendum are also identified (underlined or strike-through).

It should be noted that these conditions are not categorized as "included in the project" at this point because a formal Master Site Plan Amendment application and a proposed Development Agreement have not been submitted to the city as of this writing. In addition, the City Council may decide to through the land use review process to add or delete individual conditions. However, it is assumed for purposes of the summary that Bullfrog Flats conditions of approval will likely become part of the proposal in the future. As such, the verb "would" is used in the SEIS Addendum to indicate a condition that is assumed to be relevant pursuant to the Addendum analysis and that the City could impose as a condition of approval.

- **Required Mitigation Measures** are measures required by code, laws, or local, state, and federal regulations and the word "would" is used to indicate that compliance is assumed.

- **Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)** are measures that are based on the conditions of approval contained in the 2002 Development Agreement but that that the SEPA consultant does not consider likely to apply to the Revised Proposal and will depend on changes to the adopted Development Agreement that may be proposed in conjunction with the major modification and new or updated Development Agreement. These measures are not included in the project at this point, as a formal Master Site Plan Amendment application has not been submitted to the City. As such, they are typically represented with the verb "should" in the Final SEIS and SEIS Addendum to indicate a condition recommended by the City.

- **Other Possible Mitigation Measures** are other measures identified by the SEIS team and the city that could be implemented to further reduce impacts and are represented with the verbs "should" or "could".

Chapter 3A
NATURAL ENVIRONMENT

Section 3.0
EARTH; WATER QUANTITY & QUALITY; PLANTS, ANIMALS, & WETLANDS; AIR QUALITY / GREENHOUSE GASES; & NOISE

The Natural Environment section is a summary of the *Natural Environment Technical Memos* on earth; plants, animals, and wetlands; and air quality/greenhouse gases (GHGs) and noise (December 2022) prepared by AESI Associates, Raedeke Associates, and Landau Associates, respectively, in **Appendix A**. Information from the *Utilities Report* (January 2023) prepared by ESM Engineers in **Appendix B** is also referenced.

3.0.1 Affected Environment

2020 / 2021 SEIS & Revised Proposal

The SEIS described the existing conditions of the site and vicinity with respect to earth, water quantity and quality plants, and animals, and wetlands air quality/ GHG; and noise conditions (see Draft SEIS Sections 3.1, 3.2, 3.3, 3.4, and 3.5 for details). Natural conditions of the site have not changed substantially since publication of the *SEIS* and are briefly described below. Please consult relevant sections of the SEIS document for detailed information.

The site topography is varied and includes steep slope areas along the south site boundary and through the center of the site. Geological hazards, such as landslide, erosion, seismic, and coal mines are present on and near the site. Surface water resources onsite include the Cle Elum River which passes through the western portion of the site and joins the Yakima River to the south of I-90 offsite, and six wetlands along the Cle Elum River and in the central portion of the site. The site is mostly covered by second and third growth forests; grassland with scattered shrubs are present in the two powerline easements that pass through the site. A variety of wildlife inhabit and pass through the site and site vicinity. Endangered, threatened, proposed, candidate, species of concern, and sensitive animal species identified by federal and state agencies potentially occur in the 47° North site vicinity. Priority species, such as elk, use the site during certain times of the year.

A major source of air pollution and noise in the vicinity of the 47° North site is vehicular traffic traveling along I-90, SR 903, and Bullfrog Road, as well as within residential areas surrounding the site. Kittitas County is currently designated as an attainment area for all criteria air pollutants. Air quality/GHG emissions and noise have increased slightly since 2020, primarily due to increased background traffic in the Cle Elum area (see Section 3.6, **Transportation**, and **Appendix C** for details.)

3.0.2 Impacts

The Revised Proposal includes minor changes to the proposed Master Site Plan which were reviewed by the SEIS consultants to determine whether impacts associated with these modifications are likely to generate new or different significant impacts. A technical memorandum prepared by each consultant documenting their review and conclusion are included in **Appendix A**. Each concluded that no significant impacts beyond those identified in the SEIS for SEIS Alternative 6 would result from the Revised Proposal. Please consult the SEIS for complete discussions of potential impacts. A brief discussion of incremental impacts associated with the Revised Proposal is presented below.

Revised Proposal

Earth

The proposed clearing limits under the Revised Proposal would essentially be the same as those under SEIS Alternative 6. These limits would be outside of designated erosion hazard areas, with clearing occurring on the more gently to moderately sloping portions of the site (e.g., with inclinations of approximately 33% or less). Proposed grading volumes and impervious surface areas under the Revised Proposal would be less than under SEIS Alternative 6. As a result, potential erosion, sedimentation, stormwater runoff, and groundwater impacts would be similar to or less than under SEIS Alternative 6. With the revisions to the stormwater design, the stormwater ponds would remain in the same general locations as under SEIS Alternative 6, with infiltration ponds continuing to be limited to those areas of the site underlain by permeable outwash sediments suitable for infiltration. As a result, no significant impacts associated with geotechnical hazards are expected. In summary, the proposed changes to the project under the Revised Proposal are relatively minor with respect to the geology, soils, and groundwater, and the impacts on these conditions would be similar to or less than SEIS Alternative 6.

Water Quantity & Quality

Like SEIS Alternative 6, no direct impacts to on-site water resources (e.g., the Cle Elum River and wetlands) would occur with development of the Revised Proposal. As mentioned above, proposed grading volumes and impervious surface areas under the Revised Proposal would be less than under SEIS Alternative 6, resulting in similar or less potential erosion, sedimentation, stormwater runoff, and groundwater impacts than SEIS Alternative 6. Temporary and permanent stormwater management systems would be installed onsite to address potential impacts during construction and operation of the project, respectively.

Plants, Animals, & Wetlands

Impacts to vegetation under the Revised Proposal would be comparable to SEIS Alternative 6, as the clearing limits would essentially be the same.

Clearing, grading, and construction under the Revised Proposal would be similar to SEIS Alternative 6 and would result in similar wildlife habitat loss and increased fragmentation. There would be slightly more activity onsite and associated impacts to wildlife due to the additional 50 housing units and population under the Revised Proposal. No direct impacts to riparian habitat in the Cle Elum or Yakima Rivers would occur, and infiltrated stormwater would not have a measurable direct effect on the Yakima River. Overall, impacts to fish and associated habitat should be minimal under the Revised Proposal or SEIS Alternative 6.

The Revised Proposal would not directly impact any of the on-site wetlands. As with SEIS Alternative 6, all wetlands onsite would be preserved and protected within an open space tract; these tracts would provide the required buffers and additional retained open space beyond the buffer limits. Hydrologic support to the wetlands would be maintained by the proposed stormwater control system.

Air Quality / GHGs

The inclusion of the 50 units of affordable housing and the slight change in the mix of commercial uses under the Revised Proposal would slightly increase emissions compared to SEIS Alternative 6. However, because the region is in attainment for all criteria pollutants, and because tailpipe emissions would increase only slightly, it is unlikely that impacts at local intersections would be significant or cause an air quality "hot spot."

The increase in multi-family housing units and slight changes in commercial uses under the Revised Proposal would result in a negligible increase in potential greenhouse gas (GHG) emissions relative to SEIS Alternative 6. Forecast annual project emissions for both the Revised Proposal and SEIS Alternative 6 would represent 0.03% of 2035 statewide forecast emissions. The Revised Proposal would represent an increase of 0.001% of annual statewide forecast emissions. Emissions for both SEIS Alternative 6 and the Revised Proposal would be lower than for SEIS Alternative 5

Noise

The proposed changes under the Revised Proposal, including 50 more dwelling units and a change in the mix of commercial uses, are not expected to result in a change in short-term construction noise or long-term operational noise compared to SEIS Alternative 6. The revised Master Site Plan also does not include substantial changes in the location of residential, commercial, or RV resort uses that would change the sources or receivers of noise.

The Revised Proposal is not expected to result in significant changes to local roadway noise compared to SEIS Alternative 6 and would be less than with Alternative 5. The locations at which new project roadways would intersect with existing roadways and the distances between project roadways and existing sensitive land uses would be similar to SEIS Alternative 6. Potential changes in traffic noise were estimated by comparing project-related traffic estimates during the worst-case Sunday PM peak period at two roadway segments where traffic volumes would increase between 25 - 35% with the Revised

Proposal: (1) the RV resort access off Bullfrog Road, and (2) the site access off SR 903. The estimated changes in noise levels between SEIS Alternative 6 and the Revised Proposal would be 0.3 A-weighted decibels (dBA), which is imperceptible to the human ear. This change in modeled noise levels does not represent a change to the analysis in the SEIS.

3.0.3 Mitigation Measures

No new significant adverse impacts on the natural environment would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Earth

Required Mitigation Measures

- Infiltration facility setbacks from steep slopes would comply with requirements outlined in the 2019 Ecology Manual. Specifically, the 2019 Ecology Manual requires that infiltration ponds be set back from the top of a slope of 15% or steeper at a distance equal to or greater than the height of the slope. The 2019 Ecology Manual allows for lesser or greater setbacks where a comprehensive site assessment concludes that the alternate setback is justified based on the site conditions. Slopes in excess of 15% exist on the ~~adjacent 25-acre~~ commercial property ~~and on the municipal/community recreation center site~~. Siting of infiltration facilities in this area would consider the slope setback requirements of the 2019 Ecology Manual.

Water Quantity & Quality

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- Sufficient water rights are available from New Suncadia to supply water for proposed development of the 47° North site.~~ and the adjacent 25-acre property.~~ New Suncadia and Ecology signed an agreement in December 2015 regarding how they would use their water rights and their mitigation obligations, including putting water rights into Ecology's Trust Water Rights Program and transferring water rights to the City of Cle Elum. The transfer of water rights to the City is pending as of this writing.

Plants, Animals & Wetlands

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- With respect to overall fish and wildlife habitat, the project would include and be bound by those provisions in the Cooperative Agreement between Trendwest (now New Suncadia), Washington State Department of Fish and Wildlife (WDFW), and the Yakama Nation that apply to potential cumulative impacts from the Suncadia resort and development of the 47° North ~~and adjacent 25-acre property~~. Mitigation actions by others could include the City of Cle Elum enforcing use and access restrictions in designated areas, especially within the Cle Elum River open space, to minimize disturbance to fish and wildlife during mating and breeding seasons.

Air Quality/GHGs

Proposed Mitigation Measures (Included in the Project)

- Single family and some of the multi-family residences under ~~SEIS Alternative 6~~the Revised Proposal would consist of manufactured housing, which research has shown can result in reduced construction-related GHG emissions compared with stick-built houses.

Chapter 3B
BUILT ENVIRONMENT

Section 3.1
LAND USE / RELATIONSHIP TO PLANS & POLICIES

3.1.1 Affected Environment

2020 / 2021 SEIS & Revised Proposal

The Bullfrog UGA Master Site Plan and Development Agreement included 1,100-acres owned by Trendwest at the time of approval, and subsequently owned by their successors in interest, Suncadia and New Suncadia. The SEIS described the existing land use conditions on and in the vicinity of the Bullfrog UGA properties (see Draft SEIS Section 3.6 for details). Selected information from the Draft SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

Approximately 174 acres of the Bullfrog UGA property has been dedicated to public agencies including 38-acres to the School District, 112 acres to the city for lease to the Washington State Horse Park, 12-acres to the city for the Water Treatment Plant, and most recently 12-acres to the city for the development of a community recreation facility. Sun Communities then acquired the balance of this property in 2021, with the exception of approximately one-acre used for utilities, retained by New Suncadia.

The property now owned Sun Communities, also known as the 47° North site, is largely vacant and undeveloped, and generally comprised of vegetated/forested areas. Horseback riding, hiking, and snowmobiling occur on dirt roads throughout the site; easements are in place for authorized use of the site and certain trails by the adjacent Horse Park. Equestrian facilities, such as a small building, parking area, and load/unload areas, are also located onsite. Puget Sound Energy and Bonneville Power Administration electrical transmission lines/easements traverse the site; other utility easements are present as well.

3.1.2 Impacts

2020 / 2021 SEIS

As described in the SEIS, development of the 47° North site under SEIS Alternative 6 or Alternative 5 would result in the conversion of a vacant, undeveloped, vegetated/forested site into a mix of urban land uses. Development of SEIS Alternative 6 would be less intensive than SEIS Alternative 5: fewer housing units would be developed; 25 acres/150,000 square feet of retail could be developed by another property owner, compared to 75 acres/950,000 square feet of business park and up to 10 acres of retail; and more undeveloped open space would be retained.

The range of proposed land uses and their densities with either SEIS Alternative 5 or 6 would result in increases in activity levels and potential land use incompatibilities, which can result from more intensive land uses. Proposed development would represent a continuation of the existing trend of intensifying development in the area (e.g., Suncadia Master Planned Resort, City Heights, and Cle Elum Pines developments). Land use conflicts were not anticipated to be significant under SEIS Alternative 6 due to the proposed layout of land uses, proposed open space and buffers incorporated into the site plan, and existing physical barriers within and adjacent to the site.

The anticipated land use impacts under SEIS Alternative 6 are discussed further below in comparison to the Revised Proposal.

Revised Proposal

Development with the Revised Proposal would be almost identical to SEIS Alternative 6, including the types, amounts and distribution of land uses on the site and resulting impacts. Like SEIS Alternative 6 and Alternative 5, the Revised Proposal would change the land use character of the 47° North site to a large mixed-use, master planned development. Please refer to **Table 2-1** for a summary of the proposed land uses under the Revised Proposal and SEIS Alternative 6, and **Figure 2-4** for the Revised Proposal Master Site Plan. The amount and intensity of development would be less compared to SEIS Alternative 5.

Proposed changes to the Revised Proposal compared to SEIS Alternatives 6 are identified in **Chapter 2** of this Addendum and are not expected to substantially change land use impacts identified in the SEIS. Any differences in impacts between SEIS Alternative 6 and the Revised Proposal that would result from the modification in land uses or timing of development were previously discussed and are considered minor and insignificant.

As under SEIS Alternative 6, development under the Revised Proposal would represent a transition of the 47° North site from a vacant, largely undeveloped, forested site to more intense urban land uses, consistent with the site's current designation as a UGA and the approved Master Site Plan.

As noted in **Table 2-1**, the Revised Proposal would feature a mix of land uses similar to those under SEIS Alternative 6 but would also incorporate 50 affordable housing units, which would be dispersed in the site's multi-family areas. Under either SEIS Alternative 5 or 6, a parcel adjacent to the Horse Park (6.8 or 7.5 acres, respectively) would be dedicated to the city for the development of 50 units of affordable housing by others. Under the Revised Proposal, this area would be retained as open space and the affordable housing units would be constructed and integrated into the overall development by Sun Communities.

The revised Master Site Plan included in the Revised Proposal includes a number of other small changes that would not affect the analysis of land use impacts. The layout of

residential uses relative to SEIS Alternative 6 has been modified somewhat. Under the Revised Proposal, multi-family rather than single family housing would be located adjacent to the commercial center. This change would result in greater compatibility between the residential and commercial uses, as the multi-family housing would be a more intensive use. The mix of commercial uses would also be somewhat different, but the overall amount of commercial uses (150,000 square feet) and resulting impacts would be the same (see **Table 2-2** for a comparison of the commercial uses under the Revised Proposal and SEIS Alternative 6).

The Revised Proposal includes a net increase in the amount of open space compared to SEIS Alternative 6 (approximately 77 acres more), and a greater percentage of the overall site devoted to open space compared to Alternative 5 (58% versus 48%). The preservation of more of the site in natural open space, predominately in the southern part of the site, would provide more buffering to adjacent uses (e.g., the Horse Park). The additional open space would also be more consistent with the Mountain-to-Sound Greenway recommendation that new development be designed for maximum preservation of the natural forested character of the lands, scenic qualities, and wildlife habitat.

As for SEIS Alternative 6, it is assumed that adopted development regulations, and mitigation measures adopted as conditions of approval, would minimize potential land use incompatibility impacts onsite and between the site and adjacent areas. As a result, no new significant adverse land use impacts are anticipated with the Revised Proposal.

Indirect and Cumulative Impacts

Indirect impacts under the Revised Proposal would be similar to those described for SEIS Alternative 6 and would include additional demand for goods and services due to the increase in onsite population with a potential to spur spin off commercial development (e.g., in the Cities of Cle Elum and Roslyn, and Town of South Cle Elum). Commercial development, which is now part of the project under the Revised Proposal, could capture a portion of the demand for these types uses from the 47° North development which would reduce the demand and indirect pressure for development elsewhere in the City of Cle Elum and other adjacent municipalities. The development of new retail opportunities within the boundaries of the Master Site Plan, including a new grocery store, could reduce congestion in the vicinity of the Safeway Store, and reduce the number of new trips that would be created.

Cumulative land use impacts would also be similar to SEIS Alternative 6. Development of the Revised Proposal combined with existing and known future development in the area would increase the total developed area and associated housing and population in Kittitas County and City of Cle Elum and represent a conversion and intensification of land use in the area. Cumulative development and associated cumulative population growth would increase activity levels and create additional demand for goods and services that could encourage spin-off development in the city and nearby urban areas, similar to SEIS Alternative 6.

3.1.3 Mitigation Measures

No new significant adverse impacts on land use would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres (58% of the site) should be retained in open space, including critical areas such as the Cle Elum River, wetlands, and steep slopes.~~ A total of approximately 553 acres of open space (62% of the site) would be part of the project, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way. Existing easements are in place to protect the River Corridor Open Space and Managed Open Space in the western portion of the site. These easements would be retained by New Suncadia or transferred to the Applicant (Sun Communities).

Required Mitigation Measures

- Development of the commercial center would maintain the 50-foot-wide platted buffer adjacent to the SR 903 right of way. ~~would be maintained with possible commercial development on the adjacent 25-acre property.~~

Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)

- Note: The Bullfrog Flats approval required conveyance of a useable area of 7.5 acres to the City of Cle Elum, or another public or non-profit entity approved by the City, for development of a minimum of 50 affordable housing units. The 50 housing units were not counted towards the 1,334-unit cap for the Bullfrog Flats project. The parcel or parcels were required to be identified and conveyed prior to approval of the 250th residential housing unit. The Revised Proposal includes development and dispersal of 50 affordable housing units within the project in lieu of dedication of land. The existing condition would be deleted or modified.

- Note: A current development condition applicable to the Bullfrog Flats site only permits small-scale retail uses that would serve the convenience needs of residents and employees to be included on the commercial site. Retail uses would be limited to 10% of the floor area of the commercial development, and no individual retail use would contain over 5,000 sq. ft. Primary entrance to the retail uses would not be allowed from SR 903 or Bullfrog Road. The approved Bullfrog Flats project also includes 75 acres/950,000 sq. ft. of business park uses. The Revised Proposal includes an approximate 150,000-square foot commercial center (retail, restaurant and office uses)

on a 25-acre site with vehicle access from SR 903, and no business park uses. Approval would require modification or elimination of the current limitations.

3.1.4 Relationship to Plans and Policies

The SEIS discussed the relationship of SEIS Alternative 6 to relevant land use plans, policies, and regulations of Washington State, Kittitas County, City of Cle Elum, and neighboring cities/towns (i.e., the City of Roslyn and the Town of South Cle Elum) (see Draft SEIS Section 3.7 for details). As noted in this section and **Chapter 2**, the Revised Proposal is almost identical to SEIS Alternative 6, including the types and breakdowns of land uses, and the distribution of land uses on the site. However, there are some noted changes with the Revised Proposal, including: the inclusion of 50 affordable housing units; the inclusion of the 25-acre commercial property in the project area to be developed by Sun Communities; the addition of 78 acres of undeveloped open space; and a different development phasing plan (see **Table 2-1** for a summary comparison of land uses under SEIS Alternative 6 and the Revised Proposal). Due to the similarities in types, amounts, and layout of land uses on the site, it is anticipated that the Revised Proposal would be similarly consistent with relevant plans and policies as SEIS Alternative 6.

One significant change between the Revised Proposal and SEIS Alternative 6 is the construction, integration, and dispersal of 50 units of affordable housing into the project area to be developed by Sun Communities, rather than dedication of a site to the city for future development of 50 units of affordable housing by others. This is consistent with the provision in the Development Agreement giving preference to the dispersal of these units. This change would also enhance the consistency and compatibility of the Revised Proposal with applicable housing-related polices for the City of Cle Elum, including: the following

GOAL H-1 The City of Cle Elum includes a diverse mix of housing types that meets the needs and are affordable to all segments of its population, especially low and moderate-income households. The range of housing types also reflect market conditions, the City's rural setting, and small-town character.

Policy H-1.6 Promote the production of housing affordable for all incomes, through a mix of housing types, models, and densities throughout the City, including: small lot single family detached, zero lot line, attached housing, accessory units, cluster housing, cottages, duplexes, townhouses, and apartments, as well as manufactured housing units, that are compatible with the neighborhoods in which they are located.

Policy H-1.9 Require new multi-family or mixed-use projects involving 20 dwelling units or more to provide affordable dwelling units as part of the project.

Please consult Section 3.3, **Housing, Population, and Employment** of this Addendum for additional information about housing types and cost.

The Revised Proposal would also integrate the 25-acre commercial property into the project area to be developed by Sun Communities. The original Master Site Plan included a 75-acre business park, with limited provisions for commercial uses (a maximum of 10 acres). SEIS Alternative 6 assumed that the restrictions on commercial uses would be removed, the size of the area reduced to 25 acres, and that New Suncadia would retain ownership and develop this area separate from the balance of the project area. The integration of the commercial property into the Revised Proposal and its connection to residential uses via proposed trails and walkways would be consistent with relevant plans, policies, and zoning for the Planned Mixed Use (PMU) zone, including the following:

> *Policy LU-5.1 Assure that a broad and diverse range of products and services are available to the residents of the City of Cle Elum.*
>
> *CEMC 17.45.010.A.1 To assure that large new development creates a complete and interdependent Cle Elum community that contains a mix of land uses that provides for most of the daily needs of its residences and visitors including recreation, employment, housing affordable to all residents, and education.*
>
> *CEMC 17.45.010.A.2 To obtain development within the City with imaginative site planning in a compatible mixture of land uses that will encourage pedestrian rather than automotive access to employment opportunities and goods and services.*

It is noted, however, the PMU zoning applicable to the site (CEMC 17.45.050.A) indicates that "*retail and service uses shall be limited to those convenience retail and service uses that are sized and designed to serve the residents or employees of the PMU zone….*". Commercial uses in the Revised Proposal include a mix of grocery store, retail, restaurant, and office uses. These types of uses would serve the residents and employees of 47° North but would also provide a broader mix and greater amount of retail, service, and office uses that would also serve residents of Cle Elum and other nearby cities/towns. The City Council will determine, during its review of the proposed major amendment to the Master Site Plan and the Development Agreement, whether this element of the Revised Proposal meets the intent of applicable zoning provisions and serves the public interest.

Section 3.2
AESTHETICS / LIGHT & GLARE

3.2.1 Affected Environment

2020 / 2021 SEIS & Revised Proposal

The SEIS described the existing aesthetics and light and glare conditions on and in the vicinity of the 47° North site at that time (see Draft SEIS Section 3.8 for details). Selected information from the Draft SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

The 47° North site is largely vacant and undeveloped, and comprised of vegetated/forested land. Some dirt roads and a few equestrian trails and facilities, such as a small building, parking area, and load/unload areas, are also located onsite. Two PSE electrical transmission lines/easements traverse the site.

Although some development in the site vicinity and growth in vegetation onsite has occurred over the ensuing years, existing views of and from the 47° North site are generally the same as described in the SEIS.

3.2.2 Impacts

2020 / 2021 SEIS

As described in the SEIS, development of the 47° North site with any of the SEIS Alternatives would change the existing visual character of the site, potentially impact view opportunities to and from the site, and add new sources of light and glare to the area. SEIS Alternatives 5 and 6 would change the visual character of the site from a mostly second growth forest to a more urban environment consisting of a community with a mix of residential and recreational uses, business park and/or commercial development and open space in various proportions. Vegetated buffer areas would surround the perimeter of the site. Some of the more intensive uses of SEIS Alternative 6 (multi-family and potential commercial development) would be located in the northeastern and eastern portions of the site, near SR 903. RV resort uses would be situated in the central portion of the site, buffered from surrounding uses.

The primary visual change associated with proposed development under SEIS Alternative 6 or Alternative 5 would be the conversion of a large, forested area to urban density residential and recreational buildings and neighborhoods onsite, and to business park use in SEIS Alternative 5, or possible commercial development on the adjacent property with SEIS Alternative 6.

Visual simulations were prepared to illustrate potential views of the site under SEIS Alternative 6 from surrounding areas. Large portions of the site would be preserved in open space, and forested buffers would be retained along the perimeter of the site, including along Bullfrog Road, which would largely block views of proposed development on the 47° North site from immediately surrounding areas. The greatest potential to see the development would be from higher elevation vantage points such as from Peoh Point. As noted in the SEIS, individual residential, recreational, and smaller future commercial buildings in 47° North would be barely visible from Peoh Point.

The anticipated aesthetic impacts under SEIS Alternative 6 are discussed further below in comparison to the Revised Proposal.

Revised Proposal

Overall, visual impacts would be substantially similar to those identified for SEIS Alternative 6. The Revised Proposal would incrementally change the visual character of the site from a mostly second growth forest to a more urban environment consisting of a residential, recreational, and commercial development (the commercial area is now part of the proposal) and open space. Vegetated buffer areas would surround the perimeter of the site. The slight change in the location of the access road to the commercial center from SR 903 is not anticipated to result in any significant change in visual impact. Similar to SEIS Alternative 6, site development would be guided by architectural and design guidelines established by the Applicant for residential and other structures; these guidelines would be specifically tailored for the 47° North project site to achieve a consistent visual quality. As with SEIS Alternative 6, the greatest potential to see development on the site would be from higher elevation vantage points such as Peoh Point. And while development under the Revised Proposal would be visible at a distance in the mid-ground, the proposed development would appear as a continuation of the existing nearby grey/tan-colored development in the area and would likely be seen as a grey/tan shaded mass as well. Individual residential, recreational, and smaller commercial buildings in 47° North would be barely visible from Peoh Point. Impacts would be virtually the same as for SEIS Alternative 6.

The Revised Proposal would include up to 553 acres of open space areas – compared to 477 acres under SEIS Alternative 6 – which equates to 62% of the site (see **Table 2-1** in **Chapter 2** for details), compared to 48% of the site for SEIS Alternative 5. This open space would provide visual separation among uses within the site, and between the site and surrounding uses. Perimeter buffer areas at least 100 feet in width would be provided adjacent to Bullfrog Road and to contiguous properties to the south that are not owned or controlled by the Applicant (e.g., the Horse Park). Buffers would consist of existing trees and other vegetation and would provide visual separation between the site and adjacent uses and would screen and minimize potential visual impacts. The 50-foot-wide platted buffer

adjacent to the SR 903 right-of-way would be maintained as part of proposed commercial development, and could help maintain a natural, forested entry to the City of Cle Elum.

Landscaping would be provided throughout the site and would create transitions and buffers between various land uses on and adjacent to the site. Specific landscape plans have not been developed to date but will be included in the Master Site Plan amendment application. Conceptually, the Revised Proposal would include landscaping along both sides of the connector and internal roads, in pockets in the private community/recreation open space areas, and in the residential neighborhoods.

Light and glare impacts would also be similar to SEIS Alternative 6 or Alternative 5. The primary sources of light and glare from development associated with the Revised Proposal would include street, building, and landscape lighting. The Applicant has committed to adopting standards/ recommendations for roadway lighting intensity consistent with the Illuminating Engineering Society of North America; these standards would minimize impacts from development on adjacent land uses and include lighting standards for roadways. Light and glare would also be generated by RVs in the RV resort, particularly during the peak season.

Indirect and Cumulative Impacts

Similar to SEIS Alternative 6, indirect visual impacts associated with the Revised Proposal could result from induced growth and changes in surrounding land uses, such as a potential increase in commercial activity along the SR 903 corridor and within the City of Cle Elum. Any such impacts would be comparable to those identified for SEIS Alternative 6, would be less than with Alternative 5, and are assumed to occur, if at all, consistent with applicable land use and zoning designations.

Cumulatively, development of the Revised Proposal in conjunction with other known projects (i.e., Suncadia, City Heights, and Cle Elum Pines) would contribute to urbanization and continuing changes in the visual/aesthetic character of the site vicinity. Cumulative changes in the visual landscape would be most evident from higher elevation vantage points. Cumulative development would also contribute to existing skyglow effects created by Cle Elum, South Cle Elum, Roslyn, Suncadia, and I-90. However, the increase in skyglow would be mitigated through implementation of International Dark Sky Association lighting designs.

3.2.3 Mitigation Measures

No new significant adverse impacts to aesthetics / light and glare would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a

description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres of the site would be preserved as open space, including natural open space, Managed Open Space, River Corridor Opens Space, wetlands and their buffers, and power line easements~~. A total of approximately 553 acres of open space, including undeveloped open space (including community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the amended Master Site Plan.

Required Mitigation Measures

- The 50-foot-wide platted buffer adjacent to the SR 903 right-of-way would be maintained in conjunction with proposed commercial development ~~on the adjacent 25-acre property~~. As feasible, and accounting for the need for signage, entry visibility, and similar design considerations, the existing forested vegetation in this area could be retained to partially screen the development and help maintain a natural, forested entry to the City of Cle Elum.

Section 3.3
HOUSING, POPULATION, & EMPLOYMENT

This section is based in part on the updated *Fiscal Assessment* (February 2023) prepared by ECONorthwest (see **Appendix E**).

3.3.1 Affected Environment

2020 / 2021 SEIS

The SEIS describes the existing housing, population, and employment conditions on and in the vicinity of the 47° North site as of 2020/2021 (see Draft SEIS Section 3.9 for details). Selected information from the Draft SEIS is described in context below; please consult the SEIS document for more detailed information.

2022 Revised Proposal

Changes that have occurred in housing, population, and employment conditions in the 47° North site vicinity since issuance of the SEIS are described below.

Kittitas County

The following information on housing and population trends in unincorporated Kittitas County over the last decade is included to provide additional context on local growth trends. In 2022 there were approximately 12,748 housing units in unincorporated Kittitas County, compared to 11,430 in 2010. The unincorporated County's current population is approximately 21,045 compared to 18,063 in 2010. (Washington OFM 2022)

City of Cle Elum

In 2022, there were approximately 1,175 housing units in the City of Cle Elum, about 5% more than at the time of the SEIS (Washington OFM 2022). The majority of housing in the city continues to be single family units (approximately 76%). In 2020, Cle Elum's Median Household Income (MHI) was $46,989, a slight decrease from that documented in the SEIS. In 2020, approximately 20% of Cle Elum's population was living below the poverty level, compared to 17% in the County, and 10% of all persons in the state. For comparison, the 2020 federal poverty threshold for a family of four was $26,200 (2020 ACS 5-year Estimates). In June 2022, the median value of all owner-occupied housing in Cle Elum was $676,000, about 62% greater than in 2020 (June 2022 data from Zillow Home Value). Similar to the documentation in the SEIS, the increase in MHI did not grow as rapidly as the increase in median home value.

Since the SEIS was prepared, Cle Elum's population increased from 2,157 people (2020 Census) to an estimated population of 2,250 in 2022, an increase of 93 persons (18%) (Washington OFM 2022).

In 2020, there were approximately 1,154 people working in the City of Cle Elum, approximately 22% fewer employees than at the time of the SEIS (2020 ACS 5-year Estimates).

City of Roslyn and Town of South Cle Elum

Data on housing and population trends in the City of Roslyn and Town of South Cle Elum was not included in the SEIS but is presented here for informational purposes and to provide a context for potential indirect and cumulative impacts. Growth in these jurisdictions is also accounted for in several other sections of this Addendum (e.g., **Appendix B**, Utilities, **Appendix C**, Transportation; Section 3.7, **Public Services**).

In 2010, there were approximately 648 housing units in the City of Roslyn and approximately 271 housing units in the Town of South Cle Elum. Since that time, both jurisdictions have seen a slight decrease in the number of housing units. In 2022, the City of Roslyn contains approximately 5% fewer housing units, while the Town of South Cle Elum has approximately 3% fewer housing units than in 2010. Most of the housing units in these jurisdictions are single family housing units (93% in Roslyn and 66% in South Cle Elum) (Washington OFM, 2022).

Both the City of Roslyn and Town of South Cle Elum have experienced slight increases in their population since 2010. In 2010, Roslyn had a population of approximately 893 people and the South Cle Elum had a population of approximately 532 people. By 2022, Roslyn's population had increased by approximately 8% in this 12-year period, and the South Cle Elum's population had increased by approximately 6% (Washington OFM, 2022). The increase in population is due, at least in part, to an increasing rate of occupancy. The 2037 Growth Management Act (GMA) planning target for Roslyn population is 1,203, and for South Cle Elum a population of 1,059 (Kittitas County Comprehensive Plan, 2019).

Cumulative Impact Projects

Development of the cumulative impact projects (i.e., Suncadia Resort, City Heights, and Cle Elum Pines) has continued since the issuance of the SEIS. There have been no new vested projects in the City since 2020. Over the last two years, about 218 building permits have been issued for the Suncadia Master Planned Resort in the unincorporated Kittitas County, and about six permits in City of Cle Elum. This additional data is presented for informational purposes and is not used in a quantitative analysis because it represents a relatively short period of time. The data used in the cumulative impact analysis was collected over an extended period (up to 20 years). The recent data does indicate, however, that minimal growth has occurred in the City.

47°North Site

No development has occurred on the 47° North site since issuance of the SEIS, and the site does not contain any housing, population, or employment.

3.3.2 Impacts

2020 / 2021 SEIS

As described in the SEIS, SEIS Alternative 5 and 6 would develop the 47° North site with new residential units, in a range of housing types (single family and multi-family) and densities Both would also reserve a 6.8-acre undeveloped property that would be dedicated to the city and developed by others in the future with 50 units of affordable housing. An RV resort was also proposed with SEIS Alternative 6 but would not include permanent residential units.

While the RV sites are not considered permanent, and would not generate permanent residents, an equivalent or "proxy" population[1] was calculated for these sites and used to estimate potential impacts to public services and other elements of the environment attributable to transient/recreational visitors. As discussed further in the Public Services section, and based on updated data, the proxy RV population estimate is considered to be conservative and likely overestimates or double counts some types of impacts.

Under SEIS Alternative 5 and 6, development of the project would involve a combination of local and non-local construction workers. Development of the residential and recreational areas onsite, as well as the RV resort, would generate new employees for operation of the site. Future development of the commercial area could also generate new employment on the site.

The anticipated housing, population, and employment from SEIS Alternatives 5 and 6 is discussed further below in comparison to the Revised Proposal.

2022 Revised Proposal

As in the SEIS, new development under the Revised Proposal would create new housing and generate new population and employees on the 47° North site. **Table 3.3-1** summarizes the proposed residential units, associated permanent population, and employees under SEIS Alternative 6 and the Revised Proposal; SEIS Alternative 5 is also noted for comparison purposes. Targets for additional housing and population in Cle Elum by 2037 from the City's Comprehensive Plan are also shown.

[1] The proxy population calculated for the RV sites was based on an assumed average RV resort occupancy of 50% and three people per site, based on data provided by the Applicant reflecting occupancy at other projects throughout the U.S.

Table 3.3-1
PERMANENT HOUSING, POPULATION & EMPLOYMENT – SEIS ALTERNATIVE 6 & REVISED PROPOSAL (2037)[1]

	Residents/ Household[1]	Occupancy Rate[2]	Proposed Additional Housing (units)	City of Cle Elum 2037 Addt'l Housing Target	Proposed Additional Permanent Population	City of Cle Elum 2037 Addt'l Population Target	Proposed Commercial or Business Park Dev. (sq. ft.)[1]	Proposed Commercial or Business Park Employees[1]	Proposed RV Resort Permanent/ Seasonal Employees	Proposed Total Employees
SEIS Alt. 5	2.34	90%	1,334	**1,460**	2,809	**1,808**	950,000	1,900[1]	0	1,900
SEIS Alt. 6	2.34	90%	707	**1,460**	1,489	**1,808**	150,000	300	30 – 35/ 70 - 90[2]	400 - 425
Revised Proposal	2.37	88%	757	**1,460**	1,579	**1,808**	150,000	300[5]	30 – 35/ 70 – 90[6]	400 - 425
Revised Proposal w/o Affordable Hsg.	2.37	88%	707	**1,460**	1,475	**1,808**	150,000	300[5]	30 – 35/ 70 – 90[2]	400 - 425

Source: 2020/2021 SEIS, Sun Communities 2020, ECONW, 2020.

Note: Household sizes and occupancy rates for the Revised Proposal are based on the *U.S. Census Bureau, 2016-2020, American Community Survey, 5-Year Estimates*. The permanent residential units and associated residents are those at buildout of the residential area in 2028.

[1] The residents per household for SEIS Alt. 5 and 6 varies from that for the Revised Proposal because 2020 census data was used for the Revised Proposal.

[2] The occupancy rate for SEIS Alt. 5 and 6 varies from that for the Revised Proposal because 2020 census data was used for the Revised Proposal.

[3] SEIS Alt. 5 included business park development on a 75-acre site. SEIS Alt. 6 analyzed and the Revised Proposal includes commercial development on a 25-acre. There would be more employees in the business park development under SEIS Alt. 5 than the commercial development under SEIS Alt. 6 and the Revised Proposal because there would be a substantially larger site and developed space and different types of uses that generate different numbers of employees (e.g., there could be light industrial uses under SEIS Alt. 5).

[4]Sun Communities provided estimates for the anticipated employment numbers for the recreational facilities.

Construction

Like SEIS Alternative 6, construction of the Revised Proposal would involve a combination of local and non-local construction workers. Residential units would be constructed offsite as under SEIS Alternative 6, potentially in the Pacific Northwest. Proposed recreational buildings would be constructed onsite.

Operation

Housing

Under the Revised Proposal, 50 affordable housing units (rather than dedication of a site for future development of 50 affordable units by others) would be integrated into and dispersed on the project site to be developed by Sun Communities. The affordable housing would be located in the multi-family housing area onsite and would be developed and maintained by Sun Communities. For analysis purposes in this SEIS Addendum, housing and population are analyzed for the Revised Proposal with and without the 50 affordable housing units to help distinguish the impacts attributable to this element of the proposal.

The Revised Proposal would include a total of 757 new housing units (527 single family units and 230 multi-family units) at buildout in 2028; this total is 50 units greater (about 7%) than SEIS Alternative 6 and is attributable to the 50 units of affordable housing (see **Table 3.3-1**). The total planned residential units would fall within the City of Cle Elum's GMA 2037 planning target of an additional 1,460 housing units.

Without the affordable housing, the Revised Proposal would include the same number of units as SEIS Alternative 6, but a slightly higher population due to the revised occupancy estimate (see **Table 3.3-1**).

As with SEIS Alternative 6, it is assumed that except for the 50 affordable units, all housing under the Revised Proposal would be market rate. All the multi-family units are assumed to be rental units. Based on the Applicant's prior experience at other of its communities, it is expected that approximately 50% of the single family units would initially be rentals and 50% purchased, with an assumed 10% of the rental units being purchased each year. At full buildout, it is anticipated that approximately 10% of the single family homes would be rented (consistent with other communities in Sun Communities' portfolio).

The Revised Proposal would include the same number of RV/glamping sites as SEIS Alternative 6. As described in the SEIS, the RV sites are not considered permanent residential units and they would not be allowed to be used as housing of permanent residents (see the discussion of *Population* below for details).

The RV sites would generate temporary visitors to the site and the area. The following demographic information about RV users (PeakClub 2021) is provided for informational purposes:

- RV sales, and in turn RV site rentals, are greatest among those in the 55 to 64 age group (20% of sales), followed by the 65+ age group.
- RV purchasers are most likely to be middle class economically, making up about 2/3 of all owners and purchasers. This is largely because RVs represent a significant investment, with the average price of an RV currently at $89,500;
- The majority of RV owners/purchasers tend to be college educated, married, and from households with average incomes of $65,000 or greater.

The Revised Proposal would not directly result in the construction of any new housing in the City Roslyn or Town of South Cle Elum. It is possible that visitors to the RV resort could decide to relocate to Roslyn or South Cle Elum for their residence. This potential in-migration is speculative, however, and therefore the magnitude is unknown.

Overall, the incremental change in housing and its associated impacts under the Revised Proposal (as compared to SEIS Alternative 6) is not significant.

Population

The Revised Proposal could result in approximately 6% more population than SEIS Alternative 6 at buildout in 2028; this increase is due to updated assumptions for average residents per household and occupancy rates, and the integration of affordable housing by 2028 rather than development at some undetermined future date (see **Table 3.3-1**). Note that SEIS Alternative 5 (and the Bullfrog Flats approval) did not include or evaluate the 50 units of affordable housing that would be developed on the site dedicated to the city. The impacts of those 50 housing units would have been evaluated at some time in the future, whereas the Revised Proposal includes and evaluates those impacts as occurring by 2028. Without the additional affordable housing, the Revised Proposal's population would essentially be the same as SEIS Alternative 6 at residential buildout; any differences are explained by changes to assumptions about persons per household and occupancy rates based on 2020 census data used for the Revised Proposal). No additional population would be generated after 2028. The new permanent residents under the Revised Proposal would be within the City of Cle Elum's GMA 2037 planning target for population growth.

The Revised Proposal would include the same number of RV/glamping sites as SEIS Alternative 6. These sites would generate temporary visitors to the site and vicinity; no permanent residents would be allowed. For analysis purposes, a proxy RV site population has been calculated (the same proxy population as SEIS Alternative 6) to help estimate possible impacts associated with temporary visitors. The visitor population would vary with the season (see **Table 3.3-1**). This proxy population is used for analysis purposes in other sections of this SEIS Addendum (e.g., Section 3.7, **Public Services**, and **Appendix B**, Utilities). As noted previously and discussed further in the Public Services section, the proxy RV population estimate is considered to be conservative and likely overestimates or double counts some types of impacts.

The Revised Proposal would not directly add any new population to the City of Roslyn or Town of South Cle Elum or unincorporated Kittitas County. However, some of the visitors to the RV resort could possibly decide to relocate to neighboring jurisdictions, which would indirectly add to their population. This indirect population impact is considered speculative, however, and the magnitude and significance of any impact is unknown.

Population change in itself is not an adverse impact and overall, the incremental change in population and its associated impacts under the Revised Proposal (compared to SEIS Alternative 6) is not considered significant. The population increase associated with the approved Bullfrog UGA Master Site Plan, as evaluated in both the original EIS and the SEIS under SEIS Alternative 5, would be substantially greater (see **Table 3.3-1**).

Employment

Like SEIS Alternative 6, construction of the project would involve a combination of local and non-local construction workers.

Under the Revised Proposal, the 25-acre commercial property would be integrated into the project area developed by Sun Communities. It could include the same building area as SEIS Alternative 6 by buildout in 2031, although the types and amounts of uses would differ slightly. The commercial development is estimated to generate the same number of employees as SEIS Alternative 6 (see **Table 3.3-2**).

Table 3.3-2
ESTIMATED COMMERCIAL AREA EMPLOYEES –
REVISED PROPOSAL (2028, 2031)

	2028	2031
Grocery (sf)	50,000	50,000
Retail (sf)	42,000	56,000
Restaurant (sf)	18,000	24,000
Office (sf)	10,000	20,000
Total Employees[1]	**240**	**300**

Source: Sun Communities, ECONW, 2022.

[1] Assumes one employee per 500 square feet for each commercial development type and 100% occupancy, the same assumption as in the *SEIS*.

The same numbers of year-round employees and seasonal employees would work in the RV resort under the Revised Proposal at buildout of the recreational areas in 2027 as under SEIS Alternative 6. Seasonal employees would be employed onsite during the peak RV resort season (typically June through August) (see **Table 3.3-1**).

Indirect and Cumulative Impacts

Similar to SEIS Alternative 6, cumulative housing and population impacts would occur with the Revised Proposal together with approved/vested development in the City of Cle Elum, unincorporated Kittitas County, and surrounding cities. Housing and population under the

Revised Proposal would be slightly greater than SEIS Alternative 6 — due to the addition of affordable housing units and some changes in underlying assumptions — but substantially less than Alternative 5 at buildout.

The additional housing units and associated population in Suncadia, together with the Revised Proposal, would result in cumulative housing and population in Kittitas County, similar to SEIS Alternatives 5 and 6. Likewise, the additional housing and associated population in City Heights and Cle Elum Pines, together with the Revised Proposal, would result in cumulative housing and population in the City of Cle Elum, similar to SEIS Alternatives 5 and 6. (See Draft SEIS Section 3.9 for details.) This cumulative development in the City of Cle Elum would exceed the City's current housing and population targets, which again are not considered caps/limits on growth.

While the Revised Proposal would have slightly more residential units and population than SEIS Alternative 6, population growth is not per se an adverse impact and the incremental increase in population is not significant. To the extent that growth is properly planned for, and adequate housing, infrastructure, and services are provided, significant housing, population, and employment impacts can be avoided or reduced. Housing and population growth would be substantially less than with SEIS Alternative 5. As noted earlier in this section, between 2010 and 2022, population in unincorporated Kittitas County increased by almost 3,000 persons while the City of Cle Elum grew by 93. Other things being equal, a smaller project in the City, and one with a smaller employment component, would be likely to be a smaller impetus to indirect growth.

Like SEIS Alternative 6, the Revised Proposal could result in indirect impacts from additional housing and population associated with increased demand for public services and utilities and increased traffic. These indirect impacts could occur within the City of Cle Elum, as well as potentially in the City of Roslyn, the Town of South Cle Elum, and unincorporated Kittitas County; these impacts are discussed in other sections of this SEIS Addendum (e.g., **Appendix B**, Utilities, **Appendix C**, Transportation; and Section 3.7, **Public Services**).

Overall, the incremental changes in indirect and cumulative impacts under the Revised Proposal (compared to SEIS Alternative 6) are not considered significant.

3.3.3 Mitigation Measures

No new significant adverse impacts to housing, population, and employment would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

- ~~The estimated monthly mortgage payment for the proposed single family housing could be affordable to city residents, based on 60% of the city's and county's 2018 Median Household Income (MHI) and dedication of 30% or less of a household's monthly gross income to housing and utilities. This affordable housing would be located onsite throughout the proposed residential development.~~ Note: Fifty (50) affordable housing units would be integrated into the multi-family portion of the development. These affordable housing units would be developed and maintained by Sun Communities, but it is assumed that they would be managed by a public or non-profit entity approved by the city.

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- ~~Access, water, and sewer would be constructed, consistent with development standards, up to the affordable housing parcel boundaries, as with every other parcel in the Master Site Plan.~~ Note: The Revised Proposal includes provision of affordable units by the Applicant in lieu of dedication of a site for future development of those units by others; the acreage shown in SEIS Alternatives 5 and 6 as being dedicated to the city for affordable housing development would be retained as undeveloped open space. The existing requirement would be duplicative of the proposal, therefore, and would be deleted or modified depending on the City Council's action on the Revised Proposal. It is also noted that the adopted Bullfrog Flats Development Agreement makes the city responsible for providing sewer and water to the affordable units; the Addendum identifies and evaluates the incremental demand for utilities associated with those units so impacts can be mitigated by the appropriate party.

- ~~Sun Communities, as successor to New Suncadia, would be given the option in a new or updated Development Agreement to assist in the selection process for potential owners/developers of the affordable housing parcel.~~ This condition is no longer relevant since the affordable housing would be integrated into the master plan's residential area and not located on a separate site.

- A minimum of 150 residential dwelling units, not including the 50 possible affordable housing units, would remain rental units and a covenant would be recorded on the property to ensure this condition continues for 20 years. Note: This requirement would be met by the Revised Proposal. All proposed 180 multi-family housing units would be leased/rented; some of the single family housing would be leased/rented as well. A covenant may or may not be recorded to ensure this condition.

Required Mitigation Measures

- A housing policy in the 2019 City Comprehensive Plan (H-1.9) requires that affordable housing be provided in projects with more than 20 units. The Revised Proposal would exceed this requirement by providing 50 affordable housing units in the multi-family area onsite.

Approved Bullfrog Flats Conditions of Approval Not Included in the Proposal

- ~~A useable area of 7.5 acres is required to be conveyed to the City of Cle Elum, or another public or non-profit entity approved by the city.~~ Note: Under the Revised Proposal, a separate area for affordable housing would not be conveyed to the city because this housing would be developed by the Applicant and integrated within the multi-family residential area onsite.

- The existing supply of affordable housing in Upper Kittitas County should periodically be monitored and inventoried, and as necessary advocated for, to help ensure that a continuous supply of housing is affordable for those earning the wages paid at the Suncadia resort. Note: This requirement does not appear to be necessary for the Revised Proposal given the reduced scale of housing and employment compared to the approved Bullfrog Flats project.

- The existing labor pool should be actively recruited, hired, and contracted with to minimize in-migration employment and associated housing impacts. Note: This condition may not be relevant to 47º North since construction labor demand would be considerably less than for Bullfrog Flats due to the inclusion of manufactured housing and its construction offsite.

Section 3.4
CULTURAL RESOURCES

The Cultural Resources section is a summary of the *Cultural Resources Report* (September 2022) prepared by the Yakama Nation Cultural Resource Program (CRP). Because of its sensitive nature, this report was submitted directly to Washington State Department of Archaeology and Historic Preservation (DAHP) and consistent with state law, is not included in this Addendum. No additional investigation or analysis of the overall 47º North site was necessary or conducted.

3.4.1 Affected Environment

2020 / 2021 SEIS

The SEIS described the existing historic and cultural resources on and in the vicinity of the 47° North site at that time (see Draft SEIS Section 3.10 and Final SEIS Section 3-3 for details). The SEIS included a mitigation measure requiring that field investigation of the commercial property should be conducted when it is proposed for development.

Selected information from the Draft SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

Revised Proposal

Since the publication of the SEIS, all but one acre of the Bullfrog UGA properties owned by New Suncadia, including the 25-acre commercial development area, has been acquired by Sun Communities and is now included in the Revised Proposal. Cultural resources investigations were conducted on the commercial property for this SEIS Addendum. Following are background on and the results of the investigations.

Prehistoric/Historic Context

The 47° North site is situated within the traditional territory of the Sahaptin-speaking Kittitas and Yakama people. Other groups, such as the Southern Lushootseed-speaking Snoqualmie bands also may have overlapped with the Kittitas and Yakama. The first non-native settlers arrived in the Kittitas Valley in the 1840s. In an 1855 Treaty, the Yakamas ceded most of their ancestral land, including the future site of City of Cle Elum. Cattle ranching, mining, and logging were pursued in the Cle Elum area in the mid-1800s through the 1900s. More recently, the Cle Elum vicinity has become a recreational destination with the construction of nearby highways (e.g., I-90).

Previous Investigations

Previous, relevant archaeological investigations conducted within one mile of the proposed commercial development area are described below. The investigation conducted in 1998 for the MountainStar Resort (of which the 47° North site, including the commercial property, were originally a part) documented many resources within the larger proposed development, but no resources were identified within the project footprint. Three other surveys were performed within proximity to the commercial property. A timber sale survey conducted in 2005 of a property adjoining the property to the east resulted in the identification of two historic resources including the ranger station residence and an isolated telecommunication insulator. A survey conducted in 2019 to the south for the expansion of the Laurel Hill Cemetery identified an historic boundary marker and a discarded headstone. The most recent survey conducted in 2021 for the 47° North site found no new archeological resources.

Previously Recorded Sites

A review of the DAHP database for the presence of known cultural/archaeological sites was conducted. Within one mile of the commercial property, there are 26 previously recorded resources. All these resources are associated with historic use except for one precontact isolate. Many of these resources have been evaluated as not eligible to be listed on the National Register of Historic Places (NRHP), with seven having been recommended potentially eligible or eligible to the NRHP.

Historic Land Features

Based on a review of historic maps, historic land features which are present within the commercial property area include two historic roads. The roads branch from the east in the location where the town of Cle Elum would later be established. The northern road extends northwest towards Roslyn while the southern road extends southwest towards the Yakima River.

Several mining tunnels bisect the commercial property area. Railroads serving coal fields were also located nearby.

The parcel abutting the commercial property to the south remains owned by the City of Cle Elum and consists of the Laurel Hill Cemetery set aside in 1900.

One historic road is discernable at the southern extent of the commercial property extending from the transmission line, continuing east, and interconnecting with another road leading into the town of Cle Elum.

Site Investigation

A pedestrian survey was conducted in September 2022, using transects at 5-meter intervals covering the entire site. One historic road segment was documented *(HP729063)*. The historic road extends approximately 0.6 mile. Approximately 260 feet of this segment lies within the commercial property. While precontact archaeological resources are protected

under State Law RCW 27.53, historic resources may be evaluated under federal criteria for eligibility to the NRHP. The road segment is not associated with a significant event, person, or represent the work of a master. The road segment is unlikely to yield additional information significant to the understanding of history beyond its recordation and is therefore recommended not eligible to the NRHP.

To assess the potential for buried cultural deposits, sub-surface testing was also conducted in September 2022. No buried cultural resources were identified during the testing.

No further work on the historic property is recommended by Yakama Nation CRP.

3.4.2 Impacts

2020 / 2021 SEIS

Archaeological sites that are located onsite have been determined to be not eligible for listing on the NRHP or Washington Historic Register (WHR); therefore, significant impacts to known cultural resources are not expected. Under SEIS Alternatives 5 and 6, large areas of open space would be preserved, including along the Cle Elum River where most of the previously recorded sites were located; the Cle Elum River open space corridor is protected by a conservation easement. As described in the SEIS, unknown/unidentified cultural resources could potentially be impacted or destroyed by proposed site development under SEIS Alternative 6 and SEIS Alternative 5; this is also true for practically any site and inadvertent discovery protocols are established by State law and proposed mitigation.

Revised Proposal

No archaeological sites or resources were identified on the commercial property. Therefore, significant impacts to known cultural resources are not expected. However, ground disturbing activities, including clearing, grubbing, grading, and construction excavations, would be required for development of the commercial property which could inadvertently unearth unknown cultural or archaeological material. If any ground disturbing activities results in the inadvertent discovery of cultural or archaeological material, work would be stopped in the immediate area and contact would be made with DAHP and Yakama Nation CRP. Work would remain suspended until the find is assessed, and appropriate consultation is conducted.

While no prehistoric Native American archaeological materials were identified in the vicinity of the commercial property, such materials could be discovered during development of the overall 47° North project of which the commercial property is a component. Onsite monitoring (e.g., by Yakima Nation CRP) would take place during all ground disturbing activities with potential to intersect Holocene deposits where archaeological materials could be present, which were observed up to 8.5 feet below ground surface.

3.4.3 Mitigation Measures

No new significant adverse impacts on cultural resources would occur from the Revised Proposal and no additional mitigation measures are required. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS and one new voluntary measure. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

- ~~When the 25-acre property contemplated for future commercial use is proposed to be developed, a field investigation of the property should be conducted~~.

- The Applicant has voluntarily committed to pursue a Memorandum of Understanding (MOU) with the Yakama Nation regarding the protection of Cultural Resources on the 47º North project site. The Cultural Resources analyses in the SEIS and Addendum do not identify any direct impacts to resources located on the project site. In addition, the defined open space corridor adjacent to the Yakima River is subject to a pre-existing formal agreement that protects cultural and environmental resources within the defined open space. Notwithstanding these conclusions, the Applicant understands and appreciates that the Yakama Nation defines "cultural resources" more broadly than archaeological artifacts, and that this broader definition encompasses the larger context of historical activities and environmental conditions, and potential future indirect and cumulative effects on soils, water, fish and wildlife from development. The Applicant, therefore, agrees to pursue an MOU with the Yakama Nation that will address the potential to monitor construction activity proximate to culturally sensitive areas of the site, will consider protocols to ensure ongoing protection of the site's environmental resources, and any other issues of mutual concern to the parties.

Required Mitigation Measures

- In the event that ground disturbing or other activities result in the inadvertent discovery of archaeological deposits, work would be halted in the immediate area and contact made with DAHP and Yakama Nation CRP. Work would be halted until such time as further investigation and appropriate consultation is concluded. See *Final SEIS* Appendix B for details on protocols for inadvertent discoveries.

Section 3.5
PARKS & RECREATION

3.5.1 Affected Environment

2020 / 2021 SEIS & Revised Proposal

The SEIS described the existing parks and recreation conditions on and in the vicinity of the 47° North site at that time (see Draft SEIS Section 3.11 for details). Selected information from the Draft SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

The 47° North site is largely vacant and undeveloped, and comprised of vegetated/forested land. Horseback riding, hiking, and snowmobiling occur on dirt roads throughout the site. Easements are in place for authorized use of the site and certain trails by the adjacent Washington State Horse Park. Some authorized equestrian facilities, including a small building, parking area, and load/unload areas, are also located onsite. Other recreational uses that take place onsite are informal and occur without the permission of the property owner. An approximate 12-acre area in the north part of the Bullfrog Flats property has been removed from the master plan site and dedicated to the City for a municipal recreation center (see **Chapter 2** of this Addendum for details).

3.5.2 Impacts

2020 / 2021 SEIS

Development of the 47° North site under either of the SEIS Alternatives would result in new housing and population and the creation of new jobs, which would generate associated increases in demand for parks and recreation areas and facilities. SEIS Alternatives 5 and 6 include public trails, parks, and open space, which would accommodate some likely demand. Anticipated parks and recreation areas and facilities under SEIS Alternatives 5 and 6 are quantified and described further below in comparison to the Revised Proposal.

Revised Proposal

The Revised Proposal would generate incrementally greater demand for recreation areas and facilities compared to SEIS Alternative 6 due to an increase in housing units and associated population. The Revised Proposal would include several recreation areas and facilities on the 47° North site, similar to SEIS Alternative 6. **Table 3.5-1** summarizes parks, trails, and recreational facilities included in SEIS Alternatives 5 and 6, and the Revised Proposal. A few items should be noted. SEIS Alternative 6 and the Revised Proposal provide relatively specific information about planned facilities, whereas SEIS Alternative 5 is more

Table 3.5-1
REQUIRED & PROPOSED PARK & RECREATION FACILITIES

Parks/Recreation Facility	City Park Plan Target/Goal (2037)	SEIS Alt. 5 Required (2037)[1]	SEIS Alt. 5 Proposed	SEIS Alt. 6 Required (2037)[2]	SEIS Alt. 6 Proposed	Revised Proposal Required[3]	Revised Proposal Proposed
Active parks	6 acres/1,000 people	14.0 acres	19.6 acres[4]	8.9 acres	19.5 acres[5]	9.5 acres	20 acres[6]
Open space	9 acres/1,000 people	21.1 acres	524 acres	13.4 acres	476.7 acres	14.2 acres	553 acres
Tracks, trails, & connections	4 miles/1,000 people	9.4 miles	Unknown	6.0 miles	Approx. 6 miles	6.3 miles	Approx. 6.0 miles
Park restrooms	1 per park	Unknown	Unknown	8 restrooms	Provided	Unknown[9]	To be Deternined[9]
Park & trail head water fountains	1 per park/trailhead	Unknown	Unknown	8 water fountains	Provided	Unknown[9]	Unknown[9]
Aquatic facility	1 citywide[7]	N/A	Unknown	N/A	Provided[8]	N/A	To be Determined[8]
Basketball courts	8 citywide[7]	N/A	Unknown	N/A	None	N/A	None
Soccer fields	4 citywide[7]	N/A	Unknown	N/A	None	N/A	None
Tennis courts	4 citywide[7]	N/A	Unknown	N/A	Possibly Provided[9]	N/A	To be Determined[10]

Source: City of Cle Elum Parks, Recreation, and Open Space Plan, February 2018.

[1] A permanent population of 2,340 was assumed for SEIS Alt. 5 by year 2037; full buildout of this alternative was assumed to occur in 2051. 2037 was used for comparison and to be consistent with the SEIS Alt. 6 full buildout date.

[2] A permanent population of 1,489 was assumed for SEIS Alt. 6 in year 2037. RV resort visitors would contribute to the need for parks and recreational facilities; however, since these would not be permanent residents, and the entire RV resort could be considered a recreational amenity, the RV visitors were not included in the analysis.

[3] A permanent population of 1,579 is assumed for the Revised Proposal. See Section 3.3, **Housing, Population, and Employment**, for details on this calculation of population. Like SEIS Alt. 6, the RV visitors were not included in the analysis.

[4] SEIS Alt. 5 would include the following Active Parks:

- Neighborhood Clubhouse and Lake:	18 acres
- Mini Parks:	1.6 acres
	19.6 acres

[5] SEIS Alt. 6 would include the following Active Parks:

- Adventure Center (one):	6.0 acres
- Private Amenity Centers (one 6-acre/one 5-acre)	11.0 acres (total)
- Public Trail Parks (three)	1.5 acres (total)
- Private Community Trail Parks (two)	1.0 acres (total)
	19.5 acres

[6] The Revised Proposal would include the following Active Parks:

- Private Amenity Centers (one 6-acre in residential area/ 5 acres throughout the RV resort)	11.0 acres (total)
- Public Trail Head Park (one)	6.0 acres (total)
- Public Trail Parks (three)	2.0 acre (total)
- Private Parks/Pocket Parks (multiple)	1.0 acres (total)
	20.0 acres

[7] These are city-wide targets/goals and do not necessarily apply to specific development projects.

[8] SEIS Alt. 6 and the Revised Proposal would include private Amenity Centers, which could include pool(s).

[9] The Amenity Centers and Community Parks under SEIS Alt. 6 and the Revised Proposal would include sport courts.

[10] The quantities of required and proposed restrooms and water fountains would be determined in coordination with the City.

general and does not quantify some recreation facilities included in **Table 3.5-1**. In addition, Sun Communities has transferred a site and funds for a community recreation facility to the City; this was a condition of the 2002 UGA approval and has been fulfilled. This could result in some consolidation of aquatic and other facilities between 47° North and the future City facility.

The Revised Proposal would generate incrementally greater demand for parks and recreational facilities compared to SEIS Alternative 6 and less demand than SEIS Alternative 5 assuming that demand is measured based on population. The Revised Proposal includes 90 people more than SEIS Alternative 6 and 1,230 people less than SEIS Alternative 5. The increased population associated with the Revised Proposal, including RV resort visitors, would increase the demand on regional resources such as camping, fishing, and hiking areas within nearby National Forests and Wilderness areas, on park and recreational resources in Kittitas County, and on local playfields within the Cle Elum vicinity.

As noted in the Public Services section discussion in the Addendum, the RV proxy population estimate used to calculate demand for various services and facilities is conservative and likely overstates the demand associated with this component of Alternative 6 and the Revised Proposal. RV visitors would use the recreational amenities provided on the project site, which would relieve some portion of potential use of off-site recreation facilities.

Public and private park and recreation amenities that are included in the Revised Proposal are summarized in **Table 3.5-1** and compared to City of Cle Elum city-wide targets from the City of Cle Elum Parks, Recreation, and Open Space Plan (2018), as well as to SEIS Alternatives 5 and 6. The active parks and open space provided under the Revised Proposal would slightly exceed SEIS Alternative 6 and SEIS Alternative 5, and exceed applicable city-wide targets/goals. A network of trails and sidewalks would also be included throughout the site under the Revised Proposal that would be similar to SEIS Alternative 6 and to the city-wide goal/target for tracks, trails, and connections. Overall, impacts would be similar to those identified for SEIS Alternative 6. In sum, park and recreation facilities provided in the Revised Project would exceed City standards.

The Horse Park has requested that safe and functional trails and public parks on the 47° North site be made available, and in some cases controlled, for equestrian use by the Horse Park. The Applicant addressed this request in the revised Master Site Plan. An approximately 55-acre area to the south of the site, adjacent to the Horse Park, has been added to the master plan. The Revised Proposal designates this area as open space with trails. This area was part of the Reserve Area under SEIS Alternative 5 but was not included in SEIS Alternative 6.

The park and recreational facilities onsite would be constructed, owned, and maintained by Sun Communities. However, horse trails or specific riding courses permitted by Sun Communities would be constructed and maintained by the Horse Park.

Indirect and Cumulative Impacts

Similar to SEIS Alternative 6, new development and residential population under the Revised Proposal, in combination with the cumulative impact projects (i.e., Suncadia, City Heights, and Cle Elum Pines) would increase the use of off-site recreation areas and amenities. The provision of recreation facilities and amenities within these developments would satisfy some of the demand from the projects, but cumulatively would also attract additional visitors to the area that could increase the use of recreation areas and amenities in proximity to the projects.

3.5.3 Mitigation Measures

No new significant adverse impacts on parks and recreation would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measures identified below include those measures that have been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

- ~~A total of approximately 477 acres of open space, including the Natural, Managed, and River Corridor Open Space areas, perimeter buffers, wetlands and their buffers, and on-site power easements, should be included in the project~~. A total of approximately 553 acres of open space, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the project.

- ~~Three public trail parks totaling 1.5 acres and two Community Trail Parks totaling 1.0 acres should be provided.~~ A Trail Head Park totaling 6.0 acres, public trail parks totaling 2.0 acres, and private parks/pocket parks totaling 1.0 acres would be provided.

- ~~An approximate 6-acre adventure center open to residents and the public should be provided.~~

- ~~Two private recreational amenity centers totaling 11 acres should be provided, one in the RV resort and the other in the residential area.~~ Private recreational amenity centers totaling 11 acres would be provided in the RV resort and residential area.

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- A 12-acre parcel would be dedicated to the city for future construction of a municipal (community) recreation center. This requirement has been satisfied. The municipal recreation center site and funding have already been dedicated to the city and the site is not part of the site of the Revised Proposal.

Section 3.6
TRANSPORTATION

The Transportation section is a summary of the *Transportation Report* (January 2023) prepared by Transportation Engineering Northwest (TENW) in **Appendix C**.

3.6.1 Affected Environment

2020 / 2021 SEIS

The SEIS described the existing transportation conditions on and in the vicinity of the 47° North site at that time (see Draft SEIS Section 3.13 and Final SEIS Section 3-2 for details). Selected information from the Draft and Final SEIS is provided and compared in context below; please consult these SEIS documents for more detailed information.

Revised Proposal

The 47° North site is served by I-90 to the south, Bullfrog Road to the northwest and west, and SR 903 (2nd Street) to the northeast. No development has occurred on the site since 2020. The SEIS Addendum studies the same 27 intersections that were studied in the Draft and Final SEIS, plus the proposed site accesses on Bullfrog Road and SR 903. To be consistent with the SEIS, the updated transportation analysis evaluates future years 2025, 2031, and 2037 during the weekday, Friday, and Sunday PM peak periods, with 2025 representing an early development phase of the Revised Proposal, 2031 representing full buildout, and 2037 the horizon year for City of Cle Elum's and Kittitas County's Comprehensive Plans and post-completion of the Revised Proposal.

Supplemental summer peak hour traffic volumes were collected at ten study intersections in July 2022 for the weekday, Friday, and Sunday PM peak periods. The supplemental traffic volumes showed that the weekday PM peak period annual background traffic growth that occurred between 2019 and 2022 at study intersections along Bullfrog Road (#1-6) was higher than the SEIS anticipated to occur between 2019 and 2025. As a result, the 2025, 2031, and 2037 'Baseline' condition (with background growth but without the Revised Proposal) traffic volumes at these six intersections along Bullfrog Road were updated for the weekday PM peak hour only (see **Appendix C** for details). The background traffic growth that occurred between 2019 and 2022 at all other study intersections during the weekday PM peak hour was consistent with the forecast annual growth anticipated to occur between 2019 and 2025. Additionally, the background traffic growth that occurred between 2019 and 2022 at the ten study intersections during the Friday and Sunday peak hours was reexamined and determined to be consistent with the forecast annual 'baseline' traffic growth anticipated to occur by 2025 and were not adjusted.

'Baseline' Intersection Level of Service

'Baseline' intersection level of service (LOS) (i.e., without the project) was updated at the six study intersections along Bullfrog Road and compared to the established LOS standards: LOS C for WSDOT intersections on I-90 and SR 903, LOS C for intersections within the City of Cle Elum, and LOS D for intersections within the rural areas of Kittitas County (including Bullfrog Road).

Weekday Summer PM Peak Hour

Of the six study intersections with updated 'Baseline' volumes along Bullfrog Road, the following intersections are expected to operate at non-compliant LOS for future 'Baseline' conditions during the summer weekday PM peak hour in 2037:

- #1 - Bullfrog Road / I-90 EB Ramps – LOS F by 2037 *(identified as LOS D by 2037 in the Final SEIS)*
- #2 - Bullfrog Road / I-90 WB Ramps – LOS D by 2037 *(identified as compliant in the Final SEIS)*

Data for weekend summer PM peak hour, intersection LOS is presented in **Appendix C**.

Collisions History/Traffic Safety

The collision history summarized in the Final SEIS remains unchanged.

3.6.2 Impacts

2020 / 2021 SEIS

As described in the SEIS, SEIS Alternative 6 would generate temporary construction-related traffic impacts over buildout of the project. Construction traffic impacts would be shorter and more condensed under SEIS Alternative 6 than under SEIS Alternative 5 because of the shortened buildout period. Proposed development under the SEIS Alternatives would increase traffic volumes and congestion on area roadways (e.g., in the City of Cle Elum, Kittitas County, and on state facilities such as SR 903, SR 907, and I-90); this is identified as an unavoidable effect of urban development. The LOS analysis in the SEIS indicated that several of the studied intersections would exceed LOS standards during the PM summer peak hours in the future analysis years (2025, 2031, and 2037) with the additional traffic generated by SEIS Alternatives 5 and 6; some of these intersections would also exceed the LOS standards without the project (e.g., in the 'Baseline' scenario) due to continued growth in background traffic. Mitigation measures would offset or reduce significant adverse transportation impacts under SEIS Alternative 6.

Revised Proposal

This section compares the Revised Proposal to SEIS Alternative 6. In some cases, level of service, and the year mitigation is needed at the studied intersections may have changed

with the Revised Proposal, but there are no new off-site mitigation requirements when compared to the off-site mitigation measures identified with SEIS Alternative 6 as reported in the Final SEIS. It should be noted that the Bullfrog Road/RV Access Road intersection is a new mitigation measure in the updated transportation analysis as a result of additional background growth on Bullfrog Road. However, all intersections providing access to 47° North will be designed to meet applicable level of service standards and are included in the proposal.

Site Access & Circulation

Site access and circulation with the Revised Proposal would generally be the same as with SEIS Alternative 6 except that the Revised Proposal site access on SR 903 would now align with Bala Drive on the north side of SR 903; this access was offset in SEIS Alternative 6. There would also be some changes to the design of the onsite Connector Road (see **Chapter 2** for details).

Trip Generation

Trip generation for the Revised Proposal was updated based on the revised 47° North land use proposal and site plan, which include 50 affordable housing units and the integration of commercial development in the project. Additionally, the trip generation was updated for the revised 47° North proposal to reflect the updated development timeline (full buildout by 2031) using the latest edition of the ITE *Trip Generation Manual* (11th Edition).

Table 3.6-1 compares the total net new trip generation estimates for SEIS Alternative 6 and the Revised Proposal. As shown**,** the total net new trips generated by the Revised Proposal in 2025 is estimated to be 141 trips higher (+24%) during the weekday and Friday PM peak hours and 149 trips higher (+29%) during the Sunday peak hour than SEIS Alternative 6. The increase in the year 2025 trip generation for the Revised Proposal is primarily a result of the increase in commercial land uses that would be developed by 2025 compared to what was assumed for SEIS Alternative 6.

As also shown in **Table 3.6-1,** with full buildout of 47° North in 2031*,* the total net new trip generation under the Revised Proposal is estimated to be 77 trips higher (+6%) during the weekday and Friday PM peak hours and 316 trips higher (+31%) during the Sunday peak hour than SEIS Alternative 6. This increase in the full buildout Sunday project trip generation for the Revised Proposal is a result of the change in the mix of commercial land uses compared to Alternative 6, i.e., a reduction in office uses, which generate minimal trips on a Sunday, and an increase in retail/restaurant use. The 50 affordable housing units under the Revised Proposal are estimated to account for 1.4 to 1.6% of the total trip generation between 2025 and 2031.

Table 3.6-1
TRIP GENERATION COMPARISON –
REVISED PROPOSAL & SEIS ALTERNATIVE 6

	Total Net New Trip Generation					
	SEIS ALTERNATIVE 6			REVISED PROPOSAL		
Year	Weekday	Friday	Sunday	Weekday	Friday	Sunday
2025	580	580	506	721	721	655
Full Buildout[1]	**1,225**	**1,225**	**1,012**	**1,302**	**1,302**	**1,328**

Source: TENW, 2023.

[1] Full Buildout of the Revised Proposal is assumed to occur by 2031. Full Buildout of SEIS Alternative 6 was assumed to occur by 2037 in the *SEIS*.

Note that weekday trip generation at buildout for SEIS Alternative 5 is estimated at 1,826 trips, or approximately 30% greater. Sunday trips would be lower, however, due to the absence of retail land uses in Alternative 5.

Intersection LOS

The Revised Proposal project trip generation for future years 2025, 2031, and 2037 for the weekday PM peak hour, Friday PM peak hour, and Sunday peak hour was assigned to the road system based on the project trip distribution and assignment documented in the SEIS.

Intersection LOS analysis results with the Revised Proposal for future years 2025, 2031, and 2037 during the weekday PM peak hour in the peak summer period are summarized in **Table 3.6-2**; the intersection analysis results for the Revised Proposal are compared to those for the 'Baseline' (without project) and SEIS Alternative 6. See Tables 8 and 9 in **Appendix C** for the intersection analysis results for the same future years during the summer Friday and Sunday PM peak hours.

Study intersections forecast to operate at non-compliant LOS are shown in bold text in **Table 3.6-2**. Study intersections forecast to operate at non-compliant LOS with the Revised Proposal that were not identified to operate at a non-compliant LOS with SEIS Alternative 6 are shown as bold, purple text with purple highlight. Study intersections forecast to operate at non-compliant LOS during the weekday summer PM peak hour with the Revised Proposal are used to identify potential improvements to meet the adopted LOS standards in the *Mitigation Measures* section. The LOS results are discussed in more detail below.

Weekday Summer PM Peak Hour

As a result of the updated future 'Baseline' traffic volume forecasts along Bullfrog Road, one intersection is anticipated to operate at a non-compliant LOS in the updated transportation analysis that operated at a compliant LOS for future 'Baseline' conditions in the Final SEIS:

- #2 - Bullfrog Road/I-90 WB Ramps – LOS D by 2037 (*identified as LOS E by 2037 with SEIS Alternative 6*)

As shown in **Table 3.6-2**, the same four intersections that operated at non-compliant LOS for future 'Baseline' conditions in the Final SEIS during the summer weekday PM peak hour would operate at non-compliant LOS in the updated transportation analysis:

- #8 - Ranger Station Road / Miller Avenue / W 2nd Street (SR 903) – LOS D by 2025
- #11 - Douglas Munro Boulevard / W 1st Street – LOS E by 2025
- #12 - N Pine Street / W 1st Street – LOS D by 2025
- #13 - N Stafford Avenue / W 2nd Street (SR 903) – LOS E by 2025

Additionally, the same six intersections that would operate at non-compliant LOS during the summer weekday PM peak hour with SEIS Alternative 6 would operate at non-complaint LOS with the Revised Proposal:

- #1 - Bullfrog Road / I-90 EB Ramps – LOS F by 2031 (*identified as LOS D by 2031 with SEIS Alternative 6*)
- #3 - Bullfrog Road / Tumble Creek – LOS E by 2031 (*identified as LOS F by 2037 with SEIS Alternative 6*)
- #7 - Denny Avenue / W 2nd Street (SR 903) – LOS D by 2025 *(identified as LOS E by 2031 with SEIS Alternative 6)*
- #9 - N Pine Street / W 2nd Street (SR 903) – LOS F by 2025 *(identified as LOS D by 2025 with SEIS Alternative 6)*
- #15 - N Oakes Avenue / W 2nd Street (SR 903) – LOS E by 2025 *(identified as LOS D by 2025 with SEIS Alternative 6)*
- #21 - Pennsylvania Avenue / N 1st Street (SR 903) in Roslyn – LOS E by 2031 *(identified as LOS D by 2031 with SEIS Alternative 6)*

Overall intersection delay may have increased at some locations and the year mitigation is needed at intersections may have changed with the Revised Proposal; however, there are no new intersections beyond those identified in the SEIS that would operate at non-compliant LOS during the summer weekday PM peak hour compared to SEIS Alternative 6.

Additionally, due to the updated future 'Baseline' traffic volume forecasts along Bullfrog Road, one of the intersections that was previously reported to operate at a non-compliant LOS with SEIS Alternative 6 would now operate at a non-compliant LOS under the future 'Baseline' condition (without the project).

Table 3.6-2
INTERSECTION LOS SUMMARY – WEEKDAY PM PEAK HOUR (SUMMER) – REVISED PROPOSAL

		Weekday PM Peak Hour Conditions (Summer Peak)																	
		Year 2025						Year 2031						Year 2037					
		"Baseline"		With SEIS Alt 6		With Revised Proposal		"Baseline"		With SEIS Alt 6		With Revised Proposal		"Baseline"		With SEIS Alt 6		With Revised Proposal	
Study Intersection	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
Signalized																			
14. S Cle Elum Way / Stafford / W 1st St	C	B	11.5	B	12.0	B	12.4	B	12.8	B	13.7	B	13.6	B	13.8	B	14.6	B	14.6
16. N Oakes Ave / W 1st St (SR 903)	C	B	10.4	B	10.8	B	11.1	B	11.7	B	13.0	B	13.0	B	15.9	C	21.1	C	21.6
18. Pennsylvania Ave / 1st St (SR 903)	C	A	7.6	A	7.5	A	7.7	A	8.0	A	8.6	A	9.3	A	9.1	B	10.7	B	10.8
Roundabout																			
4. Bullfrog Rd / Suncadia Trail [2]	D	A	6.3	A	5.6	A	7.3	A	7.2	A	7.5	A	9.9	A	8.9	B	10.3	B	13.1
6. Bullfrog Rd / W 2nd St (SR 903) [2]	C	A	7.9	A	6.8	A	9.2	A	8.8	A	8.0	B	11.4	B	10.1	A	9.7	B	13.4
All-Way Stop-Controlled																			
17. Pennsylvania Ave / 2nd St	C	A	9.6	B	10.1	B	10.4	B	11.9	B	14.3	B	13.6	C	16.8	C	20.6	C	21.0
Two-Way Stop-Controlled [3]																			
1. Bullfrog Rd / I-90 EB Ramps[2]	C	C	15.8	C	15.3	C	21.4	C	24.1	**D**	30.4	**F**	88.7	**F**	54.8	**F**	> 100	**F**	> 100
2. Bullfrog Rd / I-90 WB Ramps [2]	C	B	11.8	B	11.7	B	13.4	B	15.0	C	16.9	C	24.8	**D**	28.4	**E**	42.1	**F**	88.0
3. Bullfrog Rd / Tumble Creek Dr [2]	D	C	16.3	B	13.9	C	20.0	C	20.3	C	23.9	**E**	39.9	D	33.6	**F**	61.1	**F**	> 100
5. Bullfrog Rd / Firehouse Rd [2]	D	C	15.3	B	12.5	C	18.0	B	14.6	B	13.4	C	17.9	B	14.9	B	14.0	C	18.4
7. Denny Ave / W 2nd St (SR 903)	C	C	16.6	C	23.3	**D**	28.2	C	20.1	**E**	38.1	**E**	42.6	**D**	25.8	**F**	65.5	**F**	70.5
8. Ranger Sta Rd / Miller / W 2nd (SR 903)	C	**D**	26.1	**F**	95.7	**F**	> 100	**E**	47.8	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
9. N Pine St / W 2nd St (SR 903)	C	C	18.1	**D**	33.3	**F**	53.3	C	23.5	**F**	> 100	**F**	> 100	**D**	27.4	**F**	> 100	**F**	> 100
10. Douglas Munro Blvd / Ranger Sta Rd	C	A	7.7	A	7.9	A	8.0	A	7.9	A	8.3	A	8.4	A	8.4	A	9.0	A	9.0
11. Douglas Munro Blvd / W 1st St	C	**E**	46.2	**F**	56.1	**F**	67.3	**F**	74.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
12. Pine St / W 1st St	C	**D**	27.9	**D**	30.4	**D**	32.9	**D**	27.9	**D**	32.9	**E**	38.5	**E**	35.2	**F**	51.7	**F**	53.8
13. N Stafford Ave / W 2nd St (SR 903)	C	**E**	46.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
15. N Oakes Ave / W 2nd St (SR 903)	C	C	20.3	**D**	33.3	**E**	42.4	**E**	45.0	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
19. Oakes Ave / I-90 EB Off-Ramp	C	A	9.7	A	9.8	A	9.9	B	10.2	B	10.6	B	10.6	B	10.8	B	11.3	B	11.3
20. Oakes Ave / I-90 EB On-Ramp	C	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
21. SR 903 / E Pennsylvania Ave	C	C	19.3	C	21.7	C	22.1	C	22.1	**D**	**29.3**	**E**	36.1	**D**	25.4	**E**	42.6	**E**	45.0
22. SR 903 / Pacific Ave	C	B	12.0	B	12.8	B	12.9	B	14.5	C	16.8	C	17.9	C	17.2	C	22.2	C	22.5
23. Rock Rose Rd / Morrel Rd / SR 903	C	B	10.7	B	11.0	B	11.0	B	11.2	B	11.9	B	12.2	B	12.2	B	13.2	B	13.3

Source: TENW, 2023.

[1] LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the *Final SEIS*.

[2] Include changes to LOS results from the *Final SEIS* due to updated 'Baseline' traffic volumes along Bullfrog Road.

[3] LOS at two-way stop-controlled intersections is reported for the stop-controlled movement with the highest delay.

Friday Summer PM Peak Hour

As shown in Table 8 in **Appendix C**, the same five intersections that operated at non-compliant LOS for future 'Baseline' conditions in the Final SEIS during the summer Friday PM peak hour would continue to operate at non-compliant LOS with the Revised Proposal (i.e., future 'Baseline' traffic volumes and LOS results are consistent with the Final SEIS during the Friday PM peak hour).

Additionally, the same seven intersections that would operate at non-compliant LOS during the summer Friday PM peak hour with SEIS Alternative 6 would operate at non-complaint LOS with the Revised Proposal.

As described above for the summer weekday PM peak hour, although overall intersection delay may increase at some locations with the Revised Proposal, there would be no new intersections operating at non-compliant LOS during the summer Friday PM peak hour compared to SEIS Alternative 6 and identified in the SEIS. Overall, therefore, the impacts of the Revised Proposal identified in this Addendum are consistent with the analysis of impacts in the SEIS.

Sunday Summer PM Peak Hour

As shown in Table 9 in **Appendix C**, the same ten intersections that were reported in the Final SEIS to operate at non-compliant LOS for future 'Baseline' conditions (without the project) during the summer Sunday PM peak hour would operate at non-compliant LOS with the Revised Proposal (i.e., future 'Baseline' traffic volumes and LOS results are consistent with the Final SEIS during the Sunday PM peak hour). Additionally, the same eight intersections that would operate at non-compliant LOS during the summer Sunday PM peak hour with SEIS Alternative 6 would operate at non-complaint LOS with the Revised Proposal.

As identified previously for the summer weekday PM peak hour, although overall intersection delay may increase at some locations with the Revised Proposal, there would be no new intersections that would operate at non-compliant LOS during the summer Sunday PM peak hour compared to SEIS Alternative 6. Therefore, the overall impacts of the Revised Proposal identified in this Addendum are consistent with the analysis of impacts in the SEIS.

Roadway LOS

Roadway capacity was also evaluated on roadways within the 47° North project vicinity. The roadway capacity evaluation is consistent with the City of Cle Elum LOS policy for roadways and assumptions identified in the *City of Cle Elum 2019-2037 Comprehensive Plan* (Capital Facilities element, Table 404). Roadway LOS analysis results with the Revised Proposal for future years 2031 and 2037 during the weekday PM peak hour in the peak summer period are summarized in **Table 3.6-3**. See Tables G.2 and G.9 in Appendix G of **Appendix C** for the 2031 and 2037 Friday and Sunday summer PM peak hour roadway capacity results.

TABLE 3.6-3
ROADWAY WEEKDAY PEAK HOUR VOLUME AND LEVEL OF SERVICE

						Year 2031 Weekday												Year 2037 Weekday											
						'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal			'Baseline'[3]			With Alt 6			'Baseline'[3]			With Revised Proposal		
Functional Class	Road Name	Direction of (E/O, W/O, S/O, N/O)	Nearest Crossroad	Number of Lanes	Idealized Roadway Capacity (vph)[1]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]
Freeways	I-90 Eastbound Off-ramp (Exit 84)	to	W 1st Street	1	1,200	530	44%	A	542	45%	A	--	--	--	545	45%	A	590	49%	A	604	50%	A	--	--	--	605	50%	A
	I-90 Westbound On-ramp (Exit 84)	from	W 1st Street	1	1,200	320	27%	A	328	27%	A	--	--	--	331	28%	A	360	30%	A	371	31%	A	--	--	--	371	31%	A
	I-90 Westbound Off-ramp (Exit 84A)	to	N Oakes Ave	1	1,200	340	28%	A	390	33%	A	--	--	--	392	33%	A	400	33%	A	448	37%	A	--	--	--	452	38%	A
	I-90 Eastbound On-ramp (Exit 84A)	from	N Oakes Ave	1	1,200	240	20%	A	267	22%	A	--	--	--	280	23%	A	280	23%	A	318	27%	A	--	--	--	320	27%	A
	I-90 Eastbound On-ramp (Exit 80)	from	Bullfrog Road	1	1,200	245	20%	A	269	22%	A	270	23%	A	303	25%	A	335	28%	A	367	31%	A	360	30%	A	393	33%	A
	I-90 Westbound Off-ramp (Exit 80)	to	Bullfrog Road	1	1,200	355	30%	A	405	34%	A	400	33%	A	459	38%	A	555	46%	A	610	51%	A	600	50%	A	659	55%	A
Major Collector	SR 903 (W 1st St) (Eastbound Only)	W/O	N Pennsylvania Ave	1	1,000	430	43%	A	483	48%	A	--	--	--	466	47%	A	460	46%	A	495	50%	A	--	--	--	496	50%	A
	SR 903 (W 2nd St)	W/O	N Oakes Ave	2	2,000	1,040	52%	A	1,301	65%	B	--	--	--	1,246	62%	B	1,320	66%	B	1,514	76%	C	--	--	--	1,526	76%	C
	SR 903	W/O	N Stafford Ave/ S Cle Elum Way	2	2,000	1,130	57%	A	1,537	77%	C	--	--	--	1,478	74%	C	1,310	66%	B	1,638	82%	**D**	--	--	--	1,658	83%	**D**
	W 1st St	E/O	N Pine St	2	2,000	1,000	50%	A	1,000	50%	A	--	--	--	1,059	53%	A	1,130	57%	A	1,185	59%	A	--	--	--	1,189	59%	A
	N Pennsylvania Ave	N/O	SR 903	2	2,000	240	12%	A	290	15%	A	--	--	--	293	15%	A	300	15%	A	350	18%	A	--	--	--	353	18%	A
	N Oakes Ave	N/O	Railroad Ave	2	2,000	670	34%	A	747	37%	A	--	--	--	764	38%	A	810	41%	A	898	45%	A	--	--	--	904	45%	A
	Bullfrog Road	S/O	SR 903	2	2,000	480	24%	A	625	31%	A	710	36%	A	904	45%	A	500	25%	A	686	34%	A	730	37%	A	924	46%	A

Source: TENW, 2023.

1. The City of Cle Elum's major collector idealized capacities are 1,000 vph/ln, with 400 vph for two-way left-turn (TWLT) lanes.
2. LOS = Level of Service. Bold indicates does not meet LOS standard. (LOS A = 0.60 V/C, LOS B = 0.61 to 0.70 V/C, LOS C = 0.71 to 0.80 V/C, LOS D = 0.81 to 0.90 V/C, LOS E = 0.91 to 1.0 V/C, LOS F = >1.0 V/C).
3. DASHES indicate baseline volumes are consistent with the FSEIS and did not change with this update.

In general, the LOS results shown in **Table 3.6-3** are consistent with impacts shown in the 47° North FSEIS in that there would be traffic congestion throughout the city, primarily along W 2nd Street (SR 903); congestion is anticipated to be highest on summer weekends and would be expected to continue to deteriorate over time if no improvements are made.

The results in **Table 3.6-3** show that the evaluated roadway sections are anticipated to operate at compliant levels of service (LOS C or better) during the summer weekday PM peak hour with SEIS Alternative 6 and the Revised Proposal by 2031. However, W 2nd Street (SR 903) west of N Stafford Ave is anticipated to operate at LOS D by 2037 during the summer weekday PM peak hour with either SEIS Alternative 6 or the Revised Proposal.

Site Access Intersection LOS

The LOS analyses results at the site access intersections for future years 2025, 2031, and 2037 with the Revised Proposal are summarized in **Table 3.6-4** for the weekday PM peak hour, Friday PM peak hour, and Sunday PM peak hour (all for the summer peak period).

Site access locations forecast to operate at non-compliant LOS (LOS D, E, or F for the SR 903/Main Access Road site access and LOS E or F for the proposed Bullfrog Road site accesses) are shown in bold text in **Table 3.6-4**. Site access locations forecast to operate at non-compliant LOS with the Revised Proposal that were not identified to operate at a non-compliant LOS with SEIS Alternative 6 are shown as bold, purple text and purple highlight in **Table 3.6-4**. The LOS results are discussed below.

Weekday Summer PM Peak Hour

As shown in **Table 3.6-4**, during the weekday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS E by 2031 *(identified as compliant LOS D with SEIS Alternative 6)*
- #30 - SR 903 / Main Access Road – LOS F by 2025

Friday Summer PM Peak Hour

As shown in **Table 3.6-4**, during the Friday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS F by 2031
- #30 - SR 903 / Main Access Road – LOS F by 2025

Table 3.6-4
SITE ACCESS LOS SUMMARY – REVISED PROPOSAL & SEIS ALTERNATIVE 6

		Future Conditions (Summer Peak)											
		2025				2031				2037			
		With SEIS Alt 6		With Revised Proposal		With SEIS Alt 6		With SEIS Alt 6 Revised		With SEIS Alt 6		With Revised Proposal	
Site Access Intersection [1]	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
WEEKDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	C	16.6	C	18.6	C	24.0	**E**	**40.1**	D	28.6	**F**	65.1
29. Bullfrog Road / Main Access Road	D	B	13.5	C	18.5	C	16.2	D	33.8	C	23.2	D	33.0
30. SR 903 / Main Access Road	C	**F**	55.9	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
FRIDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	D	25.2	C	22.0	**F**	53.7	**F**	64.2	**F**	65.1	**F**	> 100
29. Bullfrog Road / Main Access Road	D	C	16.2	C	17.2	C	24.8	D	32.5	D	34.7	D	31.6
30. SR 903 / Main Access Road	C	**F**	82.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
SUNDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	**E**	48.9	**E**	35.2	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
29. Bullfrog Road / Main Access Road	D	D	29.4	**E**	35.5	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
30. SR 903 / Main Access Road	C	**F**	89.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100

Source: TENW, 2023.

[1] LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. LOS analysis at site access intersections assumes two-way stop control with major roadway (Bullfrog Road and SR 903) being free flow. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the *Final SEIS*.

Sunday Summer PM Peak Hour

As shown in **Table 3.6-4**, during the Sunday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS E by 2025
- #29 - Bullfrog Road / Main Access Road – LOS E by 2025 *(identified as LOS F by 2031 with SEIS Alternative 6)*
- #30 - SR 903 / Main Access Road – LOS F by 2025

3.6.3 Mitigation Measures

Overall, the significant adverse impacts on transportation that would occur from the Revised Proposal are consistent with those identified in the *Final SEIS*. Additionally, no new off-site mitigation measures are required for the Revised Proposal. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Table 3.6-5 identifies potential mitigation measures at the 11 study intersections that are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour conditions in 2025, 2031, or 2037 due to 'Baseline' conditions or the Revised Proposal project traffic. These are the same intersections that were forecast to operate at non-compliant levels with full buildout of SEIS Alternative 6 in the same years and peak period.

As in the Final SEIS, **Table 3.6-5** also identifies two different approaches to calculating pro-rata shares to fund the identified mitigating improvements. Method A (Solely Developer Responsibility) and Method B (Shared City/Developer Responsibility) are both presented. The alternative methodologies, which reflect different principles of engineering practice and SEPA policy, are discussed in greater detail in **Appendix C**. The pro-rata shares identified in **Table 3.6-5** have been updated to reflect the updated 'Baseline' traffic volumes at the six study intersections on Bullfrog Road, the updated trip generation of the Revised Proposal, and incorporation of the commercial parcel into the project.

As described in the Final SEIS, the specific form of mitigation, the pro-rata share cost of the mitigation, and the timing of the improvements will be evaluated and discussed by the Applicant, the city, and affected agencies and jurisdictions, including WSDOT, Kittitas County, and the City of Roslyn. The selected mitigation improvement for each affected intersection, pro-rata share methodology, and timing of the mitigation will be incorporated into conditions of approval and a new or updated Development Agreement between the Applicant and the City of Cle Elum. Improvement needs and mitigation will also be addressed in subsequent updates to the appropriate jurisdiction's transportation plans and capital improvement programs.

Table 3.6-5
SUMMARY OF MITIGATION MEASURES AND PRELIMINARY ESTIMATED PRO-RATA SHARE – REVISED PROPOSAL

Off-Site Study Intersection	Estimated Year Improvement Required (Forecast LOS)	Potential Improvement to Mitigate Weekday PM Peak Hour LOS Deficiency [1]	Estimated Pro-Rata Share			
			METHOD A [2]		METHOD B [2]	
			Background Share [3]	47° North Share (Revised Proposal)	Background Share [3]	47° North Share (Revised Proposal)
IMPROVEMENTS NEEDED FOR '"BASELINE"'/BACKGROUND CONDITIONS						
#2 – Bullfrog Road / I-90 WB Ramps [5, 6]	2037 (LOS D)	Compact Roundabout	n/a	n/a	82.9%	17.1%
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903)	2025 (LOS E)	Restrict Northbound and Southbound Left-Turns	68.7%	31.3%	68.7%	31.3%
#11 – Douglas Munro Blvd / W 1st Street	2025 (LOS E)	Signalization[9]	94.4%	5.6%	94.4%	5.6%
#12 – N Pine St / W 1st Street	2025 (LOS D)	Compact Roundabout	95.5%	4.5%	95.5%	4.5%
#13 – N Stafford Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout [10]	74.7%	25.3%	74.7%	25.3%
IMPROVEMENTS NEEDED FOR CONDITIONS WITH REVISED PROPOSAL [4]						
By Year 2025:						
#7 – Denny Ave / W 2nd Street (SR 903) [7]	2025 (LOS D)	Restrict Northbound Left/ Southbound-Left Turns	n/a	100%	64.1%	33.9%
#9 – N Pine Street / W 2nd Street (SR 903)	2025 (LOS F)	Compact Roundabout	n/a	100%	69.9%	30.1%
#15 – N Oakes Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout	n/a	100%	78.4%	21.6%
By Year 2031:						
#1 – Bullfrog Road / I-90 EB Ramps	2031 (LOS F)	Compact Roundabout	n/a	100%	77.2%	22.8%
#3 – Bullfrog Road / Tumble Creek Dr [6]	2031 (LOS F)	Refuge/merge lane on Bullfrog Rd	n/a	100%	78.0%	22.0%
#21 – Pennsylvania Ave / 1st Street (SR 903)	2031 (LOS E)	All-Way Stop	n/a	100%	84.9%	15.1%
By Year 2037: [5]						
N/A[8]	--	--	--	--	--	--

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; LOS results with mitigation are included in **Table 3.7-6**. WSDOT preference is a roundabout which is assumed unless identified otherwise.
[2] Estimated pro-rata share for 47° North is preliminary and will be adjusted based on a future Monitoring Program. The pro-rata share for Method A would be the full responsibility of 47° North for any improvements needed with the Revised Proposal. The pro-rata share for Method B would be shared between the background traffic and the Revised Proposal project traffic.
[3] Share of future traffic volumes associated with 'Baseline'/background traffic growth, excluding Revised Proposal.
[4] Mitigation not triggered by 'Baseline' conditions but triggered by traffic generated by Revised Proposal.
[5] The Revised Proposal is anticipated to be built out by 2031. Thus, the pro-rata share for Method A would not be applicable for intersection #2 which is estimated to be non-compliant in 2037 under the 'Baseline' scenario.
[6] Non-compliant by Year 2037 with SEIS Alternative 6 in the *Final SEIS*.
[7] Reported as non-compliant by Year 2031 with SEIS Alternative 6 in the *Final SEIS*.
[8] No additional intersections would operate at non-compliant levels of service by 2037 with the Revised Proposal.
[9] The City has plans to install a traffic signal at intersection #11.
[10] The City has plans to install a compact roundabout at intersection #13.

To assist in identifying the type of appropriate improvements for study intersections that require mitigation and are within WSDOT's jurisdiction (i.e., SR 903 and Bullfrog Road at I-90 interchange), Intersection Control Evaluations (ICE) have been performed and technical reports have been submitted to WSDOT. Criteria addressed in the ICE documents include LOS operations, safety, right-of-way acquisition, engineering criteria and feasibility, and context for sustainable design. WSDOT has stated its preference for construction of compact roundabouts rather than traffic signals on SR 903.

Mitigation Measures for 'Baseline' Conditions

As shown in **Table 3.6-5**, five study intersections are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour 'Baseline' conditions (without the Revised Proposal). The City of Cle Elum has recently received grant funding to install a full traffic signal at study intersection #11 (Douglas Munro Boulevard /W 1st Street) and a compact roundabout at intersection #13 (N Stafford Avenue / W 2nd Street (SR 903)). However, no improvements are currently identified at the other three study intersections by the City of Cle Elum or WSDOT.

Potential improvements to mitigate non-compliant LOS at the other three study intersections under future weekday summer PM peak hour 'Baseline' conditions are identified in **Table 3.6-5** and include a compact (single-lane) roundabout or left-turn restrictions.

For the five intersections where improvements would be needed based on forecast 'Baseline' conditions, the 47° North project would contribute a pro-rata share towards intersection improvements because some additional traffic would be added by the project even though it would not trigger the improvement.

Mitigation Measures for Revised Proposal

As shown in **Table 3.6-5**, six study intersections are anticipated to operate at a non-compliant LOS due to the Revised Proposal in either 2025, 2031, or 2037 during the summer weekday PM peak hour in addition to those that are non-compliant in the Baseline (without project) condition.

Potential improvements to mitigate non-compliant LOS at the six study intersections under future weekday summer PM peak hour conditions with the Revised Proposal are identified in **Table 3.6-5** and include a compact (single-lane) roundabout, all-way stop control, roadway widening to add refuge/merge lanes, or left-turn restrictions.

The 47° North project would complete the intersection improvements or contribute a pro-rata share.

Mitigation Measures Identified in the SEIS Addendum vs in the Final SEIS

The Final SEIS identified the same 11 off-site study intersections included in **Table 3.6-5** that are forecast to operate at non-compliant LOS in future years 2025, 2031, or 2037 without or with full buildout of 47° North during the weekday summer PM peak hour.

The key differences between **Table 3.6-5** and the Final SEIS are:

- #2 – Bullfrog Road / I-90 WB Ramps is anticipated to operate at a non-compliant LOS under future 2037 'Baseline' conditions instead of with SEIS Alternative 6 conditions.
- #3 – Bullfrog Road / Tumble Creek Drive is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2025 instead of 2031.
- #7 – Denny Avenue / W 2nd Street (SR 903) is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2031 instead of 2037.

Intersection LOS with Mitigation

To test the effectiveness of identified improvements, intersection LOS was evaluated with implementation of potential improvements identified in the updated analysis. These improvements would mitigate the 11 study intersections and two site access intersections that are anticipated to operate at non-compliant LOS under future weekday summer PM peak hour conditions. LOS analysis results for weekday, Friday, and Sunday summer PM peak hour conditions in 2031 with the Revised Proposal are summarized in **Table 3.6-6**.

As shown in **Table 3.6-6**, the potential improvements identified at the 11 off-site study intersections and two site access intersections are expected to improve conditions to compliant LOS at all intersections during the weekday and Friday summer PM peak hours. During the Sunday summer PM peak hour, the potential improvements are expected to improve conditions to compliant levels of service at the majority of intersections, with the following exceptions:

- #7 – Denny Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #8 – Ranger Station Road / Miller Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #9 – N Pine Street / W 2nd Street (SR 903): as a compact roundabout, the off-site intersection is anticipated to operate at LOS E under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #30 – SR 903 / Main Access Road: as a compact roundabout, the site access intersection is anticipated to operate at LOS F under the Revised Proposal in 2031 during the Sunday summer PM peak hour.

Table 3.6-6
FUTURE YEAR INTERSECTION LOS SUMMARY WITH MITIGATION – REVISED PROPOSAL

Location	Potential Improvement to Mitigate Weekday LOS Deficiency [1]	Weekday PM Peak Hour				Friday PM Peak Hour				Sunday PM Peak Hour			
		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation	
		Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]
Off-Site Study Intersection:													
#1 – Bullfrog Road / I-90 EB Ramps [6]	Compact Roundabout	2031	Project	A	9.6	2025	Project	B	11.7	2037	Project	A	9.1
#2 – Bullfrog Road / I-90 WB Ramps [5, 6, 7]	Compact Roundabout	2037	'Baseline'	A	5.4	2031	'Baseline'	A	8.6	2037	Project	A	5.2
#3 – Bullfrog Road / Tumble Creek Dr [7]	Refuge/merge lane on Bullfrog Rd	2031	Project	C	20.1	2037	Project	C	18.6	2031	Project	D	34.5
#7 – Denny Ave / W 2nd Street (SR 903) [6, 8]	Restrict Northbound Left/ Southbound-Left Turns	2025	Project	C	16.1	2025	Project	C	18.7	2025	Project	**D**	**28.5**
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903) [6]	Restrict Northbound Left/ Southbound-Left Turns	2025	'Baseline'	C	18.8	2025	'Baseline'	C	22.5	2025	'Baseline'	**D**	**26.2**
#9 – N Pine Street / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	7.7	2025	Project	B	11.5	2025	'Baseline'	**E**	**56.6**
#11 – Douglas Munro Blvd / W 1st Street	Signalization[3]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#12 – N Pine St / W 1st Street	Compact Roundabout	2025	'Baseline'	A	7.4	2025	'Baseline'	A	8.1	2025	'Baseline'	A	7.6
#13 – N Stafford Ave / W 2nd Street (SR 903) [6]	Compact Roundabout [4]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#15 – N Oakes Ave / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	3.7	2025	Project	A	3.9	2025	'Baseline'	A	5.9
#21 – Pennsylvania Ave / 1st Street (SR 903) [6]	All-Way Stop	2031	Project	C	20.5	2031	Project	C	22.5	2031	Project	B	14.5
Site Access:													
#28 – Bullfrog Road / RV Access Road	Compact Roundabout	2031	Project	A	10.0	2031	Project	C	19.6	2025	Project	D	31.8
#30 – SR 903 / Main Access Road	Compact Roundabout	2025	Project	B	17.3	2025	Project	C	32.8	2025	Project	**F**	**>100**

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; WSDOT preference is a roundabout which is assumed unless identified otherwise; DASHES indicate LOS was not evaluated because improvements are funded and planned by the City.

[2] LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard.

[3] The City has plans to install a traffic signal at intersection #11.

[4] The City has plans to install a compact roundabout at intersection #13.

Site Access Mitigation Measures

The Revised Proposal would include new on-site roadways and intersections at its two access points with Bullfrog Road and its single access onto SR 903 (public roads). All on-site roads would be private and would be constructed and maintained by 47º North. The facilities would be constructed to City of Cle Elum standards, or standards that may be included in a new or updated Development Agreement. The Revised Proposal would also ensure that design of the new on-site roadways meets minimum requirements for emergency vehicle access and school bus access.

Based on the results of the weekday PM peak hour LOS analysis documented in Table 3.6-2 in **Appendix C** and the forecast LOS with proposed mitigation at the site access documented in **Table 3.6-6**, the traffic control at the new 47° North site access points on Bullfrog Road and SR 903 is proposed as follows:

- **#28 – Bullfrog Road / RV Access Road:** Proposed mitigation is a compact (single-lane) roundabout. (Note that this intersection was reported to operate at a compliant level of service in the Final SEIS*,* thus this is a new mitigation measure.)
- **#29 – Bullfrog Road / Main Access Road:** is anticipated to operate at complaint LOS during the weekday summer PM peak hour in 2025 and 2031 with the Revised Proposal as a side street stop-controlled intersection with the Main Access Road being stop-controlled.
- **#30 - SR 903 / Main Access Road:** Proposed mitigation is a compact (single-lane) roundabout.

Other Mitigation Measures

Other mitigation measures related to traffic monitoring, construction management program, and trail system and sidewalks still apply with the Revised Proposal and are consistent with mitigation measures in the *Final SEIS.* A complete list of mitigation measures is included in **Appendix F.**

Section 3.7
PUBLIC SERVICES

3.7.1 Affected Environment

2020 / 2021 SEIS

The SEIS described the existing public services conditions (i.e., police, fire protection, hospital and emergency medical, emergency dispatch, and school services) in the vicinity of the 47° North site at that time (see Draft SEIS Section 3.12 for details). Selected information from the Draft SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

Revised Proposal

Police Service

In the last two City of Cle Elum budget cycles, the Police Department proposed staffing increases – calculated using the International City/County Management Association (ICMA) method – to address understaffing, and the city has authorized their requests. In the 2023 budget, the city funded two new officers per shift, which contributes to an addition of four new officers since 2020 and a current total of 12 officers (*Cle Elum-Roslyn-South Cle Elum Police Department, 2022*).[1]

Fire Protection Service

No new information was provided by the Fire Department for this Addendum. Therefore, the existing conditions information from the SEIS is used for this analysis.

Hospital & Emergency Medical Service

Kittitas County is served by two hospital districts. Hospital District No. 1 operates a full-service critical access hospital in Ellensburg. Hospital District No. 2 operates Medic One ambulance service and maintains a medical clinic in Cle Elum.

Kittitas Valley Hospital District No. 1

Hospital District No. 1 provided updated information on staffing levels and other projected needs for their services in the future, and this information indicates that staffing levels for Hospital District No. 1 have decreased since 2019. This reduction has not been intentional but is due to several extraneous factors, including retirements, and could be transitory. To provide a more conservative estimate of impacts, the analysis in this Addendum continues to use the prior, higher staffing levels identified in the SEIS to estimate population-based demand for the Revised Proposal.

[1] Later in 2023, the City of South Cle Elum will begin contracting for police service with Kittitas County and the city department will be renamed the Cle Elum-Roslyn Police Department. This change will incrementally reduce the population served by the department and will in effect increase the existing level of service as measured by population.

Hospital District No. 1 does not have an adopted level of service but provided information regarding various population estimates and ratios of staff-to-population that could be used to identify service demand. (*Hospital District No. 1/Kittitas Valley Healthcare, 2022*). The 2020 census data generally shows that Kittitas County has significantly higher population-to-provider ratios than the state as a whole (i.e., it provides a lower effective level of service and has an existing service deficiency). The provided data also notes that Washington State has the fewest primary care providers per 100,000 residents of any state in the nation, which also suggests a present deficiency relative to other states. Hospital District No. 1 calculated the staff, using the current Washington State ratios, needed to meet the demands of the current County population (less than 50,000) and a future County population of 70,000. **Table 3.7-4**, later in this section, presents the alternative staffing needs based on the 50,000 population. A portion of the demand embodied in this calculation reflects an existing deficiency, however, which cannot be attributed to a proposed project according to long-standing SEPA policy.

Projected staffing needs based on a future 70,000 population have not been calculated, however, for several reasons. First, the Washington State Office of Financial Management (OFM) projects population only as far as 2050; based on OFM's forecast growth rates, Kittitas County would not reach a population of 70,000 until approximately 2070. Calculating health care demands beyond 2050 would be extremely speculative. In addition, the Revised Proposal would be built out in 2031, and any additional growth and service impacts beyond that date would not be attributable to 47º North; its pro rata share of need would also decrease as the population base increased. In addition, extending the time horizon and using it to establish a hypothetical level of service would serve to carry forward and exacerbate the Hospital District's existing staffing deficiency. As noted previously, Hospital District 1 has not adopted a level of service standard and using an unadopted standard based on a projection of future population would merely identify a hypothetical need that is not attributable to the proposal.

Hospital District No. 1 also documented current costs and revenues to the District overall, noting that its costs are rising and revenues do not cover all costs. This situation is unfortunately common for many special purpose districts in Washington State, due to limited taxing authority, levy lids, etc. As noted in the Fiscal Conditions analysis discussion in the SEIS and this Addendum, however, hospital districts also rely primarily on charges for service, including insurance reimbursements, to generate the majority of their revenue. Based on 2021 data submitted by the District to the State Department of Health, Hospital District 1 receives more than 96% of its revenues from patient charges and a very minor amount from tax revenues. The District has the flexibility to increase service charges to address rising costs.

Kittitas Valley Hospital District No. 2

Hospital District No. 2, which serves the Suncadia Master Planned Resort and unincorporated area surrounding Cle Elum as well as the City, supplied updated information on calls for emergency medical service from 2016 to 2022. This data shows that call volumes to Hospital District No. 2 have remained relatively constant over the past seven years with an average of 1,410 calls per year. A breakdown of the distribution of calls for the most recent year (2022) indicates that approximately 30% of the calls to Hospital District No. 2 were for emergency medical service within the City of Cle Elum and the remaining 70% of the calls were for service from locations outside of the City, i.e., unincorporated Kittitas County and other cities. See **Appendix D** for details on calls to Hospital District No. 2. Therefore, most of the calls to Hospital District No. 2 are from outside the City of Cle Elum. The distribution of calls received from permanent residents versus those from recreational visitors is unknown. However, calls associated with recreational visitors are included within the service call total, whether within or outside the City. In addition, approximately one-half of the housing within the zip code that corresponds to the Hospital District 2 service area/taxing boundary are occupied seasonally (https://www.unitedstateszipcodes.org/98922/#stats).

Emergency Dispatch

Updated staffing information was provided by KITTCOM for this analysis. KITTCOM is currently authorized for 15 full-time emergency dispatchers (*KITTCOM, 2022*).

Schools

The Cle Elum-Roslyn School District provided updated enrollment history and enrollment projection information, including student generation rates for single family and multi-family residences. Student enrollment in October 2022 was approximately 935 students. **Table 3.7-1** summarizes enrollment projections for the School District through 2032. These projections include assumptions for the 47° North project (including the addition of affordable housing units) as well as other known development that is anticipated to occur within the School District (e.g., the Suncadia Master Planned Resort and the City Heights project).

Table 3.7-1
CLE ELUM-ROSLYN SCHOOL DISTRICT
STUDENT ENROLLMENT PROJECTIONS

Grade	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
K-5	423	446	475	516	553	570	575	581	589	594	596
6-8	237	221	209	206	228	257	301	328	341	342	349
9-12	275	300	322	323	317	310	304	320	354	397	439
Total Students	**935**	**967**	**1,006**	**1,045**	**1,098**	**1,137**	**1,180**	**1,229**	**1,284**	**1,333**	**1,384**

Source: Cle Elum-Roslyn School District and Educational Data Solutions, 2022.

Based on existing School District facility capacity information that was identified in the SEIS (i.e., capacity for approximately 970 students), it is anticipated that the projected enrollment identified in **Table 3.7-1** would exceed the district's existing facility capacity by 2024. As part of the district's planning and projections, they anticipate the need to develop an Early Childhood Learning Center (ELC) in the future. The ELC could include between 8 and 10 classrooms and auxiliary spaces like offices, conference rooms, and space for support programs (e.g., for physical therapy, occupational therapy, and speech). The current plan is to include preschool, transitional kindergarten, Early Childhood and Assistance Program (E-Cap), and Kindergarten. The district is in the early stages of planning for this facility.

Current student generation rates identified by the School District are 0.4 students per single family residence and 0.1 students per multi-family residence *(Cle Elum-Roslyn School District, 2022),* which is slightly higher than the average student generation rate used in the SEIS (0.25 per household) and reflects a greater number of students from the Suncadia Master Planned Resort and other development than originally projected.

3.7.2 Impacts

2020 / 2021 SEIS

The SEIS evaluated additional demand for public services (police service, fire protection, hospital and emergency medical, emergency dispatch, and public schools) associated with construction and operation of SEIS Alternatives 5 and 6. The SEIS analyzed operational impacts based on population, as it is commonly assumed that population would be the primary generator of service demand. For purposes of analysis, it was generally assumed that staffing needs would increase in direct proportion with population increases using current ratios of staff-to-population. Use of de facto population-based LOS standards are commonly applied in environmental documents to estimate service demands in jurisdictions that have not adopted a formal LOS standard. An alternate method of assessing impacts on police service (the ICMA method) prepared by the Cle Elum-Roslyn-South Cle Elum Police Department was also presented in the SEIS.

Overall, using population-based standards and including a proxy population for RV resort sites, the SEIS concluded that Alternative 6 would generate less demand for services compared to Alternative 5 (see **Table 3.7-2**, footnote 4 for an explanation of the RV population used for the analysis). However, as discussed further below, the use of a proxy population to estimate transient demand from RV visitors may be overly conservative and may overstate probable demand. As noted previously, the Cle Elum area is a popular recreational destination and demand associated with transient recreational visitors is already reflected in historic local demand for various services. Attributing a separate proxy population to RV sites may, therefore, reflect double counting and be overly conservative. Alternative de facto levels of service using local data (e.g., number of calls experienced

historically rather than an assumed population) are also discussed in the analysis where more specific information is available.

Revised Proposal

As in the SEIS, the analysis of public service impacts of the Revised Proposal is generally based on population, and it is assumed that project-related population would be the primary generator of additional service demand. As mentioned above, this method is a generally accepted approach to estimating service impacts in the absence of adopted quantitative levels of service standards, as is the case for all service providers considered here. An alternative method for calculating police service demand recommended by the Cle Elum Police Department, is also considered in the SEIS and this Addendum. Additional data that bears on demand and alternative estimates are also discussed where local historical data is available.

It is noted that assuming a continuing linear increase in demand and staffing in proportion to population increases may not be an accurate predictor of future needs. For example, this methodology does not account for economies of scale that are present in many organizations and allows them to accommodate some amount of increased demand without increasing staff. While it is appropriate to take a conservative approach to estimating demand for purposes of analysis, it is also appropriate to consider other data that bears on demand, along with methods that can be applied to measure project performance and actual post-development demand.

Table 3.7-2 provides a breakdown of the proposed residential units and associated permanent population under SEIS Alternative 6 and the Revised Proposal; SEIS Alternative 5 is also noted for comparison purposes. An equivalent or proxy population is calculated for the RV sites and included in the total population used to calculate potential public service demands that would be generated by the RV component of SEIS Alternative 6 and the Revised Proposal. The calculation of service demand uses a staff-to-population ratio that accounts for potential calls from non-residents (including university students), recreational visitors and part-time residents. These population groups currently and historically comprise a sizable portion of the total area-wide population and create some proportion of demand for various services; this proportion is not separately tracked or estimated by service providers, however. To the extent such service demand is already accounted for in the staff-to-population ratios used by the various service purveyors to determine staffing needs (i.e., it is already implicitly included in the number of calls for service that inform a service provider's level of service and its existing ratio or staff-to-population), the proxy population likely results in some amount of double counting and resulting calculations may be overly conservative. Equating transient RV visitors to some proportion of permanent residential population may overstate future demand. For example, as shown in **Table 3.7-2**, the RV proxy population metric used to estimate demand for the Revised Proposal and SEIS

Alternative 6 adds approximately 39% to the total population that is used to estimate service demand and a proportional increase in the staff required to meet the demand. Eliminating or modifying the RV proxy population metric would reduce the estimates of service needs by some factor.

Table 3.7-2
RESIDENTIAL POPULATION –
SEIS ALTERNATIVES 5 and 6, & REVISED PROPOSAL (2031)

Alternative	Permanent Residential Units	Residents / Household	Occupancy Rate	New Residents	RV Sites	RV Proxy Population	Total Resident/ RV Population
SEIS Alternative 5	1,334	2.34[1]	90%[1]	2,809	0	0	2,809
SEIS Alternative 6	707	2.34[1]	90%[1]	1,489	627	941[4]	2,430
Revised Proposal	757[3]	2.37[2]	88%[2]	1,579[3]	627	941[4]	2,520
Revised Proposal w/o Affordable Housing	707[3]	2.37[2]	88%[2]	1,475[3]	627	941[4]	2,416

Source: 2020/2021 SEIS, Sun Communities, 2022.

[1] Household sizes and occupancy rates for SEIS Alternatives 5 and 6 are based on the *U.S. Census Bureau, 2014-2018, American Community Survey, 5-Year Estimates*.

[2] Household sizes and occupancy rates for the Revised Proposal are based on the *U.S. Census Bureau, 2016-2020, American Community Survey, 5-Year Estimates*.

[3] The permanent residential units and associated residents are those at buildout of the entire Revised Proposal in 2031.

[4] The proxy population calculated for the RV sites is based on 627 sites, an assumed average RV resort occupancy of 50%, and three people per site, based on data provided by the Applicant reflecting occupancy at other projects throughout the U.S.

Table 3.7-3 compares the public service demands from operation of SEIS Alternatives 5 and 6 with those from the Revised Proposal. Details about the public services demands from the Revised Proposal are described below. The specific impacts of the Revised Proposal and SEIS Alternative 6 are substantially similar using de facto population-based level of service ratios. Alternative 5 would generate greater demand for public services overall due to its larger population.

Police Service

New residents and RV site visitor population during operation of the Revised Proposal would generate increased demand for police service, including new calls for service from the site. New calls and increased demand for police service would create an increased need for additional officers to serve new residents. Based on the updated, higher Police Department staffing levels and using a population-based standard (12 officers per 3,775 population), the Revised Proposal at buildout would generate a greater need for additional officers than SEIS Alternative 6 but less than SEIS Alternative 5 in 2031 (see **Table 3.7-3**). The small increase in demand for SEIS Alternative 6 is primarily attributable to the City's recently increased staffing level. The additional affordable housing units in the Revised Proposal comprise approximately 4% of the increase and in itself this is not considered a significant difference from SEIS Alternative 6 or a significant impact.

Table 3.7-3
PUBLIC SERVICE DEMANDS –
SEIS ALTERNATIVE 5, 6, & REVISED PROPOSAL (2031)

Service Provider	SEIS Alternative 5[1]	SEIS Alternative 6[1]	Revised Proposal[1]	Revised Proposal w/o Affordable Hsg.[1]
Police Service[2]	8.9 officers	7.7 officers	8.0 officers	7.7 officers
Fire Service	1.8 firefighters	1.6 firefighters	1.6 firefighters	1.6 firefighters
Hospital Dist. #2 Medic One[3]	5.4 EMTs, 6.6 paramedics	4.7 EMTs, 5.7 paramedics	4.9 EMTs, 5.9 paramedics	4.7 EMTs, 5.7 paramedic
Cle Elum Medical Clinics[3]	0.6 physicians, 4.8 APCs, and 3.6 RNs	0.5 physicians, 4.2 APCs, and 3.1 RNs	0.5 physicians, 4.3 APCs, and 3.2 RNs	0.5 physicians, 4.1 APCs, and 3.1 RNs
Hospital Dist. #1 Ellensburg Hospital[3]	1.0 physicians, 0.2 APCs, and 6.0 RNs	0.9 physicians, 0.2 APCs, and 5.2 RNs	0.9 physicians, 0.2 APCs, and 5.3 RNs	0.9 physicians, 0.2 APCs, and 5.2 RNs
Emergency Dispatch/KITTCOM	0.9 dispatchers	0.8 dispatchers	0.8 dispatchers	0.8 dispatchers
Public Schools	376 students 25.4 teachers 6.3 to 8.4 new buses	229 students 15.5 teachers 3.8 to 5.1 new buses	234 students 15.8 teachers 3.9 to 5.2 new buses	229 students 15.5 teachers 3.8 to 5.1 new buses

Sources: Cle Elum–Roslyn–South Cle Elum Police Dept., Cle Elum Fire Dept., Kittitas Hospital Districts #1 & #2, KITTCOM, Cle Elum – Roslyn School Dist., 2020 and 2022.

[1] Calculations based on 2022 population data for service provider jurisdictions.

[2] Based on data from Cle Elum Police Department indicating a current staffing level of 12 officers per 3,775 population.

[3] Based on 2020 staffing levels identified by Hospital District No. 1 and No. 2.

EMT = Emergency Medical Technician

APC = Advanced Practice Clinician

RN = Registered Nurse

As noted previously, the Police Department also provided an update of their alternative ICMA methodology analysis, which is not based solely on population. Using this method, the Police Department estimates that the Revised Proposal would generate the need for a total of eight additional officers at full buildout with or without the additional affordable housing units of the Revised Proposal (*Cle Elum-Roslyn-South Cle Elum Police Department, 2022*). It is unknown whether the ICMA method would result in a different estimate of need once South Cle Elum is withdrawn from the department's service area.

New officers would require additional vehicles and other equipment. The growth and service demand represented by 47° North may also contribute to an eventual need to expand the existing police station. The Police Department is in the very early stages of planning for a new or expanded police station, including the possibility of a joint facility with the Kittitas County Sheriff's Department. Given the preliminary nature of such plans, however, the extent of any impact and proportional responsibility of 47° North cannot be determined at this time.

Fire Protection Service

During operation, new residents and RV site visitors would generate additional demand for fire protection services. Based on the Fire Department's identified future need for full-time firefighters and an average of the full-time firefighters in comparably sized cities (4 firefighters per 6,115 people), it is anticipated that new development and associated population under the Revised Proposal at buildout would generate the same need for additional full-time firefighters as SEIS Alternative 6 but less than SEIS Alternative 5 in 2031. The 50 affordable housing units would not materially change the need for firefighters for the Revised Proposal (see **Table 3.7-3**).

Additional equipment would also likely be required, including replacement of the primary fire engine and primary ambulance.

Emergency Access. Like SEIS Alternative 6, the proposed access points and on-site access roads under the Revised Proposal would provide adequate emergency access based on the International Fire Code (IFC); no additional emergency access is required for the Revised Proposal subject to confirmation by the Fire Department. However, to enhance public safety for other neighborhoods in the Cle Elum area, the Revised Proposal includes an emergency access road in the RV resort that extends to the southern site boundary (see **Figures 2-4**, Master Site Plan – Revised Proposal). The City and the Horse Park could extend this road offsite through the Horse Park and connect to Douglas Munro Boulevard. With this off-site extension, emergency access could be provided from Bullfrog Road and SR 903 to Douglas Munro Boulevard for other neighborhoods in the Cle Elum area.

Under SEIS Alternative 6, an emergency access road could also be provided by the City from the affordable housing site access road. Under the Revised Proposal, the affordable housing site would not be developed on a separate site (affordable housing would be located in the multi-family area onsite), and an emergency access road would not be provided from this portion of the site.

Hospital & Emergency Medical Service

The following analysis is based on the application of several different levels of service (LOS) to estimate demand with the Revised Proposal. The affected service providers, Kittitas Valley Hospital Districts No. 1 and 2, have not adopted quantitative LOS standards and the impact analysis in the SEIS and this Addendum are, therefore, based on several de facto ratios of staff-to-population. Use of de facto standards is a standard approach used in environmental documents in situations where quantitative LOS standards have not been adopted by the jurisdiction or service provider. The ratio used in the SEIS to identify impacts was based on the current number of staff in affected local and regional healthcare facilities using different service area populations (Upper County or county-wide, respectively). Those same ratios are used again in this document to help facilitate comparisons between the SEIS

Alternatives and the Revised Proposal. As noted previously, the proxy population assumed for the RV sites and transient visitors may overstate demand by some degree.

Hospital District No. 1 and 2 also provided two additional staffing ratios based on existing and future county-wide and state-wide population in response to a request for updated information. The results of applying the ratios are also included in the analysis. It is noted, however, that the broad staffing categories used by the Hospital Districts in the information provided for this document differ from and are not directly comparable to those provided and used in the SEIS. In addition, it is important to identify and segregate any existing deficiencies that may be reflected in current staffing levels so that they are recognized as such and are not inappropriately attributed to the Revised Proposal. Relatedly, the Hospital Districts have acknowledged that they are currently affected by staffing shortages due to retirements, job changes, and workers leaving the area. The staff reductions could be considered to reflect a decrease in the level of service or as existing deficiencies. However, the analysis takes a more conservative approach that treats this reduction as temporary and uses the former (SEIS) staffing level to avoid underestimating future project-related demand.

Kittitas Valley Hospital District No. 1. Hospital District No. 1 is expected to experience increased demand for hospital services from new residents under the Revised Proposal. Based on 2020 staffing levels at the hospital in Ellensburg (17 physicians, four APCs, and 101 RNs per 46,570 people), it is anticipated that the Revised Proposal at buildout would generate the same need for additional staff as SEIS Alternative 6 but less than Alternative 5 in 2031. The additional affordable housing units included in the Revised Proposal would comprise approximately 2% of the additional demand for RNs; the demand for physicians and APCs would be relatively equal with or without the additional housing units (see **Table 3.7-3**). Potential demand associated with transient recreational visitors is addressed on page 3.7-6 above and in the separate discussion on page 3.7-12 below.
The district anticipates that increased demand (as well as other growth in the County) would result in the need to provide additional building space at one of the existing facilities.

The following discussion is based on the updated information provided by Hospital District No. 1 on their current and projected staffing needs using ratios of staff to existing and forecast countywide and statewide population. These ratios are not adopted levels of service and it is not clear if the district uses them for its own planning, hiring or other purposes. Results are shown in **Table 3.7-4** and vary considerably depending on which ratio is applied. Either ratio, however, indicates an existing deficiency in current district staff levels before considering the impacts of the Revised Proposal. Applying staffing ratios that are based on the 2020 census population of the State of Washington as a whole and state-wide healthcare staffing levels provided by the Hospital Districts, the current Kittitas County population of approximately 50,000 people would require a total of approximately 13 primary care providers, 183 mental health providers, 42 dental providers, and 136 specialty care providers. As noted earlier in this section of the Addendum, staffing needs with a

future County population of 70,000 are not documented for reasons identified in the discussion.

Table 3.7-4
HOSPITAL DISTRICT NO. 1 STAFF NEEDS – ALTERNATIVE POPULATION-BASED RATIO (50,000 COUNTY POPULATION[A)] – REVISED PROPOSAL

Provider Type	Existing Staff[1,]	Current Staff Needs based on 50,000 Population[1, 3]	Existing Deficiency	Staff Needs of Revised Proposal[3, 4]
Primary Care	29 providers	42 providers	13 providers	**2.1 providers**
Mental Health	82 providers	185 providers	103 providers	**9.3 providers**
Dental Health	22 providers	42 providers	20 providers	**2.1 providers**
Specialty Care	N/A[5]	136 providers	N/A[5,B]	**6.9 providers**

Source: Hospital District No. 1, 2022; EA Engineering, 2022.

[1] Assumes a current County population of 50,000 as provided by Hospital Districts. Note that existing county population (2020 census as adjusted by OFM) is 46,468.

[2] Kittitas County hospital staff-to-population ratios provided by Kittitas Hospital Districts on Oct. 10, 2022. Existing staff was derived based on this ratio.

[3] Washington state hospital staff-to-population ratios provided by Kittitas Hospital Districts on Oct. 10, 2022.

[4] Based on permanent population from the residential uses and proxy population from the RV resort under the Revised Proposal (see the Housing, Population, and Employment analysis for the calculation of this population). Result reflects project population and need as a proportion of countywide population and need exclusive of existing deficiency. As noted previously, the RV proxy population may overstate demand.

[5] No existing Kittitas County ratio of hospital staff to population was provided for this category of staff.

Notes:

A. The alternative County staff-to-population ratios provided by the Hospital Districts and used to calculate existing staff are as follows:
   - Primary Care – 1 provider / 1,710 population
   - Mental Health – 1 provider / 610 population
   - Dental – 1 provider / 2,280 population
   - Specialty Care – no ratio available.

   The alternative Washington State staff-to-population ratios provided by the Hospital Districts and used to calculate current and future staff need based on countywide population, as well as the staff needs of the Revised Proposal, are as follows:
   - Primary Care – 1 provider / 1,180 population
   - Mental Health – 1 provider / 270 population
   - Dental – 1 provider / 1,200 population
   - Specialty Care – no ratio available.

B. Note that the existing deficiency has not been calculated for the future/2037 population scenario. The Revised Project's elements would be built out in 2028 (residential/RV) and 2031 (commercial) and would not be generating additional population or staff needs in 2037.

Proportional hospital staffing demand from the Revised Proposal was analyzed based on the alternative staffing ratios provided by Hospital District No. 1. The results – showing existing staffing deficiencies and projected staffing needs of the Hospital District based on current Kittitas County population – are shown in **Table 3.7-4**. As indicated in the table, when the alternative ratios are applied, approximately one-third of the Hospital District's projected needs reflect existing staffing deficiencies. (Note that complete data is not available for all provider categories, so results are approximate.) The Revised Proposal would generate a

need for approximately 20.4 staff across the provider categories, including a substantial number of staff that would be needed to correct existing deficiencies based on these hypothetical ratios, compared to approximately 15.6 based on the staff-to-population ratio used in the SEIS.

Kittitas Valley Hospital District No. 2. During operation, new residents and RV site visitor population would generate increased demand for emergency medical services (ambulance transports, etc.) and hospital services. Based on 2020 staffing levels for Hospital District No. 2 Medic One (9 EMTs and 11 paramedics per 4,200 people), it is estimated that new development and associated population under the Revised Proposal at buildout, including the proxy population calculated for the RV component, would generate incrementally greater need for more additional staff than SEIS Alternatives 6 and less than SEIS Alternative 5 in 2031 based on the District's 2022 service area population. The demand attributable to the additional population/affordable housing units included in the Revised Proposal compared to SEIS Alternative 6 would comprise approximately 4% of the increased demand (see **Table 3.7-3**). The incremental differences are not considered significant and impacts with either alternative would be less than for SEIS Alternative 5. As discussed previously, the assumed RV proxy population and resulting impacts identified for the Revised Proposal and Alternative 6 likely double count and overestimate demand.

Note that SEIS Alternative 6 did not study the impacts of the 50 affordable housing units that would ultimately be developed by others on the land dedicated to the City for that purpose. Those impacts would be the same as the incremental impact associated with the Revised Proposal.

The existing clinics in Cle Elum would also see increased demand. 2020 staffing levels at the facilities in Cle Elum consist of one physician, eight APCs, and six RNs per 4,200 population., It is estimated that the Revised Proposal, including the RV proxy population, would generate the need for incrementally more staff than SEIS Alternatives 6 but less than SEIS Alternative 5. The 50 additional affordable housing units would comprise approximately 4% of the additional demand for APCs and RNs; the demand for physicians would be relatively equal with or without affordable housing units. The incremental differences are not considered significant. As noted previously, the RV proxy population used in this analysis is considered conservative and likely overstates impacts.

The potential number of emergency services calls that could be generated by the Revised Proposal can also be estimated using recent service call data provided by Hospital District 2. Of the total calls received by Hospital District No. 2 in 2022 (1,420 total calls), approximately 425 calls were for service in the City of Cle Elum. With approximately 1,175 housing units in the City of Cle Elum in 2022, the existing housing units generated approximately 0.36 emergency service calls per housing unit in 2022. Using that same ratio of calls per housing unit, the new residential units under the Revised Proposal would generate approximately 274 emergency service calls per year. Calls could vary further if occupancy and or vacancy rates are lower than assumed for the analysis (refer to SEIS Section 3.9).

Demand for Hospital District Service from the RV Resort. As mentioned previously, the demand for Kittitas Valley Hospital Districts' services from the RV resort component of the Revised Proposal and SEIS Alternative 6 was estimated by calculating and incorporating a proxy population from the resort in addition to the permanent population. These calculations are based on two different methodologies discussed above.

The Kittitas Valley Hospital Districts have also questioned whether transient visitors to the 47º North RV resort would generate greater demand for the Hospital Districts' services than the general population. The Hospital District did not provide any data to support this hypothesis, however. As noted in the previous paragraph, the proxy population estimate identified in the SEIS and this Addendum are intended to account for the demand from the RV resort. The SEPA consultant conducted additional research and analysis which did not identify any local or national data that directly supports the hypothesis that RV visitors would generate disproportional demand for medical or emergency services. Most of the data, in fact, suggests the converse, i.e., that transient recreational-visitor related demand would be less than that associated with permanent residential population. Relevant data is described below.

It is noted in passing that the MountainStar Draft EIS (Kittitas County, 1999) did not evaluate impacts to Hospital District No. 1 and the conditions of approval did not require any specific mitigation for the Master Planned Resort, which was proposing more than 4,000 recreational-residential units and extensive recreational facilities, other than monitoring of demand and reporting to Kittitas County every 2-5 years. The EIS analysis for Hospital District No. 2 similarly did not quantify anticipated demand but did require acquisition of an ambulance for the district and periodic monitoring/reporting of calls.

As background, the 47° North RV resort includes RV and glamping sites and related recreational facilities (see **Chapter 2** for details). The main activities at the RV resort would be leisure and recreational in nature and would include the use of on-site parks, trails, and amenity centers. Visitors would stay at the resort for an average of three to four days. RV visitors could also participate in off-site recreational activities.

One study identified the most common injury activities associated with sports and recreation activity as hiking, winter sports, and mountaineering *(Stephens, Dickema, Klein 2005)*. Some data, while not definitive, suggests that the average RV owner, who is 55+ years old (see Section 3.3, **Housing, Population, and Employment** for details), is less likely to engage in the types of recreational activities (skiing, football, basketball, soccer) that are more likely to result in injury and emergency room admissions. *(National Health Statistic Reports, 2019)*. This data implies that the off-site recreational activities in which the visitors to the 47º North RV resort might engage – such as hiking, given that the average age of RV visitors would be 55+/- – would not likely result in a substantial demand for hospital/emergency medical services.

Some relevant data specific to Washington State also identifies the potential for recreational injuries to be sustained during hiking. Between 1997 and 2001, a total of 535 injuries were reported at the Mt. Rainier and Olympic National Parks, which equates to an average of 20.4 incidents per million visits or 0.00002 injuries per visit. This is a low incident rate and likely not all the incidents resulted in emergency care or hospitalization.

Available local data also sheds light on the potential demand associated with the RV sites. The most recent Kittitas County *Community Health Improvement Plan,* summarizing information collected between 2018 and 2023, indicates that the biggest factors impacting Kittitas County's health and therefore health services are: being a rural area with healthcare and mental health provider shortages; and having a large older adult population, a large university student population, a significant amount of families in poverty, and lower median per capita and household incomes *(Read, Fuller 2023)*. Health service impacts relating to the County's transient population/recreational visitors are not identified as a major factor.

Information on calls to the Ellensburg KOA RV Resort by KITTCOM over an eight-year period was also collected and analyzed. This data indicates that the Ellensburg RV resort -- which is a similar use occupied by transient/ recreational visitors – generates considerably fewer calls for emergency police, fire, and hospital services – an average of 20 calls per year, or 0.16 calls per site per year – compared to 1.77 calls per residential unit per year for the Kittitas County residential population as a whole. Additional information is included in the following subsection on *Emergency Dispatch Service.*

Overall, therefore, national, state and local data identified through the foregoing research does not support the hypothesis that the transient/recreational-oriented population of the RV component of 47º North would generate greater than anticipated demand for emergency or hospital services. No data was provided or otherwise identified to support this assertion. The proxy population included for the RV sites already addresses, and likely overestimates, recreational tourist demand. Local data from a similar land use, in fact, suggests that demand would be lower than a typical residential unit. And it has been noted previously that the region is a popular recreational destination and that any demand associated with a transient population is already blended into each provider's calls for service and resulting staffing needs and are factors in the de facto levels of service used in the SEIS and this Addendum.

Emergency Dispatch Service

Calls for service for the Cle Elum-Roslyn-South Cle Elum Police Department, Cle Elum Fire Department, and Hospital District No. 2 from the Revised Proposal would be handled and dispatched by KITTCOM. Based on the updated staffing levels provided by KITTCOM (15 dispatchers for 47,200 people), it is anticipated that development under the Revised Proposal at buildout would generate the same need for additional staff as SEIS Alternative 6 but less than SEIS Alternative 5 in 2031 (see **Table 3.7-3**).

Although the SEIS and Addendum attribute a proxy/equivalent population to the RV component of 47º North, updated data suggests that the demand associated with this transient population may be overestimated. For example, data from Hospital District No. 2 indicates that emergency call volumes have not substantially increased over the past 7 years[2] despite permanent population growth and increased recreational/transient population within their service area.

In addition, KITTCOM provided historic annual call data to the existing KOA RV Park in Ellensburg (which contains 121 sites) between 2014 and 2021 *(KITTCOM, 2022)*. In this 8-year period, the KOA RV Park generated an average of approximately 20 emergency calls to KITTCOM annually, which equates to approximately 0.16 calls per RV site per year. Note that emergency service calls from KITTCOM include calls for police, fire/emergency medical, and hospital service.

Based on this call generation rate derived from local data, it is estimated that the RV component in SEIS Alternative 6 and the Revised Proposal (627 sites) would generate approximately 103 emergency calls per year in total. The residential uses in SEIS Alternative 6 and the Revised Proposal would generate approximately 1.77 calls per residential unit annually, which would equate to approximately 1,339 calls per year. Therefore, based on data from a similar use located in Kittitas County, the RV sites could be expected to generate fewer calls to KITTCOM than the proposed residential units and fewer than estimated attributing a proxy/equivalent population to the Revised Proposal's RV sites. This alternative method for calculating demand suggests that the RV equivalent/proxy population metric may be overly conservative and overestimates potential demand.

Public Schools

Students. Development and associated residents during operation of the Revised Proposal would generate new students and increased demand for public school services from the Cle Elum-Roslyn School District.[3] Based on the recently updated student generation rates of approximately 0.4 students per single family residence and 0.1 students per multi-family residence[4], it is anticipated that new residential units under the Revised Proposal at buildout would generate more additional students than SEIS Alternative 6 at buildout, but less than SEIS Alternative 5 in 2031 or at buildout. The 50 affordable housing units would comprise approximately 2% of the increased student generation (see **Table 3.7-3**), while most of the increase is attributable to the district's updated student generation factors.

Based on grade level percentage information recently provided by the Cle Elum-Roslyn School District (60% elementary students, 20% middle school students, and 20% high school

[2] Hospital District No. 2 received 1,420 calls for service in 2022. The seven-year average (2016-2022) has been approximately 1,458 calls for service annually.
[3] RV site population is not considered a permanent population on the site and as such, population associated with the RV resort is not factored into the student generation analysis.
[4] Updated student generation rates derived from the Cle Elum-Roslyn School District in November 2022.

students), it is anticipated that of the students generated by the Revised Proposal, 140 students would be elementary school age, 47 would be middle school age, and 47 would be high school age.

As noted above in the *Affected Environment* sub-section, recent enrollment projections from the School District include updated assumptions for student generation from the Revised Proposal as well as other known anticipated development expected to occur within the school district (e.g., City Heights, Suncadia). Based on existing School District facility capacity of 970 students identified in the SEIS, it is anticipated that the projected enrollment identified in **Table 3.7-1,** a portion of which would be students from the Revised Proposal, would exceed the School District's existing facility capacity by 2024. Exceedance of the School District's facility capacity could exacerbate the need for new or expanded facilities.

Teachers. New students under the Revised Proposal would generate a need for additional teachers within the School District. Based on the School District student-to-teacher ratio (approximately 14.8 students for every teacher), new students associated with the Revised Proposal at buildout would generate the need for slightly more additional staff than SEIS Alternative 6 but less than SEIS Alternative 5 in 2031. The additional affordable housing units in the Revised Proposal would comprise approximately 2% of the anticipated demand for new teachers (see **Table 3.7-3**).[5] This is not considered a significant change in identified impacts.

School Buses. New students under the Revised Proposal would also create additional demand for school buses to transport students to and from school. Based on approximately 45 to 60 students in a typical school bus, it is anticipated that the Revised Proposal at buildout would generate the need for more additional buses than SEIS Alternative 6 but less than SEIS Alternative 5 in 2031. The additional 50 affordable housing units in the Revised Proposal would comprise approximately 2% of the anticipated demand for additional school buses (see **Table 3.7-3**). This is not considered a significant change in identified impacts.

Indirect and Cumulative Impacts

Indirect impacts under the Revised Proposal are anticipated to be similar to SEIS Alternative 6 and could include minor additional demand for public service agencies that have mutual aid agreements with Cle Elum, such as police and fire departments. Additional indirect student generation in the Cle Elum-Roslyn School District could also occur from growth in population associated with new employment.

Cumulative impacts to public services would also be similar to SEIS Alternative 6 and would result from other development in the site vicinity and its associated population within the same time horizon. Such development would include ongoing development of the Suncadia

[5] Note that actual future needs for new teachers would be based on student enrollment, as well as other factors such as state and local funding that is available to the School District, and future state policies and programs.

resort (in unincorporated Kittitas County), and development of the City Heights and Cle Elum Pines (in City of Cle Elum). Other smaller scale development would also likely occur in Kittitas County, City of Cle Elum, City of Roslyn, and Town of South Cle Elum. This development, together with the Revised Proposal, would generate additional population in the area which would increase demand for public services and impacts on the County, City of Cle Elum, and other nearby jurisdictions.

3.7.3 Mitigation Measures

No new significant adverse impacts to public services would occur from the Revised Proposal and no additional mitigation measures are necessary. However, data identified in the Addendum identifies uncertainty regarding some estimates of impacts, and local and national data that could influence how demand is accurately calculated. It is recommended, therefore, that the quantity of service calls for affected providers, such as for emergency response, be monitored periodically to determine actual demand. Note that a mitigation measure for fiscal impacts is also relevant.

The mitigation measure identified below includes a measure that has been updated for the Revised Proposal compared to those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Proposed Mitigation Measures (Included in the Project)

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- Mitigation measures for each public service provider would include execution of a separate mitigation agreement, where feasible, and a program to monitor actual calls for service, actual revenues and expenses, for affected providers. The program would, to the maximum extent possible, strive to time expenditures to when revenues are available and strive to time capital expenditures to when the jurisdiction has sufficient capacity to issue bonds for the improvements and sufficient tax revenue to service the debt. The program would also rely on shortfall mitigation payments to address any identified fiscal impacts, where applicable.

- Monitoring would track the number of service calls to affected providers at reasonable intervals to allow comparisons of actual and estimated calls and impacts. Any mitigation requirements would be adjusted accordingly to reflect actual impacts. Outreach and coordination between the Applicant and affected service providers is underway and is anticipated to result in mitigation agreements that will address impacts that are attributable to the Revised Proposal. Executed agreements will be included in a new or updated Development Agreement, if available.

- Site development would follow the Land Stewardship Plan (LSP) that is used for Suncadia, which includes provisions for fire-wising (e.g., thinning small trees, cutting limbs, raking debris and other fuel-reduction techniques to help prevent fires) during operation of the project. The LSP would be reviewed and updated, as necessary.

Required Mitigation Measures

- Roadway design would conform with applicable requirements for vehicular access, including roadway width, adequate turning radius, fire hydrant access, provisions for vehicle back up, and weight bearing capacity to provide adequate emergency access to site.

- A secondary access would be provided when more than 30 single- or multi-family units are built, in accordance with the International Fire Code (IFC) to provide emergency access to the site.

Section 3.8
UTILITIES

The Utilities section is a summary of the *Utilities Report* (January 2023) prepared by ESM Consulting Engineers (ESM), including the *Updated Water System Analysis* (January 2023) prepared by HLA Engineering and Land Surveying (HLA), in **Appendix B**.

3.8.1 Affected Environment

2020 / 2021 SEIS & Revised Proposal

The SEIS described the existing utilities conditions on and in the vicinity of the 47° North site at that time, including water, sewer, and solid waste (see Draft SEIS Section 3.14 and Final SEIS Section 3-4 for details). Selected information from the SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

The 47° North site is largely vacant and undeveloped. An existing sewer trunk system network traverses the site. No water or solid waste collection facilities are present onsite. Existing utility providers and the capacity of their facilities remain the same as those described in the SEIS, including the City of Cle Elum for water and sewer service and Waste Management of Ellensburg for solid waste service.

3.8.2 Impacts

2020 / 2021 SEIS

As described in the SEIS, development under SEIS Alternatives 5 and 6 would generate demand for water, sewer, and solid waste service during construction and operation of the project. Water and sewer service would be provided by City of Cle Elum. The capacity of the City's water treatment plant is 6 million gallons per day (gpd) with room for expansion to 8 million gpd. The Bullfrog Flats Master Site Plan project (located on the 47° North site) was planned to be served by this water treatment plant. The City's water system would require improvements to serve SEIS Alternatives 5 and 6. The capacity of the regional Wastewater Treatment Plant (WWTP) is 3.6 million gpd; the WWTP has adequate capacity to serve the SEIS Alternatives. Solid waste service for the project would be provided by Waste Management of Ellensburg; waste would be hauled to the Cle Elum Transfer Station prior to transport to the Greater Wenatchee Land Fill for final disposal. The Cle Elum Transfer Station is nearing capacity and would require expansion and/or the extension of operating hours with the general growth in the County, including the addition of solid wastes generated by SEIS Alternatives 5 and 6.

Revised Proposal

Construction and operation of the Revised Proposal would result in increased demand for water, sewer, and solid waste service from the service providers. The analysis of the utility demands of the Revised Proposal has been updated based on new demand projections. The demand from the Revised Proposal is summarized below and compared to SEIS Alternatives 5 and 6.

Construction & Utility System Design

The design of the utility systems under the Revised Proposal would be almost identical to under SEIS Alternative 6. Like SEIS Alternative 6, the Revised Proposal would generate demand for utilities during construction. The greatest demand would be for disposal of construction and demolition (C&D) debris. **Table 3.8-1** summarizes the C&D debris under the Revised Proposal and SEIS Alternatives 5 and 6. As shown, the Revised Proposal is anticipated to generate slightly more C&D debris than SEIS Alternative 6 due to the addition of 50 affordable housing units but would generate substantially less than SEIS Alternative 5. Like SEIS Alternative 6, single family and multi-family residential units would be constructed offsite and assembled onsite, which would reduce the C&D debris generated onsite. As under SEIS Alternative 6, inert C&D debris would be collected and hauled to the Kittitas County Inert/Demolition Debris Waste Landfill at Ryegrass in Ellensburg, while non-inert C&D debris would be collected and hauled to the Cle Elum Transfer Station.

Table 3.8-1
CONSTRUCTION & DEMOLITION DEBRIS GENERATION SUMMARY – REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

	Revised Proposal		SEIS Alternative 6		SEIS Alternative 5[1]	
	Residential	Non-residential	Residential	Non-residential	Residential	Non-residential
Full Buildout Total (tons)[2]	2,506	427	2,413	455	5,955	1,939

Source: ESM Engineers, 2023.

[1] Excludes the Reserve Area.

[2] Buildout total represents the cumulative total quantity for the Revised Proposal and SEIS Alt. 6 by year 2031 and for SEIS Alt. 5 by year 2051.

Operation

As under SEIS Alternative 6, operation of the residential, commercial, and RV resort uses under the Revised Proposal would generate demand for water, sewer, and solid waste service, as described below. The Revised Proposal would be served by the same utility providers as SEIS Alternative 6.

Water

Sufficient water rights are available to serve SEIS Alternative 5 and 6, as well as the as the Revised Proposal. New Suncadia's water rights have been put into Ecology's Water Rights Program. Transfer of water rights to the city is pending.

Treated water demands were calculated for the Revised Proposal and compared to SEIS Alternatives 5 and 6, including the average daily treated water demands (see **Table 3.8-2**); and the maximum month treated water demands (see **Table 3.8-3**), both at buildout in 2031.

Table 3.8-2
AVERAGE DAILY TREATED WATER DEMANDS –
REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

Alt. No.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.	Total (ac-ft)
Revised Proposal	0.18	0.18	0.18	0.18	0.18	0.28	0.38	0.32	0.28	0.18	0.18	0.18	0.22	248
SEIS Alt. 6[1]	0.17	0.17	0.17	0.17	0.17	0.27	0.36	0.31	0.27	0.17	0.17	0.17	0.22	238
SEIS Alt. 5[2]	0.31	0.31	0.31	0.31	0.31	0.41	0.50	0.45	0.41	0.31	0.31	0.31	0.35	389

Source: ESM Engineers, 2023.
[1] Calculations for SEIS Alt. 6 include the off-site commercial property.
[2] Excludes the Reserve Area.

Table 3.8-3
MAXIMUM MONTH TREATED WATER DEMANDS –
REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

	Average Daily Demand (ADD)[1, 2]	Maximum Day Demand (MDD)[1, 3]	Peak Hour Demand (PHD)[1, 4]
Revised Proposal	0.29 mgd (203 gpm)	0.76 mgd (527 gpm)	1.52 mgd (1,054 gpm)
SEIS Alt. 6[5]	0.28 mgd (195 gpm)	0.73 mgd (508 gpm)	1.46 mgd (1,017 gpm)
SEIS Alt. 5[6]	0.38 mgd (265 gpm)	1.50 mgd (1,042 gpm)	3.00 mgd (2,085 gpm)

Source: ESM Engineers, 2023.
[1] For treated water, the daily system loss and demand contingency is calculated as total annual demand x 10%
[2] ADD is calculated as average month estimated demand (residential and commercial) + irrigation + system loss.
[3] MDD was obtained from Table 3 of the HLA memorandum dated January 5, 2023.
[4] PHD was obtained from Table 3 of the HLA memorandum dated January 5, 2023.
[5] Calculations for SEIS Alt. 6 include the off-site commercial property.
[6] Excludes Reserve Area.
Uses original 2002 EIS calculations and 1.5 MDD and 2.2 PHD peaking factors.

Treated water demand for the Revised Proposal is anticipated to be slightly greater than SEIS Alternative 6 due to the inclusion of the 50 affordable housing units and the slight change in the mix of commercial uses. However, treated water demand for the Revised Proposal would be substantially less than SEIS Alternative 5.

A preliminary storage and pump analysis for the City of Cle Elum water system was also completed for the Revised Proposal together with the development of the City Heights

project (see **Appendix B**). Similar to SEIS Alternative 6, the analysis determined that sufficient water supply exists, but the City's current water system is not sufficient to meet the projected water demand or storage requirements and improvements would be necessary. These improvements would be the same as those identified for SEIS Alternative 6 and include: a new filter train, a new Zone 3 finished water pump, and a new Zone 3 reservoir storage. However, the project's proportionate share has increased somewhat relative to SEIS Alternative 6 due to project changes and revised demand factors. To confirm the proportionate share responsibility for the Revised Proposal a monitoring/metering plan should be provided that would adjust allocation on an actual demand basis and be used to determine when capacity improvements would be triggered.

Like SEIS Alternative 6, untreated water is not proposed to be used for the Revised Proposal at this time. However, untreated water may be used in the future for recreational and public landscape irrigation. If untreated water is used in the future, it would reduce treated water consumption.

Like Alternative 6, fire flow and domestic water demand requirements account for all buildings other than residential to be sprinklered. All proposed construction will be evaluated in accordance with City of Cle Elum requirements and the International Fire Code, by the City of Cle Elum Fire Chief for compliance with applicable fire protection safety standards.

Sewer

Table 3.8-4 summarizes the monthly wastewater flow under the Revised Proposal, as well as SEIS Alternatives 5 and 6 at buildout. As shown, monthly wastewater flow would be slightly greater for the Revised Proposal than SEIS Alternative 6 but would be less than SEIS Alternative 5. Estimated wastewater loadings, in terms of biochemical oxygen demand (BOD) and total suspended solids (TSS) under the Revised Proposal are presented in **Table 3.8-5** and are compared to SEIS Alternatives 5 and 6. The BOD demand calculations for the Revised Proposal differ from those for SEIS Alternatives 5 and 6 for several reasons, including: unknown factors from the 2002 EIS (e.g., regarding numbers of employees and visitors), assumptions that were made (e.g., regarding people per unit), and the inclusion of the required affordable housing units in the analysis of the Revised Proposal.

The allocation of the wastewater treatment facility (WWTP) capacity among regional partners is addressed in an agreement that was entered into in 2002 and amended in 2008, between the City of Cle Elum, Town of South Cle Elum, City of Roslyn, and Trendwest Investments (the former owners of the Suncadia resort) and described in the SEIS. Similar to SEIS Alternative 6, wastewater capacity within the existing city facilities has been designed and specifically reserved to accommodate proposed development in the Cle Elum UGA.

Table 3.8-4
MONTHLY WASTEWATER FLOW (MGD)[1] – REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

Alt.	Year	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Average Annual
Revised Proposal	30 w/o I/I [2]	0.18	0.18	0.18	0.18	0.18	0.22	0.22	0.22	0.18	0.18	0.18	0.18	0.19
Revised Proposal	30 w/ I/I	0.21	0.22	0.22	0.21	0.21	0.24	0.24	0.24	0.20	0.20	0.20	0.20	0.22
SEIS Alt. 6[3]	30 w/o I/I[2]	0.17	0.17	0.17	0.17	0.17	0.21	0.21	0.21	0.17	0.17	0.17	0.17	0.18
SEIS Alt. 6[3]	30 w/ I/I	0.21	0.21	0.19	0.19	0.19	0.23	0.23	0.23	0.19	0.19	0.19	0.19	0.20
SEIS Alt. 5[4]	30 w/o I/I	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
SEIS Alt. 5 [4]	30 w/ I/I	0.29	0.30	0.29	0.28	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27

Source: ESM Engineers, 2023.

[1] Includes wastewater flows from the commercial development.

[2] I/I represents infiltration and inflow, which varies by month from 10% to 25% of maximum month inside wastewater production. The Cle Elum region has high I/I in the months of February and March when the river/groundwater elevations are up.

[3] Calculations for SEIS Alt. 6 include the off-site commercial property.

[4] Excludes the Reserve Area

Table 3.8-5
PROJECTED WASTEWATER LOADINGS (LB PER DAY)[1] – REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

Alternative	BOD&TSS	Buildout
Revised Proposal	Annual Average	718
	Max. Month Average (Aug.)	754
SEIS Alt. 6[2]	Annual Average	694
	Max. Month Average (Aug.)	733
SEIS Alt. 5[3]	Annual Average	699
	Max. Month Average (Aug.)	738

Source: ESM Engineers, 2023.

[1] Includes wastewater flows for commercial development demand.

[2] Calculations for SEIS Alt. 6 include the off-site commercial property.

[3] Excludes the Reserve Area.

Solid Waste

Table 3.8-6 summarizes solid waste production at buildout of the Revised Proposal compared to SEIS Alternatives 5 and 6. As shown, the Revised Proposal would generate slightly more solid waste than SEIS Alternative 6 and SEIS Alternative 5. The estimated solid waste could be further reduced with an effective recycling program. Kittitas County Solid Waste will determine whether the Revised Proposal is responsible to mitigate impacts for its proportional share of the costs associated with improvements to the Cle Elum Transfer Station and Ryegrass Landfill.

Table 3.8-6
SOLID WASTE PRODUCTION (TONS/YEAR) –
REVISED PROPOSAL, SEIS ALT. 5, & SEIS ALT. 6

Buildout Year	Revised Proposal	SEIS Alt. 6	SEIS Alt. 5[1]
Municipal	2,192	2,074	2,712
Yard	137	131	171
Hazardous/Moderate Risk[2]	14	13	17
Total Buildout (tons/year)[3]	**2,343**	**2,218[4]**	**2,900**

Source: ESM Engineers, 2023.

[1] Excludes the Reserve Area.

[2] Includes non-residential hazardous waste.

[3] Buildout total represents the cumulative total quantity for the Revised Proposal and SEIS Alt, 6 by year 2031 and for SEIS Alt. 5 by year 2051.

[4] Calculations for SEIS Alt. 6 include the off-site commercial property.

Indirect and Cumulative Impacts

Similar to SEIS Alternative 6, development under the Revised Proposal, in combination with other growth in the area (including Suncadia Master Planned Resort, City Heights, and Cle Elum Pines), would cumulatively increase impacts on utilities and hasten the need for utility improvements (e.g., improvements to the city's water system, including: a filter train in the water treatment plant, a finished water pump in Zone 3, and a reservoir in Zone 3). The City of Cle Elum plans for operations and upgrades to their utility systems based on forecasts of future growth in the city's utility service areas and will implement improvements to the systems as they are needed, with pro-rata contributions from new development.

3.8.3 Mitigation Measures

No new significant adverse impacts on utilities would occur from the Revised Proposal and no additional mitigation measures are recommended. The mitigation measure identified below includes a measure that has been updated for the Revised Proposal from those listed in the Final SEIS. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

Required Mitigation Measures

Solid Waste

- ~~The Applicant would contribute a pro-rata share to construct improvements to the solid waste transfer station, consistent with the Kittitas County Solid Waste Management Plan (SWMP) Amendment for the Trendwest (now New Suncadia) Master Plan Resort and UGA (November 2000). The Applicant would handle all construction debris, separate re-cyclable materials, and otherwise handle all of its solid waste and household hazardous waste consistent with the requirement for such handling in the Kittitas~~

~~SWMP. The same requirements would apply to the adjacent commercial development property, based on pro-rata share.~~ Kittitas County Solid Waste will be consulted to determine the basis for any mitigation requirement and whether the 47° North development is responsible to mitigate impacts, and for its proportional contribution to improvements to the Cle Elum Transfer Station and the Ryegrass Landfill. Kittitas County supports its solid waste program through tipping fees (91%) and grants; project-based mitigation may not be applicable.

Section 3.9
FISCAL CONDITIONS

The Fiscal Conditions section is a summary of the *Fiscal Conditions Report* (February 2023) prepared by ECONorthwest in **Appendix E**. The reader should consult the full report for more detailed information.

3.9.1 Affected Environment

2020 / 2021 SEIS

The SEIS described the existing fiscal and economic conditions on and in the vicinity of the 47° North site at that time, including the fiscal conditions in City of Cle Elum (including for police and fire service) and for other local service providers, such as Hospital District No. 2, KITTCOM, and Cle Elum – Roslyn School District (see Draft SEIS Section 3.15 and Final SEIS Section 3-7 for details). Selected information from the SEIS is provided and compared in context below; please consult the SEIS document for more detailed information.

3.9.2 Impacts

2020 / 2021 SEIS

The temporary and permanent jobs under any of the SEIS Alternatives are expected to result in positive impacts to the local economy. SEIS Alternative 5 would generate more jobs due to its greater amount of development onsite. Both SEIS Alternatives would increase the tax base and increase the demand for services in each of the taxing jurisdictions evaluated. At buildout, both SEIS Alternatives would generate fiscal surpluses to the City of Cle Elum. The future commercial component of SEIS Alternative 6 could generate fiscal shortfalls in the city in earlier years but would ultimately generate surpluses; the 47° North residential and recreational component would generate fiscal surpluses in the city throughout buildout. While costs could exceed tax revenues for other public service purveyors (e.g., Hospital District No. 2, KITTCOM, and Cle Elum – Roslyn School District), mitigation may or may not be required, as the analysis only includes tax revenues and excludes other significant funding sources such as charges for service or intergovernmental revenues.

Revised Proposal

The updated fiscal impact analysis considers the marginal fiscal effects of 47° North by comparing the additional revenue generated by the development with the additional operational costs needed to serve the development. The focus of the revenue analysis is on local tax revenues. Comparing revenues and costs from development is a complicated task. For example, city revenues derived from development (e.g., property tax, sales tax, real

estate excise tax (REET), and other taxes or fees) all flow to different funds, some of which are available for use citywide in an annual budgeting process, and some of which are restricted in use in different ways.

Revenues also accrue over a period and may not be available at the time that a cost is incurred. In the updated analysis, the approach taken is to estimate the present value of the total costs of providing service increases, and the present value of total revenue sources that are available to the city and other service providers. The analysis relies on a set of assumptions about revenues and costs which are plugged into a cash flow revenue model. The model is also based on development assumptions, including phasing and timing of development, to estimate changes in affected taxes. Assumptions about the type, value, and timing of development were provided by the Applicant. The development of the project would also fuel the growth of tax bases attributable to 47° North. (See **Appendix E** for details on these assumptions.)

The updated fiscal impact analysis builds on the previous Draft SEIS and Final SEIS analyses and compares the fiscal impacts of the Revised Proposal to SEIS Alternative 6. As appropriate, references are made to SEIS Alternative 5 as well. No methods in the analysis have changed from the previous analysis; however, several assumptions have been updated in this updated analysis. These changes are described below.

Assumptions

Time Frame

The base year of the updated analysis incorporates information collected in 2022. The time horizon of the analysis shows impacts through 2037. The buildout year for the Revised Proposal is 2031 but 2037 is retained as an endpoint for the analysis so it can be compared to buildout of SEIS Alternative 6.

Development Program and Timing

The updated development program provided by the Applicant differs from SEIS Alternative 6 in the following ways:

- **Timing.** Development in the revised program reaches full buildout sooner in the analysis period (2031).
- **Valuation.** The Applicant has provided detailed information related to the following elements of their program:
    - Market valuation of the commercial and residential properties;
    - Construction costs of the commercial and residential properties;
    - Economic productivity estimates of the commercial properties; and
    - Land preparation and infrastructure construction estimates of the commercial and residential properties.

With respect to timing, the amount of buildout varies between the alternatives:

- Alternative 5 assumed development occurring in phases starting in 2021 and reaching full buildout in 2051.
- Alternative 6 assumed development occurring in phases starting in 2021 and reaching full buildout in 2037.

The implication of these timing disparities between SEIS Alternative 5 and 6, and the Revised Proposal, presents challenges that makes simple yearly comparisons between alternatives very difficult. These include:

- Annual revenues are influenced by the degree of one-time construction related taxes versus the on-going operational taxes that flow once buildings are occupied. An extended buildout will have a larger share of one-time revenues as part of its total revenue mix.
- Annual expenditures are driven by the development program. A program that delivers buildout earlier will reach the full extent of the public service impacts sooner.

As a result, comparing the impacts of the Revised Proposal several years post-buildout to SEIS Alternative 6 at buildout is not an apples-to-apples comparison. The decrease in one-time revenues that is observed post-buildout would, in fact, occur for any of the alternatives after construction is complete.

Tax Policy

Tax policy was updated for all the affected jurisdictions. Please refer to **Appendix E** for details.

Public Service Costs

Outside of the changes to the estimated staffing impacts identified in the Section 3.7, **Public Services**, the fiscal analysis has also updated employee compensation estimates. As analyzed in Public Services, staff are incurred on a prorated basis depending on the amount of population (households and RV effective population) in any given year depending on buildout. The updated proposal by Sun Communities also assumes that all roads, parks, and utilities will be privately constructed and maintained, which results in no public works or parks service responsibilities by the City of Cle Elum and, therefore, no cost impacts in these areas.

City of Cle Elum

The City of Cle Elum is the local service provider for police, fire, public works, community development, parks, and other local services. To support these services, the city collects a range of general and restricted taxes. Tax revenues are estimated in three categories:

- **One-time Revenues.** These general-purpose revenues (or for public safety) are tied to the construction of housing and commercial products. Specifically, they include the retail sales tax on construction (material and labor).
- **Recurring Revenues.** These general-purpose revenues (or for public safety) are derived from the occupation of residential and commercial structures by residents,

businesses, and employees. Specific revenues include the property tax, retail sales tax (resulting from new sales tax sourcing rules), and utility taxes.

- **Restricted Revenues.** These revenues are statutorily restricted to fund certain capital expenses and are generally not available to fund public safety service costs. Specific revenues include the REET and hotel-motel tax.

See **Appendix E** for additional descriptions and assumptions for property taxes, sales and use taxes, utility taxes, state shared motor vehicle fuel tax and liquor board tax, business license fees, REET, and special hotel/motel tax.

Tax revenues are calculated based on the changes in the components of the city's tax base resulting from development at the site. Elements of growth that influence revenues include the timing, scale, and quality of the project's development as well as the population and employment impacts of the development once complete.

The Revised Proposal also assumes that all roads, parks, and utilities will be privately constructed and maintained, which results in there being no public works or parks service responsibilities for the City of Cle Elum and, therefore, no cost impacts in these areas. Therefore, the analysis seeks to isolate general tax revenues and public safety restricted revenues that can be used to fund police and fire related costs. Unrestricted revenues, in contrast, can be dedicated to areas where no service impacts are anticipated.

Police Services

Section 3.7, **Public Services**, estimates the officers that would be needed at development buildout of the Revised Proposal. Officers are added to meet proportionate demand based on the officer to population growth ratios used in the that section. See Section 3.7, **Public Services**, of this Addendum and the Public Services section in the Draft SEIS for additional information about the different methods for estimating demand. Note that the population method includes the population from the proposed residential units, as well as a proxy population calculated for the RV sites to conservatively analyze impacts on police service. As explained in Section 3.7, **Public Services**, the RV proxy population used in the analysis is likely overly conservative and overestimates probable impacts associated with the RV element of the proposal.

The city's police department submitted staffing and cost information for the project's impacts on police service using a methodology recommended by the International City Managers Association (ICMA). Section 3.7, **Public Services**, estimates the need for police officers using both a population-based to service-based formula and the police department's ICMA method. The full allotment of officers is required upon buildout in 2031 (e.g., officers are added to meet proportionate demand based on the officer to population growth ratios used in Section 3.7, **Public Services**). The police department's ICMA method assumes 1/2 of the officers are brought on in 2023 and the remaining 1/2 are added in 2027. However, the methods and assumptions used by the department to determine

timing were not documented in a manner such that the analysis could be explained, reproduced, or incorporated in this updated fiscal impact analysis.

Fire Services

Section 3.7, **Public Services**, estimates the firefighters that would be needed at development buildout under the Revised Proposal. Firefighters are added to meet demand proportionate to population growth at 47° North (see the note above and in the Public Services section regarding the RV proxy population).

Fiscal Impacts

Table 3.9-1 and **Table 3.9-2** summarize the cost and revenue impacts of the 47° North development under the Revised Proposal to the City of Cle Elem. On the revenue side, the summary includes restricted revenues of REET, the hotel-motel tax, and the motor vehicle fuel tax (as part of state shared revenues) that cannot be used to fund police or fire service costs. By 2031, annual City costs are estimated to be $1.1 million, and revenues are estimated to be more than $2.3 million. By 2037, annual city costs are estimated to be $1.4 million a year and annual city revenues are estimated to be $2.1 million a year. As noted above, comparing the Revised Proposal six years after buildout (2037) to Alternative 6 at buildout in 2037 may not be an apples-to-apples comparison; see Table 3-5 in the Final SEIS for a city cost and revenue summary for SEIS Alternative 6.

Table 3.9-1
SUMMARY OF COST IMPACTS FOR CLE ELUM – REVISED PROPOSAL

	2023	2024	2025	2026	2027	2028	2029	2030
Police	$0	$197,000	$405,000	$581,000	$766,000	$835,000	$908,000	$935,000
Fire	$0	$37,000	$75,000	$108,000	$143,000	$155,000	$169,000	$174,000
Total	$0	$233,000	$481,000	$689,000	$908,000	$991,000	$1,077,000	$1,109,000

	2031	2032	2033	2034	2035	2036	2037
Police	$963,000	$992,000	$1,022,000	$1,053,000	$1,084,000	$1,117,000	$1,150,000
Fire	$179,000	$185,000	$190,000	$196,000	$202,000	$208,000	$214,000
Total	$1,142,000	$1,177,000	$1,212,000	$1,248,000	$1,286,000	$1,324,000	$1,364,000

Source: ECONorthwest, 2023.

Table 3.9-2
SUMMARY OF REVENUE IMPACTS FOR CLE ELUM – REVISED PROPOSAL

	2023	2024	2025	2026	2027	2028	2029	2030
Property Tax	$0	$199,000	$404,000	$549,000	$698,000	$759,000	$822,000	$840,000
Sales Tax on Construction	$587,000	$605,000	$415,000	$427,000	$112,000	$115,000	$35,000	$36,000
Sales Tax Ongoing	$0	$83,000	$171,000	$209,000	$250,000	$290,000	$333,000	$376,000
Utility Taxes	$36,000	$73,000	$102,000	$133,000	$144,000	$155,000	$160,000	$165,000
Criminal Justice & Public Safety	$0	$43,000	$89,000	$123,000	$159,000	$180,000	$203,000	$209,000
State Shared Taxes	$0	$16,000	$34,000	$47,000	$60,000	$68,000	$77,000	$79,000
Business License Fees	$0	$0	$1,000	$1,000	$1,000	$1,000	$2,000	$2,000
REET	$0	$236,000	$269,000	$208,000	$230,000	$230,000	$249,000	$149,000
Hotel-Motel Tax	$0	$101,000	$209,000	$314,000	$424,000	$437,000	$450,000	$464,000
Total	$623,000	$1,256,000	$1,484,000	$1,698,000	$1,654,000	$1,800,000	$1,881,000	$1,857,000

	2031	2032	2033	2034	2035	2036	2037
Property Tax	$858,000	$866,000	$875,000	$884,000	$893,000	$902,000	$912,000
Sales Tax on Construction	$0	$0	$0	$0	$0	$0	$0
Sales Tax Ongoing	$422,000	$434,000	$448,000	$461,000	$475,000	$489,000	$504,000
Utility Taxes	$170,000	$174,000	$178,000	$183,000	$187,000	$192,000	$197,000
Criminal Justice & Public Safety	$215,000	$222,000	$228,000	$235,000	$242,000	$249,000	$257,000
State Shared Taxes	$82,000	$84,000	$87,000	$89,000	$92,000	$95,000	$97,000
Business License Fees	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
REET	$618,000	$157,000	$161,000	$165,000	$169,000	$173,000	$177,000
Hotel-Motel Tax	$478,000	$492,000	$507,000	$522,000	$538,000	$554,000	$570,000
Total	$2,366,000	$1,939,000	$1,978,000	$2,019,000	$2,060,000	$2,102,000	$2,145,000

Source: ECONorthwest, 2023.

Table 3.9-3 summarizes the net annual surplus or deficit of the estimated costs and revenues. For revenues, restricted revenues of the REET, hotel-motel tax, and motor vehicle fuel taxes are excluded from the balance since they cannot be used to fund these public services. Development at 47° North is estimated to create fiscal surpluses that accumulate over time; $8.7 million in restricted revenues are excluded from the general revenue fund and would be additive to this operating surplus.

By year 2037, which is six years after buildout of the Revised Proposal, the city is estimated to have a cumulative revenue surplus of $2.9 million of general revenues to support police and fire expenses with the Revised Proposal. Initial annual surplus revenues coming from one-time sales taxes on construction would fall once development is complete and would combine with rising services costs to produce a situation where annual surpluses would give way to a small deficit only in 2037. However, on top of the $2.9 million in cumulative general revenues to support police and fire, the city would also have an additional $9.7 million in other restricted revenues for which it has no corresponding public service cost to account for; this amount is additive to the $2.9 million cumulative surplus in 2037 covering public safety costs.

Table 3.9-3
SURPLUS/DEFICIT OF COSTS AND REVENUES FOR CLE ELUM – REVISED PROPOSAL

	2023	2024	2025	2026	2027	2028	2029	2030
Total Costs	$0	$233,000	$481,000	$689,000	$908,000	$991,000	$1,077,000	$1,109,000
Total Non-Restricted Revenues	$623,000	$911,000	$990,000	$1,154,000	$972,000	$1,101,000	$1,146,000	$1,207,000
Annual Surplus/Deficit	$623,000	$678,000	$509,000	$465,000	$64,000	$110,000	$69,000	$98,000
Cumulative Impact	$623,000	$1,301,000	$1,810,000	$2,275,000	$2,339,000	$2,449,000	$2,518,000	$2,616,000
Other Cumulative Restricted Revenues	$0	$345,000	$839,000	$1,383,000	$2,065,000	$2,764,000	$3,499,000	$4,149,000

	2031	2032	2033	2034	2035	2036	2037
Total Costs	$1,142,000	$1,177,000	$1,212,000	$1,248,000	$1,286,000	$1,324,000	$1,364,000
Total Non-Restricted Revenues	$1,231,000	$1,250,000	$1,269,000	$1,290,000	$1,309,000	$1,330,000	$1,352,000
Annual Surplus/Deficit	$89,000	$73,000	$57,000	$42,000	$23,000	$6,000	-$12,000
Cumulative Impact	$2,705,000	$2,778,000	$2,835,000	$2,877,000	$2,900,000	$2,906,000	$2,894,000
Other Cumulative Restricted Revenues	$5,284,000	$5,973,000	$6,682,000	$7,411,000	$8,162,000	$8,934,000	$9,727,000

Source: ECONorthwest, 2023.

Comparison of Revised Alternative to SEIS Alternative 5 & SEIS Alternative 6

The SEIS estimated that Alternative 5 and Alternative 6 would result in cumulative fiscal surpluses to the city in 2037 ($4.4 million and $956,000, respectively). The fiscal surplus of the Revised Proposal would similarly result in a positive surplus at buildout in 2031.

Hospital District No. 2

Kittitas Hospital District No. 2 operates Medic One ambulance services and responds to calls from a point about halfway to Ellensburg all the way to Snoqualmie Pass. The district also owns Kittitas Valley Healthcare (KVH) Family Medicine Clinic in Cle Elum and leases the clinic building to Kittitas Valley Healthcare (Hospital District No.1) for their operation of the KVH Family Medicine (Cle Elum Rural Health Clinic). Kittitas Valley Healthcare operates an Urgent Care Clinic in Cle Elum.

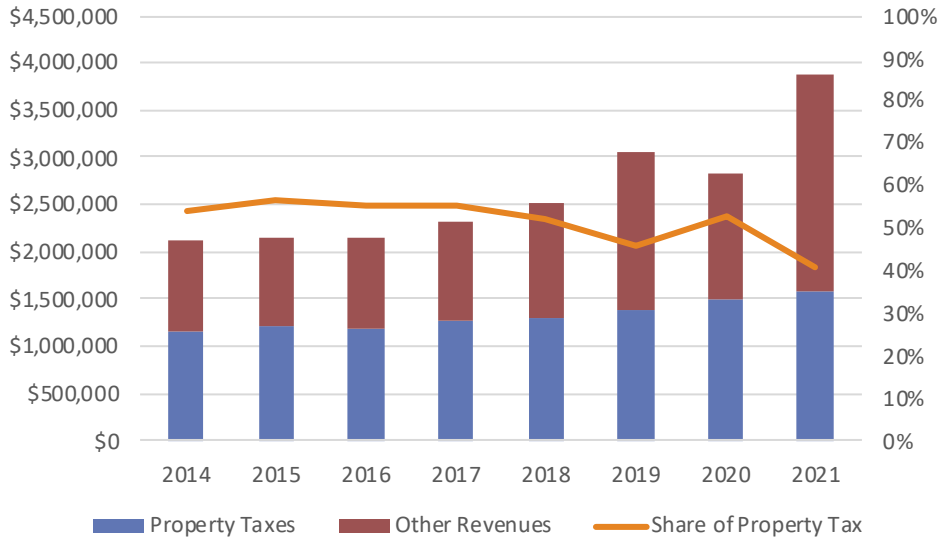
Tax Revenues

The Hospital District collects two distinct property tax levies to fund two different services: one based on a permanent EMS levy and the other a regular levy (see **Appendix E** for details on these levies).

Other Revenues

Reoccurring revenues received by Hospital District No. 2 include patient/service fees and property taxes. **Figure 3.9-1** summarizes the district's cumulative revenues received through their operating property tax levies (EMS and hospital) and other revenue sources. In 2021, patient service fees and other revenues accounted for about 59% of the district's total revenues. This fiscal analysis assumes that service fees could scale to meet additional costs beyond revenues provided by property tax revenues alone, as they have historically. For example, if new hires are required to accommodate increased service needs, then revenues from services fees would theoretically increase too.

Figure 3.9-1
SUMMARY OF KITTITAS HOSPITAL DISTRICT NO.2 REVENUES



Source: Washington State Auditor Financial Intelligence Tool, 2022.

Fiscal Impacts

The analysis of fiscal impacts to Hospital District No. 2 is based on the personnel that would be added to meet demand proportionate to population growth at 47° North under the Revised Proposal at buildout in 2031. As noted previously, the population used to estimate impacts includes a proxy RV population factor which is likely overly-conservative. (See Section 3.7, **Public Services,** for details.)

Medic One

The cost and revenue impacts of the Revised Proposal are summarized in Exhibits 7 and 8 in **Appendix E**. Medic One supports its services through a combination of property taxes and charges for its services. Results in the referenced exhibits show only the property tax component of revenues relative to increased personnel costs and, therefore, presents an incomplete and inaccurate picture of the future fiscal condition and highlights the disparity inherent in the tax revenue stream. Although costs are higher than property tax revenues in the analysis, Medic One also receives user service charges that make up a large proportion of its total revenues.

The analysis assumes that patient service fees could scale to meet additional costs beyond revenues provided by property tax revenues. For example, if new hires are required to accommodate increased service needs, then revenues from services fees would increase as well per charges for service from the district. Again, this is a key assumption, but this analysis has no publicly available data from the district to rule out if there is a structural issue between its cost for service relative to the combination of fees and taxes it receives. However, the district has grown its beginning fund balances over time during a period where both property taxes continue to grow while also representing a smaller share of

overall revenues. In 2014, for example, it had a beginning balance of $3,435,567 which had grown to $6,366,267 in 2021.[1] In summary, the analysis finds that all service impacts and any hypothetical shortfalls could be wholly offset by adjusting patient service fees.

Cle Elum Clinic

The cost and revenue impacts of the Revised Proposal are summarized in Exhibits 9 and 10 in **Appendix E**. Results show only the property tax component of revenues relative to increased personnel costs and excludes patient charges for service.

The Cle Elum Clinic is run by Kittitas Valley Healthcare (Hospital District No.1) but supported in part by Hospital District No.2 through their ownership of the facility. District No.2 owns the clinic building and receives rent payments from District 1. Although costs are higher than property tax revenues in the analysis, the clinic also receives user service charges that make up most of its revenue base. The analysis assumes that patient service fees could scale to meet additional costs beyond revenues provided by property tax revenues.

For example, if new hires are required to accommodate increased service needs, then revenues from services fees would increase as well per charges for service from the district. Kittitas Valley Healthcare states that its services are almost exclusively supported by revenue generated from patient services.[2] Services provided to 47º North residents and visitors would be supported by fees charged to those patients in the same manner as existing residents pay for their services. District No. 2 also receives property taxes and as well as payments made by Kittitas Valley Healthcare to District No. 2 for lease of the medical facility. In summary, the analysis finds that all service impacts and any hypothetical shortfalls could be wholly offset by adjusting patient service fees.

Comparison of Revised Alternative to SEIS Alternative 5 & SEIS Alternative 6

The SEIS fiscal analysis estimated that SEIS Alternative 5 and Alternative 6 would generate more in service costs than property tax revenues by 2037. The same would be true of the Revised Proposal if only tax revenues are considered. However, District No. 2 revenues come primarily from patient user fees rather than property taxes, so considering property tax revenues alone provides an incomplete and inaccurate picture of fiscal conditions. The SEIS noted that service fees have scaled to meet costs beyond property tax revenue in past years and that condition would likely continue in the future.

Hospital District No. 1

Hospital District No. 1 provides care to Kittitas County and surrounding areas. The public hospital district is governed by a five-member elected Board of Commissioners and is almost exclusively supported by revenue generated from patient services. The SEIS did not evaluate fiscal impacts to Hospital District No. 1 because the 47° North property is not within the district's taxing district. Similarly, the 2002 Bullfrog Flats Master Site Plan EIS did not evaluate fiscal impacts to the district.

[1] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.
[2] https://www.kvhealthcare.org/about-us/

Revenues

The City of Cle Elum, and therefore 47° North are not located within the district's boundary and taxing area; therefore, there is no property tax revenue that currently accrues to the district, and none would accrue to the district from the Revised Proposal. However, the site is broadly within the district's service area (it is the closest regional hospital) and 47° North would result in additional demand for services from the district and associated cost impacts, as described below. Note that District No. 1 also operates the Cle Elum Clinic, which is owned by District No. 2 and discussed above.

District No. 1 generates almost all revenues from user fees and states in published information that its services are almost exclusively supported by revenue generated from patient services.[3] Its main recurring revenue sources include patient/service fees and other sources of funds including its property tax levy and grants. In 2021, the district collected $5,061 in property taxes which is 0.004% of its total revenue of $118,867,617.

Fiscal Impact

The fiscal impact analysis of the Revised Proposal to Hospital District No. 1 is based on the personnel that would be added to meet demand proportionate to population growth at 47° North at buildout in 2031. As noted previously, the population used to estimate impacts includes a proxy RV population factor which is likely overly-conservative. (See Section 3.7, **Public Services,** for details.) The analysis finds that all service impacts and any hypothetical shortfalls could be wholly offset by adjusting patient service fees.

KITTCOM

Revenues

KITTCOM is funded primarily by intergovernmental revenue as well as fees paid by emergency service subscribers (which varies by subscriber based on the dispatch service costs) and through monthly excise taxes levied on telephone lines ($0.70 per line: land, mobile, and voice over internet protocol (VOIP)).

Fiscal Impacts

The fiscal impacts of the Revised Proposal to KITTCOM are analyzed based on the personnel that would be added to meet estimated demand in proportion to population growth at 47° North at buildout in 2031. As noted previously, the population used to estimate impacts includes a proxy RV population factor which is likely overly conservative and overstates probable demand. (See Section 3.7, **Public Services,** for details.)

Exhibits 11 and 12 in **Appendix E** summarize the cost and revenue impacts of the Revised Proposal. Reoccurring revenues received by KITTCOM predominately include intergovernmental revenues, fees paid by emergency service subscribers, and a monthly tax

[3] https://www.kvhealthcare.org/about-us/

applied to telephone lines. Residents of 47° North are expected to pay similar levels of line fees per household as existing residents of the city (and the district as a whole). Line charge revenues at buildout in 2031 are estimated to be $13,000, while projected new staffing costs are estimated at $135,000. The analysis is limited to line charge revenues, however, and estimates of intergovernmental revenues and/or subscriber fees, which historically have and could be restructured to cover additional funding needs, are not included. Line charge revenues alone, therefore, provide an incomplete and inaccurate picture of fiscal conditions.

Comparison of Revised Alternative to SEIS Alternative 5 & SEIS Alternative 6

The SEIS fiscal analysis estimated that both Alternative 5 and Alternative 6 would generate more in service costs than line tax revenues by 2037. However, it was noted that subscriber fees could scale to meet costs beyond line fee revenue as has been the case historically for KITTCOM. The Revised Proposal reflects the same conclusion as SEIS Alternative 5 and SEIS Alternative 6.

Cle Elum – Roslyn School District

Tax Revenues

Property Tax

In 2019, maintenance and operations levies proposed by local school districts and approved by voters were replaced by enrichment levies as part of the state's McCleary resolution. Enrichment levies are capped based on assessed value or per full-time equivalent student. For taxes due in 2020 and beyond, the levy cap for voter-approved enrichment levies has increased. See **Appendix E** for details on how the cap is used in the updated fiscal analysis. For the analysis, households are transformed into students using the district's student generation rate and the incremental levy impact is computed by the growth in students coming from 47° North.

Fiscal Impact

The fiscal impacts analysis of the Revised Proposal on Cle Elum-Roslyn School District is based on the teachers and buses that would be added to meet demand proportionate to permanent resident growth/student generation at 47° North at buildout in 2031. As noted previously, the population used to estimate impacts includes a proxy RV population factor which is likely overly-conservative. (See Section 3.7, **Public Services,** for details.)

Exhibits 13 and 14 in **Appendix E** summarize the cost and revenue impacts of the Revised Proposal. While costs exceed enrichment levy revenues, this single tax presents an incomplete picture of school district revenues. The district would also receive intergovernmental revenues, the majority through state school funding support, which accounts for over 75% of total district revenues. The analysis assumes that these sources of state and federal support could scale to meet these service costs. The impact on the school's main enrichment levy would be the same for every student generated within the

development as it is for the existing district due to the changes in how local enrichment levies function after the McCleary resolution.

Comparison of Revised Alternative to SEIS Alternative 5 & SEIS Alternative 6

The SEIS fiscal analysis estimated that both Alternative 5 and Alternative 6 would generate more in service costs than local property tax revenues by 2037. The Revised Proposal would similarly generate greater costs than local revenues. However, the SEIS and this analysis note that local revenues are not the primary source of district funding; intergovernmental funds have scaled to meet costs beyond local property tax revenue historically and are expected to do the same in the future.

3.9.3 Mitigation Measures

No new, significant or materially different fiscal impacts would occur from the Revised Proposal and no additional mitigation measures are recommended.

The mitigation measure identified below is updated to provide additional considerations relating to fiscal monitoring; monitoring was recommended in the Final SEIS and would similarly apply to the Revised Proposal. See **Appendix F** for a complete list of the mitigation measures under the Revised Proposal, including additional discussion of monitoring. See the Introduction to **Chapter 3** for a description of the different categories of mitigation (e.g., proposed, required, other possible).

City of Cle Elum

- The fiscal monitoring consultant will need the following information to assure that all taxes due to the city are properly reported and collected:
    - **Property Taxes**. The consultant will need information from the county assessor that detail new construction value and assessed value for all 47° North tax parcels.
    - **Sales Taxes.** The city will have to work with the Washington State Department of Revenue to request individual tax reports for businesses and households. If these data are not available to the fiscal monitoring consultant due to data privacy restrictions, the consultant will have to work with publicly available retail sales data to apportion city receipts to 47° North.
    - **Utility Taxes.** Due to the mix of utility providers, the consultant will have to work with publicly available utility tax data to apportion city receipts to 47° North.
    - **Real Estate Excise Taxes.** The consultant will need information from the county assessor to summarize real estate transactions within 47° North.

Other Service Purveyors

- The Applicant should, and has committed to, pursue mitigation agreements with the affected service providers to address fiscal impacts, if any, resulting from increased service demands attributable to the Revised Proposal.

Chapter 4
REFERENCES

CHAPTER 4
REFERENCES

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Revised 47 North SEIS Addendum Appendices

Appendix A: Natural Environment Memos

Appendix B: Utilities Report

Appendix C: Transportation Report

Appendix D: Hospital District No. 2 Call Data

Appendix E: Fiscal Conditions Report

Appendix F: Mitigation Measures and Significant Unavoidable Adverse Impacts

Appendix A
NATURAL ENVIRONMENT MEMOS

December 9, 2022
Project No. 20190414H001

EA Engineering, Science, and Technology, Inc.
2200 6th Avenue, #707
Seattle, Washington 98121

Attention: Ms. Gretchen Brunner

Subject: Review of Master Site Plan Revisions
47° North
Cle Elum, Washington

Reference: *Technical Report: Geology, Soils, and Groundwater, 47° North Master Site Plan Supplemental Environmental Impact Statement*, prepared by Associated Earth Sciences, Inc. (AESI) for EA Engineering, Science, and Technology, Inc., dated September 2020.

Dear Ms. Brunner:

We have completed our review of the recent revisions to the Master Site Plan (MSP) for the subject project as presented in the following documents:

- Civil plan sheets C000, C001 through C004, C100, C101, C102, C300, C301, C302, and C600, prepared by Atwell, LLC, dated September 30, 2022.

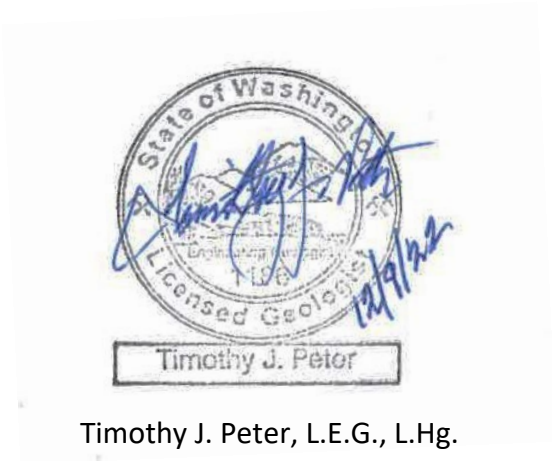
- *Supplement to the Site Engineering Technical Report for 47° North*, prepared by ESM Consulting Engineers, dated November 18, 2022.

Based on our review, the proposed clearing limits under the revised MSP would be the same as those previously proposed under SEIS Alternative 6, addressed in our September 2020 report. The clearing limits would remain outside of designated erosion hazard areas and would be limited to the more gently to moderately sloping portions of the site with inclinations of approximately 33 percent or less. The proposed grading volumes and impervious surface areas under the revised plan would be less than those proposed under SEIS Alternative 6. For this reason, potential erosion,

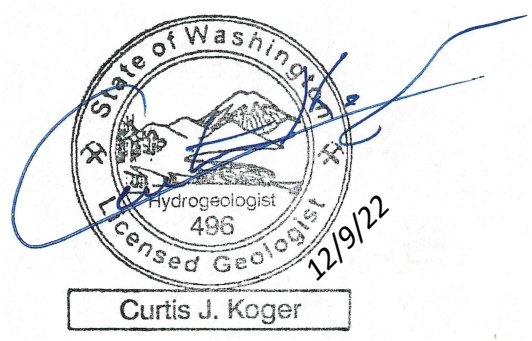
sedimentation, stormwater runoff, and groundwater impacts under the revised plan will be similar or reduced. The revisions to the stormwater design indicate that the stormwater ponds remain in the same general locations as proposed under SEIS Alternative 6 with infiltration ponds continuing to be limited to those areas of the site underlain by permeable outwash sediments suitable for infiltration. The proposed revisions will result in no significant unavoidable adverse impacts associated with seismic hazards, coal mine hazards, or volcanic hazards for the same reasons discussed in our September 2020 report for SEIS Alternative 6. In summary, it is our opinion that the proposed revisions are relatively minor with respect to the geology, soils, and groundwater components of the project, and our findings and conclusions presented in our September 2020 technical report remain unchanged.

We trust this letter meets your current needs. Should you have any questions, please contact us at your convenience.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Timothy J. Peter, L.E.G., L.Hg.
Senior Engineering Geologist



Curtis J. Koger, L.G., L.E.G., L.Hg.
Senior Principal Geologist/Hydrogeologist

H-03

Raedeke Associates, Inc.

Wetland & Aquatic Sciences
Wildlife Ecology
Landscape Architecture

TECHNICAL MEMORANDUM

December 9, 2022

To:	Gretchen Brunner, EA Engineering, Science, and Technology, Inc.
From:	Christopher W. Wright, B.S. Soil and Wetland Scientist Raedeke Associates, Inc. Richard W. Lundquist, M.S. President/ Wildlife Biologist
RE:	47º North – Master Plan Update Analysis (R.A.I. No. 2019-084-005)

This memorandum compares impacts of the Master Plan Update for 47º North (Atwell, LLC 2022, received November 18, 2022) on wetlands and plants and animals with SEIS Alternative 6 (Raedeke Associates, Inc. 2020).

Based on review of the Master Plan Update plans (Atwell, LLC 2022) and the ESM Consulting Engineers, LLC (2022) addendum to the site engineering report for 47º North, the revised site plan occupies the same general footprint as SEIS Alternative 6, would result in approximately the same area of vegetative clearing (145 acres versus 143 acres), but would involve less cut and fill grading and result in less area of new impervious surfaces (53 acres versus 71 acres).

WETLANDS

Under the revised site plan, the proposed project would result in no direct impacts to wetlands. As under the previously evaluated proposal, all wetlands in the project area would be preserved and buffered within an open space tract that includes the required buffers and additional retained open space beyond the buffer limits

A decrease in the extent of impervious area in the vicinity of the wetlands would reduce the potential loss of hydrologic support of Wetlands 4, 5, and 6 compared with SEIS Alternative 6. As with SEIS Alternative 6, the stormwater plan under the revised site plan

would match pre-development flows to Wetland 4 with pervious and pre-treated runoff from adjoining lots, as needed, and the catchment areas contributing to Wetlands 5 and 6 would be relatively unaffected.

Proposed stormwater management facilities would meet or exceed all applicable detention/retention and water quality standards. Development regulations requiring adequate wetland buffers would be implemented and the buffers would remain in their natural state to protect wetland hydrology maintained primarily through precipitation. No significant adverse impacts are anticipated.

AQUATIC RESOURCES

The revised site plan would continue to retain the entire Cle Elum River and associated riparian wetlands and habitat within dedicated open space. An adjoining area of managed open space would be retained as well, allowing only recreational activities, such that no residential or RV resort development would occur within at least 1,900 feet of the river. Thus, no direct impacts to aquatic and fish habitat would occur under the revised proposal.

No additional clearing will occur under revised proposal than was evaluated under SEIS Alternative 6. As no other stream channels occur on site, infiltration of stormwater will result in no stormwater discharges to the Cle Elum or Yakima Rivers during construction.

At full buildout, stormwater collection and treatment will follow recommended treatment in the WDOE (2019) Stormwater Management Manual for Eastern Washington (SWMMEW) (ESM Consulting Engineers, LLC 2020). These measures provide collection and treatment through combined infiltration ponds, swales, and dispersion to upland infiltration, with no surface discharges to the Cle Elum or Yakima Rivers. No discharge of stormwater runoff from developed areas would occur within the Cle Elum drainage basin.

Because the soils in the areas of infiltration provide considerable transmissivity, infiltrated stormwater will disperse broadly in the near surface groundwater beginning 2000 feet or more from Yakima River surface waters. The resulting transmission of stormwater through the near surface groundwater should result in no discernable impact to Yakima River surface water quality or associated fish and habitat.

Several species of salmonid fish, including steelhead, and bull trout, both listed as federal threatened species, are known to occur within the Cle Elum and Yakima Rivers. Middle Columbia Chinook salmon, though not listed, also occur in these rivers. Under the revised proposal, no direct impacts to riparian habitat on the Cle Elum or Yakima Rivers will occur, and infiltrated stormwater will not have a measurable direct effect on the Yakima River. Thus, impacts to fish and associated habitat should be minimal under the revised proposal, as under SEIS Alternative 6.

VEGETATION

Impacts to vegetation under the revised proposal would be comparable to that described in the SEIS. No additional area of clearing would occur under the revised proposal.

WILDLIFE

The clearing, grading, and construction of the revised proposal would have similar impacts to SEIS Alternative 6 and would result in similar habitat loss and increased fragmentation. This, together with increased disturbance (e.g., vehicular traffic, human presence throughout the trail systems) may affect movement patterns of some wildlife species, creating a barrier to movements of small mammals, reptiles, and amphibians. Increased mortality would likely result from animals attempting to cross roads, and some animals may alter movement patterns to avoid areas or time periods of high activity. However, many species would probably continue to use undeveloped areas of the site.

LIMITATIONS

We have prepared this document for the exclusive use of EA EST and their consultants. No other person or agency may rely upon the information, analysis, or conclusions contained herein without permission from EA EST.

The determination of stormwater quality or ecological system classifications, functions, values, and boundaries is an inexact science, and different individuals and agencies may reach different conclusions. With regard to wetlands, the final determination of their boundaries for regulatory purposes is the responsibility of the various agencies that regulate development activities in wetlands. We cannot guarantee the outcome of such agency determinations. Therefore, the conclusions of this document should be reviewed by the appropriate regulatory agencies prior to any detailed site planning or construction activities.

We warrant that the work performed conforms to standards generally accepted in our field, and has been prepared substantially in accordance with then-current technical guidelines and criteria. The conclusions of this report represent the results of our analysis of the information provided by the project proponent and their consultants, together with information gathered in the course of the study. No other warranty, expressed or implied, is made.

Thank you for the opportunity to provide this information. If you have any questions or need additional information, please do not hesitate to contact me at (206) 525-8122 or via email at cwright@raedeke.com.

LITERATURE CITED

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ESM Consulting Engineers, LLC. 2022. Supplement to the Site Engineering Technical Report for 47º North. November 18, 2022 report prepared for Sun Communities, Inc., Southfield, MI.

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Washington Department of Ecology. 2019. Stormwater Management Manual for Eastern Washington. Water Quality Program. Publication #18-10-044. August 2019.

December 2, 2022

EA Engineering, Science, and Technology, Inc., PBC
2200 Sixth Avenue, Suite 707
Seattle, WA 98121

Attn: Gretchen Brunner

Transmitted via email to: *gbrunner@eaest.com*

Re: Draft: Response to 2022 47° North Revised Proposal
Air Quality and Noise Assessments
Cle Elum, Washington
Landau Project No. 0878007.020

Dear Gretchen:

At the request of the City of Cle Elum, Landau Associates, Inc. (Landau) under contract with EA Engineering, Science, and Technology, Inc. (EA) prepared Air Quality and Noise technical reports in 2020 to provide technical information and analyses to support the Supplemental Environmental Impact Statement (SEIS) for the 47° North Project in Cle Elum, Kittitas County, Washington. These analyses and associated SEIS supplemented the 2002 Trendwest Properties: Cle Elum Urban Growth Area Environmental Impact Statement.

This letter is provided in response to the 2022 "47° North Revised Master Site Plan Amendment Proposal" (Revised Proposal), which is based on the revised formal application prepared by Sun Communities that incorporates some focused revisions to the project that were evaluated in the 2020/2021 SEIS. This letter is intended to supplement the 2020 technical reports, which provide detailed explanations of the analyses referenced herein.

Landau was provided with a revised project description, a land-use summary comparison of the 2020 "SEIS Alternative 6" to the Revised Proposal, site plans, and traffic data associated with the Revised Proposal.

Summary of Changes

Based on the information received by Landau from EA and Transportation Engineering NorthWest (TENW), the Revised Proposal includes the following changes from the 2020 SEIS Alternative 6, relevant to the air quality and noise analyses:

- The inclusion of 50 affordable housing units within the multi-family area, increasing the total number of dwelling units from 707 to 757.

- Commercial property development previously included in the analysis as "potential future commercial" has been included in the Revised Proposal. Proposed commercial uses have changed to eliminate medical offices and increase retail, restaurant and general office use.
- The 12.2-acre municipal recreation center that was previously included in the project has since been dedicated to the City, so it has been removed from the Revised Proposal.
- The amount of land apportioned for RV resort sites was decreased by approximately 20 acres; however, no change was made to the number of individual RV sites.
- Approximately 78 acres of undeveloped open space have been added to the Revised Proposal: a 55-acre parcel that has been added to the property and approximately 23 acres of currently undeveloped land converted from other proposed uses.

Air Quality

From an air quality perspective, an increase in multi-family housing units represents a negligible increase in potential greenhouse gas (GHG) emissions compared to the analysis presented in the 2020 Air Quality Technical Report.

In 2020, the commercial property development was considered potential future development, not part of the Master Plan, but was conservatively included in the GHG calculations. Slight changes in the commercial uses are forecast to result in slight changes in GHG emissions due primarily to the number of vehicle trips associated with each commercial use.

The municipal recreation center was not previously included in the GHG calculations, so removal from the Revised Proposal does not change the air quality analysis. The increase in undeveloped open space slightly decreases the amount of GHG attributable to soil carbon emissions (emissions associated with removal of vegetation).

The 2020 Air Quality Technical Report compared forecast annual project emissions to statewide forecast emissions (2035). Landau estimated potential annual GHG emission changes associated with the Revised Proposal compared to the 2020 Alternative 6. Forecast annual project emissions for both 2020 Alternative 6 and the Revised Proposal represented 0.03 percent of 2035 statewide forecast emissions. The Revised Proposal would represent an increase of 0.001 percent of annual statewide forecast emissions.

The addition of 50 affordable housing units and the change in commercial uses associated with the Revised Proposal will slightly increase vehicle tailpipe emissions. However, because the region is in attainment for all criteria pollutants, and because this would only slightly increase tailpipe emissions, it is unlikely that air quality impacts at local intersections would be significant or cause a "hot spot."

Noise

From a noise perspective, the changes described above are not expected to result in significant changes to the noise environment as summarized in the 2020 Noise Technical Report. The increase in

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dwelling units and change in mix of commercial uses are not expected to result in a change in short-term construction noise or long-term operational noise as described in the 2020 report (noise associated with the use and maintenance of residences, parks, commercial uses, etc.). Site plans do not indicate significant changes in the location of residential land use, commercial land use, RV resort, or other use categories.

The Revised Proposal is not expected to result in significant changes to local roadway noise, as described below. The locations at which new project roadways would intersect with existing roadways and the distances between project roadways and existing sensitive land uses appear unchanged. Landau estimated potential changes in traffic noise by comparing project-related traffic estimates provided by TENW. The following changes were noted:

- TENW recalculated forecast traffic increases based on updated traffic counts conducted in 2022. TENW increased the assumed rate of traffic increase over time for weekday traffic along Bullfrog Road in the No Action model only (2020 Alternative 5), resulting in approximately 5 to 15 percent higher traffic volumes. These relatively small increases are not associated with the Revised Proposal.
- Landau compared worst-case Sunday PM peak-hour traffic volumes for the Revised Proposal (full buildout in 2031, provided by TENW) to equivalent traffic data for 2020 Alternative 6 (full buildout in 2037). For the traffic segments modeled, with the exception of two segments described below, there was no change in forecast traffic volume, or an increase between 1 and 8 percent over the estimated traffic data used in 2020 (between 2 and 60 vehicles per hour).
- For two roadway segments, TENW reported potential increases in traffic volume between 25 and 35 percent.
  - RV Park Access off Bullfrog Road. Receivers A1 and A2 represented residential areas north of the project site (in the Suncadia Resort), north of Bullfrog Road. TENW forecast an increase in traffic on RV Park Access Road of approximately 25 percent compared to Alternative 6.
  - Site Access Road off West 2nd Street.[1] Receiver B1 represented a residential area northeast of the project site (Cle Elum Pines West), east of West 2nd Street / State Route 903. Receiver B2 represented the Cle Elum-Roslyn School District #404 campus located northeast of the project site. TENW forecast an increase in traffic on Site Access Road of approximately 35 percent compared to Alternative 6.

Landau estimated the change in noise levels associated with the roadway segments listed above by revising the relevant 2020 screening-level noise models. The maximum modeled increase in noise level between the 2020 Alternative 6 and the Revised Proposal was 0.3 A-weighted decibels (dBA), imperceptible to the human ear.[2] This change in modeled noise levels does not represent a change to

[1] TENW added Bala Drive to the intersection of West 2nd Street and Main Access Road. Bala Drive provides access to the development to the northeast of 47° North and is not project-related. No traffic is predicted to enter or exit Bala Drive traveling to or from the project Main Access Road.

[2] Under ideal listening conditions, differences of 2 to 3 dBA can be detected by some people. Most people, under normal listening conditions, can perceive a 5-dBA change in noise of a similar nature.

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the original analysis, which modeled noise levels exceeding the Washington State Department of Transportation (WSDOT) threshold of 66 dBA at receiver location B1. Use of federal or state funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement at impacted receivers.

Conclusions

Based on a review of information provided by EA and TENW, Landau concluded that the changes associated with the Revised Proposal, compared to the 2020 Alternative 6, do not represent significant changes with respect to potential air quality or noise impacts. Revised Air Quality and Noise technical reports are not required.

LANDAU ASSOCIATES, INC.

Amy Maule
Senior Scientist

Steve Quarterman
Senior Associate

AEM/WGW/MWB/SJQ/ccy
P:\878\007\R\2022 Revision\Landau_Air-Noise Response to 2022 Revised Proposal_ltr - 12-02-22.docx

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Appendix B
UTILITIES REPORT

Supplement to the Site Engineering Technical Report for 47° North

Revised January 5, 2022

Prepared for

Sun Communities, Inc.
27777 Franklin Road, Suite 200
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01/05/2023

Submitted by

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Appendix – HLA Memorandum

Introduction

The purpose of the Supplement to the Site Engineering Technical Report (SETR) for 47° North is to serve as an update to the 2002 SETR by W&H Pacific, Inc., as relevant for the 47° North development. The SETR was completed as Appendix E of the Final Environmental Impact Statement (EIS) for the Trendwest Properties Cle Elum UGA (2002 EIS).

The updates in this supplement consist of evaluating the following alternatives from the 47° North Master Site Plan Supplemental Environmental Impact Statement (SEIS) and subsequent formal application:

- SEIS Alternative 6 – Proposed 47° North Master Site Plan Amendment
- SEIS Alternative 5 (No Action Alternative) – Approved Bullfrog Flats Master Site Plan
- Revised 47° North Master Site Plan Amendment (Revised Proposal)

The SEIS alternatives/Revised Proposal are compared, relative to the codes currently in effect. With each comparison, any new significant impacts will be identified, and mitigation measures proposed.

The SETR will evaluate impacts in the following categories, matching the format of the 2002 SETR:

- Section 1 Site Information, including clearing, grading, and impervious area data
- Section 2 Stormwater, including hydrologic modeling for existing and developed conditions and a water quality analysis
- Section 3 Preliminary Water Plans
- Section 4 Preliminary Sewer Plans
- Section 5 Solid Wastes

1.1 Clearing, Grading, and Impervious Area Information

This section provides estimates of areas to be cleared during construction, impervious areas, and cut and fill earthwork volumes for the Revised Proposal and compares them to SEIS Alternatives 5 and 6.

1.1.1 Project Clearing

In order to maintain the natural setting of the project under the Revised Proposal, the extent of clearing associated with project construction would be kept to reasonable minimums through project design. Estimated areas to be cleared are presented in **Table 1-1** by type of land use category.

Cleared areas for roads were assumed to be the full road right-of-way over the length of the roads. Cleared areas for other land uses include their respective roadways and were taken as the assumed maximum developed area for each land use. Impervious areas by land use category are also presented in **Table 1-1**.

It should be noted that some of the areas assumed to be cleared and in impervious surfaces differ between the alternatives (public facilities, community recreation center, school expansion, and cemetery expansion) because different assumptions were made for these areas in the Revised Proposal versus SEIS Alternatives 5 and 6.

Table 1-1: Estimated Cleared and Impervious Areas, Acres[a]

Land Use	Revised Proposal		SEIS Alternative 6		SEIS Alternative 5[b]	
	Area Cleared	Impervious Area[c]	Area Cleared	Impervious Area	Area Cleared	Impervious Area
Residential	145	67	143	71	161	104
Residential Amenity Center	6	5	6	5	0	0
Trailhead Park	6	2	6	5	0	0
Roads	10	8	10	8	122	61
Public Facilities	0	0	0	0	23	4
Community Recreation Ctr.	0	0	0	0	10	6
School Expansion	0	0	0	0	17	8
Cemetery Expansion	0	0	0	0	8	1
Commercial Development	18	17	18	17	62	63
RV Park	131	44	146	57	0	0
Stormwater Open Space	17	0	5	4	0	0
Total	**333**	**155**	**333**	**167**	**403**	**247**

[a] Note: Numbers may not sum to totals shown due to rounding.
[b] Excludes Reserve Area.
[c] Residential and RV Park Impervious Area includes a 20% contingency.

1.1.2 Site Grading

The general considerations for grading throughout the site under the Revised Proposal include the following:

- Clearing limits would be minimized as discussed previously.
- Grading will be performed to provide positive drainage.
- Grading designs would seek reasonable balances of cut and fill by development area phases.
- No excavated materials are expected to be transported off-site.
- Except as discussed in the following sections, no general borrow materials are expected to be imported from off-site sources.
- Excavated topsoil would be stockpiled and reused.
- Erosion and sedimentation control measures would be implemented.

Estimated earthwork quantities are presented in **Table 1-2** for the Revised Proposal and compared to SEIS Alternatives 5 and 6. The proposed 47° North development grading under the Revised Proposal is shown on **Figure 1-1**. For the Revised Proposal and SEIS Alternative 6, roadway quantities to subgrade have been determined from a preliminary roadway vertical design based on the horizontal alignments presented in the master site plan. Quantities of cut and fill for other land uses were estimated on the basis of unit area volume procedures for each land use type. The unit area volumes were applied to the assumed maximum development areas estimated for each land use category.

Table 1-2: Estimated Earthwork Quantities, Cubic Yards

Land Use	Revised Proposal		SEIS Alternative 6		SEIS Alternative 5[a]	
	Cut	Fill	Cut	Fill	Cut	Fill
Residential	85,000	120,000	126,000	164,000	116,000	75,000
Residential Amenity Center	4,000	14,000	4,000	14,000	0	0
Trailhead Park	3,000	16,000	3,000	16,000	0	0
Roads	2,000	4,000	2,000	4,000	79,000	16,000
Public Facilities	0	0	0	0	82,000	15,000
Community Recreation Ctr.	0	0	0	0	19,000	19,000
School Expansion	0	0	0	0	37,000	37,000
Cemetery Expansion	0	0	0	0	8,000	16,000
Commercial Development	95,000	2,000	99,000	2,000	303,000	242,000
RV Park	60,000	75,000	106,000	108,000	0	0
RV Amenity Center	11,000	2,000	11,000	2,000	0	0
Total[b]	**260,000**	**233,000**	**351,000**	**310,000**	**644,000**	**420,000**

[a] Excludes Reserve Area.
[b] Revised Proposal Earthwork Quantities include 20% contingency.

Stripping volumes for the Revised Proposal and SEIS Alternative 6 are anticipated to be the same: 391,000 cubic yards with an estimated stripping depth of 12 inches.

Grading volumes for the Revised Proposal are significantly less than SEIS Alternative 6 because the proposed ground elevations were redesigned to closer match existing ground elevations in order to be able to retain more existing trees.

1.2 Imported Materials

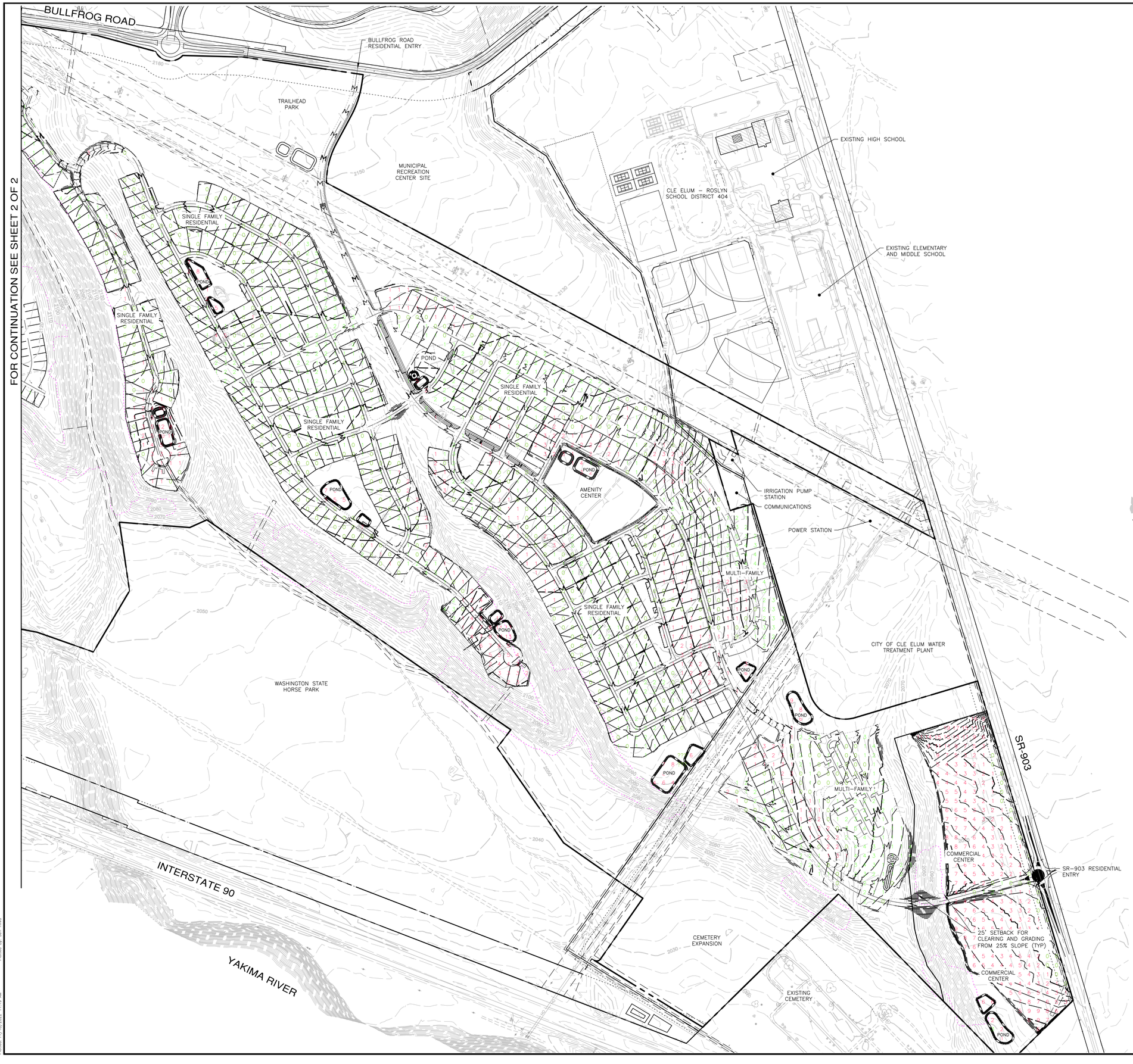
In the event on-site materials are not able to be used for construction, imported materials will be required under the Revised Proposal. These materials would include gravel base course and crushed rock base course materials for roadway, parking areas and paved trails; asphalt concrete; and bedding materials for pipelines. The estimated total volume of these materials is 150,000 cubic yards, same as for SEIS Alternative 6.

Delivery of imported materials under the Revised Proposal would follow the proposed construction schedule for the infrastructure, which is estimated to be 5 to 10 years. Assuming a six-month construction season for site work (May - October), approximately 2,500 to 5,000 cubic yards per month would be delivered to the site. Assuming 12 cubic yard capacity trucks are used, the material importing activities would generate about 210 to 420 truck trips per month.

Some stockpiling of materials on site would be expected such as bedding materials for pipeline construction. Stockpiling would tend to increase daily truck trip volumes above the average daily truck trip volume for the construction season. However, the total truck trip volume for the season would not be expected to change.

1.3 Site Information Summary

The Revised Proposal development cleared and impervious areas, as well as the cut and fill earthwork volumes, are less or the same as SES Alternatives 5 and 6. Therefore, less associated impacts are anticipated (e.g., erosion and sedimentation into water resources), and no additional mitigation is proposed other than what is already required by current codes.



FOR CONTINUATION SEE SHEET 2 OF 2

SCALE: 1" = 200'

200 100 0 200 400

CONTOUR INTERVAL = 2'

PRELIMINARY GRADING VOLUMES

RESIDENTIAL UNITS & BUSINESS PARK
CUT: 196,000 CY
FILL: 143,600 CY
NET: 52,400 CY (CUT)

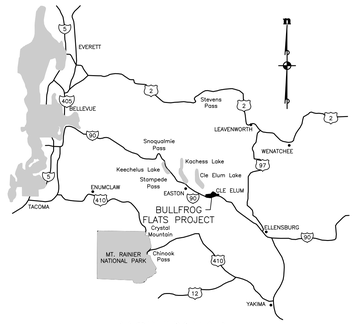
12" STRIPPING: 252,333 CY

RV & REC-1 UNITS
CUT: 20,500 CY
FILL: 50,600 CY
NET: 30,100 CY (FILL)

12" STRIPPING: 138,389 CY

TOTAL EARTHWORK
(INCLUDES 20% CONTINGENCY)
CUT: 259,800 CY
FILL: 233,040 CY
NET: 26,760 CY (CUT)

12" STRIPPING: 391,000 CY



VICINITY MAP
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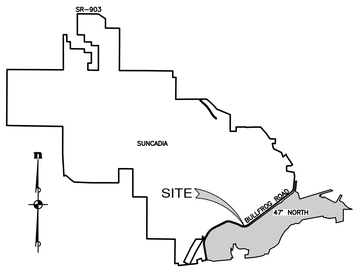

KEY MAP
NOT TO SCALE

47°N
RV RESORT & RESIDENCES

REVISIONS

NO.	DESCRIPTION/DATE	BY

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Public Works | Project Management | Landscape Architecture

SUN COMMUNITIES INC

47° NORTH

CONCEPTUAL GRADING PLAN

CITY OF CLE ELUM

WASHINGTON

JOB NO.	2050-001-018
DWG. NAME	EN-19
DESIGNED BY:	LGB
DRAWN BY:	JJH
CHECKED BY:	
DATE:	10/24/2022

FIG 1-1

1 OF 2 SHEETS

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SUN COMMUNITIES INC

47° NORTH

CONCEPTUAL GRADING PLAN

CITY OF CLE ELUM WASHINGTON

JOB NO.	2050-001-018
DWG. NAME	EN-19
DESIGNED BY:	LGB
DRAWN BY:	JJH
CHECKED BY:	
DATE:	10/24/2022

FIG 1-1

2 OF 2 SHEETS

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This section updates the stormwater analysis for the property under the Revised Proposal and compares it to SEIS Alternatives 5 and 6. The stormwater analysis is compared as related to current code compliance, including the following items:

- Hydrology, including hydrologic model of existing and developed conditions. Developed conditions include development methodology for flow control, water quality, and conveyance.
- Water quality analysis of adjacent water bodies.

The current stormwater design standards for the property, including hydrologic modeling, are outlined in the 2019 Washington State Department of Ecology (Ecology) Stormwater Management Manual for Eastern Washington (SMMEW). The following current stormwater codes were also used for additional guidelines:

- 2019 Ecology Stormwater Management Manual for Wester Washington (SMMWW) – used for reference since it describes some stormwater concepts in more detail than the SMMEW.
- 2016 King County Surface Water Design Manual (KCSWDM) – used for reference as related to master drainage plans.
- 2019 Washington State Department of Transportation (WSDOT) Highway Runoff Manual (HRM) meets the level of stormwater management established in the SMMEW and has additional best management practices (BMPs).

2.1 Hydrology

2.1.1 Hydrologic Model

Following is an update to the stormwater hydrologic modeling completed for the 2002 EIS SETR:

- Evaluation of the original hydrologic modeling to verify it complies with current code requirements.
- Estimate of hydrologic impacts of the Revised Proposal as compared to SEIS Alternatives 5 and 6 and recommendations for associated mitigation.

2.1.2 Hydrologic Model Comparison

The hydrologic simulation model originally used for the 2002 EIS SETR is the same model used by the neighboring Suncadia project. The model is the Hydrologic Simulation Program - Fortran (HSPF) Release 11, (United States Environmental Protection Agency, 1996). The model continuously simulates the rainfall-runoff response of a watershed by simulating the physical process response to changing climatic conditions. HSPF is a standard hydrologic computational tool.

In past documentation, Ecology noted that HSPF is relatively complex to use and is best suited for basin plans and master drainage plans. Ecology requires the use of a continuous simulation model for basin plans. Due to the large size of the MountainStar watershed (19.5. square miles) and environmental review considerations, the HSPF model was selected for that project.

The 2019 SMMEW identifies HSPF as one of the best rainfall-runoff modeling approaches for Eastern Washington, but it does not go into further detail as to its benefits. Therefore, the 2016 KCSWDM was used as an additional guideline as relevant to HSPF and master drainage plans to confirm its

applicability. The 2016 KCSWDM states *"HSPF is also an approved model but is more complex than other approved models and is typically used for basin planning and master drainage plan analyses."*

Therefore, the original hydrologic modeling continues to meet current code requirements and can be used for estimating hydrologic impacts of the Revised Proposal.

2.1.3 HSPF to MSRTS

Input to the model includes land segment information such as soil parameters, elevation and vegetation parameters, as well as several continuous climatological time series for the time period being simulated. The climatological parameters required by HSPF for runoff and snow simulation are:

- Precipitation
- Evaporation
- Air temperature
- Dewpoint temperature
- Solar radiation
- Wind movement

Runoff is modeled as the combined effect of surface flow, shallow subsurface flow (interflow) and groundwater flow response to climatological conditions. The distribution of flow between runoff mechanisms is determined by land segment characteristics such as soil moisture content, infiltration rate, and interception storage. The model generates flow from pervious and impervious land segments, and routes it through the drainage network. The drainage network can include pipes, streams, vaults, detention ponds, lakes and wetlands.

Snow accumulation and melt are simulated based on energy balance equations. Snowpack conditions, including ice content, density, albedo (reflectivity of the snow) and temperature, change over time according to climate conditions. Snowmelt water is added to precipitation inputs to the land segment and is routed through the land segment runoff mechanisms before entering the drainage network.

Northwest Hydraulics Incorporated, with the permission of King County, took the output from the HSPF model and used it to modify the King County Runoff Time Series (KCRTS) program. This new modified KCRTS program became the Mountain Star Runoff Time Series (MSRTS) that is used for the hydrology calculations for the Suncadia Master Planned Resort and the Bullfrog UGA that is now the proposed 47° North development. To most accurately model the pre and post developed conditions, all areas entered into MSRTS are classified in the gradual slope categories.

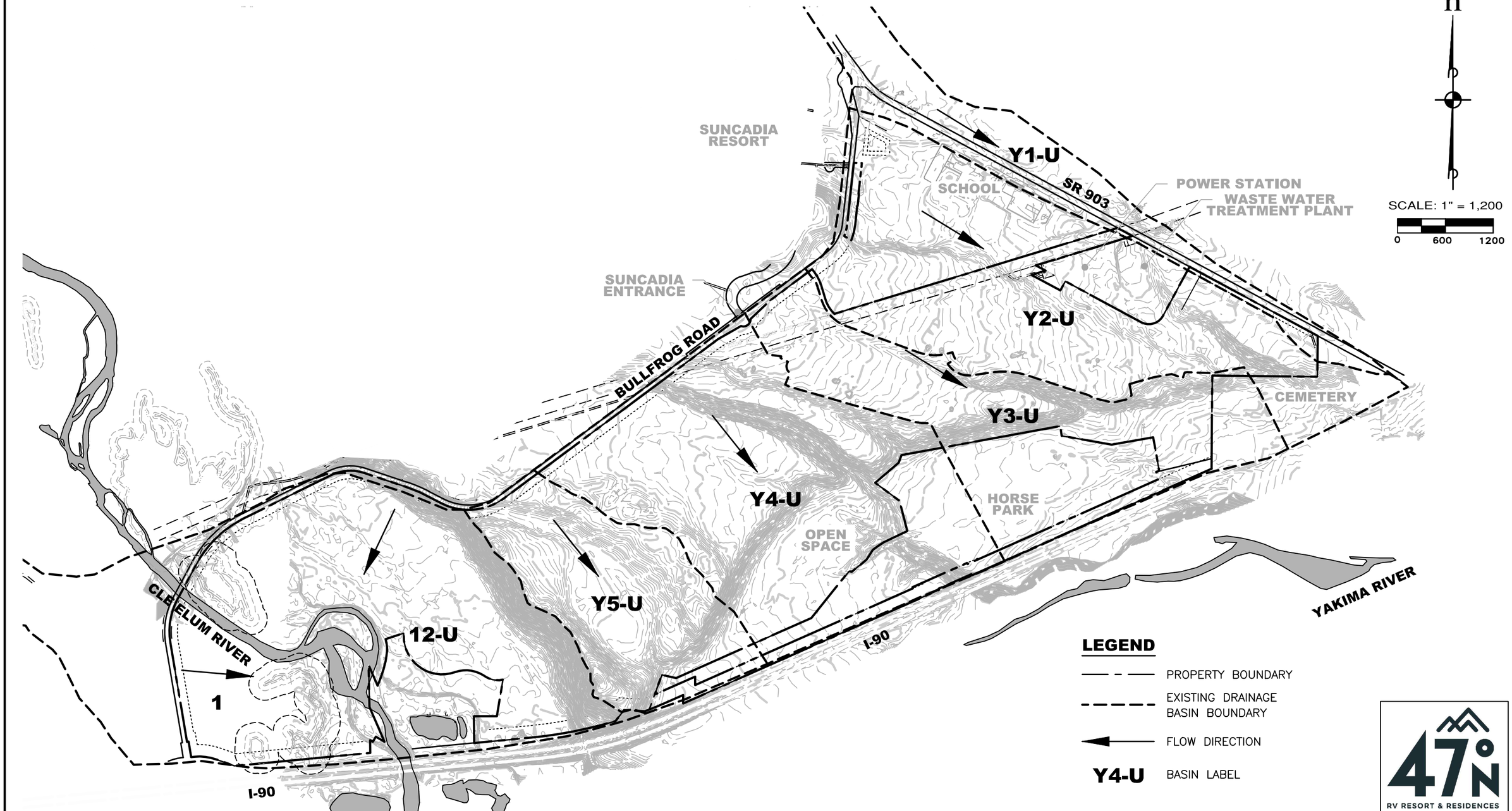
2.2 Existing Conditions

The existing conditions hydrologic model was developed as part of the 2002 EIS SETR, with basins and sub-basins, according to soil type, vegetative cover, and average slope conditions for FEIS Alternative 2, because it represented the highest impact alternative.

As described in Section 1 – Site Information, the Revised Proposal cleared, graded, and impervious areas are less than SEIS Alternatives 5 and 6. Therefore, the existing conditions hydrologic model of the 2002 EIS SETR is not required to be updated.

The existing condition basin information has been updated as relevant to the proposed 47° North development under the Revised Proposal. The soil type has been evaluated in more detail by Associated Earth Sciences, Inc. (AESI). The vegetative cover has been updated by Raedeke Associates, Inc.

The topographic aerial information and associated average slope conditions have remained generally the same to date, therefore the existing conditions model basin boundaries remain the same and are shown in **Figure 2-1**.



Source: ESM Consulting Engineers, 2022.

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Figure 2-1
Existing Subbasins

2.2.1 Soil Type

CDM (formerly AGI Technologies) originally characterized soil types on the property that have been analyzed in more detail by AESI for the 47° North development. **Table 2-1** summarizes the soil types present in each of the subbasins. The soil types for the property watershed are shown in **Figure 2-2.**

Table 2-1: Existing Subbasin Soil Types[a]

Subbasin	Basin Area (acres)	Alpine Till (Acres)	Outwash (Acres)	Dirty Glacial Outwash (acres)	Alluvium (acres)
Basin 1-1U	71	-	-	-	71
Basin 1-2U	-	-	-	-	-
Basin 12-U	224	13	162	-	49
Basin Y1-U	5	-	5	-	-
Basin Y2-U1	74	-	74	-	-
Basin Y2-U2	54	-	54	-	-
Basin Y2-U3	-	-	-	-	-
Basin Y2-U4	6	-	6	-	-
Basin Y3-U1	53	-	53	-	-
Basin Y3-U2	7	-	7	-	-
Basin Y3-U3	14	-	14	-	-
Basin Y3-U4	39	-	39	-	-
Basin Y3-U5	2	-	2	-	-
Basin Y4-U1	97	24	73	-	-
Basin Y4-U2	57	6	51	-	-
Basin Y4-U3	13	-	13	-	-
Basin Y4-U4	56	-	56	-	-
Basin Y5-U1	95	51	1	43	-
Basin Y5-U2	22	12	2	8	-
Total	**889**	**106**	**612**	**51**	**120**

[a] Includes only the portions of basins within 47° North development and commercial development.

2.2.2 Cover

Vegetative cover information has been field verified and analyzed by Raedeke Associates, Inc. into two general cover classes for the hydrologic model: forested for the majority of the site and grass with shrubs for the areas under the powerlines. The vegetative cover types for the property watershed are shown in **Figure 2-3.**

2.2.3 Slope

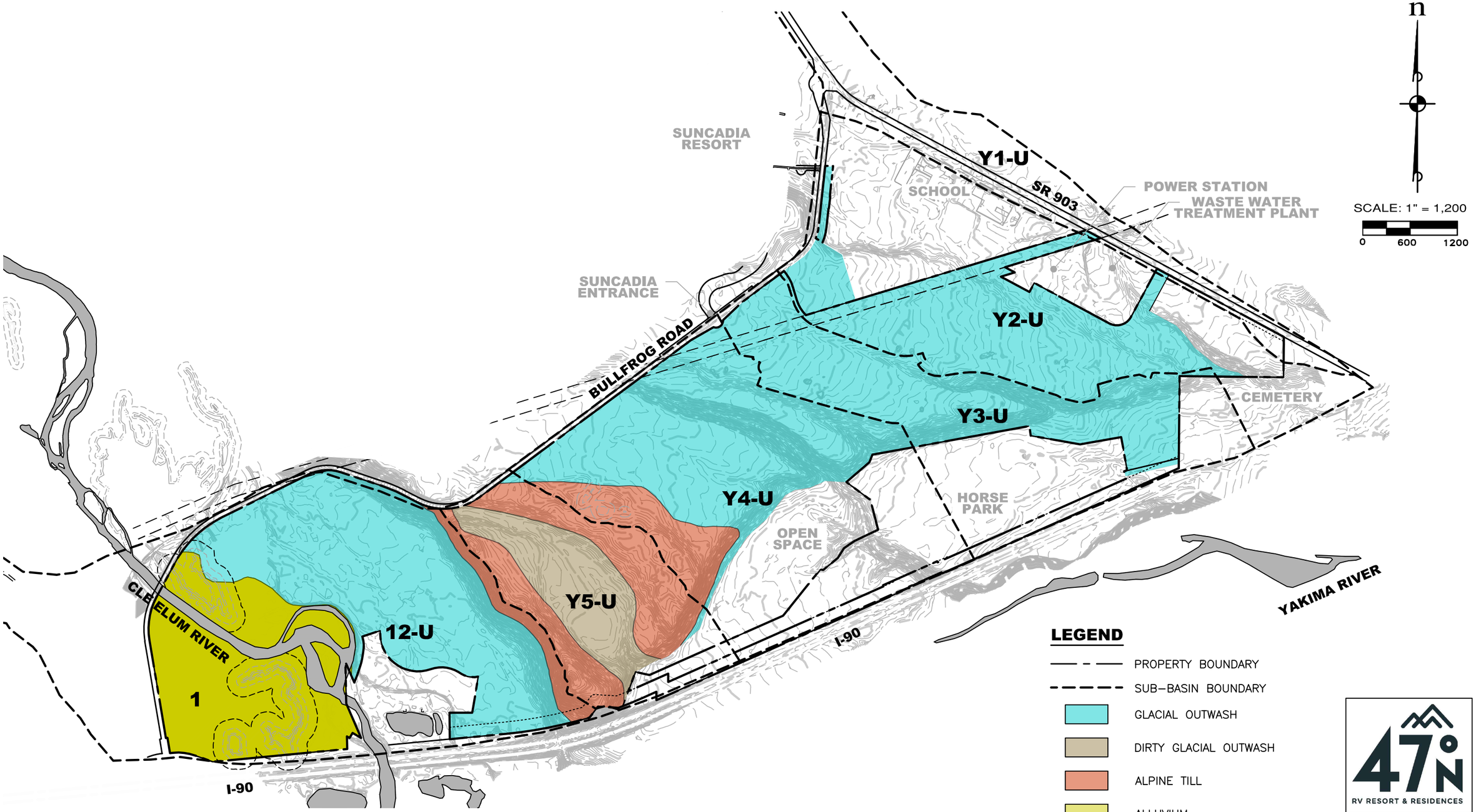
The existing ground topographic survey data has remained the same since the original 2002 EIS SETR was completed. In addition to the slope analysis performed originally, ESM has performed an additional slope delineation, identifying 15 percent slope areas, 25 to 71 percent steep slope areas and the associated setback for clearing and grading. The slope limits were identified in the areas where the ground surface has a vertical relief of 10 feet or more at 25 percent. The results of the slope category delineation for the project watershed are shown in **Figure 2-4.**

A summary of the existing conditions land use for the site is contained in **Table 2-2.**

Table 2-2: Pre-Developed Condition Subbasin Land-Use/Land Cover[a]

Subbasin	Basin Area (acres)	Forested Area (acres)	Grass/Shrubs (acres)	Impervious Roads (acres)	Impervious Other (acres)
Basin 1-1U	71	71	-	-	-
Basin 1-2U	-	-	-	-	-
Basin 12-U	224	224	-	-	-
Basin Y1-U	5	5	-	-	-
Basin Y2-U1	74	64	10	-	-
Basin Y2-U2	54	52	2	-	-
Basin Y2-U3	-	-	-	-	-
Basin Y2-U4	6	1	5	-	-
Basin Y3-U1	53	46	7	-	-
Basin Y3-U2	7	7	-	-	-
Basin Y3-U3	14	14	-	-	-
Basin Y3-U4	39	37	2	-	-
Basin Y3-U5	2	2	-	-	-
Basin Y4-U1	97	97	-	-	-
Basin Y4-U2	57	57	-	-	-
Basin Y4-U3	13	6	7	-	-
Basin Y4-U4	56	56	-	-	-
Basin Y5-U1	95	95	-	-	-
Basin Y5-U2	22	22	-	-	-
Total	**889**	**856**	**33**	**-**	**-**

[a] Includes only the portions of basins within 47° North development and commercial development.



Source: Associated Earth Sciences Inc., 2020.

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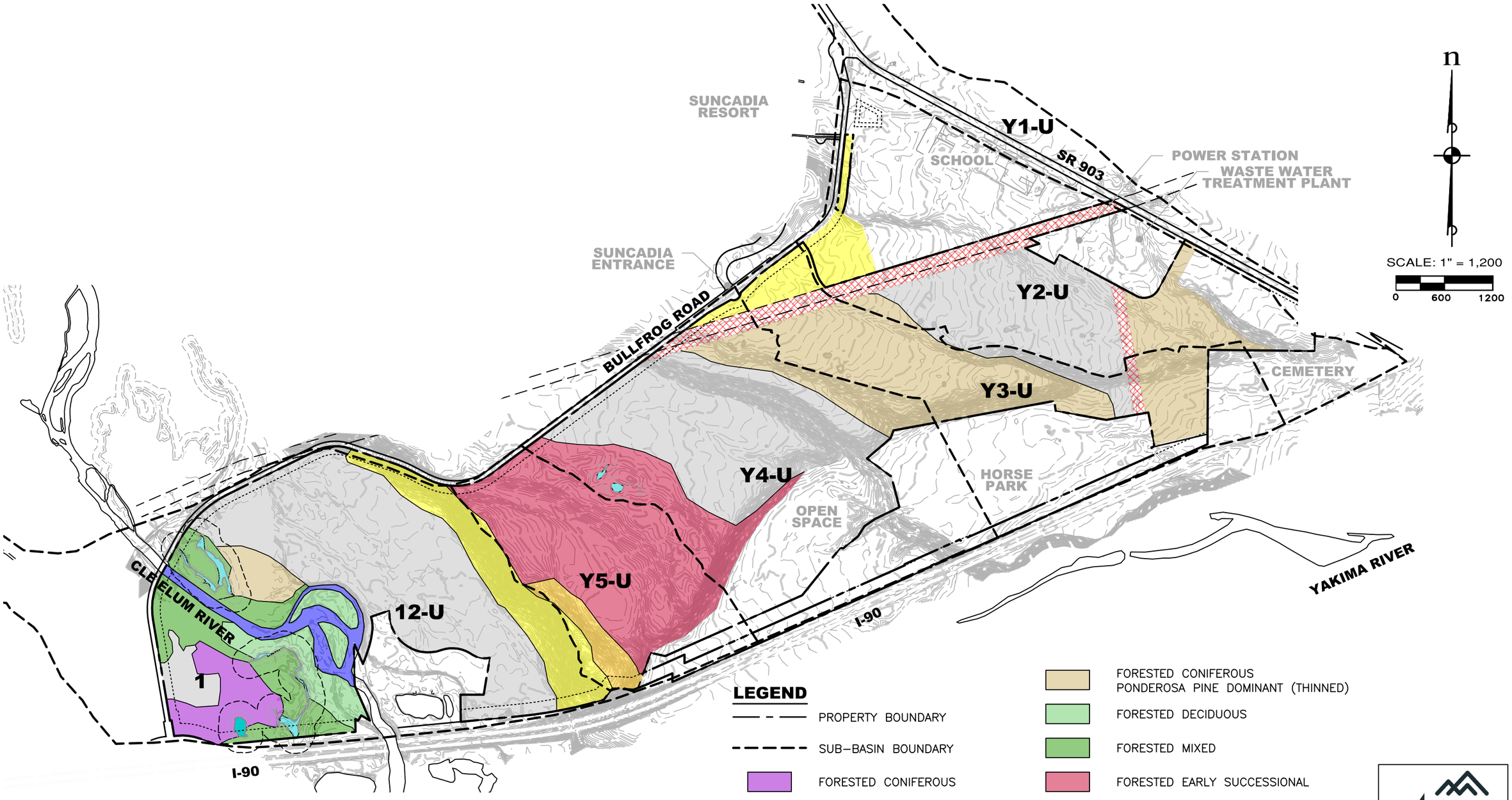
Figure 2-2
Soil Types



Source: Raedeke Associates Inc., 2020.

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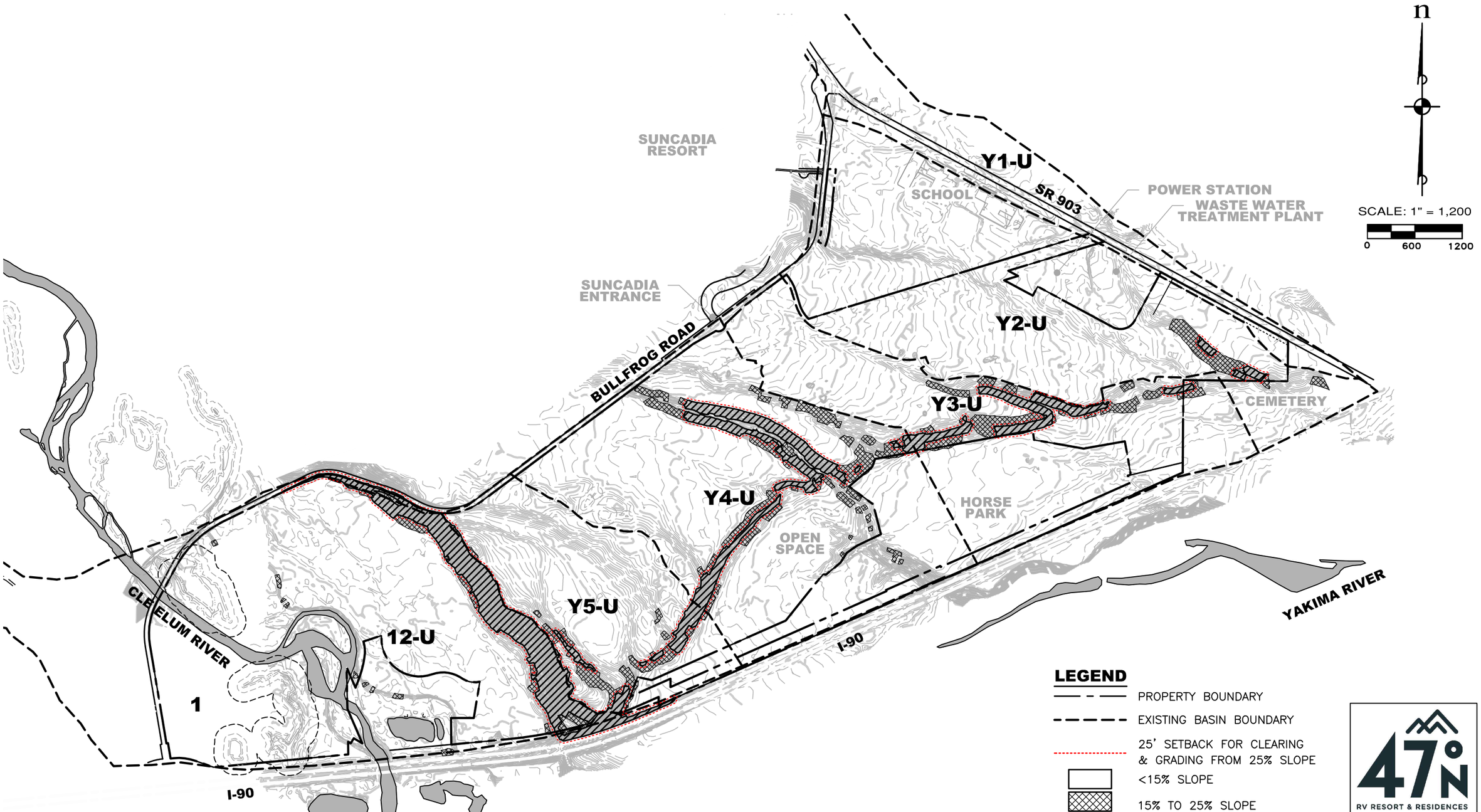
Figure 2-3
Existing Vegetative Cover



Source: ESM Consulting Engineers, 2022.

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Figure 2-4
Slope Map

2.3 Developed Conditions

The developed condition drainage concept under the Revised Proposal includes collection and conveyance facilities, water quality treatment facilities, infiltration basins, and detention basins.

Table 2-3 provides a summary of the developed land use/land cover.

Table 2-3: Developed Condition Subbasin Land-use/Land Cover, Revised Proposal[a]

Subbasin	Basin Area (acres)	Undisturbed Area (acres)	Landscape Area (acres)	Impervious Road (acres)	Impervious Other[b] (acres)
Basin 1-1U	70.9	70.9	-	-	-
Basin 1-2U	-	-	-	-	-
Basin 12-U	224.1	224.1	-	-	-
Basin Y1-U	4.8	1.6	0.5	0.1	2.6
Basin Y2-U1A	14	12.4	-	1.6	0
Basin Y2-U1B	17.6	2.4	7.2	1.8	6.2
Basin Y2-U1C	13.6	1.8	5.4	2.0	4.4
Basin Y2-U1D	28.7	2.7	12.5	3.1	10.4
Basin Y2-U2	54.1	3.7	15.8	7.0	27.6
Basin Y2-U3	-	-	-	-	-
Basin Y2-U4	6.0	6.0	-	-	-
Basin Y3-U1A	35.4	15.7	6.3	2.5	10.9
Basin Y3-U1B	17.7	2.2	8.0	2.1	5.4
Basin Y3-U2	6.8	0.4	3.2	1.0	2.2
Basin Y3-U3	13.8	13.8	-	-	-
Basin Y3-U4	39.5	39.5	-	-	-
Basin Y3-U5	1.8	1.8	-	-	-
Basin Y4-U1A	43.0	4.5	19.0	7.5	12.0
Basin Y4-U1B	53.9	11.7	21.3	9.7	11.2
Basin Y4-U2	57.0	57.0	-	-	-
Basin Y4-U3	12.8	0.5	6.0	2.1	4.2
Basin Y4-U4	56.1	48.9	4.6	0.2	2.4
Basin Y5-U1	94.9	11.9	68.2	6.2	8.6
Basin Y5-U2	22.0	22	-	-	-
Total	**889.3**	**556.3**	**178.0**	**46.9**	**108.1**

[a] Includes only the portions of basins within 47° North development and commercial development.
[b] Residential and RV Park Impervious Area includes a 20% contingency.

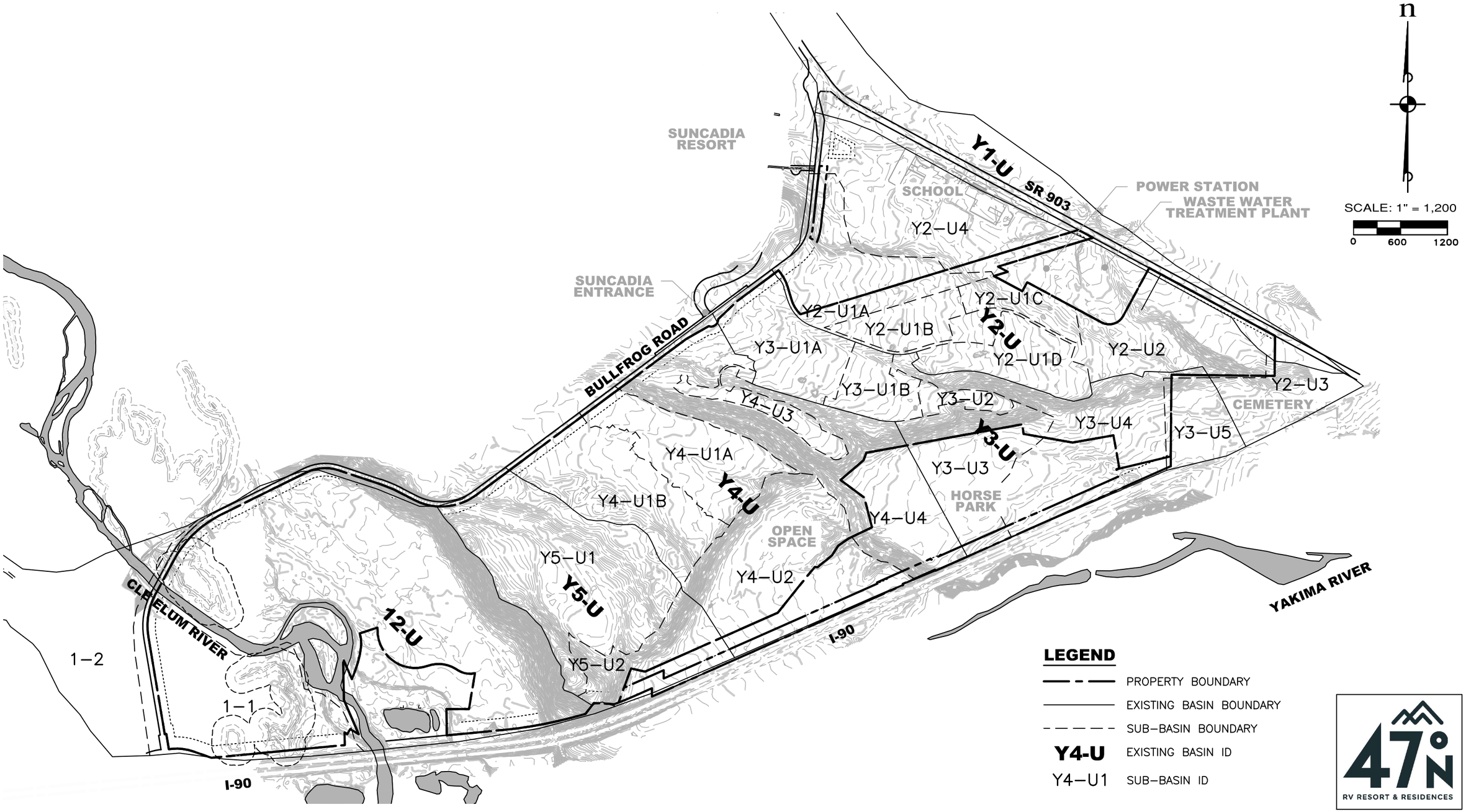
For comparison, impervious and landscaped areas for the Revised Proposal as well as SEIS Alternatives 5 and 6 are summarized in Table 2-4.

Table 2-4: Impervious and Landscape Area Summaries[a]

Surface Type, Acres	Project Alternative					
	Revised Proposal		SEIS Alternative 6		SEIS Alternative 5[b]	
	Impervious Area[b]	Landscape Area	Impervious Area	Landscape Area	Impervious Area	Landscape Area
Residential	67	73	71	72	104	57
Residential Amenity Center	5	1	5	1	0	0
Trailhead Park	2	4	5	1	0	0
Roads	8	2	8	2	61	61
Public Facilities	0	0	0	0	4	19
Community Recreation Ctr.	0	0	0	0	6	4
School Expansion	0	0	0	0	8	9
Cemetery Expansion	0	0	0	0	1	7
Commercial Development	17	1	17	1	63	0
RV Park	56	75	57	88	0	0
RV Amenity Center	0	5	4	1	0	0
Stormwater Open Space	0	17	0	0	0	0
Total	**155**	**178**	**167**	**166**	**247**	**157**

[a]Note: Numbers may not sum to totals shown due to rounding.
[b]Excludes Reserve Area.
[c]Residential and RV Park Impervious Area includes a 20% contingency.

Developed conditions and developed condition basin boundaries are shown on **Figures 2-5** and **2-6.**



Source: ESM Consulting Engineers, 2022.

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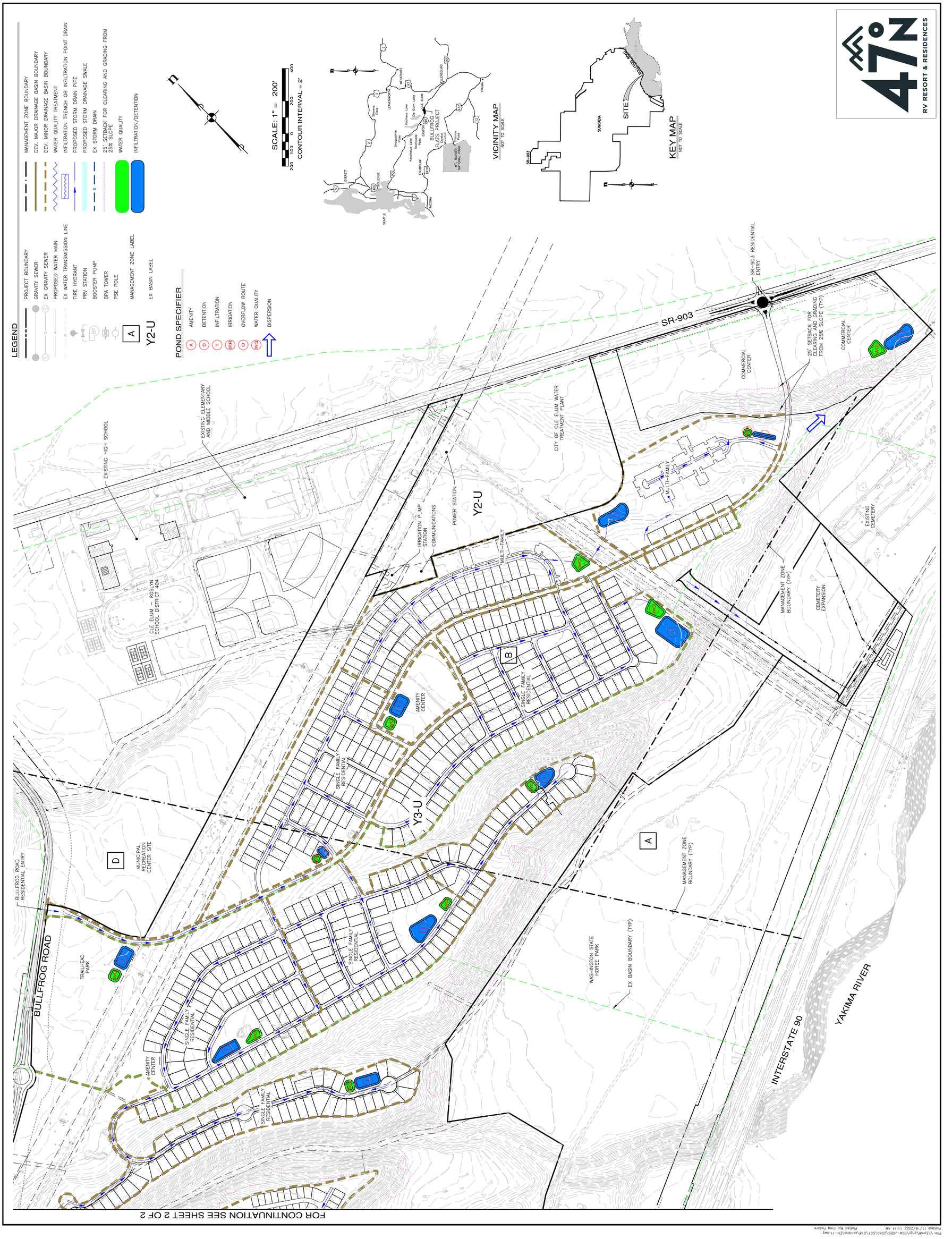
Figure 2-5
Developed Condition Basin Boundaries



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Public Works | Project Management | Landscape Architecture

SUN COMMUNITIES INC

47° NORTH

COMCEPTUAL STORM DRAINAGE PLAN

CITY OF CLE ELUM

WASHINGTON

JOB NO. 2050-001-018
DWG. NAME EN-14
DESIGNED BY: LGB
DRAWN BY: JJH
CHECKED BY:
DATE: 11/15/2022

FIG 2-6
1 OF 2 SHEETS

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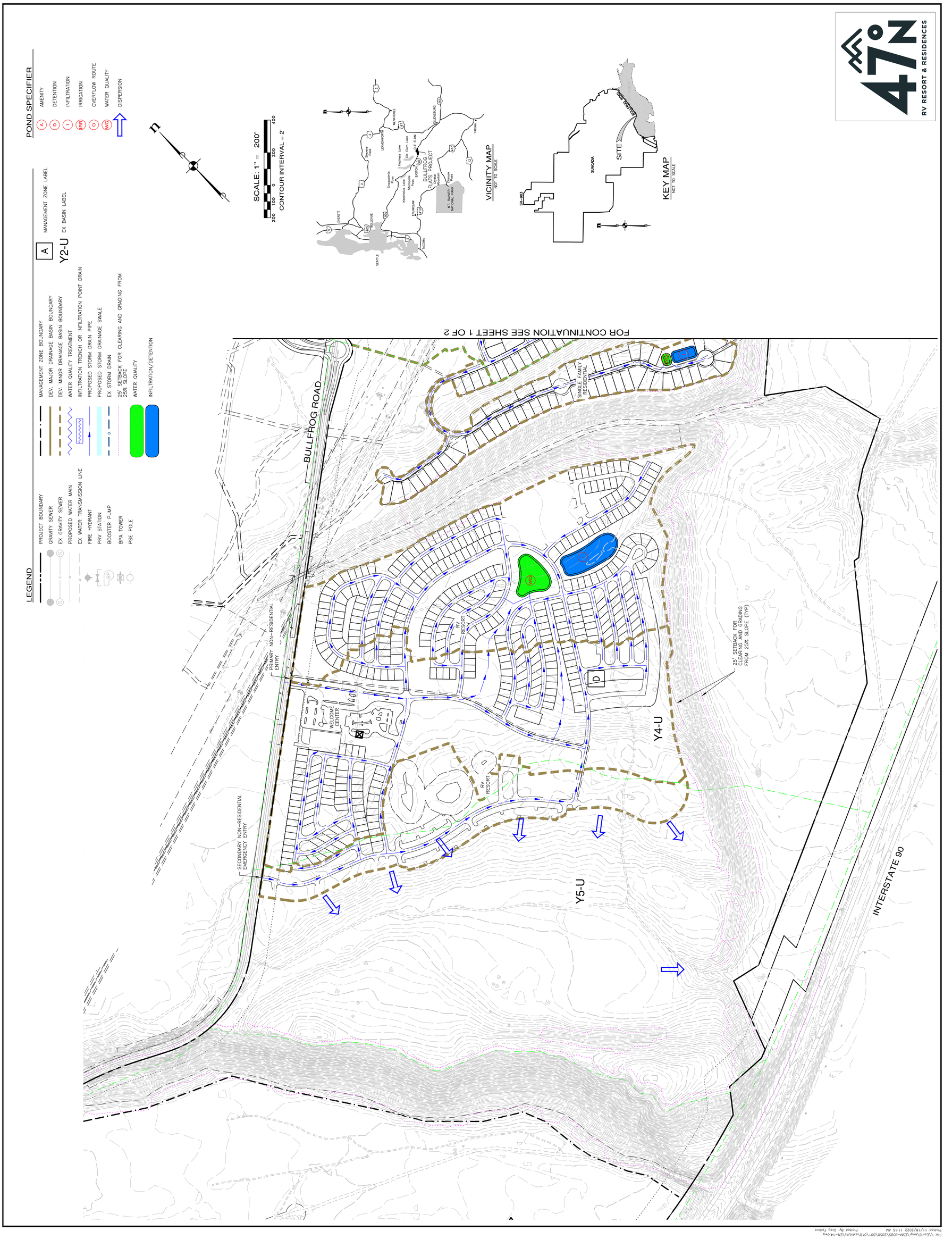

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CONCEPTUAL STORM DRAINAGE PLAN

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CITY OF CLE ELUM

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DWG. NAME EN-14
DESIGNED BY: LGB
DRAWN BY: JJH
CHECKED BY:
DATE: 11/15/2022

FIG 2-6
2 OF 2 SHEETS

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2.4 Flow Control, Water Quality Treatment, and Conveyance Methodology

Under the Revised Proposal, stormwater runoff from the developed project areas impervious and landscaped surfaces will generally be collected in catch basins or roadside water quality swales and directed to water quality and infiltration or detention facilities (depending on existing soil features) via pipes or conveyance swales or dispersed, if feasible. Overflow routes will be provided for all proposed stormwater facilities.

2.4.1 Flow Control

The proposed flow control facilities will consist of either infiltration, detention, or sheet flow dispersion. Infiltration and detention facilities would be ponds or vaults, and the dispersion facilities would be trenches.

2.4.1.1 Infiltration Facilities

The majority of flow control facilities shown on **Figure 2-6** are infiltration ponds, as allowed by the existing outwash soils. These infiltration facilities were sized based on preliminary infiltration rates of 5 to 10 inches per hour recommended by AESI with a factor of safety of 20 percent. The infiltration facilities will infiltrate the 100-year storm event.

2.4.1.2 Detention Facilities

One proposed detention facility is located in the lower plateau of the RV park, because the existing soils in this area are alpine till. The proposed detention facility has been designed to detain the proposed developed flows and release pre-developed forested flows (50 percent of the 2-year storm event flow up to the 50-year storm event) to a dispersion trench that transforms the released flows to sheet flow dispersion at the natural discharge location.

2.4.1.3 Sheet Flow Dispersion

Sheet flow dispersion will also be used to for stormwater flow control, as may be applicable for single family and RV resort areas that abut open space and slope away from the developed areas in a native vegetated area with slopes less than 15 percent.

2.4.2 Water Quality Treatment

Water quality treatment will be provided for runoff from impervious road and parking surfaces. Treatment will be provided in one of several Ecology recommended treatment facility types. Water quality treatment options include wetponds, biofiltration swales, bio-infiltration and sheet flow dispersion. All water quality facilities are sized to treat the water quality storm. The water quality storm is that storm for which all storms equal or smaller in size account for 90 percent of the average annual runoff. Proposed water quality facilities are described in the following sections.

The 2002 UGA EIS divided the property into four water quality management zones named A, B, C, and D, as a result of underlying geology and the groundwater flow patterns. The developed condition basin boundaries were established by an analysis of existing drainage basins, proposed roadway locations, and areas suitable for stormwater infiltration.

The water quality management zones and associated subbasins for the developed conditions are shown in **Figure 2-6**. The alluvial soils found adjacent to the Cle Elum River represent Management Zone C. The main central portion of the property is Management Zone D, which has areas of both till and outwash soils at the surface. Further east, under Management Zones A and B, the surface soils are similar to Zone D. However, Zones A and B are distinguished from D because the thick lacustrine aquitard is absent. Zone A is more proximate to the Yakima River and the associated Yakima Hatchery intake wells, which is why the two zones are separated.

Management Zone D runoff requires the basic level of treatment. This requirement can be satisfied by the use of a single facility such as a biofiltration swale or a water quality pond. Zone C does not have development proposed and thus has no direct influence on water quality. Zones A and B have less natural filtration afforded from the underlying sediments. Runoff from these zones requires enhanced treatment to further reduce dissolved metals and other contaminants prior to infiltration.

Management Zones A and B require the use of Ecology's enhanced treatment menu and Management Zone D will use the basic treatment menu. The water quality treatment best management practices most suited for the proposed 47° North development for the Revised Proposal are described below.

2.4.2.1 Sheet Flow Dispersion

Sheet flow dispersion is an approved Ecology basic water quality and quantity control method for areas that preserve the existing forest duff, in a native vegetated area with slopes less than 15 percent.

2.4.2.2 Biofiltration Swales

Biofiltration swales are another approved Ecology basic water quality treatment facility which are sized to treat the water quality design storm. They may be used for enhanced treatment as part of a treatment train. Biofiltration uses vegetation in conjunction with slow and shallow-depth flow for runoff treatment. As runoff passes through the vegetation, pollutants are removed through the combined effects of sedimentation filtration, soil sorption, and plant uptake.

Biofiltration swales are not anticipated to be irrigated and therefore must be seeded with drought resistant vegetation suitable for the upper Kittitas County climate. The typical seed mixture that can be used for biofiltration swales is listed in **Table 2-5**.

Table 2-5: Typical Seed Mixture

Seed Mixture Type	Percentage
Sherman Big Blue Grass	10
Joseph Idaho Fescue	30
Sodar Streambank Bunch Grass	30
Secar Blue Bunch Wheat Grass	30

(Source: Wildland, Inc., Richland, WA, October 2000.)

This mixture may be changed based on recommendations from design professionals to accommodate site conditions.

2.4.2.3 Bioinfiltration Swales

Bioinfiltration swales, also known as grassed percolation areas, combine grasses (or other vegetation) and soils to remove stormwater pollutants by percolation into the ground. Their pollutant removal mechanisms include filtration, soil sorption, and uptake by vegetated root zones. Bioinfiltration swales may be used for basic or enhanced water quality treatment.

2.4.2.4 Bioretention Cells or Swales

Bio-retention cells or swales provide treatment by using a designed planting soil mix and a variety of plant material, including trees, shrubs, grasses, and/or other herbaceous plants. Bioretention cells or swales may be used for basic or enhanced water quality treatment.

2.4.2.5 Water Quality Ponds or Vaults

Water quality ponds or vaults provide basic runoff treatment by allowing the settling of particulates during quiescent conditions. Additionally, when a shallow marsh area is provided for a wet pond, basic runoff treatment is provided by biological uptake through plant growth and by vegetative filtration. Water quality ponds contain a permanent pool of water and a wet pool equal to the runoff volume of the water quality storm event. Water quality ponds or vaults are sized based upon the volume of the water quality storm and may be combined with a detention facility or be part of a treatment train for enhanced treatment.

2.4.2.6 Infiltration Ponds

Infiltration ponds may also be used for basic or enhanced water quality treatment where soils remove pollutants from stormwater using either suitable native soils or a treatment layer.

2.4.2.7 Sand Filters

Sand filters provide enhanced water quality treatment from filtration, which removes particulates and associated contaminants, and from adherence of contaminants within the filter.

2.4.2.8 Filter Strips

Filter strips provide biofiltration of runoff and basic or enhanced water quality treatment. They may be used in a treatment train for enhanced water quality or stand-alone, with compost-amended vegetation. Filter strips are typically installed adjacent to paved areas (road, parking, drives), receive runoff directly from those areas, and discharge to a collection system.

2.4.3 Conveyance

Collection and conveyance of stormwater will be by conventional methods of curbs and gutters, catchbasins, and buried storm drainpipes, depending on the development area. Where appropriate to specific site design, conveyance by grass-lined ditches and swales may be considered.

Culvert crossings will be designed for the locations where proposed roadways or utility infrastructure cross draws or ravines. These culverts will be sized to convey the upstream runoff, following Ecology requirements.

2.4.4 Overflow Routes

Each detention or infiltration stormwater facility is anticipated to have an overflow route that discharges to an overflow drainage swale or enclosed pipe where it is conveyed to a downstream facility or controlled dispersion area. In the case of infiltration ponds, overflow routes are provided to the next

downstream infiltration facility where feasible. This provides for the infiltration of stormwater even if one facility is partially clogged or out of operation.

2.5 Developed Condition Summary

Based on the 2002 EIS SETR, 7.40 acre-feet of average runoff was established per acre of equivalent impervious area. The total impervious area and estimated runoff comparing the Revised Proposal with SEIS Alternatives 5 and 6 is shown in **Table 2-6.**

Table 2-6: Estimated Annual Runoff

Alternative	Equivalent Impervious Area, Acres	Estimated Average Runoff (Surface and Interflow), Ac-Ft
Revised Proposal	129	955
SEIS Alt. 6	166	1,236
SEIS Alt. 5	247	1,828

2.6 Water Quality Analysis

A Water Quality Technical Report was originally completed as part of the 2002 UGA EIS as it relates to water quality elements of the Yakima and Cle Elum Rivers and groundwater.

The proposed 47° North development under the Revised Proposal will infiltrate or disperse all stormwater runoff and no direct discharge of stormwater is proposed to the Yakima River. The proposed infiltration and dispersion facilities are at a distance of approximately 3,000 feet from the Yakima River.

No development is proposed in the Cle Elum River drainage basin.

The purpose of this water quality analysis is to update the 2002 UGA EIS water quality information for current conditions and codes currently in effect.

2.6.1 Hydrologic Setting

The hydrologic setting of the property was previously described in the 2002 UGA EIS and has not changed in 2022. The proposed 47° North development lies within the upper Yakima River drainage basin, which is designated as Water Resource Inventory Area (WRIA) 39 (Washington State Department of Fisheries [WDF] 1975). The property is adjacent to the lower portion of the Cle Elum River between Bullfrog Road and Interstate 90. The Cle Elum River runs along the western boundary of the site and joins the Yakima River at River Mile (RM) 185.6. The Yakima River and Interstate 90 run along the southern boundary of the site.

With the Revised Proposal 593 acres of the property is topographically located within the Yakima River basin, and 296 acres is topographically within the Cle Elum River basin. Due to the nature of surface soils on the site, natural drainage from the site occurs through infiltration and subsurface groundwater flow. The Cle Elum River flows are controlled at the Cle Elum Dam operated by the United States Bureau of

Reclamation (USBR). The dam is upstream of the project at RM 8.2. Water impounded by the dam forms Cle Elum Lake, which the USBR uses primarily for storing fall, winter and spring flows to supply late-spring through early fall irrigation demands in the Yakima Valley. A secondary function of the dam is flood control.

2.6.2 Surface Water Quality

Use designations for fresh waters by water resource inventory area (WRIA) are described in WAC 173-201A-602.

The Yakima River, for the reach from the Cle Elum River confluence (RM 185.6) up to its headwaters, has the following uses:

Aquatic Life Use:	Core summer salmonid habitat
Recreation Use:	Primary contact recreation
Other Uses:	Water Supply Uses (Domestic, Industrial, Agricultural, Stock) and Miscellaneous Uses (Wildlife Habitat, Harvesting, Commerce/Navigation, Boating, Aesthetics).

The Yakima River, from its mouth to the confluence with the Cle Elum River has the following uses:

Aquatic Life Use:	Salmonid spawning, rearing, and migration
Recreation Use:	Primary contact recreation
Other Uses:	Water Supply Uses (Domestic, Industrial, Agricultural, Stock) and Miscellaneous Uses (Wildlife Habitat, Harvesting, Commerce/Navigation, Boating, Aesthetics).

The Cle Elum River from the mouth to Cle Elum Dam (RM 8.2) is identified as water body segment WA-39-1050 and has the following uses:

Aquatic Life Use:	Core summer salmonid habitat
Recreation Use:	Primary contact recreation
Other Uses:	Water Supply Uses (Domestic, Industrial, Agricultural, Stock) and Miscellaneous Uses (Wildlife Habitat, Harvesting, Commerce/Navigation, Boating, Aesthetics).

The Yakima River, from its mouth to the confluence with the Cle Elum River has the following water quality criterion:

Temperature:	17.5°C (63.5°F)
Supplemental spawning:	None
Dissolved Oxygen (DO):	8.0 mg/L
pH:	pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.5 units
Turbidity:	5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

Bacteria: E. coli and fecal coliform criteria are expressed as colony forming units (CFU) or most probable number (MPN).
To protect recreational use:

- E.coli organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 320 CFU or MPN per 100 mL.
- Fecal coliform organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 CFU or MPN per 100 mL. (The use of fecal coliform organism levels to determine compliance will expire December 31, 2020.)

Other requirements:

- A minimum of three samples is required to calculate a geometric mean for comparison to the geometric mean criteria. Sample collection dates shall be well distributed throughout the averaging period so as not to mask noncompliance periods.
- When averaging bacteria sample values for comparison to the geometric mean criteria, it is preferable to average by season. The averaging period of bacteria sample data shall be ninety days or less.

The Yakima River, for the reach from the Cle Elum River confluence up to its headwaters, and the Cle Elum River from the mouth to Cle Elum Dam have the following water quality criterion:

Temperature: 16°C (60.8°F)
Supplemental spawning: Salmon and trout (13°c) from 9/15 to 6/15
Dissolved Oxygen (DO): 9.5 mg/L
pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units
Turbidity: 5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Bacteria: E. coli and fecal coliform criteria are expressed as CFU or MPN.
To protect recreational use:

- E.coli organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 320 CFU or MPN per 100 mL.
- Fecal coliform organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten

sample points exist) obtained for calculating the geometric mean value exceeding 200 CFU or MPN per 100 mL. (The use of fecal coliform organism levels to determine compliance will expire December 31, 2020.)

Other requirements:

- A minimum of three samples is required to calculate a geometric mean for comparison to the geometric mean criteria. Sample collection dates shall be well distributed throughout the averaging period so as not to mask noncompliance periods.
- When averaging bacteria sample values for comparison to the geometric mean criteria, it is preferable to average by season. The averaging period of bacteria sample data shall be ninety days or less.

For both Yakima and Cle Elum River portions that are located downstream of the proposed devleopment, the water quality standards have generally remained the same since the 2002 UGA EIS and are listed below. The only notable update is that the Yakima River (from its mouth to the confluence with the Cle Elum River) has a reduced temperature requirement from 18°C (64.4°F) to 17.5°C (63.5°F). This temperature variation does not affect the proposed development because there is no direct discharge of stormwater proposed to the Yakima River.

2.6.3 The Water Quality Assessment and the 303(d) List

The Water Quality Assessment was completed by Ecology with water bodies divided into the following categories:

Category 1:	Meets standards for parameter(s) for which it has been tested.
Category 2:	Waters of concern.
Category 3:	Waters with no data or insufficient data available.
Category 4:	Polluted waters that do not require a TMDL because a) they have an approved TMDL being implemented, or b) they have a pollution control program in place that should solve the problem, or c) are impaired by a non-pollutant such as low water flow, dams, or culverts.
Category 5:	Polluted waters that require a TMDL – the 303(d) list.

Based on the Ecology website, the Yakima River portion downstream of the proposed development is identified as Category 1 and the Cle Elum River is identified as Category 2, waters of concern with the specific concern of temperature. No development is proposed in the Cle Elum River drainage basin; therefore, no mitigation is proposed.

2.6.4 Stormwater Runoff National Pollutant Discharge Elimination System (NPDES) Permit

Temporary stormwater management will be completed such as to prevent the transport of sediment from the project site to downstream water resources, following the best management practices and requirements of the Construction Stormwater Pollution Prevention Plan.

For all new construction activity exceeding 1 acre in size, a Notice of Intent (NOI) must be filed for a NPDES General Permit with Ecology, as associated with clearing, grading, and temporary erosion and sediment control. A Stormwater Pollution Prevention Plan (SWPPP) is also required for the project.

The property currently has an active NPDES Permit (No. WA0052361). This permit will be amended to include a transfer of coverage for new ownership. A SWPPP document was also prepared by W&H Pacific, Inc. in 2002 and was revised by ESM in 2007 and 2022. The SWPPP will be amended prior to the construction phase of the project as applicable to the proposed 47° North development and current Ecology requirements.

2.7 Stormwater Summary

The proposed Revised Proposal development cleared and impervious areas are less than the SEIS Alternatives 5 and 6, and therefore will generate less impact to onsite stormwater as well as downstream to the Yakima River. No significant impacts are anticipated, and no additional mitigation is proposed other than what is already required by current codes.

Section 3 Preliminary Water Plans

Presented in this section is information on the preliminary water system concepts for the revised Proposal and a comparison to the SEIS Alternatives 5 and 6.

3.1 System Capacity Requirements

The City of Cle Elum 2015 Water System Plan (WSP) was used as a guideline to determine requirements for the proposed 47° North development. This plan is in the process of being updated in 2022 and currently under review by the Department of Health.

Two water systems are available for the 47° North development: a treated water system and an untreated water system.

The proposed 47° North development under the Revised Proposal intends to use the treated water system as a standard potable water system providing water to all dwelling units and commercial uses in the area. The treated system would provide some minor irrigation for common areas as associated with entries, amenities, and public road right-of-way. The proposed project will include low-flow fixtures consistent with State building code requirements, limitations on landscaping, and other water-conservation measures as coordinated with the City of Cle Elum.

The untreated water system is available, if desired, for irrigation water to larger demand areas such as amenity center and trailhead park, recreation areas and other open spaces.

3.2 Treated (Domestic) Water Requirements

Water demands for the development were based on Washington State Department of Health standard unit demands. Unit interior water demands for each unit type are described below.

3.2.1 Single Family and Multi-Family

Unit interior demands for single family residences and multi-family unit accommodations were obtained from the HLA memorandum dated January 5, 2023 and are summarized in **Tables 3-1** and **3-2,** respectively.

Table 3-1: Revised Proposal Single Family Residences

	Primary Residences
Total Interior Unit Demand (gpd)	170
Average Annual Occupancy	100%

Table 3-2: Revised Proposal Multi-Family Units

	Primary Residences
Total Interior Unit Demand (gpd)	170
Average Annual Occupancy	100%

Water use for both single and multi-family units was calculated using the Total Interior Unit Demand of 170 gpd x 757 units resulting in 128,690 gpd.

3.2.2 Commercial Development

Potable water use for the commercial center for the Revised Proposal was calculated using the design units outlined in **Table 3-3** below. The grocery store and restaurant potable water use demand was estimated using 125 percent of the estimated sewer flows in Table G2-2 of the Criteria for Sewage Works Design dated January 2022. The retail and office potable water use demands were calculated using 0.085 gpd per square foot of building area, matching the 2002 EIS SETR.

Table 3-3: Commercial Development Potable Water Use

Business Park	Design Units	Flow / Unit, gpd	Total Flow, gpd
Grocery Store	50,000 sf	375	18,750
Retail	56,000 sf	0.085	4,760
Restaurant	180 seats	62.5	11,250
Office	20,000 sf	0.085	1,700
Total			**36,460**

3.2.3 RV Park Guests

Campsite water use was based on 627 units x 3 persons per unit x unit demand of 50 gpd per person per unit x average annual occupancy was assumed to be 50 percent resulting in 47,025 gpd.

3.2.4 Amenity Center and Trailhead Park Guests

The amenity center and trailhead park demand was calculated based on 0.085 gpd per square foot of building area, matching the 2002 EIS SETR. Using 69,700 square-feet, resulting in 5,925 gpd.

3.2.5 Outside Water Demands

Outside water demands were calculated as a percentage of total landscaped area. The total proposed development landscaped area under the Revised Proposal is approximately 200 acres, and 10 percent is estimated to be irrigated, for a total irrigated landscaped area of 20 acres. For the commercial area, the estimated irrigated landscaped area is 1 acre.

The irrigation demands calculated for the months of June to September using the same irrigation factors from the 2002 EIS SETR. The net unit area irrigation requirement for turf and the resulting applied irrigation rate at a 60 percent irrigation efficiency are given in Table 3-4. Maximum monthly irrigation allowances for each maximum irrigated area are presented in Table 3-5.

Table 3-4: Irrigation Requirements

Month	Net Irrigation Requirement, in [a]	Applied Irrigation Requirement, in [b]
May	0.0	0.0
June	3.3	5.5
July	6.5	10.8
August	4.8	8.0
September	3.5	5.8
October	0.0	0.0
Total	18.1	30.2

[a] Source: Washington State Irrigation Guide, turf/pasture requirements, Cle Elum.
[b] At 60 percent irrigation efficiency.

Table 3-5: Maximum Allowable Irrigation Flows, gpd

Month	Residential	Commercial
June	99,559	4,978
July	195,497	9,775
August	144,813	7,241
September	104,989	5,249

Monthly treated water demands at buildout, including irrigation demands, for the revised proposal and SEIS Alternatives 5 and 6are presented in **Tables 3-6** and **3-7**.

Table 3-6: Avg. Daily Treated Water Demands at Buildout, mgd

Alt. No.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.	Total (ac-ft)
Revised Proposal	0.18	0.18	0.18	0.18	0.18	0.28	0.38	0.32	0.28	0.18	0.18	0.18	0.22	248
SEIS 6	0.17	0.17	0.17	0.17	0.17	0.27	0.36	0.31	0.27	0.17	0.17	0.17	0.22	238
SEIS 5[a]	0.31	0.31	0.31	0.31	0.31	0.41	0.50	0.45	0.41	0.31	0.31	0.31	0.35	389

[a] Excludes Reserve Area.

Table 3-7: Avg. Daily Treated Water Demands at Buildout for Commercial Development Demands, mgd

Alt. No.	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.	Total (ac-ft)
Revised Proposal	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	50
SEIS 6	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	48
SEIS 5[a]	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	100

[a] Excludes Reserve Area.

Peaking factors used for the water system design are presented in **Table 3-8** and are applied to maximum month average daily demands. Equalizing storage will be provided to accommodate hourly peak requirements. These peaking factors are applicable only to the treated water demands.

Table 3-8: Peaking Factors

Ratio	Peaking Factor
Maximum Daily to Average Daily (Maximum Month)	2.00
Maximum Daily to Average Daily for Commercial Development (Maximum Month)	3.33
Maximum Hourly to Average Daily (Maximum Month)	5.00

Using the above average daily water demands and peaking factors, the maximum month design demands (at buildout) for the combined residential and commercial development of the Revised Proposal are given in **Table 3-9.**

Table 3-9: Maximum Month Treated Water Demands

	Average Daily Demand (ADD)[a,b]	Maximum Day Demand (MDD)[a,c]	Peak Hour Demand (PHD)[a,d]
Revised Proposal	0.29 mgd (203 gpm)	0.76 mgd (527 gpm)	1.52 mgd (1,054 gpm)
SEIS Alt. 6	0.28 mgd (195 gpm)	0.73 mgd (508 gpm)	1.46 mgd (1,017 gpm)
SEIS Alt. 5[e]	0.38 mgd (265 gpm)	1.50 mgd (1,042 gpm)	3.00 mgd (2,085 gpm)

[a] For treated water the daily system loss is calculated as total annual demand x 10%.
[b] ADD is calculated as average month estimated demand (residential and commercial) + irrigation + system loss.
[c] MDD was obtained from Table 3 of the HLA memorandum dated January 5, 2023.
[d] PHD was obtained from Table 3 of the HLA memorandum dated January 5, 2023.
[e] Excludes Reserve Area.
[f] Uses original 2002 EIS SETR calculations and 1.5 MDD and 2.2 PHD peaking factors.

3.2.6 Equivalent Residential Unit (ERU) Demands

The ERU values were evaluated as part of the original 2002 EIS SETR and estimated at 302 gpd/ERU ADD and 750 gpd/ERU MDD. An analysis of ERU values will be completed to confirm demand.

In accordance with the City of Cle Elum's adopted water policy for the urban growth area, the City will initially issue certificates of water availability for the project based on the water use rate set forth in the City's 2015 Comprehensive Water Plan. The Washington State DOH design criteria requires a minimum of three years of historical consumption data be used in establishing ERU average demand.

3.2.7 Fire Flows

Fire flow and domestic water demand requirements will account for all buildings other than residential to be sprinkled.

Chapter 248-293-640 Washington Administrative Code (WAC), specifies minimum fire flow demands of 500 gpm for 30 minutes for residential areas, and 750 gpm for 60 minutes for commercial and multi-family areas. The City of Cle Elum supersedes this requirement in the WSP where fire suppression storage equals 480,000 gallons (4,000 gpm for 2 hr duration). The minimum fire flow at locations not otherwise identified in the WSP is 1,000 gpm.

All proposed construction will be evaluated in accordance to the City of Cle Elum, the 2018 International Fire Code, and the City of Cle Elum Fire Chief for compliance with applicable fire protection safety standards.

3.3 Untreated Water Requirements

Untreated water may be used in the future for recreational irrigation and public landscape irrigation. Untreated water is not proposed to be used at this time.

3.4 Water Use Standards

Draft Water Use Standards will be updated as part of the Development Standards for the 47° North development. The Standards would be required under the project CC&R's. The Draft Water Use

Standards are provided at the end of this section. The conditions of approval as well as the CC&Rs will require that these water use standards in the UGA be met.

3.5 Source of Water Supply

Based on the 2015 Water System Plan, the domestic water system in Cle Elum consists of a municipal water supply system on three distribution pressure zones. Four sources supply water to the system. Two major water supply sources owned by the City of Cle Elum are surface water sources on the Yakima and Cle Elum Rivers. These two river sources pump water to the Cle Elum water treatment plant for filtration and chlorination before entering the distribution system. The Town of South Cle Elum also owns two ground water sources (Well No. 1, and Well No. 7) that are included in the regional water system and have a combined pumping capacity of 300 gpm.

There is an existing water treatment plant, located at the northeast corner of the property, just west of SR 903 and south of the Puget Sound Energy Substation as shown in **Figure 3-1**.

The existing water treatment plant has been active since 2004. Its purpose is to generate potable water by filtering and processing raw Yakima River and Cle Elum River water. The current treatment capacity of this plant currently is 6 million gallons per day with room for expansion to 8 million gallons per day. This water plant serves the City of Cle Elum, the Town of South Cle Elum, and Suncadia.

3.6 Preliminary Water Distribution System Plan

The preliminary water distribution system for domestic supply for the 47° North development for the Revised Proposal is shown on **Figure 3-1**. Also shown on **Figure 3-1** are the existing water utilities, including the treated domestic water transmission main and the untreated raw water irrigation transmission main.

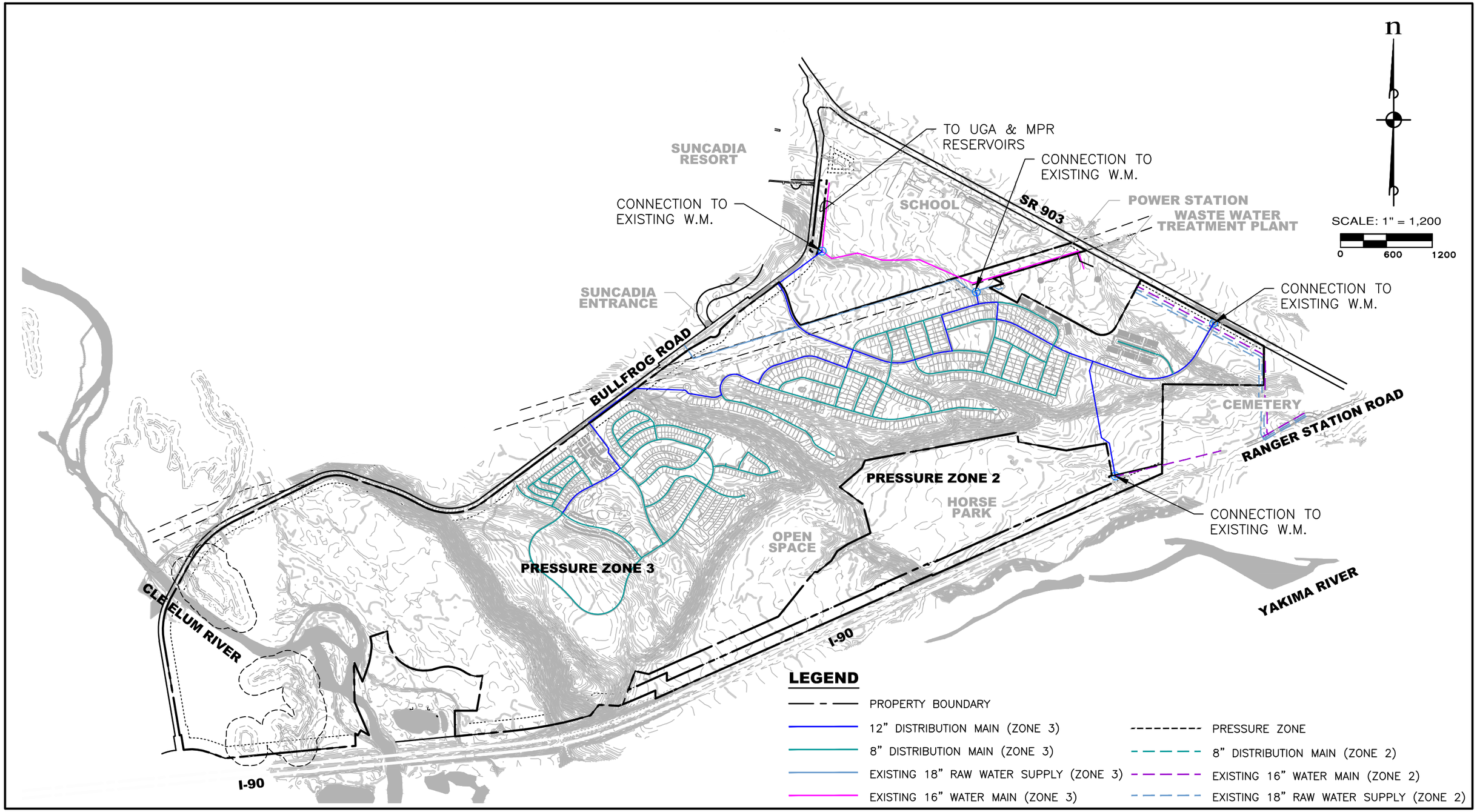
The preliminary water distribution system has four points of connections proposed in order to avoid dead-end conditions that can hinder fire flow demand and add flexibility for maintenance and operation of the network system. The available points of connection for the site's fire and treated domestic water supply are as follows:

- To an existing 16-inch diameter treated water line that supplies the reservoir tank, at a point north of the BPA easement and west of the existing high school site (Pressure Zone 3).
- To an existing 16-inch diameter treated water line that supplies the reservoir tank, at a point south of the BPA easement and south of the existing high school site (Pressure Zone 3).
- To an existing 16-inch diameter City supply line that flows from the Water Treatment Plant towards Cle Elum, on the east side of the project site, along SR 903 (Pressure Zone 2).
- To an existing 16-inch diameter City treated water main stub-out on Douglas Munro Boulevard, near the southwest corner of the existing cemetery (Pressure Zone 2).

The proposed single- and multi-family development as well as the RV resort will be part of a private Group A water system that will be permitted thru the Department of Health and owned, operated, and maintained privately. One water meter is anticipated to serve the single- and multi-family portion of the

developed site and a second water meter will serve the RV resort site. The water mains will connect to the nearest available points of connection as listed above.

The commercial development will be served by the existing 8-inch diameter treated City supply line in an estimated looped system and metered thru the City of Cle Elum.



Source: ESM Consulting Engineers, 2022.

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Figure 3-1

Preliminary Water Plan - Revised Proposal

3.6.1 Pressure Zones

The study area for the revised Proposal as well as for SEIS Alternatives 5 and 6 is split into two pressure zones at an elevation of approximately 2,080 feet. Zone 3 (upper elevation pressure zone) encompass the elevations between 2,154 and 2,080. Zone 2 (lower elevation pressure zone) encompasses the elevations between 2,080 and 2,000. Pressure reducing stations would be installed at most of the distribution lines crossing the boundary between Zones 3 and 2.

3.6.2 Treated Water Storage

Treated Water Storage was evaluated by the City Engineer, HLA Engineering and Land Surveying, Inc., as part of an updated water system analysis that preliminarily evaluates storage and pumping. Based on this preliminary evaluation, the existing water system is not sufficient to meet projected water storage requirements and will be responsible for mitigation as determined by monitoring and metering.

3.6.3 Distribution Mains

The distribution systems for the 47° North development under SEIS Alternative 5 is comprised of looping water distribution pipe networks of 8- to 12-inch diameter waterlines. The distribution system for each alternative will provide water at pressures between 31 and 72 psi to all services during maximum day demand.

The untreated irrigation demands, if needed, would be served from the transmission mains shown in **Figure 3-1.**

3.7 Water Use Standards

The Water Use Standards were established as part of the original 2002 EIS SETR to minimize indoor and outdoor water use. The indoor water use standards required water conservation fixtures and encouraged water conservation appliances and the outdoor water use standards limits irrigated areas. These standards are not anticipated to require revisions. Water use and conservation policies will be contained in the CC&R's for the 47° North development, including low-flow fixtures, limitations on landscaping, and other water-conservation measures as coordinated with the City of Cle Elum.

3.8 Preliminary Water Plans Summary

The Revised Proposal development water demand is slightly more than SEIS Alternative 6 due to the added 50 affordable housing and change in commercial development. The Revised Proposal remains significantly less than SEIS Alternative 5 because the proposed RV use and commercial development footprint generate less demand than the uses previously contemplated.

In addition to water storage, the HLA updated water system analysis also evaluated preliminarily pumping. Based on this preliminary evaluation, the existing water system is not sufficient to meet both projected water demand and storage requirements and will be responsible for mitigation as determined by monitoring and metering.

The total proposed mitigation for the City water system consists of three new elements: a filter train, a finished water pump, and a Zone 3 reservoir. To confirm proportionate share responsibility for the Revised Proposal, the HLA memorandum dated January 5, 2023 recommends a usage

monitoring/metering plan that would adjust allocation on actual demand basis. The monitoring/metering plan will also be used to determine when the capacity improvements will be triggered.

In summary, the proposed development triggers additional mitigation for water storage and pumping and will be responsible for a portion of this mitigation as determined by monitoring and metering.

Section 4 Preliminary Sewer Plans

Presented in this section is information on the preliminary sewer system concepts for the revised Proposal and a comparison to the SEIS Alternatives 5 and 6.

4.1 Wastewater Flow Projections

Wastewater flow projections were generally estimated the same way as in the 2002 EIS SETR, with updated uses for the Revised Proposal. The wastewater production is calculated as a percentage of inside water demand, as shown in **Table 4-1**. The percent return values were developed considering Ecology's standard flow rate for new systems (including normal infiltration), side sewer length considerations relative to the type of unit appropriate adjustments infiltration, and typical wastewater flow data presented in the literature (i.e., Metcalf & Eddy*, Wastewater Engineering - Treatment, Disposal, Reuse*, 3rd edition). For purposes of system pipe sizing and design, seasonally varying infiltration and inflow percentages, shown in **Table 4-2**, were applied to the wastewater generation estimates.

Table 4-1: Wastewater Generation/Return Flow as a Fraction of Inside Water Demand – Revised Proposal

Unit Type	Percentage of Water Demand
Multi-Family	90
Single Family	80
Daytime Visitors/Employees	80
Amenity Center and Trailhead Park	80
RV Park	80
Business Center	80

Table 4-2: Infiltration/Inflow as a Percentage of Maximum Month Wastewater Production – Revised Proposal

Month	Infiltration/Inflow, Percentage of Wastewater Production
January	20
February	25
March	25
April	15
May	15
June	10
July	10
August	10
September	10
October	10
November	10
December	15

Usual practice is to estimate infiltration/inflow rates as a maximum value on a per acre basis. However, seasonally varying infiltration/inflow (I/I) rates have been used to estimate the monthly I/I return flow component for the water supply analysis. Very little inflow is expected, as the 47° North development

under the Revised Proposal will prohibit discharge of stormwater to the sanitary sewer system. Ecology's standard residential unit rate of 100 gpcd includes an allowance for normal infiltration. From **Table 4-1,** the normal wastewater is 80 percent times the water demand of 100 gpcd, or 80 gpcd. From **Table 4-2,** the normal maximum seasonal I/I allowance is 25 percent of maximum month wastewater generation. Using the 80 gpcd inside generation for the maximum month and the 25 percent I/I allowance, the seasonal maximum wastewater generation would be:

80 gpcd + 25 percent x 80 gpcd = 100 gpcd.

This is the same value as recommended by Ecology for new sewer systems in the 2008 Criteria for Sewage Works Design.

Wastewater generation for single and multi-family units are summarized in **Tables 4-3** and **4-4,** respectively, matching the water demand established in Section 3.

Table 4-3: Wastewater Generation - Single Family, Revised Proposal

Parameter	Primary Residences
Water Demand (gpd)	170
Wastewater Production Percentage	80%
Total Wastewater Production (gpd)	136

Table 4-4: Wastewater Generation - Multi-family, Revised Proposal

Parameter	Primary Residences
Water Demand (gpd)	170
Wastewater Production Percentage	90%
Total Wastewater Production (gpd)	153

Commercial development wastewater production is summarized in **Table 4-5** below. The grocery store and restaurant wastewater generation was estimated using 80 percent of the estimated water flow demand, matching Table G2-2 in the Criteria for Sewage Works Design dated January 2022. The retail and office potable water use demands were calculated using 0.068 gpd per square foot of building area, matching the 2002 EIS SETR. There was no updated information available since the 2002 EIS SETR, so this rate will continue to be used.

Table 4-5: Wastewater Generation - Commercial Development, Revised Proposal

Business Park	Design Units	Flow / Unit, gpd	Total Flow, gpd
Grocery Store	50,000 sf	300	15,000
Retail	56,000 sf	0.068	3,808
Restaurant	180 seats	50	9,000
Office	20,000 sf	0.068	1,360
Total			**29,168**

Similarly, for the RV park under the Revised Proposal, the following 2002 EIS SETR will be continued to be used: a daily wastewater production of 60 gpd per site was used. This is based on 3 persons per campsite, 50 gpd per person water demand x average annual occupancy of 50 percent and an 80 percent

wastewater fraction of water demand. To account for peak usage, for the months of June, July, and August, 100% occupancy was used.

The amenity center and trailhead park wastewater flows were alco calculated based on 0.068 gpd per square foot of building area, matching the 2002 EIS SETR. Using 69,700 square-feet, resulting in 4,740 gpd.

The projected monthly wastewater flows at buildout for the Revised Proposal and SEIS Alternatives 5 and 6 are provided in **Table 4-6.**

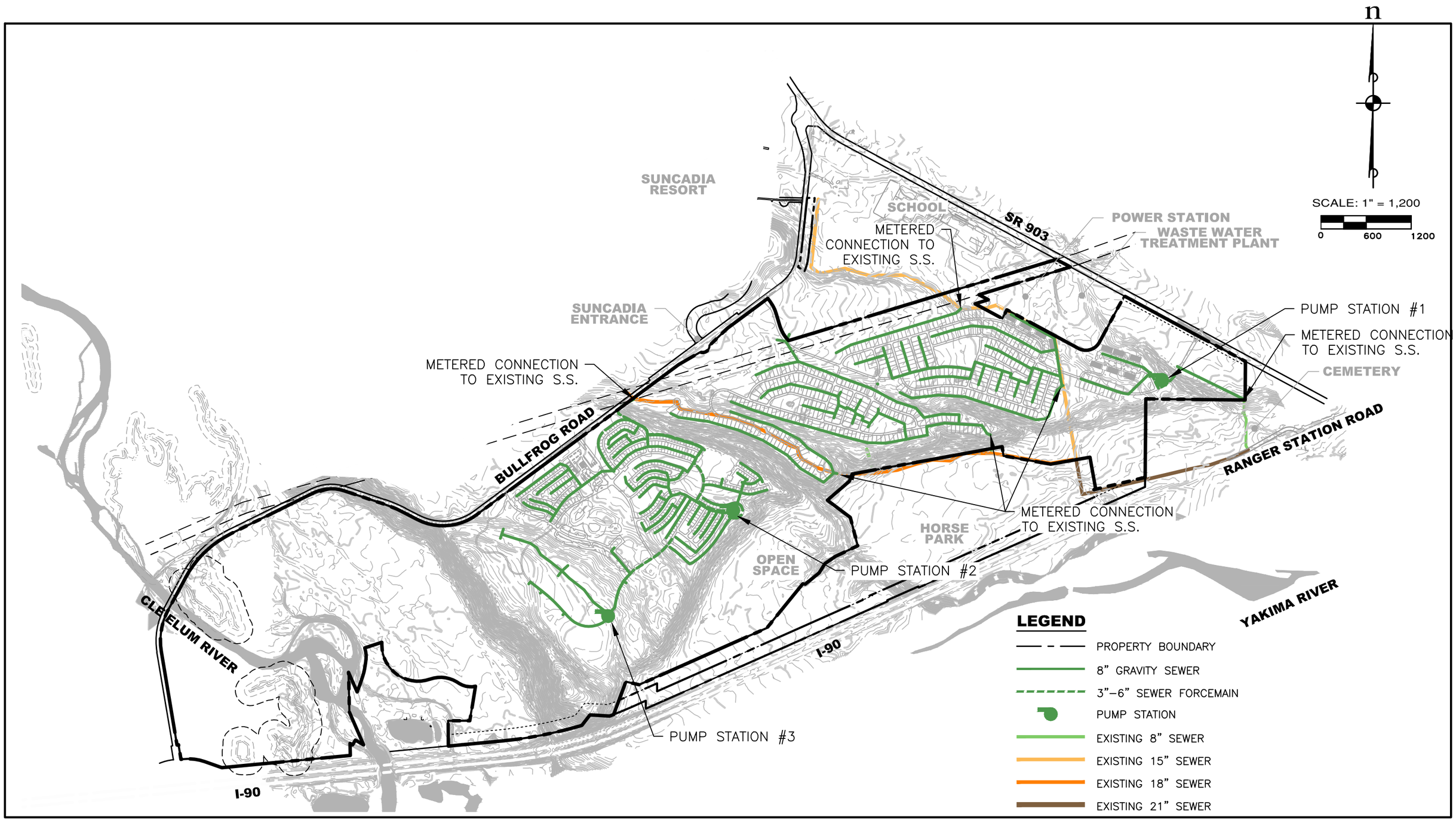
Table 4-6: Monthly Wastewater Flow at Buildout, mgd[a]

Alt.	Year	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Average Annual
Revised Proposal	30 w/o I/I [b]	0.18	0.18	0.18	0.18	0.18	0.22	0.22	0.22	0.18	0.18	0.18	0.18	0.19
Revised Proposal	30 w/ I/I	0.21	0.22	0.22	0.21	0.21	0.24	0.24	0.24	0.20	0.20	0.20	0.20	0.22
SEIS 6	30 w/o I/I [b]	0.17	0.17	0.17	0.17	0.17	0.21	0.21	0.21	0.17	0.17	0.17	0.17	0.18
SEIS 6	30 w/ I/I	0.21	0.21	0.19	0.19	0.19	0.23	0.23	0.23	0.19	0.19	0.19	0.19	0.20
SEIS 5[c]	30 w/o I/I	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
SEIS 5[c]	30 w/ I/I	0.29	0.30	0.29	0.28	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27

[a] Includes wastewater flows from the commercial development.

[b] I/I represents infiltration and inflow, which varies by month from 10 percent to 25 percent of maximum month inside wastewater production.

[c] Excludes Reserve Area.



Source: ESM Consulting Engineers, 2022.

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Figure 4-1

Preliminary Sewer Plan SEIS Alternative 6

4.2 Collection and Conveyance System

The existing and proposed preliminary sewer systems layout for the Revised Proposal are shown on **Figure 4-1**.

An existing sewer trunk system network traverses the site to provide service to Suncadia and the proposed development. This existing sanitary sewer system consists of 15- and 18-inch diameter sewer mains that border the east and south sides of the property, respectively, and are available to serve the proposed 47° North development. The 18-inch diameter sewer main has 8-inch diameter stub-outs designed and constructed to serve future development. The two sewer mains connect to the southeast and continue east along an existing 21-inch diameter sanitary trunk system that follows Douglas Munro Blvd and connects with the South Cle Elum trunk sewer.

The 47° North single and multi-family development, as well as the associated amenity center and Trailhead Park are proposed to be served by private 8- to 12-inch diameter gravity sanitary sewer mains that would be owned, operated, and maintained privately.

The 47° North RV park development under the Revised Proposal is proposed to be served by private 8-inch diameter gravity sanitary sewer mains that would also be owned, operated, and privately maintained by the owner. These gravity sewer mains would connect to sewer lift stations that would flow via a force main (3 inches to 6 inches in diameter), all owned, operated, and maintained privately to the existing 18-inch diameter sewer main.

Discharge meters and automated sampling/monitoring will be required for the 47° North single and multi-family development as well as for the RV park. These will continually log flow characteristics, and the City may elect to take samples from time to time to ensure the data logger is operating correctly.

The commercial development under the Revised Proposal will be served by public 8-inch diameter gravity sewer mains that will be owned, operated, and maintained by the City of Cle Elum.

The topography of the site requires three estimated lift stations for the Revised Proposal to transport sewage from lower to higher elevations, as shown in **Figure 4-1**. Preliminary design conditions for each sewage lift station with 5 hp or more requirements are presented in **Table 4-7.**

Table 4-7: Preliminary Revised Proposal Lift Station Design Parameters

Alternative	Lift Station No.	Capacity (gpm)	Elevation Head (ft)
Revised Proposal	1	50	23
	2	450	17
	3	140	34

4.3 Wastewater Treatment and Disposal

4.3.1 Flows and Loadings

Estimated wastewater flows for buildout of the Revised Proposal and SEIS Alternatives 5 and 6 are provided in **Tables 4-8, 4-9** and **4-10**. A peak hourly factor of 3.5 was used, matching the 2002 EIS calculations.

Table 4-8: Projected Wastewater Flows for Revised Proposal, mgd[a]

Flow Condition	Buildout
Annual Average	0.22
Wet Weather (Oct.-Apr.):	
Average	0.21
Peak Hourly	0.65
Dry Weather (May-Sept.):	
Average	0.23
Peak Hourly	0.79
Peak Maximum Month	**0.84**

[a] Includes I/I and wastewater flows for the commercial development.

Table 4-9: Projected Wastewater Flows for SEIS Alternative 6, mgd[a]

Flow Condition	Buildout
Annual Average	0.20
Wet Weather (Oct.-Apr.):	
Average	0.20
Peak Hourly	0.69
Dry Weather (May-Sept.):	
Average	0.21
Peak Hourly	0.75

[a] Includes I/I and wastewater flows for the commercial development.

Table 4-10: Projected Wastewater Flows for SEIS Alternative 5, mgd[a,b]

Flow Condition	Buildout
Annual Average	0.35
Wet Weather (Oct.-Apr.):	
Average	0.36
Peak Hourly	1.26
Dry Weather (May-Sept.):	
Average	0.34
Peak Hourly	1.19

[a] Includes wastewater flows for non-Trendwest demands located in the UGA.

[b] Excludes reserve area.

Estimated wastewater loadings, in terms of biochemical oxygen demand (BOD) and total suspended solids (TSS) are given in **Table 4-11**. These loadings are based on a unit loading for BOD and TSS of 0.2 pounds per day per person. Population for the Revised Proposal was calculated as follows: 1,772 people

for residential areas (757 residences x 2.34 people per residence), 941 people at the RV park (627 x 3 people per site x 50 percent occupancy), 500 visitors, and 377 employees for the commercial development for a total of 3,590 people.

Table 4-11: Projected Loadings, lb. per day[a]

Alternative No.	BOD&TSS	Buildout
Revised Proposal	Annual Average	718
	Max. Month Average (Aug.)	754
SEIS Alt. 6	Annual Average	694
	Max. Month Average (Aug.)	733
SEIS Alt. 5[b]	Annual Average	699
	Max. Month Average (Aug.)	738

[a] Includes wastewater flows for commercial development demand.
[b] Excludes Reserve Area.

The BOD&TSS demand calculations for the Revised Proposal differ from those for SEIS Alternatives 5 and 6 for several reasons, including: unknown factors from the 2002 EIS (such as estimated numbers of employees and visitors), assumptions that were made (such as people per unit), and the additional affordable housing units in the Revised Proposal.

4.4 Wastewater Treatment and Disposal Alternatives

The City of Cle Elum has currently adopted the General Sewer Plan (GSP) dated March 2021 as prepared by HLA Engineering and Land Surveying, Inc. The 47° North site is in the City of Cle Elum's sewer service area.

The City of Cle Elum completed the construction of a new 3.6 million gallon per day Sequential Batch Reactor (SBR) wastewater treatment plant in the spring of 2005. This new SBR plant, which is called the Upper Kittitas County Regional Wastewater Treatment Facility (WWTF), has replaced the old lagoon treatment system and it now provides wastewater treatment for the following entities:

- City of Cle Elum and its UGA
- Town of South Cle Elum
- City of Roslyn
- Community of Ronald (and its nearby unincorporated areas)
- Existing Units in Pine Loc III
- Suncadia Resort

4.5 Preliminary Sewer Plans Summary

The Revised Proposal sewer demand is slightly more than SEIS Alternative 6 due to the added 50 affordable housing units and significantly less than SEIS Alternative 5 because the proposed RV use and commercial development footprint generate less demand than the uses previously contemplated.

Wastewater capacity within the existing City facilities has been designed to include the proposed development as described in the March 2021 GSP. The connection charge including capital reimbursement charge will be in effect for all connections and the connection points will be metered and monitored. Therefore, no significant impacts are anticipated, and no mitigation is necessary.

This section estimates the expected sources and quantities of solid wastes that would be generated by the Revised Proposal and compared to SEIS Alternatives 5 and 6.

5.1 Solid Waste Sources and Classifications

The sources of solid waste for the Revised Proposal were identified in the following categories.

5.1.1 Construction and Demolition Debris (C&D):

Construction and demolition debris (C&D) was described in the 2002 EIS SETR as Construction and Inert Waste (CDL) and includes waste material that is produced in the process of construction of new structures. Structures include buildings of all types, both residential and nonresidential, as well as roads, utilities and bridges. It should be noted that construction wastes from renovation or demolition of existing structures are estimated to be minor through buildout and are, therefore, not estimated.

5.1.2 Residential

Residential solid waste would be generated from the single-family residences, multi-family units, and in the RV park.

5.1.3 Commercial

Commercial solid waste would be generated from the amenity center and trailhead park as well as the commercial development.

5.1.4 Streets and Recreation Areas

This source includes waste from all internal roadways and recreation areas.

5.1.5 Water and Wastewater Treatment

This source includes waste from the water and wastewater treatment facilities and was included in the 2002 EIS SETR. There are no proposed water and wastewater treatment facilities as part of the Revised Proposal and therefore no associated waste.

5.2 Classification of Solid Wastes

The solid wastes that will be generated for the Revised Proposal are classified as follows.

5.2.1 Construction and Demolition Debris (C&D)

This waste stream is composed of both construction and demolition wastes, each of which includes inert and non-inert components.

"*Demolition waste" means solid waste, largely inert waste, resulting from the demolition or razing of buildings, roads and other man-made structures. Demolition waste consists of, but is not limited to, concrete, brick, bituminous concrete, wood and masonry, composition roofing and roofing paper, steel, and minor amounts of other metals like copper. Plaster (i.e., sheet rock or plaster board) or any other material, other than wood, that is likely to produce gases or a leachate during the decomposition process and asbestos wastes are not considered to be demolition waste for the purposes of this regulation* (WAC 173-304-100(19)).

"Inert wastes" means noncombustible, nondangerous solid wastes that are likely to retain their physical and chemical structure under expected conditions of disposal, including resistance to biological attack and chemical attack from acidic rainwater (WAC 173-304- 100(40)).

Specific components of demolition waste - drywall, plaster, wood, and asphalt shingles - are not considered inert waste. Neither drywall nor wood waste are considered C&D for disposal. Drywall must be disposed of as municipal solid waste. Wood waste can be recycled, given away, converted to wood chips, or disposed of as municipal solid waste.

5.2.2 Municipal Wastes

These include food wastes and rubbish. Food wastes are the animal, fruit, or vegetable residues resulting from the handling, preparation, cooking, and eating of foods. They are generated from the residential and commercial land uses.

Rubbish consists of combustible and noncombustible solid wastes of households, institutions, and commercial activities, excluding food wastes or other highly putrescible materials. It is produced by the residential, commercial and recreational land uses.

5.2.3 Hazardous/Moderate Risk Wastes

These include chemical, biological, flammable, explosive, or radioactive wastes that pose a moderate risk, immediately or over time, to human, plant, or animal life. For the Revised Proposal, moderate risk wastes will be generally produced by households and commercial operations in small quantities. These waste materials include many common products, such as:

- Oil based and water-based paints
- Paint thinners and solvents
- Adhesives, glues and sealant
- Brake fluid and antifreeze
- Used motor oil
- Car batteries
- Pesticides/herbicides
- Unwanted fuels (gasoline, kerosene)

5.2.4 Biosolids/Septage

Biosolids include the solid and semi-solid wastes from water and wastewater treatment facilities in this classification. Septage (the combination of sludge, scum, and liquid pumped from septic tanks) is also included in this classification.

5.2.5 Yard Waste

This includes leaves, grass clippings, brush, garden waste, tree trunks, holiday trees, and pruning from trees or shrubs. Yard waste results from the care and maintenance of landscaped areas. It is mostly generated by residential, commercial, street, and recreational land uses.

5.2.6 Land Clearing

Land clearing waste includes trees and vegetation removed for construction, but not sold as timber.

5.3 Waste Stream Quantities and Management

The waste stream quantity estimates for the Revised Proposal are presented in this section.

5.3.1 C&D Waste Generation Estimate

C&D wastes were estimated at 4.38 lbs per sf of new construction for residential areas and 3.89 lbs per sf of new construction for non-residential areas (2002 EIS SETR - EPA, "Characterization of Building-Related Construction and Demolition Debris in the United State," 1998). This original estimate is likely too conservative, because both single and multi-family units proposed as part of the 47° North development will be constructed offsite and hauled in. However, there are no updated C&D waste rates found, so this rate will be used.

The residential building areas for the Revised Proposal were calculated using 1,800 sf per residential single-family home (527 units) and 850 sf per multi-family and affordable housing (230 units). Quantity estimates are based on these rates and the rounded building areas (rounded to the nearest 1,000 sf) given in **Tables 5-1** and **5-2**.

Table 5-1: Estimated Residential Building Areas

Residential Building Area, sf		
Revised Proposal	SEIS Alternative 6	SEIS Alternative 5[a]
1,144,000	1,102,000	2,719,000

[a] Excludes buildings in 175-acre reserve parcel, for which uses are undefined.

Table 5-2: Estimated Non-Residential Building Areas

	Total Building Area, sf		
Facility	**Revised Proposal**	**SEIS Alternative 6**	**SEIS Alternative 5[a]**
Water Treatment Plant	-	-	13,000
SF and MF Amenity Center	7,000	31,000	-
Trailhead Park	3,500	3,500	-
General Maintenance Building	-	-	9,000
RV Amenity Center	40,700	31,000	-
Community Center	-	-	10,000
Commercial Development	150,000	150,000	950,000
RV Park/Temporary RV Park	18,500	18,500	2,500[b]
Residential Recreation Buildings/Neighborhood Center	-	-	12,500
Total	**219,700**	**234,000**	**997,000**

[a] Excludes Reserve Area.
[b] Temporary RV park.

Estimated total build-out C&D quantities are given in **Table 5-3**.

Table 5-3: Projected C&D Generation Rates and Total Quantity at Full Buildout, tons

	Revised Proposal		SEIS Alternative 6		SEIS Alternative 5[a]	
	Residential	Non-Residential	Residential	Non-residential	Residential	Non-residential
Buildout Total (tons)[b]	2,506	427	2,413	455	5,955	1,939

[a] Excludes Reserve Area.
[b] Buildout total represents the cumulative total quantity for the Revised Proposal and SEIS Alternative 6 by year 2031 and for SEIS Alternative 5 by year 2051.

The Revised Proposal will generate slightly more C&D than SEIS Alternative 6 only due to the added 50 affordable housing units and significantly less C&D than SEIS Alternative 5 based on building square footage, for both residential and non-residential construction, because the proposed development square footage is smaller. Furthermore, both single family and multi-family units proposed as part of the 47° North development will be constructed offsite and hauled in. The generation estimates presented in **Table 5-3** do not include wastes from road, utility, and non-building structure construction. Estimating criteria for this waste stream was not found in the literature. However, the magnitude of this waste stream is expected to be minor.

Inert C&D waste will be collected on-site and hauled directly to the Kittitas County Inert/Demolition Debris Waste Landfill at Ryegrass. Non-inert C&D wastes will be collected on- site and hauled to the Cle Elum Transfer Station (also known as the Upper County Transfer Station) for disposal. Non-inert construction waste will be hauled to Kittitas County-owned transfer stations. A C&D recycling program will be developed that will require participation of all contractors working on the 47° North development. The program will be approved by the Kittitas County Solid Waste Department prior to the start of construction.

5.3.2 C&D Management Provisions

C&D collection points will be at locations specified by the City of Cle Elum through its building permit process. Inert and non-inert waste will be handled as described below.

5.3.3 Inert Wastes

Drop boxes will be maintained on-site for temporary storage of inert wastes during construction. Inert wastes collected in drop boxes will be hauled directly to the permitted Ryegrass landfill by the contractors or by Waste Management by agreement with the contractors. The recyclable materials will be segregated from the waste stream on-site.

5.3.4 Non-Inert Wastes

Non-inert wastes will be temporarily stored in separate drop boxes on-site until hauled to the Cle Elum Transfer Station. The wastes except for the recyclables will then be transported to the Greater Wenatchee Landfill, Douglas County for the final disposal. Recyclable materials will be segregated from the waste stream as discussed for inert wastes.

5.3.5 Wood Wastes

Construction wood waste will be handled on-site. Wood wastes will not be hauled to the Kittitas County municipal solid waste facilities. Wood waste will be given away as firewood, chipped, or recycled.

5.3.6 Municipal and Other Wastes

For residential solid waste, a generation rate of 5.45 lbs per person per day was originally used (2002 SETR - 1999 Washington State). According to the Kittitas County 2020 Solid Waste and Moderate Risk Waste Management Plan (SWMP), the 2017 actual rate was 4.33 lbs per person per day. According to the 2017 EPA estimate for the national average of Municipal Solid Waste (MSW) generation was 1,646 pounds per person per year or 4.51 lbs per person per day. The more current conservative 4.51 lbs per person per day rate was applied to the Revised Proposal, and SEIS Alternatives 5 and 6 for residential areas and RV park areas.

For street and alley cleaning solid waste, a generation rate of 0.25 lb per person per day was originally used (2002 SETR - Tchobanoglous, "Solid Waste Management: Engineering Principles and Management Issues", 1993). There were no updated generation rates found, so this rate was applied to the residential areas and RV park areas.

For yard waste, a generation rate of 0.44 lbs per person per day was originally used (2002 EIS SETR - EPA, *Decision-Maker's Guide to Solid Waste Management*, Second Edition, 1995). According to the Kittitas County 2020 SWMP, the 2017 yard waste was 0.30 lbs per person per day. The more current 0.30 lbs per person per day was applied to the Revised Proposal and SEIS Alternatives 5 and 6 for residential areas and RV park areas.

Household hazardous/moderate waste was originally estimated based on 1997-1999 Kittitas County records at 0.13 lbs per person per day. The 2011 Kittitas County Solid Waste Management Plan states that households generated an annual average of 233 tons for 2008. Based on a population of 45,600 in 2018, this is equivalent to a daily average of 0.08 pounds per household or 0.03 pounds per person per day. There were no updated rates found in the Kittitas County 2020 SWMP, so the most current 0.03 lbs per persons per day was applied to the Revised Proposal as well as SEIS Alternatives 5 and 6 for residential areas and RV park areas.

The original party value used in the 2002 SETR was 2.4 people per household. The party value was updated to 2.34 persons per household based on current US Census figures for the Revised Proposal and SEIS Alternatives 5 and 6.

The original occupancy percentage is estimated to have been 100 percent in the 2002 UGA EIS for solid waste production. This occupancy percentage has been revised to 90 percent for residential units. A 50 percent occupancy will be estimated for the RV park.

For the commercial development, the waste stream quantities have been estimated based on a generation rate of 0.16 lbs per person per day (2002 EIS SETR - Tchobanoglous, "Integrated Solid Waste Management: Engineering Principles and Management Issues," 1993). There were no updated generation rates found for this use, so this rate was applied based on the number of employees. Since no current data is available and the commercial development waste is a small portion of the overall generated solid waste, the total estimated buildout commercial development solid waste was added to the municipal waste portion of the buildout year.

Total buildout projections of solid waste generation are presented in **Table 5-4**.

Table 5-4: Solid Waste Production (tons/year)

Buildout Year	Revised Proposal	SEIS Alternative 6	SEIS Alternative 5[a]
Municipal	2,192	2,074	2,712
Yard	137	131	171
Hazardous/Moderate Risk [b]	14	13	17
Total Buildout (tons/year)[c]	**2,343**	**2,218**	**2,900**

[a] Excludes Reserve Area.

[b] Includes non-residential hazardous waste.

[c] Buildout total represents the cumulative total quantity for the Revised Proposal and SEIS Alternative 6 by year 2031 and for SEIS Alternative 5 by year 2051.

5.3.7 Management Provisions

The 47° North development will generate an estimated 2,142 tons of municipal solid wastes annually at full buildout under the Revised Proposal. Waste Management of Ellensburg or its successors will collect the wastes. The methods and points of connection will vary by type of use and accommodation. The principal arrangements are likely to be as follows:

Accommodation/Area	Collection Responsibility	Collection Point
Single family residential	Residents	Curb-side pickup by Waste Management
Multi-family residential	Residents	Central dumpsters
Amenity Center and Trailhead Park, Commercial Development, and RV park areas	Operators/tenants	Central dumpsters

The wastes will then be hauled to the Cle Elum Transfer Station prior to transport to the Greater Wenatchee Landfill in Douglas County for final disposal.

Yard waste disposal by residents will be by curb-side pickup by Waste Management, or self-haul to an allowable transfer station. Yard waste disposal for commercial operators/tenants will be the responsibility of their commercial landscape services.

Streets will be cleaned periodically in accordance with City of Cle Elum practices.

Hazardous/moderate risk wastes will be disposed of by residents and commercial operators/tenants at local community-sponsored turn-in events.

5.3.8 Recycling

According to the Kittitas County 2020 SWMP, 2017 recycling rate for Kittitas County was 11.4 percent, a significant decrease from the 27.8 percent in 2008. Materials that had a decrease in the quantity recycled include cardboard, ferrous metal, nonferrous metal, cooking oil, and used oil.

The City of Cle Elum does not have curbside recycling at this time. Residences in the area self-haul recycling to transfer stations and there are proposed options and implementation actions in the 2020 SWMP to improve recycling.

Recycling within the 47° North development will be encouraged. Many of the residents will move from areas with effective recycling programs and will expect similar programs to be in place. Preliminarily, the recycling program elements are expected to include recycle bins at each central dumpster location for use by residents and commercial operators/tenants. It is recommended that the dumpster/recycle stations be designed so that the dumpsters can be removed without moving the recycling containers. These stations will receive aluminum cans, corrugated cardboard, glass, magazines, newspaper, plastic milk jugs, plastic pop bottles, and tin cans. The destination(s) of these materials will be coordinated with the City of Cle Elum.

5.3.9 Septage Wastes

Septage wastes are not proposed for the Revised Proposal.

5.3.10 Land Clearing Wastes

It is not anticipated that any wastes generated from land clearing operations under the revised proposal or SEIS Alternatives 5 and 6 will be hauled to Kittitas County solid waste facilities. Land clearing wastes remaining after removal of saleable timber will likely be burned, given away as free firewood, or chipped on-site. Chipped wood wastes could be marketed as pulp material or made available free of charge to the public.

5.3.11 Waste Loading Impacts

Based on data presented in **Table 5-3** and **5-4**, the Revised Proposal quantities of C&D and MSW are slightly more than SEIS Alternative 6, due to the added 50 affordable housing units and less than SEIS Alternatives 5 because the proposed development square footage is smaller in the Revised Proposal.

5.3.12 Cle Elum Transfer Station

Based on communication with Kittitas County Solid Waste, the Cle Elum Transfer Station is reported by Kittitas County to have processed 11,096 tons of waste in 2019. Customers made a total of 40,119 deliveries to the transfer station. The station is reported to be near capacity, based on the number of cars queued at the station on Saturdays. Tuesdays and Saturdays are the busiest days at the station, as it is closed Sundays and Mondays.

Kittitas County Solid Waste is currently working on evaluating options to expand the existing Cle Elum Transfer facility and/or expand operating hours.

5.3.13 Ryegrass Landfill.

C&D inert wastes will be hauled to the landfill at the Ryegrass site for disposal. Kittitas County Solid Waste is evaluating options to expand this facility and/or expand operating hours.

5.3.14 Solid Wastes Projections

About 5 percent of the C&D wastes is estimated to be inert and hauled to the landfill, which is calculated at 138 tons for the buildout condition (without recycling).

Based on the Kittitas County 2020 SWMP, for the buildout condition estimated in year 2031, 40,637 tons of municipal solid waste would be processed and the Revised Proposal would continue to add the same 2,343 tons, or 6 percent.

An effective recycling program would likely reduce both C&D and municipal solid waste volumes substantially. At a minimum, it is estimated to have at least a 10 percent reduction in waste due to recycling.

5.4 Solid Wastes Summary

The Revised Proposal development solid waste generation is slightly more than SEIS Alternative 6, due to the added 50 affordable housing units and less than SEIS Alternatives 5 because the proposed development square footage is smaller. The estimated impact may be further reduced with an effective recycling program for both C&D and municipal solid waste streams.

Kittitas County Solid Waste will confirm whether or not the 47° North development is responsible to mitigate impacts for its proportional share of the costs associated with improvements to the Cle Elum Transfer Station and the Ryegrass Landfill.

Appendix

HLA Engineering and Land Surveying, Inc.

* MEMORANDUM *

Date: January 6, 2023

Project No.: 19055E

To: ESM Consulting Engineers
33400 8th Avenue South, Suite 205
Federal Way, 98003

Attention: Laura Bartenhagen
Project Manager

From: Benjamin A. Annen, PE

Re: 47º North Development – Updated Water System Analysis for Revised Proposal

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Sun Communities (Developer) has proposed the 47º North (47N) residential development on 889 acres in the Bull Frog Flats area of the City of Cle Elum (City) within the City Limits. 47N intends to connect to the City's domestic water system as a single customer, while maintaining a private on-site water system. To determine water system impacts of the 47N development, HLA has conducted preliminary storage and pump analysis for the Cle Elum water system as a whole, as well as Pressure Zone 3, which is the primary location of the development.

As the 2015 Water System Plan (2015 WSP) update is under review by the Department of Health, and not yet adopted by the City, projection data from the 2015 WSP was used to develop current condition estimates. The 2019 projections presented in the 2015 WSP were assumed to be the best representation of current conditions including background growth.

Water Demand

The current water system demand by pressure zone, assumed to equal 2019 projections, are summarized in Table 1.

To allow for direct comparison to the 2019 projections, two proposed major developments were converted to Equivalent Residential Units (ERUs) based on the demands recorded in 2015 WSP Table 2-27:

- 207 gallons per day (gpd) Average Annual Demand (ADD) per 1.0 ERU
- 689 gpd Maximum Day Demand (MDD) per 1.0 ERU

The two proposed major developments included the City Heights (CH) development and the 47N development, both with active Development Agreements. As the 47N development is anticipated to be built-out in 2037 and the CH development build-out for 2040, total maximum CH ERUs were estimated for 2037 at 85% of full build-out.

The current 47N development is considered Revised Proposal, compared to the SEIS Alternative 6 (Alt 6) and the no action, Bullfrog Flats Adopted Master Plan, SEIS Alternative 5 (Alt 5). The projected 2037 water demand for CH, 47N (Revised Proposal), SEIS Alt 6, and SEIS Alt 5 are summarized in Table 2, Table 3, Table 4, and Table 5, respectively.

In the Draft Supplemental Environmental Impact Statement (DSEIS), water demand from the single- and multi- family manufactured homes and RV units under the 47N Proposed Master Site Plan Amendment (SEIS Alt 6) was based on the Washington State Department of Health, Water System Design Manual standards; equating to 211 gpd for single- and multi- family, and 75 gpd for RV units. This was comparable to historical City of Cle Elum single-family home water demand data of 207 gpd as presented above. However, this was a very conservative approach as manufactured homes historically have lesser demands than single-family homes based on national data.

For the Final Supplemental Environmental Impact Statement (FSEIS), the Applicant provided a substantial amount of water demand data from over 60 Sun Community resorts across the country. The City reviewed this data, and revised the development's projected water demands, including factor of safety provisions; equating to 170 gpd for single- and multi- family, and 75 gpd for RV units, as presented in Table 3. These rates are higher than any of the other Sun Community resorts, and so still are considered conservative, but are lower than Cle Elum's historical single-family demands.

The Revised Proposal incorporates the 50 low-income housing units into the residential demands, totaling 757 residential units.

Table 1: Current Water Demand (2019)

Zone	No. of Services[a]	Annual Demand[a] *gpy*	Total ADD[b] *gpd*	ADD ERUs[c]	Total MDD[a] *gpd*	MDD ERUs[d]	Peak Hour Demand[a] *gpm*
1	1,164	147,149,750	403,150	*Non-applicable*	1,298,088	*Non-applicable*	1,803
2	284	60,798,780	166,572	*Non-applicable*	619,795	*Non-applicable*	861
3	364	168,043,810	460,394	2,224	1,580,175	2,293	2,195
Total	1,812	375,992,340	1,030,116	4,976	3,498,058	5,082	4,907

[a] Values from 2015 WSP Table 2-36

[b] Divide Annual Demand by 365 days per year

[c] Divide Annual Day Demand by 207 gpd/ERU

[d] Values from 2015 WSP Table 2-31

Table 2: Projected Water Demand for City Heights at 85% Buildout

	Zone	No. of Services[a]	ADD/Service[b] *gpd*	Total ADD[c] *gpd*	ADD ERUs/Service[b]	ADD ERUs[d]	MDD/Service[b] *gpd*	Total MDD[e] *gpd*	MDD ERUs/Service[b]	MDD ERUs[f]	Peak Hour Demand[g] *gpm*
Single Family Residences	3	438	207	90,614	1.0	438	689	301,610	1.00	438	419
Multi-Family Units	3	128	691	88,103	3.3	426	1,329	169,448	1.93	246	235
Subtotal	-	565	-	178,717	-	863	-	471,057	-	684	654

[a] Values from Conceptual Water Systems Connections for City Heights – 85% of maximum units for Zones 3 and 4

[b] Values from 2015 WSP Table 2-27

[c] Multiply number of services by ADD per service.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply number of services by MDD per service.

[f] Multiply number of services by ADD ERUs/service.

[g] MDD divided by 1,440 then multiplied by 2.

Table 3: Projected Water Demand for 47° North at Full Buildout (Revised Proposal)

	Zone	No. of Services[a]	ADD/Service[a] *gpd*	Total ADD[b] *gpd*	ADD ERU/Service[c]	ADD ERUs[d]	MDD/Service[e] *gpd*	Total MDD[f] *gpd*	MDD ERUs/Service[g]	MDD ERUs[h]	Peak Hour Demand[i] *gpm*
Business Park	2	1	36,460	36,460	176.14	176	121,412	121,412	176.21	176	169
Business Park Irrigation[j]	2	1	2,270	2,270	10.97	11	9,775	9,775	14.19	14	14
Single and Multi-Family Units	3	757	170 [l]	128,690	0.82	622	340	257,380	0.49	374	357
RV Units	3	627	75 [k,l]	47,025	0.36	227	150	94,050	0.22	137	131
Amenity Center	3	1	5,925	5,925	28.62	29	11,850	11,850	17.20	17	16
Residential Irrigation[j]	3	1	45,405	45,405	219.35	219	195,497	195,497	283.74	284	272
Subtotal	-	1,388		265,775		1,284		689,964		1,001	958
10% Losses/Contingency				26,578		128		68,996		100	96
Total				292,353		1,412		758,960		1,102	1,054

[a] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North, dated December 2022.

[b] Multiply number of services by ADD per service.

[c] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor (Business Park) and 2.0 peaking factor per DOH Water System Design Manual (Single/Multi-family Units, RV Units, and Amenity Center). Irrigation MDD based on peak month projections from ESM SETR Table 3-5.

[f] Multiply number of services by MDD per service.

[g] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[h] Multiply number of services by MDD ERUs/service.

[i] MDD divided by 1,440 then multiplied by 2.

[j] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months. MDD irrigation demand highest of 12-month period.

[k] RV Units ADD is based on 50% annual occupancy.

[l] ADD per service as supported by consumption documentation for comparable Sun Communities sites across the country.

Table 4: Projected Water Demand for SEIS Alt 6 at Full Buildout

	Zone	No. of Services[a]	ADD/Service[a] *gpd*	Total ADD[b] *gpd*	ADD ERU/Service[c]	ADD ERUs[d]	MDD/Service[e] *gpd*	Total MDD[f] *gpd*	MDD ERUs/Service[g]	MDD ERUs[h]	Peak Hour Demand[i] *gpm*
Business Park	2	1	33,475	33,475	161.71	162	111,472	111,472	161.79	162	155
Business Park Irrigation[j]	2	1	2,270	2,270	10.97	11	9,775	9,775	14.19	14	14
Single and Multi-Family Units	3	707	170 [l]	120,190	0.82	581	340	240,380	0.49	349	334
RV Units	3	627	75 [k,l]	47,025	0.36	227	150	94,050	0.22	137	131
Amenity Center	3	1	7,140	7,140	34.49	34	14,280	14,280	20.73	21	20
Residential Irrigation[j]	3	1	45,405	45,405	219.35	219	195,497	195,497	283.74	284	272
Subtotal	-	1,338		255,505		1,234		665,454		966	924
10% Losses/Contingency				25,551		123		66,545		97	92
Total				281,056		1,358		731,999		1,062	1,017

[a] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North, dated December 2022.

[b] Multiply number of services by ADD per service.

[c] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor (Business Park) and 2.0 peaking factor per DOH Water System Design Manual (Single/Multi-family Units, RV Units, and Amenity Center). Irrigation MDD based on peak month projections from ESM SETR Table 3-5.

[f] Multiply number of services by MDD per service.

[g] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[h] Multiply number of services by MDD ERUs/service.

[i] MDD divided by 1,440 then multiplied by 2.

[j] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months. MDD irrigation demand highest of 12-month period.

[k] RV Units ADD is based on 50% annual occupancy.

[l] ADD per service as supported by consumption documentation for comparable Sun Communities sites across the country.

Table 5: Projected Water Demand for SEIS Alt 5 at Full Buildout

	Zone	No. of Services[a]	ADD/Service[b] *gpd*	Total ADD[c] *gpd*	ADD ERU/Service[d]	ADD ERUs[e]	MDD/Service[f] *gpd*	Total MDD[g] *gpd*	MDD ERUs/Service[h]	MDD ERUs[i]	Peak Hour Demand[j] *gpm*
Business Park and Irrigation[k,l]	2	1	15,020	15,020	72.56	73	50,017	50,017	72.59	73	69
Business Park and Irrigation[k,m]	3	1	80,108	80,108	387.00	387	266,760	266,760	387.17	387	370
Single Family Units	3	810	211	170,910	1.02	826	703	569,130	1.02	826	790
Multi-Family Units	3	524	211	110,564	1.02	534	703	368,178	1.02	534	511
Amenity Center/ Clubhouse[n]	3	1	6,000	6,000	28.99	29	19,980	19,980	29.00	29	28
Residential Irrigation[o]	3	1	68,107	68,107	329.02	329	226,797	226,797	329.17	329	315
Subtotal	-	1,338		450,710		2,177		1,500,863		2,178	2,085

[a] Values from 2002 EIS Table 2-5 Summary – Alternative 5

[b] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North

[c] Multiply number of services by ADD per service.

[d] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[e] Multiply number of services by ADD ERUs/service.

[f] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor

[g] Multiply number of services by MDD per service.

[h] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[i] Multiply number of services by MDD ERUs/service.

[j] MDD divided by 1,440 then multiplied by 2.

[k] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months from Section 3, Table 3-4: Maximum Allowable Irrigation Flows

[l] Zone 2 Business Park and Irrigation Demand assumed equivalent to 47N Zone 2 demands

[m] Zone 3 Business Park and Irrigation Demand assumed 5.33 times greater than Zone 2 (800,000 SF / 150,000 SF)

[n] Amenity Center and Neighborhood Clubhouse demand assumed equivalent to 47N Amenity and Adventure Center demands

[o] ADD irrigation demand estimated as 150% of 47N average maximum allowable flows for all 12 months from Section 3, Table 3-4: Maximum Allowable Irrigation Flows

Physical capacity of the total water system, including water rights, source, treatment, and storage capacity, was analyzed as part of the 2015 WSP in terms of ERU capacity. A Demand Rate per ERU for each system component was calculated with production values rather than consumption values to account for relatively high system loss (15-25%). The ERUs for 2012 (last year of complete data from 2015 WSP), estimated current conditions, and full buildout of CH (85%), 47N (Revised Proposal), Alt 6, and Alt 5, summarized below, allow for direct comparison to the original capacity analysis:

Table 6A: Summarization of ERUs – 47N (Revised Proposal)

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
47º North	1,412	1,102
Proposed ERUs	2,276	1,785
Total	7,252	6,867

Table 6B: Summarization of ERUs – Alt 6

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
SEIS Alt. 6	1,358	1,062
Proposed ERUs	2,221	1,746
Total	7,197	6,828

Table 6C: Summarization of ERUs – Alt 5

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
SEIS Alt. 5	2,177	2,178
Proposed ERUs	3,041	2,862
Total	8,017	7,944

Each analysis below was completed for three scenarios. Scenario A includes 2019 projections, CH development projections (at 85% of full buildout), and 47N Revised Proposal projections. Scenario B includes 2019 projections, CH development projections (at 85% of full buildout), and SEIS Alt 6 projections. Scenario C includes 2019 projections, CH development projections (at 85% of full buildout), and SEIS Alt 5 projections.

Water Rights

Table 7 summarizes the water rights capacity analysis for 47N. The rights are granted by the existing development agreement with Suncadia Properties, which transfers Suncadia's existing water rights (included in current capacities below) as development and subsequent water demand occurs within the Cle Elum Bull Frog Flats area. This analysis includes the Bull Frog Flats area, or 47N, but includes only 140 units of the CH development as defined in the 2011 City Heights Annexation and Development Agreement. The revised ERU capacity for water rights with the 47N Revised Proposal is 1,714 and 3,162 for Annual and Instantaneous Rights, respectively.

Table 7A: Water Rights Analysis – 47N (Revised Proposal)

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	1,552	1,714
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	1,242	3,162

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all 47N ERUs from Table 6A
[d] Subtract proposed ERUs from current available ERU capacity

The revised available ERU capacity for water rights with the Alt 6 development is 1,769 and 3,201 for Annual and Instantaneous Rights, respectively.

Table 7B: Water Rights Analysis – Alt 6

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	1,498	1,769
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	1,202	3,201

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all Alt 6 ERUs from Table 6B
[d] Subtract proposed ERUs from current available ERU capacity

The revised available ERU capacity for water rights with the Alt 5 development is 949 and 2,085 for Annual and Instantaneous Rights, respectively.

Table 7C: Water Rights Analysis – Alt 5

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	2,317	949
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	2,318	2,085

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all Alt 5 ERUs from Table 6C
[d] Subtract proposed ERUs from current available ERU capacity

Source Analysis

Source capacity must be analyzed for raw water pumping capacity, total system finished water capacity, and Zone 3 finished water capacity.

Source (Raw Water)

Table 8 summarizes the source capacity analysis for the raw water pumps. There are no future improvements planned to increase source pumping capacity, which is the capacity of three 1,400 gpm pumps, or 4,200 gpm total. The revised ERU source capacity for raw water with the 47N Revised Proposal is 16,082 and 1,669 for ADD and MDD, respectively.

Table 8A: Source (Raw Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	2,276	16,082
MDD	4,200	gpm	0.492	gpm	3,455	1,785	1,669

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6A
[d] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for raw water with the Alt 6 development is 16,136 and 1,708 for ADD and MDD, respectively.

Table 8B: Source (Raw Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	2,221	16,136
MDD	4,200	gpm	0.492	gpm	3,455	1,746	1,708

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6B
[d] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for raw water with the Alt 5 development is 15,317 and 593 for ADD and MDD, respectively.

Table 8C: Source (Raw Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	3,041	15,317
MDD	4,200	gpm	0.492	gpm	3,455	2,862	593

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6C
[d] Subtract proposed ERUs from current available ERU capacity

Source (Total System Finished Water)

Table 9 summarizes the source capacity analysis for the finished water filter trains. Since the 2015 WSP, one of two new 2.0 mgd filter trains has been constructed, which increased the total capacity at the treatment plant to 4,500 gpm. With one filter train out of service (consistent with DOH standards), the finished water capacity is 3,100 gpm. The revised ERU source capacity for total system finished water with the 47N Revised Proposal is 9,971 and -566 for ADD and MDD, respectively.

Table 9A: Source (Total System Finished Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	2,276	9,971
MDD	3,100	gpm	0.492	gpm	1,219	1,785	-566

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6A
[e] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for total system finished water with the Alt 6 development is 10,025 and -527 for ADD and MDD, respectively.

Table 9B: Source (Total System Finished Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	2,221	10,025
MDD	3,100	gpm	0.492	gpm	1,219	1,746	-527

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6B
[e] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for total system finished water with the Alt 5 development is 9,206 and -1,643 for ADD and MDD, respectively.

Table 9C: Source (Total System Finished Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	3,041	9,206
MDD	3,100	gpm	0.492	gpm	1,219	2,862	-1,643

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6C
[e] Subtract proposed ERUs from current available ERU capacity

Source (Zone 3 Finished Water)

Table 10 summarizes the source capacity analysis for the Zone 3 finished water pumps. The water treatment plant currently includes two Zone 3, 1,400 gpm, finished water pumps. With one pump out of service (consistent with DOH standards), the pumping capacity to Zone 3 is 1,400 gpm. The ERU source capacity for Zone 3 finished water with the 47N Revised Proposal is 3,398 and -1,092 for ADD and MDD, respectively.

Table 10A: Source (Zone 3 Finished Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,156	3,398
MDD	1,400	gpm	0.492	gpm	553	1,644	-1,092

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 3 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

The ERU source capacity for Zone 3 finished water with the Alt 6 development is 3,436 and -1,068 for ADD and MDD, respectively.

Table 10B: Source (Zone 3 Finished Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,118	3,436
MDD	1,400	gpm	0.492	gpm	553	1,621	-1,068

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 4 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

The ERU source capacity for Zone 3 finished water with the Alt 5 development is 2,586 and -2,237 for ADD and MDD, respectively.

Table 10C: Source (Zone 3 Finished Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,968	2,586
MDD	1,400	gpm	0.492	gpm	553	2,789	-2,237

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 5 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

Storage Analysis

Table 11A summarizes the current and proposed water demands calculated in Tables 1, 2, and 3, for the Revised Proposal.

Table 11A: Summarization of Water Demand – 47N (Revised Proposal)

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	444,492	0.444	1,161,021	1.161	1,613
City Heights	178,717	0.179	471,057	0.471	654
47° North	265,775	0.266	689,964	0.690	958
Current & Proposed Demand	1,474,608	1.475	4,659,079	4.659	6,520

Table 11B summarizes the current and proposed water demands calculated in Tables 1, 2, and 4, for Alt 6.

Table 11B: Summarization of Water Demand – Alt 6

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	434,222	0.434	1,136,511	1.137	1,578
City Heights	178,717	0.179	471,057	0.471	654
SEIS Alt. 6	255,505	0.256	665,454	0.665	924
Current & Proposed Demand	1,464,338	1.464	4,634,569	4.635	6,485

Table 11C summarizes the current and proposed water demands calculated in Tables 1, 2, and 5, for Alt 5.

Table 11C: Summarization of Water Demand – Alt 5

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	629,426	0.629	1,971,920	1.972	2,739
City Heights	178,717	0.179	471,057	0.471	654
SEIS Alt. 5	450,710	0.451	1,500,863	1.501	2,085
Current & Proposed Demand	1,659,542	1.660	5,469,978	5.470	7,646

The storage analysis tables and calculations below are consistent with those presented in Chapter 3 of the 2015 WSP, and have been updated to reflect the current and proposed demands summarized above.

Total System Storage

Standby Storage: The current conditions have been updated to reflect the additional 2.0 mgd filter train, which increased the supply source total (net the largest source) to 4.5 mg. Calculations for Scenarios A, B, and C, are shown in Table 12A, 12B, and 12C, respectively.

Table 12A: Total System Standby Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
System ADD	1.030	mgd	1.475	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	2.949	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		7,252	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.450	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.450**	**mg**

Table 12B: Total System Standby Storage – Alt 6

	Current		Current & Proposed	
System ADD	1.030	mgd	1.464	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	2.929	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		7,197	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.439	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.439**	**mg**

Table 12C: Total System Standby Storage – Alt 5

	Current		Current & Proposed	
System ADD	1.030	mgd	1.660	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	3.319	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		8,017	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.603	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.603**	**mg**

Fire Suppression Storage: The City of Cle Elum requirement of 480,000 gal, which exceeds DOH minimum requirements, will remain the minimum fire suppression storage for the water system for all scenarios.

Equalizing Storage: As with standby storage, the current conditions have been updated to reflect the additional 2.0 mgd filter train, which increased the supply source total to 4,500 gpm. Calculations for Scenarios A, B, and C are shown in Table 13A, 13B, and 13C, respectively.

Table 13A: Total System Equalizing Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	6,520	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	2,020	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.303**	**mg**

Table 13B: Total System Equalizing Storage – Alt 6

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	6,485	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	1,985	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.298**	**mg**

Table 13C: Total System Equalizing Storage – Alt 5

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	7,646	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	3,146	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.472**	**mg**

Operational Storage: Consistent with the 2015 WSP, the operational storage for the system is equal to 456,280 gallons in all scenarios.

Total Storage: The total storage requirements have been updated per the current conditions and all proposed developments for Scenarios A, B, and C, which are summarized in Table 14A, 14B, and 14C, respectively.

Table 14A: Total System Storage Requirements – 47N (Revised Proposal)
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	7,252
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.303
Standby Storage	0.995	1.450
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	2.689
10% Contingency for Losses	0.199	0.269
Total Storage Required	2.191	2.958
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.384**

Table 14B: Total System Storage Requirements – Alt 6
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	7,197
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.298
Standby Storage	0.995	1.439
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	2.673
10% Contingency for Losses	0.199	0.267
Total Storage Required	2.191	2.941
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.367**

Table 14B: Total System Storage Requirements – Alt 5
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	8,017
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.472
Standby Storage	0.995	1.603
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	3.011
10% Contingency for Losses	0.199	0.301
Total Storage Required	2.191	3.312
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.738**

Zone 3 Storage

Standby Storage: As discussed in the Zone 3 Finished Water analysis, the pumping capacity for the Zone 3 standby storage calculation assumes one of two pumps out of service for a source capacity of 2.0 mg. Calculations for Scenarios A, B, and C are shown in Table 15A, 15B, and 15C, respectively.

Table 15A: Zone 3 Standby Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.866	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.732	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		4,196	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	0.839	mg
Minimum Required Standby Storage	**0.445**	**mg**	**0.839**	**mg**

Table 15B: Zone 3 Standby Storage – Alt 6

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.859	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.718	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		4,160	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	0.832	mg
Minimum Required Standby Storage	**0.445**	**mg**	**0.832**	**mg**

Table 15C: Zone 3 Standby Storage – Alt 5

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.641	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.282	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		5,192	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	1.038	mg
Minimum Required Standby Storage	**0.445**	**mg**	**1.038**	**mg**

Fire Suppression Storage: The City of Cle Elum requirement of 480,000 gal, which exceeds DOH requirements, will remain the minimum fire suppression storage for the Zone 3 reservoir for all scenarios.

Equalizing Storage: The maximum source capacity for Zone 3 is the two existing 1,400 gpm pumps. Calculations for Scenarios A, B, and C are shown in Table 16A, 16B, and 16C, respectively.

Table 16A: Zone 3 Equalizing Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,626	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		826	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.124**	**mg**

Table 16B: Zone 3 Equalizing Storage – Alt 6

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,514	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		714	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.107**	**mg**

Table 16C: Zone 3 Equalizing Storage – Alt 5

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,605	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		2,064	805
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.121**	**mg**

Operational Storage: Consistent with the 2015 WSP, the operational storage for Zone 3 is equal to 54,149 gallons in all scenarios.

Total Storage: The Zone 3 storage requirements have been updated per the current conditions and all proposed developments for Scenarios A, B, and C, which are summarized in Table 17A, 17B, and 17C, respectively.

Table 17A: Zone 3 Storage Requirements – 47N (Revised Proposal)
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	4,196
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.124
Standby Storage	0.445	0.839
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.497
10% Contingency for Losses	0.098	0.150
Total Storage Required	1.077	1.647
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.247**

Table 17B: Zone 3 Storage Requirements – Alt 6
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	4,160
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.121
Standby Storage	0.445	0.832
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.487
10% Contingency for Losses	0.098	0.149
Total Storage Required	1.077	1.635
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.235**

Table 17C: Zone 3 Storage Requirements – Alt 5
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	5,192
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.310
Standby Storage	0.445	1.038
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.882
10% Contingency for Losses	0.098	0.188
Total Storage Required	1.077	2.070
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.670**

Conclusion

The existing water system is not sufficient to meet projected water demand nor storage requirements of Scenarios A, B, or C, as presented in Table 18 (next page). Three system components will need to be addressed to accommodate 85% of City Heights development full buildout and full buildout of the 47º North (Revised Proposal), SEIS Alternative 6, and the original Bullfrog Flats (SEIS Alternative 5) developments:

- Source – New filter train (per MDD analysis)
- Source – New Zone 3 finished water pump (per MDD analysis)
- Storage – New Zone 3 reservoir storage (per ADD and MDD analysis)

Table 18 (next page) summarizes the results of each analysis for Scenarios A, B, and C.

Projected water demands will be translated into actual consumption as the development phases are constructed. The 2001 Water Supply System Project Development Agreement between the City of Cle Elum and Trendwest established "trigger" points when improvements would become necessary, including production thresholds for specified durations, or when a specified number of new water connections were reached. Similar "trigger" points should be established for three system components identified in this analysis.

The proportionate share responsibility for the water system deficiencies under Scenarios A and B are calculated as the ratio of proposed ERUs for the two developments to the total number of proposed ERUs for each scenario within the analyzed buildout period. The results are shown in Table 19 below:

Table 19: Development Proportionate Share Responsibility

	Scenario A			*Scenario B*			*Scenario C*		
	CH	47N	Total	CH	Alt 6	Total	CH	Alt 5	Total
ADD ERUs	863	1,284	2,147	863	1,234	2,098	863	2,177	3,041
Proportionate Responsibility	**40%**	**60%**	**100%**	**41%**	**59%**	**100%**	**28%**	**72%**	**100%**
MDD ERUs	684	1,001	1,685	684	966	1,650	684	2,178	2,862
Proportionate Responsibility	**41%**	**59%**	**100%**	**41%**	**59%**	**100%**	**24%**	**76%**	**100%**

To confirm proportionate share responsibility, a usage monitoring/metering plan is recommended, that would adjust allocation on an actual demand basis. Monitoring/metering will already be necessary, to determine when the capacity improvements will be triggered.

Table 18A: Summarization of Water System Source Analyses

System Component	Current Capacity	Demand/ERU	Current ERU Capacity	Scenario A – CH & 47N (Revised Proposal)		Scenario B – CH & Alt 6		Scenario C – CH & Alt 5	
				Proposed ERUs	Current and Proposed Available ERU Capacity	Proposed ERUs	Current and Proposed Available ERU Capacity	Proposed ERUs	Current and Proposed Available ERU Capacity
Water Rights									
Annual	783 mg	0.095 mg	3,266	1,552	1,714	1,498	1,769	2,317	949
Instantaneous	4,667 gpm	0.492 gpm	4,404	1,242	3,162	1,202	3,201	2,318	2,085
Source (Raw Water)									
Total ADD	4,200 gpm	0.18 gpm	18,357	2,276	16,082	2,221	16,136	3,041	15,317
Total MDD	4,200 gpm	0.492 gpm	3,455	1,785	1,669	1,746	1,708	2,862	593
Source (Finished Water)									
Total ADD	3,100 gpm	0.18 gpm	12,246	2,276	9,971	2,221	10,025	3,041	9,206
Total MDD	3,100 gpm	0.492 gpm	1,219	1,785	-566	1,746	-527	2,862	-1,643
Source (Zone 3 Finished Water)									
Total ADD	1,400 gpm	0.18 gpm	5,554	2,156	3,398	2,118	3,436	2,968	2,586
Total MDD	1,400 gpm	0.492 gpm	553	1,644	-1,092	1,621	-1,068	2,789	-2,237

Table 17B: Summarization of Water System Storage Analyses

Storage (all values in mg)	Existing Capacity	Current Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage
Total System	2.574	2.191	0.383	2.958	-0.384	2.941	-0.367	3.312	-0.738
Zone 3	1.400	1.077	0.323	1.647	-0.247	1.635	-0.235	2.070	-0.670

HLA Engineering and Land Surveying, Inc.

* MEMORANDUM *

Date: January 6, 2023

Project No.: 19055E

To: ESM Consulting Engineers
33400 8th Avenue South, Suite 205
Federal Way, 98003

Attention: Laura Bartenhagen
Project Manager

From: Benjamin A. Annen, PE

Re: 47º North Development – Updated Water System Analysis for Revised Proposal

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Sun Communities (Developer) has proposed the 47º North (47N) residential development on 889 acres in the Bull Frog Flats area of the City of Cle Elum (City) within the City Limits. 47N intends to connect to the City's domestic water system as a single customer, while maintaining a private on-site water system. To determine water system impacts of the 47N development, HLA has conducted preliminary storage and pump analysis for the Cle Elum water system as a whole, as well as Pressure Zone 3, which is the primary location of the development.

As the 2015 Water System Plan (2015 WSP) update is under review by the Department of Health, and not yet adopted by the City, projection data from the 2015 WSP was used to develop current condition estimates. The 2019 projections presented in the 2015 WSP were assumed to be the best representation of current conditions including background growth.

Water Demand

The current water system demand by pressure zone, assumed to equal 2019 projections, are summarized in Table 1.

To allow for direct comparison to the 2019 projections, two proposed major developments were converted to Equivalent Residential Units (ERUs) based on the demands recorded in 2015 WSP Table 2-27:

- 207 gallons per day (gpd) Average Annual Demand (ADD) per 1.0 ERU
- 689 gpd Maximum Day Demand (MDD) per 1.0 ERU

The two proposed major developments included the City Heights (CH) development and the 47N development, both with active Development Agreements. As the 47N development is anticipated to be built-out in 2037 and the CH development build-out for 2040, total maximum CH ERUs were estimated for 2037 at 85% of full build-out.

The current 47N development is considered Revised Proposal, compared to the SEIS Alternative 6 (Alt 6) and the no action, Bullfrog Flats Adopted Master Plan, SEIS Alternative 5 (Alt 5). The projected 2037 water demand for CH, 47N (Revised Proposal), SEIS Alt 6, and SEIS Alt 5 are summarized in Table 2, Table 3, Table 4, and Table 5, respectively.

In the Draft Supplemental Environmental Impact Statement (DSEIS), water demand from the single- and multi- family manufactured homes and RV units under the 47N Proposed Master Site Plan Amendment (SEIS Alt 6) was based on the Washington State Department of Health, Water System Design Manual standards; equating to 211 gpd for single- and multi- family, and 75 gpd for RV units. This was comparable to historical City of Cle Elum single-family home water demand data of 207 gpd as presented above. However, this was a very conservative approach as manufactured homes historically have lesser demands than single-family homes based on national data.

For the Final Supplemental Environmental Impact Statement (FSEIS), the Applicant provided a substantial amount of water demand data from over 60 Sun Community resorts across the country. The City reviewed this data, and revised the development's projected water demands, including factor of safety provisions; equating to 170 gpd for single- and multi- family, and 75 gpd for RV units, as presented in Table 3. These rates are higher than any of the other Sun Community resorts, and so still are considered conservative, but are lower than Cle Elum's historical single-family demands.

The Revised Proposal incorporates the 50 low-income housing units into the residential demands, totaling 757 residential units.

Table 1: Current Water Demand (2019)

Zone	No. of Services[a]	Annual Demand[a] *gpy*	Total ADD[b] *gpd*	ADD ERUs[c]	Total MDD[a] *gpd*	MDD ERUs[d]	Peak Hour Demand[a] *gpm*
1	1,164	147,149,750	403,150	*Non-applicable*	1,298,088	*Non-applicable*	1,803
2	284	60,798,780	166,572	*Non-applicable*	619,795	*Non-applicable*	861
3	364	168,043,810	460,394	2,224	1,580,175	2,293	2,195
Total	1,812	375,992,340	1,030,116	4,976	3,498,058	5,082	4,907

[a] Values from 2015 WSP Table 2-36

[b] Divide Annual Demand by 365 days per year

[c] Divide Annual Day Demand by 207 gpd/ERU

[d] Values from 2015 WSP Table 2-31

Table 2: Projected Water Demand for City Heights at 85% Buildout

	Zone	No. of Services[a]	ADD/Service[b] *gpd*	Total ADD[c] *gpd*	ADD ERUs/Service[b]	ADD ERUs[d]	MDD/Service[b] *gpd*	Total MDD[e] *gpd*	MDD ERUs/Service[b]	MDD ERUs[f]	Peak Hour Demand[g] *gpm*
Single Family Residences	3	438	207	90,614	1.0	438	689	301,610	1.00	438	419
Multi-Family Units	3	128	691	88,103	3.3	426	1,329	169,448	1.93	246	235
Subtotal	-	565	-	178,717	-	863	-	471,057	-	684	654

[a] Values from Conceptual Water Systems Connections for City Heights – 85% of maximum units for Zones 3 and 4

[b] Values from 2015 WSP Table 2-27

[c] Multiply number of services by ADD per service.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply number of services by MDD per service.

[f] Multiply number of services by ADD ERUs/service.

[g] MDD divided by 1,440 then multiplied by 2.

Table 3: Projected Water Demand for 47° North at Full Buildout (Revised Proposal)

	Zone	No. of Services[a]	ADD/Service[a] *gpd*	Total ADD[b] *gpd*	ADD ERU/Service[c]	ADD ERUs[d]	MDD/Service[e] *gpd*	Total MDD[f] *gpd*	MDD ERUs/Service[g]	MDD ERUs[h]	Peak Hour Demand[i] *gpm*
Business Park	2	1	36,460	36,460	176.14	176	121,412	121,412	176.21	176	169
Business Park Irrigation[j]	2	1	2,270	2,270	10.97	11	9,775	9,775	14.19	14	14
Single and Multi-Family Units	3	757	170 [l]	128,690	0.82	622	340	257,380	0.49	374	357
RV Units	3	627	75 [k,l]	47,025	0.36	227	150	94,050	0.22	137	131
Amenity Center	3	1	5,925	5,925	28.62	29	11,850	11,850	17.20	17	16
Residential Irrigation[j]	3	1	45,405	45,405	219.35	219	195,497	195,497	283.74	284	272
Subtotal	-	1,388		265,775		1,284		689,964		1,001	958
10% Losses/Contingency				26,578		128		68,996		100	96
Total				292,353		1,412		758,960		1,102	1,054

[a] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North, dated December 2022.

[b] Multiply number of services by ADD per service.

[c] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor (Business Park) and 2.0 peaking factor per DOH Water System Design Manual (Single/Multi-family Units, RV Units, and Amenity Center). Irrigation MDD based on peak month projections from ESM SETR Table 3-5.

[f] Multiply number of services by MDD per service.

[g] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[h] Multiply number of services by MDD ERUs/service.

[i] MDD divided by 1,440 then multiplied by 2.

[j] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months. MDD irrigation demand highest of 12-month period.

[k] RV Units ADD is based on 50% annual occupancy.

[l] ADD per service as supported by consumption documentation for comparable Sun Communities sites across the country.

Table 4: Projected Water Demand for SEIS Alt 6 at Full Buildout

	Zone	No. of Services[a]	ADD/Service[a] *gpd*	Total ADD[b] *gpd*	ADD ERU/Service[c]	ADD ERUs[d]	MDD/Service[e] *gpd*	Total MDD[f] *gpd*	MDD ERUs/Service[g]	MDD ERUs[h]	Peak Hour Demand[i] *gpm*
Business Park	2	1	33,475	33,475	161.71	162	111,472	111,472	161.79	162	155
Business Park Irrigation[j]	2	1	2,270	2,270	10.97	11	9,775	9,775	14.19	14	14
Single and Multi-Family Units	3	707	170 [l]	120,190	0.82	581	340	240,380	0.49	349	334
RV Units	3	627	75 [k,l]	47,025	0.36	227	150	94,050	0.22	137	131
Amenity Center	3	1	7,140	7,140	34.49	34	14,280	14,280	20.73	21	20
Residential Irrigation[j]	3	1	45,405	45,405	219.35	219	195,497	195,497	283.74	284	272
Subtotal	-	1,338		255,505		1,234		665,454		966	924
10% Losses/Contingency				25,551		123		66,545		97	92
Total				281,056		1,358		731,999		1,062	1,017

[a] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North, dated December 2022.

[b] Multiply number of services by ADD per service.

[c] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[d] Multiply number of services by ADD ERUs/service.

[e] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor (Business Park) and 2.0 peaking factor per DOH Water System Design Manual (Single/Multi-family Units, RV Units, and Amenity Center). Irrigation MDD based on peak month projections from ESM SETR Table 3-5.

[f] Multiply number of services by MDD per service.

[g] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[h] Multiply number of services by MDD ERUs/service.

[i] MDD divided by 1,440 then multiplied by 2.

[j] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months. MDD irrigation demand highest of 12-month period.

[k] RV Units ADD is based on 50% annual occupancy.

[l] ADD per service as supported by consumption documentation for comparable Sun Communities sites across the country.

Table 5: Projected Water Demand for SEIS Alt 5 at Full Buildout

	Zone	No. of Services[a]	ADD/Service[b] *gpd*	Total ADD[c] *gpd*	ADD ERU/Service[d]	ADD ERUs[e]	MDD/Service[f] *gpd*	Total MDD[g] *gpd*	MDD ERUs/Service[h]	MDD ERUs[i]	Peak Hour Demand[j] *gpm*
Business Park and Irrigation[k,l]	2	1	15,020	15,020	72.56	73	50,017	50,017	72.59	73	69
Business Park and Irrigation[k,m]	3	1	80,108	80,108	387.00	387	266,760	266,760	387.17	387	370
Single Family Units	3	810	211	170,910	1.02	826	703	569,130	1.02	826	790
Multi-Family Units	3	524	211	110,564	1.02	534	703	368,178	1.02	534	511
Amenity Center/ Clubhouse[n]	3	1	6,000	6,000	28.99	29	19,980	19,980	29.00	29	28
Residential Irrigation[o]	3	1	68,107	68,107	329.02	329	226,797	226,797	329.17	329	315
Subtotal	-	1,338		450,710		2,177		1,500,863		2,178	2,085

[a] Values from 2002 EIS Table 2-5 Summary – Alternative 5

[b] Values from Section 3 Preliminary Water Plans, ESM Consulting Addendum to the Site Engineering Technical Report for 47° North

[c] Multiply number of services by ADD per service.

[d] Divide ADD/service by 207 GPD per ADD ERU from 2015 WSP Table 2-27.

[e] Multiply number of services by ADD ERUs/service.

[f] Multiply ADD/service by 3.33 peaking factor from ESM SETR Section 3, Table 3-8: Peaking Factor

[g] Multiply number of services by MDD per service.

[h] Divide GPD/service by 689 GPD per MDD ERU from 2015 WSP Table 2-27.

[i] Multiply number of services by MDD ERUs/service.

[j] MDD divided by 1,440 then multiplied by 2.

[k] ADD irrigation demand estimated as average maximum allowable irrigation flows for all 12 months from Section 3, Table 3-4: Maximum Allowable Irrigation Flows

[l] Zone 2 Business Park and Irrigation Demand assumed equivalent to 47N Zone 2 demands

[m] Zone 3 Business Park and Irrigation Demand assumed 5.33 times greater than Zone 2 (800,000 SF / 150,000 SF)

[n] Amenity Center and Neighborhood Clubhouse demand assumed equivalent to 47N Amenity and Adventure Center demands

[o] ADD irrigation demand estimated as 150% of 47N average maximum allowable flows for all 12 months from Section 3, Table 3-4: Maximum Allowable Irrigation Flows

Physical capacity of the total water system, including water rights, source, treatment, and storage capacity, was analyzed as part of the 2015 WSP in terms of ERU capacity. A Demand Rate per ERU for each system component was calculated with production values rather than consumption values to account for relatively high system loss (15-25%). The ERUs for 2012 (last year of complete data from 2015 WSP), estimated current conditions, and full buildout of CH (85%), 47N (Revised Proposal), Alt 6, and Alt 5, summarized below, allow for direct comparison to the original capacity analysis:

Table 6A: Summarization of ERUs – 47N (Revised Proposal)

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
47º North	1,412	1,102
Proposed ERUs	2,276	1,785
Total	7,252	6,867

Table 6B: Summarization of ERUs – Alt 6

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
SEIS Alt. 6	1,358	1,062
Proposed ERUs	2,221	1,746
Total	7,197	6,828

Table 6C: Summarization of ERUs – Alt 5

	ADD ERUs	MDD ERUs
2012	3,843	3,950
Current Conditions	4,976	5,082
City Heights	863	684
SEIS Alt. 5	2,177	2,178
Proposed ERUs	3,041	2,862
Total	8,017	7,944

Each analysis below was completed for three scenarios. Scenario A includes 2019 projections, CH development projections (at 85% of full buildout), and 47N Revised Proposal projections. Scenario B includes 2019 projections, CH development projections (at 85% of full buildout), and SEIS Alt 6 projections. Scenario C includes 2019 projections, CH development projections (at 85% of full buildout), and SEIS Alt 5 projections.

Water Rights

Table 7 summarizes the water rights capacity analysis for 47N. The rights are granted by the existing development agreement with Suncadia Properties, which transfers Suncadia's existing water rights (included in current capacities below) as development and subsequent water demand occurs within the Cle Elum Bull Frog Flats area. This analysis includes the Bull Frog Flats area, or 47N, but includes only 140 units of the CH development as defined in the 2011 City Heights Annexation and Development Agreement. The revised ERU capacity for water rights with the 47N Revised Proposal is 1,714 and 3,162 for Annual and Instantaneous Rights, respectively.

Table 7A: Water Rights Analysis – 47N (Revised Proposal)

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	1,552	1,714
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	1,242	3,162

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all 47N ERUs from Table 6A
[d] Subtract proposed ERUs from current available ERU capacity

The revised available ERU capacity for water rights with the Alt 6 development is 1,769 and 3,201 for Annual and Instantaneous Rights, respectively.

Table 7B: Water Rights Analysis – Alt 6

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	1,498	1,769
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	1,202	3,201

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all Alt 6 ERUs from Table 6B
[d] Subtract proposed ERUs from current available ERU capacity

The revised available ERU capacity for water rights with the Alt 5 development is 949 and 2,085 for Annual and Instantaneous Rights, respectively.

Table 7C: Water Rights Analysis – Alt 5

Water Right	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
Annual (Q_a)	783	mg	0.095	mg	3,266	2,317	949
Instantaneous (Q_i)	4,667	gpm	0.492	gpm	4,404	2,318	2,085

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] 140 CH ERUs and all Alt 5 ERUs from Table 6C
[d] Subtract proposed ERUs from current available ERU capacity

Source Analysis

Source capacity must be analyzed for raw water pumping capacity, total system finished water capacity, and Zone 3 finished water capacity.

Source (Raw Water)

Table 8 summarizes the source capacity analysis for the raw water pumps. There are no future improvements planned to increase source pumping capacity, which is the capacity of three 1,400 gpm pumps, or 4,200 gpm total. The revised ERU source capacity for raw water with the 47N Revised Proposal is 16,082 and 1,669 for ADD and MDD, respectively.

Table 8A: Source (Raw Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	2,276	16,082
MDD	4,200	gpm	0.492	gpm	3,455	1,785	1,669

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6A
[d] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for raw water with the Alt 6 development is 16,136 and 1,708 for ADD and MDD, respectively.

Table 8B: Source (Raw Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	2,221	16,136
MDD	4,200	gpm	0.492	gpm	3,455	1,746	1,708

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6B
[d] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for raw water with the Alt 5 development is 15,317 and 593 for ADD and MDD, respectively.

Table 8C: Source (Raw Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[a]		Current Available ERU Capacity[b]	Proposed ERUs[c]	Revised Available ERU Capacity[d]
ADD	4,200	gpm	0.18	gpm	18,357	3,041	15,317
MDD	4,200	gpm	0.492	gpm	3,455	2,862	593

[a] Values from 2015 WSP Table 2-35
[b] Divide current capacity by demand/ERU and subtract current ERUs
[c] Values from Table 6C
[d] Subtract proposed ERUs from current available ERU capacity

Source (Total System Finished Water)

Table 9 summarizes the source capacity analysis for the finished water filter trains. Since the 2015 WSP, one of two new 2.0 mgd filter trains has been constructed, which increased the total capacity at the treatment plant to 4,500 gpm. With one filter train out of service (consistent with DOH standards), the finished water capacity is 3,100 gpm. The revised ERU source capacity for total system finished water with the 47N Revised Proposal is 9,971 and -566 for ADD and MDD, respectively.

Table 9A: Source (Total System Finished Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	2,276	9,971
MDD	3,100	gpm	0.492	gpm	1,219	1,785	-566

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6A
[e] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for total system finished water with the Alt 6 development is 10,025 and -527 for ADD and MDD, respectively.

Table 9B: Source (Total System Finished Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	2,221	10,025
MDD	3,100	gpm	0.492	gpm	1,219	1,746	-527

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6B
[e] Subtract proposed ERUs from current available ERU capacity

The revised ERU source capacity for total system finished water with the Alt 5 development is 9,206 and -1,643 for ADD and MDD, respectively.

Table 9C: Source (Total System Finished Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	3,100	gpm	0.18	gpm	12,246	3,041	9,206
MDD	3,100	gpm	0.492	gpm	1,219	2,862	-1,643

[a] Three 2.0 mgd filter trains at treatment plant and 300 gpm well, assumed one filter train out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 6C
[e] Subtract proposed ERUs from current available ERU capacity

Source (Zone 3 Finished Water)

Table 10 summarizes the source capacity analysis for the Zone 3 finished water pumps. The water treatment plant currently includes two Zone 3, 1,400 gpm, finished water pumps. With one pump out of service (consistent with DOH standards), the pumping capacity to Zone 3 is 1,400 gpm. The ERU source capacity for Zone 3 finished water with the 47N Revised Proposal is 3,398 and -1,092 for ADD and MDD, respectively.

Table 10A: Source (Zone 3 Finished Water) Analysis – 47N (Revised Proposal)

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,156	3,398
MDD	1,400	gpm	0.492	gpm	553	1,644	-1,092

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 3 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

The ERU source capacity for Zone 3 finished water with the Alt 6 development is 3,436 and -1,068 for ADD and MDD, respectively.

Table 10B: Source (Zone 3 Finished Water) Analysis – Alt 6

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,118	3,436
MDD	1,400	gpm	0.492	gpm	553	1,621	-1,068

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 4 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

The ERU source capacity for Zone 3 finished water with the Alt 5 development is 2,586 and -2,237 for ADD and MDD, respectively.

Table 10C: Source (Zone 3 Finished Water) Analysis – Alt 5

Total	Current Capacity[a]		Demand/ERU[b]		Current Available ERU Capacity[c]	Proposed ERUs[d]	Revised Available ERU Capacity[e]
ADD	1,400	gpm	0.18	gpm	5,554	2,968	2,586
MDD	1,400	gpm	0.492	gpm	553	2,789	-2,237

[a] Two 1,400 gpm finished water Zone 3 pumps, assume one pump out of service consistent with DOH standards
[b] Values from 2015 WSP Table 2-35
[c] Divide current capacity by demand/ERU and subtract current ERUs
[d] Values from Table 5 with exception of Business Park (Zone 2), with 10% losses/contingency
[e] Subtract proposed ERUs from current available ERU capacity

Storage Analysis

Table 11A summarizes the current and proposed water demands calculated in Tables 1, 2, and 3, for the Revised Proposal.

Table 11A: Summarization of Water Demand – 47N (Revised Proposal)

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	444,492	0.444	1,161,021	1.161	1,613
City Heights	178,717	0.179	471,057	0.471	654
47° North	265,775	0.266	689,964	0.690	958
Current & Proposed Demand	1,474,608	1.475	4,659,079	4.659	6,520

Table 11B summarizes the current and proposed water demands calculated in Tables 1, 2, and 4, for Alt 6.

Table 11B: Summarization of Water Demand – Alt 6

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	434,222	0.434	1,136,511	1.137	1,578
City Heights	178,717	0.179	471,057	0.471	654
SEIS Alt. 6	255,505	0.256	665,454	0.665	924
Current & Proposed Demand	1,464,338	1.464	4,634,569	4.635	6,485

Table 11C summarizes the current and proposed water demands calculated in Tables 1, 2, and 5, for Alt 5.

Table 11C: Summarization of Water Demand – Alt 5

	ADD		MDD		PHD
	gpd	*mgd*	*gpd*	*mgd*	*gpm*
Current Demand	1,030,116	1.030	3,498,058	3.498	4,907
Proposed Demand	629,426	0.629	1,971,920	1.972	2,739
City Heights	178,717	0.179	471,057	0.471	654
SEIS Alt. 5	450,710	0.451	1,500,863	1.501	2,085
Current & Proposed Demand	1,659,542	1.660	5,469,978	5.470	7,646

The storage analysis tables and calculations below are consistent with those presented in Chapter 3 of the 2015 WSP, and have been updated to reflect the current and proposed demands summarized above.

Total System Storage

Standby Storage: The current conditions have been updated to reflect the additional 2.0 mgd filter train, which increased the supply source total (net the largest source) to 4.5 mg. Calculations for Scenarios A, B, and C, are shown in Table 12A, 12B, and 12C, respectively.

Table 12A: Total System Standby Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
System ADD	1.030	mgd	1.475	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	2.949	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		7,252	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.450	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.450**	**mg**

Table 12B: Total System Standby Storage – Alt 6

	Current		Current & Proposed	
System ADD	1.030	mgd	1.464	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	2.929	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		7,197	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.439	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.439**	**mg**

Table 12C: Total System Standby Storage – Alt 5

	Current		Current & Proposed	
System ADD	1.030	mgd	1.660	mgd
X 2 Days	2		2	
Storage Subtotal	2.060	mg	3.319	mg
Sum of all Sources minus Largest Source	4.5	mg	4.5	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	4,976		8,017	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.995	mg	1.603	mg
Minimum Required Standby Storage	**0.995**	**mg**	**1.603**	**mg**

Fire Suppression Storage: The City of Cle Elum requirement of 480,000 gal, which exceeds DOH minimum requirements, will remain the minimum fire suppression storage for the water system for all scenarios.

Equalizing Storage: As with standby storage, the current conditions have been updated to reflect the additional 2.0 mgd filter train, which increased the supply source total to 4,500 gpm. Calculations for Scenarios A, B, and C are shown in Table 13A, 13B, and 13C, respectively.

Table 13A: Total System Equalizing Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	6,520	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	2,020	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.303**	**mg**

Table 13B: Total System Equalizing Storage – Alt 6

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	6,485	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	1,985	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.298**	**mg**

Table 13C: Total System Equalizing Storage – Alt 5

	Current		Current & Proposed	
Peak Hour Demand	4,907	gpm	7,646	gpm
- Maximum Source Capacity	4,500	gpm	4,500	gpm
Equalizing Storage Subtotal	407	gpm	3,146	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.061**	**mg**	**0.472**	**mg**

Operational Storage: Consistent with the 2015 WSP, the operational storage for the system is equal to 456,280 gallons in all scenarios.

Total Storage: The total storage requirements have been updated per the current conditions and all proposed developments for Scenarios A, B, and C, which are summarized in Table 14A, 14B, and 14C, respectively.

Table 14A: Total System Storage Requirements – 47N (Revised Proposal)
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	7,252
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.303
Standby Storage	0.995	1.450
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	2.689
10% Contingency for Losses	0.199	0.269
Total Storage Required	2.191	2.958
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.384**

Table 14B: Total System Storage Requirements – Alt 6
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	7,197
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.298
Standby Storage	0.995	1.439
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	2.673
10% Contingency for Losses	0.199	0.267
Total Storage Required	2.191	2.941
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.367**

Table 14B: Total System Storage Requirements – Alt 5
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	4,976	8,017
Operational Storage	0.456	0.456
Equalizing Storage	0.061	0.472
Standby Storage	0.995	1.603
Fire Suppression Storage	0.480	0.480
Subtotal	1.992	3.011
10% Contingency for Losses	0.199	0.301
Total Storage Required	2.191	3.312
Existing Storage Capacity	2.574	2.574
Available System Storage	**0.383**	**-0.738**

Zone 3 Storage

Standby Storage: As discussed in the Zone 3 Finished Water analysis, the pumping capacity for the Zone 3 standby storage calculation assumes one of two pumps out of service for a source capacity of 2.0 mg. Calculations for Scenarios A, B, and C are shown in Table 15A, 15B, and 15C, respectively.

Table 15A: Zone 3 Standby Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.866	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.732	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		4,196	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	0.839	mg
Minimum Required Standby Storage	**0.445**	**mg**	**0.839**	**mg**

Table 15B: Zone 3 Standby Storage – Alt 6

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.859	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.718	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		4,160	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	0.832	mg
Minimum Required Standby Storage	**0.445**	**mg**	**0.832**	**mg**

Table 15C: Zone 3 Standby Storage – Alt 5

	Current		Current & Proposed	
Zone 3 ADD	0.460	mgd	0.641	mgd
X 2 Days	2		2	
Storage Subtotal	0.921	mg	1.282	mg
Sum of all Sources minus Largest Source	2.0	mg	2.0	mg
Storage Subtotal minus Supply Subtotal	less than 0		less than 0	
Equivalent Residential Units (ERUs)	2,224		5,192	
x Min. 200 gal	200	gal	200	gal
Storage Minimum	0.445	mg	1.038	mg
Minimum Required Standby Storage	**0.445**	**mg**	**1.038**	**mg**

Fire Suppression Storage: The City of Cle Elum requirement of 480,000 gal, which exceeds DOH requirements, will remain the minimum fire suppression storage for the Zone 3 reservoir for all scenarios.

Equalizing Storage: The maximum source capacity for Zone 3 is the two existing 1,400 gpm pumps. Calculations for Scenarios A, B, and C are shown in Table 16A, 16B, and 16C, respectively.

Table 16A: Zone 3 Equalizing Storage – 47N (Revised Proposal)

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,626	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		826	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.124**	**mg**

Table 16B: Zone 3 Equalizing Storage – Alt 6

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,514	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		714	gpm
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.107**	**mg**

Table 16C: Zone 3 Equalizing Storage – Alt 5

	Current		Current & Proposed	
Peak Hour Demand	2,195	gpm	3,605	gpm
- Maximum Source Capacity	2,800	gpm	2,800	gpm
Equalizing Storage Subtotal	less than 0		2,064	805
x DOH Multiplier	150	gal/gpm	150	gal/gpm
Equalizing Storage Total	**0.000**	**mg**	**0.121**	**mg**

Operational Storage: Consistent with the 2015 WSP, the operational storage for Zone 3 is equal to 54,149 gallons in all scenarios.

Total Storage: The Zone 3 storage requirements have been updated per the current conditions and all proposed developments for Scenarios A, B, and C, which are summarized in Table 17A, 17B, and 17C, respectively.

Table 17A: Zone 3 Storage Requirements – 47N (Revised Proposal)
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	4,196
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.124
Standby Storage	0.445	0.839
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.497
10% Contingency for Losses	0.098	0.150
Total Storage Required	1.077	1.647
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.247**

Table 17B: Zone 3 Storage Requirements – Alt 6
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	4,160
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.121
Standby Storage	0.445	0.832
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.487
10% Contingency for Losses	0.098	0.149
Total Storage Required	1.077	1.635
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.235**

Table 17C: Zone 3 Storage Requirements – Alt 5
(Storage values in mg)

	Current	Current & Proposed
Number of ERUs	2,224	5,192
Operational Storage	0.054	0.054
Equalizing Storage	0.000	0.310
Standby Storage	0.445	1.038
Fire Suppression Storage	0.480	0.480
Subtotal	0.979	1.882
10% Contingency for Losses	0.098	0.188
Total Storage Required	1.077	2.070
Existing Storage Capacity	1.400	1.400
Available Zone 3 Storage	**0.323**	**-0.670**

Conclusion

The existing water system is not sufficient to meet projected water demand nor storage requirements of Scenarios A, B, or C, as presented in Table 18 (next page). Three system components will need to be addressed to accommodate 85% of City Heights development full buildout and full buildout of the 47º North (Revised Proposal), SEIS Alternative 6, and the original Bullfrog Flats (SEIS Alternative 5) developments:

- Source – New filter train (per MDD analysis)
- Source – New Zone 3 finished water pump (per MDD analysis)
- Storage – New Zone 3 reservoir storage (per ADD and MDD analysis)

Table 18 (next page) summarizes the results of each analysis for Scenarios A, B, and C.

Projected water demands will be translated into actual consumption as the development phases are constructed. The 2001 Water Supply System Project Development Agreement between the City of Cle Elum and Trendwest established "trigger" points when improvements would become necessary, including production thresholds for specified durations, or when a specified number of new water connections were reached. Similar "trigger" points should be established for three system components identified in this analysis.

The proportionate share responsibility for the water system deficiencies under Scenarios A and B are calculated as the ratio of proposed ERUs for the two developments to the total number of proposed ERUs for each scenario within the analyzed buildout period. The results are shown in Table 19 below:

Table 19: Development Proportionate Share Responsibility

	Scenario A			*Scenario B*			*Scenario C*		
	CH	47N	Total	CH	Alt 6	Total	CH	Alt 5	Total
ADD ERUs	863	1,284	2,147	863	1,234	2,098	863	2,177	3,041
Proportionate Responsibility	**40%**	**60%**	**100%**	**41%**	**59%**	**100%**	**28%**	**72%**	**100%**
MDD ERUs	684	1,001	1,685	684	966	1,650	684	2,178	2,862
Proportionate Responsibility	**41%**	**59%**	**100%**	**41%**	**59%**	**100%**	**24%**	**76%**	**100%**

To confirm proportionate share responsibility, a usage monitoring/metering plan is recommended, that would adjust allocation on an actual demand basis. Monitoring/metering will already be necessary, to determine when the capacity improvements will be triggered.

Table 18A: Summarization of Water System Source Analyses

System Component	Current Capacity	Demand/ERU	Current ERU Capacity	Scenario A – CH & 47N (Revised Proposal)		Scenario B – CH & Alt 6		Scenario C – CH & Alt 5	
				Proposed ERUs	Current and Proposed Available ERU Capacity	Proposed ERUs	Current and Proposed Available ERU Capacity	Proposed ERUs	Current and Proposed Available ERU Capacity
Water Rights									
Annual	783 mg	0.095 mg	3,266	1,552	1,714	1,498	1,769	2,317	949
Instantaneous	4,667 gpm	0.492 gpm	4,404	1,242	3,162	1,202	3,201	2,318	2,085
Source (Raw Water)									
Total ADD	4,200 gpm	0.18 gpm	18,357	2,276	16,082	2,221	16,136	3,041	15,317
Total MDD	4,200 gpm	0.492 gpm	3,455	1,785	1,669	1,746	1,708	2,862	593
Source (Finished Water)									
Total ADD	3,100 gpm	0.18 gpm	12,246	2,276	9,971	2,221	10,025	3,041	9,206
Total MDD	3,100 gpm	0.492 gpm	1,219	1,785	-566	1,746	-527	2,862	-1,643
Source (Zone 3 Finished Water)									
Total ADD	1,400 gpm	0.18 gpm	5,554	2,156	3,398	2,118	3,436	2,968	2,586
Total MDD	1,400 gpm	0.492 gpm	553	1,644	-1,092	1,621	-1,068	2,789	-2,237

Table 17B: Summarization of Water System Storage Analyses

Storage (all values in mg)	Existing Capacity	Current Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage	Current and Proposed Storage Demand	Available Storage
Total System	2.574	2.191	0.383	2.958	-0.384	2.941	-0.367	3.312	-0.738
Zone 3	1.400	1.077	0.323	1.647	-0.247	1.635	-0.235	2.070	-0.670

Appendix C
TRANSPORTATION REPORT

47° North

Cle Elum, WA

UPDATED TRANSPORTATION ANALYSIS

January 2023

TENW

Transportation Engineering NorthWest

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Introduction and Methodology

The *47° North Draft SEIS (DSEIS) Transportation Analysis* (TENW, September 2020) and *47° North Final SEIS (FSEIS) Transportation Analysis Addendum* (TENW, April 2021) were prepared to support the *47° North Final SEIS (FSEIS),* and provide a detailed analysis of the potential transportation impacts of the proposed 47° North development. The *47° North Draft SEIS (DSEIS) Transportation Analysis* includes analyses of baseline, SEIS Alternative 5 (Approved Bullfrog Flats Master Site Plan), and SEIS Alternative 6 (Proposed 47° North Master Site Plan Amendment at that time) conditions for three future development years (2025, 2031, and 2037) and three time periods (weekday PM peak hour, Friday PM peak hour, and Sunday PM peak hour, all during the summer). The *47° North DSEIS Transportation Analysis* also identifies potential mitigation and estimated pro-rata share contributions for roadway improvements necessary for SEIS Alternatives 5 and 6 to meet LOS standards for the weekday summer PM peak hour.

The *47° North FSEIS Transportation Analysis Addendum* was an update to the *47° North DSEIS Transportation Analysis* that addressed transportation-related comments received on the DSEIS as part of the public comment period. The Mitigation Measures section of the *Transportation Analysis Addendum* (pages 24-34) was updated from the *DSEIS* based on revised projected occupancy data for the RV resort during the weekday summer PM peak hour. Revised pro-rata share mitigation calculations and associated tables were also included with an alternative pro-rata share method for comparison with the method used in the DSEIS. Additionally, the Mitigation Measures section identified potential improvements at the site access intersections and study intersections anticipated to operate at non-compliant levels of service (LOS) in the future with the 47° North project.

This *47° North Updated Transportation Analysis* is an update to the *47° North SEIS (*including both the *Draft SEIS Transportation Analysis* and the *Final SEIS Transportation Analysis Addendum)* that reflects a revised land use proposal and buildout timeline, and also changes to background 'baseline' traffic volumes along the Bullfrog Road corridor based on updated travel forecasts conducted by Fehr & Peers. The current 47° North project proposal will be referred to throughout this document as the Revised Proposal. This *47° North Updated Transportation Analysis* focuses on a comparison of transportation impacts and required mitigation measures between the SEIS Alternative 6 and the Revised Proposal, in particular the nature of any incremental changes in impacts between the prior and revised proposals.

Affected Environment

The transportation analysis has been updated to reflect the following:

- Updated future baseline traffic volumes at the six study intersections on Bullfrog Road to reflect area growth that has occurred since the SEIS was published.
- A revised 47° North land use proposal and site plan (see Chapter 2) that includes 50 affordable housing units and the inclusion of commercial development in the project.
- An updated development timeline for the 47° North land use proposal, reflecting an overall project buildout in 2031.
- Updated trip generation for the revised 47° North land use proposal using the latest edition of the ITE *Trip Generation Manual* (11th Edition).

It should be noted that where there are no changes in this updated transportation analysis to the previous SEIS, those sections have been noted as such.

Study Scope

The scope of this transportation analysis is consistent with the SEIS which was based on several items including: (1) 2002 Cle Elum UGA FEIS scope of work; (2) public and agency comments received during the SEIS scoping process for 47° North; (3) project trip generation estimates; (4) information about existing transportation conditions; and (5) consultation with staff from the City of Cle Elum, Kittitas County, and WSDOT. Based on these inputs, a specific scope of work was established to evaluate the transportation impacts of SEIS Alternative 6 (2020 47° North Master Site Plan Amendment).

Traffic analyses typically focus on key intersections that would experience additional traffic from a proposed action. Based on initial scoping inputs, a total of 27 study intersections were identified, plus the proposed site accesses on Bullfrog Road and SR 903 to serve the proposed development. No additional intersections were suggested in comments received on the Draft SEIS.

The 27 study intersections evaluated in this updated transportation analysis are shown in **Appendix A**.

Forecast Years with Development Phases

To be consistent with the SEIS, future years 2025, 2031, and 2037 were evaluated in this updated transportation analysis with the Revised Proposal:

- **Year 2025** – represents near-term development of initial project phase and is generally addressed in local agency six-year capital plans.
- **Year 2031** – represents full buildout of 47° North development which now includes the commercial parcel.
- **Year 2037** – represents the current planning horizon of City of Cle Elum and Kittitas County Comprehensive Plans.

It should be noted that the one of the main differences between the Revised Proposal and SEIS Alternative 6 is that the commercial parcel is included in the proposal and will be developed by 2031 instead of 2037. As a result, the 2037 analysis in this updated transportation analysis only includes additional background growth from 2031 to 2037.

Traffic Volumes

Future 'Baseline' Traffic Volumes

Existing weekday, Friday, and Sunday peak hour traffic volumes used in the SEIS analysis were collected in August and December 2019 at the 27 study intersections. For this *47° North Updated Transportation Analysis,* supplemental summer peak hour traffic volumes were collected at ten study intersections in July 2022 for the following three time periods (consistent with the SEIS):

- Weekday PM peak period (3:00 to 6:00 p.m.)
- Friday PM peak period (2:00 to 4:00 p.m.)
- Sunday PM peak period (3:00 to 5:00 p.m.)

The 2022 existing (summer) traffic volumes are included in **Appendix B**. The purpose of collecting new summer peak period traffic counts was to identify background traffic growth from 2019 to 2022, and to determine whether future traffic forecasts should be modified.

The 2022 existing (summer peak) traffic volumes were compared to the year 2019 existing (summer peak) traffic volumes and the forecast year 2025 traffic volumes to confirm that the background 'baseline' traffic growth estimated to occur between 2019 and 2025 as documented in the SEIS for the weekday, Friday, and Sunday peak hours was still accurate. The comparison of summer 2019 and 2022 traffic counts indicated that the weekday PM peak period annual background traffic growth that occurred between 2019 and 2022 at study intersections along Bullfrog Road (#1-6 as shown in **Appendix A** as **Figure 1**) was higher than was anticipated to occur between 2019 and 2025 in the prior/SEIS travel demand forecasting model as explained in further detail by Fehr & Peers in **Appendix C**. The background traffic growth that occurred between 2019 and 2022 at all other study intersections during the weekday PM peak hour was consistent with the forecast annual growth anticipated to occur

between 2019 and 2025. Additionally, the background traffic growth that occurred between 2019 and 2022 at the ten study intersections during the Friday and Sunday peak hours was reexamined and determined to be consistent with the forecast annual 'baseline' traffic growth anticipated to occur by 2025.

To reflect the changes in recent background growth, Fehr & Peers provided updated 2025, 2031 and 2037 'Baseline' traffic volumes (without development on the 47° North site) at study intersections #1-6 along Bullfrog Road for the weekday PM peak hour only. The Friday and Sunday 2025, 2031, and 2037 'Baseline' PM peak hour traffic volumes are consistent with the traffic volumes documented in the SEIS. A memorandum detailing the methodology and assumptions used by Fehr & Peers for the updated weekday traffic volume forecasting for the six (6) study intersections on Bullfrog Road is provided in **Appendix C.** The memorandum also includes explanation for the higher than anticipated growth that occurred between 2019 and 2022.

Table 1 summarizes the calculated average annual growth rate at all study intersections between each of the analysis periods (2019 to 2025, 2025 to 2031, and 2031 to 2037) and for each of the time periods studied (weekday PM peak, Friday PM peak, and Sunday PM peak, during summer peak period) based on the 'Baseline' traffic volumes provided by Fehr & Peers.

Table 1
BACKGROUND GROWTH SUMMARY FOR 'BASELINE' CONDITIONS

	Average Annual Growth Rate for 'Baseline' Traffic Volumes at All Study Intersections (Peak Summer Conditions)					
	47° North SEIS			**47° North Updated Analysis**		
Years	Weekday PM Peak Hour	Friday PM Peak Hour	Sunday PM Peak Hour	Weekday PM Peak Hour	Friday PM Peak Hour	Sunday PM Peak Hour
2019 to 2025	5.8%	5.6%	3.7%	7.2%	same as SEIS	same as SEIS
2025 to 2031	3.0%	3.0%	2.6%	2.7%	same as SEIS	same as SEIS
2031 to 2037	2.6%	2.5%	2.6%	2.5%	same as SEIS	same as SEIS

As shown in **Table 1**, the updated 'Baseline' weekday PM peak hour traffic volumes at the six study intersections on Bullfrog Road reflect higher-than-anticipated traffic growth from 2019 to 2022 on Bullfrog Road during the weekday PM peak hour. To reflect this change, the annual growth rate from 2019 to 2025 in this updated analysis was increased from that previously assumed in the *47° North SEIS*. In addition, the background annual growth between 2025 and 2037 for the weekday PM peak hour in this *47° North Updated Transportation Analysis* is slightly less than what was previously assumed in the 47° North SEIS as explained in further detail by Fehr & Peers in **Appendix C.** Because the Friday and Sunday PM peak hour 'Baseline' traffic volumes did not change in this *47° North Updated Transportation Analysis*, the Friday

and Sunday background annual growth rates assumed in this updated analysis are the same as what was assumed in the 47° North SEIS.

The future year 2025 'Baseline' traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 1**, **Figure 2**, and **Figure 3**, respectively. The future year 2031 'Baseline' traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 4**, **Figure 5**, and **Figure 6**, respectively. The future year 2037 'Baseline' traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 7**, **Figure 8**, and **Figure 9**, respectively. It should be noted that the 2025, 2031, and 2037 'Baseline' Friday and Sunday peak hour traffic volumes are the same as disclosed and analyzed in the *47° North FSEIS Transportation Analysis*.

Intersection LOS

Intersection level of service (LOS) was analyzed at the study intersections using Synchro and Sidra traffic analysis software, which is the same software used for the SEIS analyses. The established LOS standard is LOS C for WSDOT intersections on Interstate 90 and State Route 903, LOS C for intersections within the City of Cle Elum, and LOS D for intersections within the rural areas of Kittitas County.

Future 'Baseline' Intersection LOS

No changes were made to the existing (2019) LOS evaluations as documented in Table 1 of the *47° North FSEIS Transportation Analysis Addendum.* Additionally, no changes were made to the majority of intersections included in the future year 2025, 2031, and 2037 'Baseline' LOS analyses, as documented in Table 2 of the *47° North FSEIS Transportation Analysis Addendum.* The exceptions are the six study intersections along Bullfrog Road where the future year 2025, 2031, and 2037 weekday PM peak hour LOS analyses were revised based on the new weekday PM peak hour traffic volume forecasts. The updated LOS results at the six study intersections on Bullfrog Road are summarized in **Table 2**.

Study intersections forecast to operate at non-compliant LOS (LOS D, E, or F for City and WSDOT intersections and LOS E or F for Kittitas County intersections) are shown in bold text in the table. Study intersections forecast to operate at non-compliant LOS based on the updated 'Baseline' traffic volumes that were not identified as non-compliant in the *47° North FSEIS* are shown in bold, purple text in **Table 2** in this *47° North Updated Transportation Analysis.* Please refer to footnote 1 in the table for further explanation. The LOS results are discussed in detail following the table.

It should be noted that the Friday and Sunday PM peak hour 'Baseline' analysis results for future years 2025, 2031, and 2037 as summarized in Table 3 and Table 4 of the *47° North FSEIS Transportation Analysis* also did not change in this *47° North Updated Transportation Analysis*.

Table 2
FUTURE 'BASELINE' INTERSECTION LOS SUMMARY – WEEKDAY PM PEAK HOUR (SUMMER)

		Weekday PM Peak Hour Conditions (Summer Peak)					
		Year 2025 'Baseline'		Year 2031 'Baseline'		Year 2037 'Baseline'	
Study Intersection	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
Signalized							
14. S Cle Elum Way / Stafford / W 1st St	C	*Did not change from SEIS*					
16. N Oakes Ave / W 1st St (SR 903)	C	*Did not change from SEIS*					
18. Pennsylvania Ave / 1st St (SR 903)	C	*Did not change from SEIS*					
Roundabout							
4. Bullfrog Rd / Suncadia Trail	D	A	6.3	A	7.2	A	8.9
6. Bullfrog Rd / W 2nd St (SR 903)	C	A	7.9	A	8.8	B	10.1
All-Way Stop-Controlled							
17. Pennsylvania Ave / 2nd St	C	*Did not change from SEIS*					
Two-Way Stop-Controlled [3]							
1. Bullfrog Rd / I-90 EB Ramps	C	C	15.8	C	24.1	**F**	54.8
2. Bullfrog Rd / I-90 WB Ramps	C	B	11.8	B	15.0	**D**	28.4
3. Bullfrog Rd / Tumble Creek Dr	D	C	16.3	C	20.3	D	33.6
5. Bullfrog Rd / Firehouse Rd	D	C	15.3	B	14.6	B	14.9
7. Denny Ave / W 2nd St (SR 903)	C	*Did not change from SEIS*					
8. Ranger Sta Rd / Miller / W 2nd (SR 903)	C	*Did not change from SEIS*					
9. N Pine St / W 2nd St (SR 903)	C	*Did not change from SEIS*					
10. Douglas Munro Blvd / Ranger Sta Rd	C	*Did not change from SEIS*					
11. Douglas Munro Blvd / W 1st St	C	*Did not change from SEIS*					
12. Pine St / W 1st St	C	*Did not change from SEIS*					
13. N Stafford Ave / W 2nd St (SR 903)	C	*Did not change from SEIS*					
15. N Oakes Ave / W 2nd St (SR 903)	C	*Did not change from SEIS*					
19. Oakes Ave / I-90 EB Off-Ramp	C	*Did not change from SEIS*					
20. Oakes Ave / I-90 EB On-Ramp	C	*Did not change from SEIS*					
21. SR 903 / E Pennsylvania Ave	C	*Did not change from SEIS*					
22. SR 903 / Pacific Ave	C	*Did not change from SEIS*					
23. Rock Rose Rd / Morrel Rd / SR 903	C	*Did not change from SEIS*					

1. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the FSEIS.
2. LOS at two-way stop-controlled intersections is reported for the stop-controlled movement with the highest delay.

Weekday Summer PM Peak Hour

As shown in **Table 2**, the following intersections along Bullfrog Road are expected to operate at non-compliant LOS for future 'Baseline' conditions during the summer weekday PM peak hour with the updated future 'Baseline' traffic volume forecasts along Bullfrog Road. These intersections would operate at non-compliant LOS in 2037 without the Revised Proposal:

- #1 - Bullfrog Rd / I-90 EB Ramps – LOS F by 2037 *(identified as LOS D by 2037 in the 47° North FSEIS)*
- #2 - Bullfrog Rd / I-90 WB Ramps – LOS D by 2037 *(identified as compliant in the 47° North FSEIS)*

Collision History and Traffic Safety

No updates were needed to the collision history summary[1] as documented in Table 5 of the *47° North FSEIS Transportation Analysis Addendum*.

[1] Collision history from 2020-2021 was reviewed and observed to follow similar trends to what was documented in the FSEIS.

Impacts of Revised Proposal

This section identifies the differences between SEIS Alternative 6 and the Revised Proposal and addresses the following elements.

- Land Use Assumptions
- Site Access/Circulation
- Updated trip generation forecasts
- Project trip distribution and assignment
- Traffic volumes
- Intersection LOS

The analysis for both SEIS Alternative 6 and the Revised Proposal address future traffic conditions in 2025, 2031, and 2037 for the weekday PM peak hour, Friday PM peak hour, and Sunday PM peak hour, all during the peak summer period. Consistent with the *47° North FSEIS,* the results of the intersection LOS analysis are compared to the 'Baseline' results.

Revised Proposal

The Revised Proposal represents the Applicant's proposed revisions to SEIS Alternative 6 and includes an updated development timeline and the inclusion of 50 affordable multi-family housing units. Additionally, the commercial parcel that was under separate ownership (New Suncadia) in the SEIS analysis is now owned by the applicant and included in the 47º North Master Site Plan; all development would be complete by 2031. Proposed commercial uses in the Revised Proposal also include more retail/restaurant use and less office use compared to SEIS Alternative 6, but total development is the same.

A summary of the previous phased buildout assumptions for SEIS Alternative 6 for future years 2025, 2031, and 2037 as documented in the SEIS along with the current phased buildout assumptions for the Revised Proposal is provided in **Table 3**.

Table 3
LAND USE SUMMARY of SEIS ALTERNATIVE 6 BY YEAR

	SEIS Alternative 6			Revised Proposal	
	2025	**2031**	**2037 [1]**	**2025**	**2031 (Full Build) [2]**
Residential Uses:	Units [3]	Units [3]	Units [3]	Units [3]	Units [3]
- Single Family	264 DU	527 DU	527 DU	250 DU	527 DU
- Multi-Family	180 DU	180 DU	180 DU	96 DU	180 DU
- Affordable Housing	--	--	--	24 DU	50 DU
- RV Resort	627 occ sites	627 occ sites	627 occ sites	327 occ sites	627 occ sites
Total	*1,071*	*1,334*	*1,334*	*697*	*1,384*
Commercial Uses:	Units [3]	Units [3]	Units [3]	Units [3]	Units [3]
- Supermarket	--	45,000 sf	45,000 sf	50,000 sf	50,000 sf
- Retail & Restaurant	15,000 sf	30,000 sf	45,000 sf	20,000 sf	80,000 sf
- Office	--	--	--	--	20,000 sf
- Medical Office	--	--	60,000 sf	--	--
Total	*15,000 sf*	*75,000 sf*	*150,000 sf*	*70,000 sf*	*150,000 sf*

Source: 47° North FSEIS; Sun Communities, 2022.

1) Full buildout of SEIS Alternative 6 was anticipated to occur by 2037, however the residential and RV use was assumed to be built out by 2031.
2) Full buildout of Revised Proposal is anticipated to occur by 2031.
3) DU = dwelling unit, occ sites = occupied sites, sf = square feet.

As shown in **Table 3**, the Revised Proposal includes less residential development by 2025 when compared to SEIS Alternative 6. However, the total residential development by 2031 (full buildout) is the same between project alternatives except for the 50 affordable housing units which are now included in the Revised Proposal.

Site Access and Circulation

The site access and circulation assumptions for the Revised Proposal are consistent with what was assumed in the SEIS with the exception of the new 47º North site access on SR 903 which is now assumed to align with Bala Drive on the north side of SR 903 (the SEIS analysis assumed the new site access was located west of Bala Drive).

Updated Project Trip Generation for Revised Proposal

The weekday PM peak hour trip generation estimates for the Revised Proposal are based on methodology documented in the current Institute of Transportation Engineers (ITE) *Trip Generation* Manual (11th edition). The trip generation for SEIS Alternative 6 as documented in the SEIS was based on the 10th Edition of the ITE *Trip Generation* Manual. The methodology used in this report applies the same standard trip generation practices consistent with the SEIS, which includes adjustments to the gross trip generation of the proposed uses to account for internal and pass-by trips.

Table 4 summarizes the land use assumptions and total net new trip generation estimates for the Revised Proposal for the weekday, Friday, and Sunday PM peak hours during the summer peak period in future years 2025 and 2031 (anticipated full buildout). The detailed updated trip generation calculations for the Revised Proposal are provided in **Appendix E**.

Table 4
REVISED PROPOSAL TRIP GENERATION SUMMARY

		Revised Proposal Net New Total Trip Generation [1]					
		Weekday and Friday PM Peak Hour			Sunday PM Peak Hour		
Year	Land Use / Size	In	Out	Total	In	Out	Total
2025	250 Single Family Residential units 96 Multi-Family Residential units *24 Affordable Housing units* 327 RV Resort sites 50,000 SF Supermarket 14,000 SF Retail 6,000 SF Restaurant	409	312	721	332	323	655
Full Build (2031)	527 Single Family Residential units 180 Multi-Family Residential units *50 Affordable Housing units* 627 RV Resort sites 50,000 SF Supermarket 56,000 SF Retail 24,000 SF Restaurant 20,000 SF Office	742	560	1,302	670	658	1,328

Table 5 provides a comparison of the total net new trip generation estimates between SEIS Alternative 6 and the Revised Proposal. A land use summary and trip generation summary comparing the two Alternatives is included in **Appendix E.**

Table 5
TRIP GENERATION COMPARISON (REVISED PROPOSAL VS. SEIS ALTERNATIVE 6)

	Total Net New Trip Generation					
	SEIS ALTERNATIVE 6			REVISED PROPOSAL		
Year	Weekday	Friday	Sunday	Weekday	Friday	Sunday
2025	580	580	506	721	721	655
Full Buildout*	1,225	1,225	1,012	1,302	1,302	1,328

1. Full Buildout of the Revised Proposal is assumed to occur by 2031. Full Buildout of SEIS Alternative 6 was assumed to occur by 2037 in the SEIS.

As shown in **Table 5,** the total net new trip generation for the Revised Proposal in 2025 is estimated to be 141 trips higher (+24%) during the weekday and Friday PM peak hours and 149 trips higher (+29%) during the Sunday peak hour when compared to SEIS Alternative 6. The increase in the year 2025 project trip generation for the Revised Proposal is primarily a result of the increase in commercial land use developed by 2025 compared to what was assumed for SEIS Alternative 6.

As also shown in **Table 5,** with full buildout of 47° North, the total net new trip generation for the Revised Proposal is estimated to be 77 trips higher (+6%) during the weekday and Friday PM peak hours and 316 trips higher (+31%) during the Sunday peak hour when compared to SEIS Alternative 6. This increase in the full buildout Sunday project trip generation for the Revised Proposal is a result of commercial land uses consisting of less office use (which generates minimal trips on a Sunday) and more retail/restaurant use when compared to SEIS Alternative 6.

Table 6 includes a summary of the breakdown of the weekday PM summer peak hour trip generation for the 50 affordable housing units that are included in the Revised Proposal by analysis year. As shown, the 50 affordable housing units are estimated to account for 1.4 to 1.6 percent of the total 47° North trip generation between 2025 and 2031 (full buildout).

Table 6
REVISED PROPOSAL WEEKDAY TRIP GENERATION SUMMARY

	Revised Proposal Net New Weekday PM Peak Hour Trip Generation		
Year	47° North Trips (%)	50-units Affordable Housing Trips (%)	TOTAL TRIPS (%)
2025	340 (98.6%)	10 (1.4%)	721 (100%)
2031	1,281 (98.4%)	21 (1.6%)	1,302 (100%)

Project Trip Distribution and Assignment for Revised Proposal

The Revised Proposal project trip generation for future years 2025, 2031, and 2037 for the weekday PM peak hour, Friday PM peak hour, and Sunday peak hour was assigned to the 27 study intersections and the three (3) site access intersections based on the project trip assignment and resulting trip distribution that was documented in the SEIS (see Appendix A of the *47° North Draft SEIS Transportation Analysis* for a memorandum from Fehr & Peers).

Year 2025 Revised Proposal project trip assignment for the weekday, Friday, and Sunday PM peak hours is included in **Appendix D** as **Figure 10**, **Figure 11**, and **Figure 12**, respectively.

Year 2031 Revised Proposal project trip assignment for the weekday, Friday, and Sunday PM peak hours is included in **Appendix D** as **Figure 13**, **Figure 14**, and **Figure 15**, respectively.

Year 2037 Revised Proposal project trip assignment for the weekday, Friday, and Sunday PM peak hours is included in **Appendix D** as **Figure 16**, **Figure 17**, and **Figure 18**, respectively. It should be noted that the project trip assignment for 2037 is exactly the same as 2031 since the 47° North project is anticipated to be built out by 2031.

Future Year Traffic Volumes with Revised Proposal

Future year 2025, 2031, and 2037 traffic volumes with the Revised Proposal were estimated by adding the 'Baseline' traffic volumes (see **Figures 1 to 9 in Appendix D**) to the Revised Proposal trip assignments (see **Figures 10 to 18** in **Appendix D**).

Year 2025 with the Revised Proposal traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 19**, **Figure 20**, and **Figure 21**, respectively.

Year 2031 with the Revised Proposal traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 22**, **Figure 23**, and **Figure 24**, respectively.

Year 2037 with the Revised Proposal traffic volumes for the weekday, Friday, and Sunday PM peak hours are included in **Appendix D** as **Figure 25**, **Figure 26**, and **Figure 27**, respectively. All traffic volumes illustrated in the figures are representative of the summer peak period.

Future Year Intersection LOS with SEIS Alternative 5 and Alternative 6

Intersection LOS analyses results at the 27 study intersections with SEIS Alternative 5 (Approved Bullfrog Flats Master Site Plan) and SEIS Alternative 6 (47° North Master Site Plan Amendment) for future years 2025, 2031, and 2037 were summarized in Tables 6-8 of the *47° North FSEIS Transportation Analysis Addendum* (for the weekday PM peak hour, Friday PM peak hour, and Sunday peak hour during the peak summer period).

Future Year Intersection LOS with the Revised Proposal

Intersection LOS analyses results at the 27 study intersections with the Revised Proposal for future years 2025, 2031, and 2037 are summarized in **Table 7** for the weekday PM peak hour, **Table 8** for the Friday PM peak hour, and **Table 9** for the Sunday peak hour during the peak

summer period. Year 2025, 2031, and 2037 'Baseline' and With SEIS Alternative 6 LOS results as documented in the *47° North Final SEIS Transportation Analysis Addendum* are also presented in **Tables 7 to 9** for comparison purposes.

It should be noted that the LOS and delay reported in **Tables 7 to 9** for 'Baseline' conditions is the same as previously reported in the *47° North Final SEIS Transportation Analysis Addendum*, with exception of the 'Baseline' weekday PM peak hour LOS in **Table 7** at study intersections #1 to #6 on Bullfrog Road which have been updated in this analysis based on new 'Baseline' traffic volumes.

Mitigation requirements are based on whether or not an intersection is expected to operate at a compliant level of service and this *Updated Transportation Analysis* highlights intersections that were reported to operate at compliant levels of service in the *47° North Final SEIS Transportation Analysis Addendum* but are now estimated to operate at noncompliant levels of service with the Revised Proposal. For this analysis, a change from one level of service to another would not require mitigation unless the intersection becomes non-compliant with the Revised Proposal.

The LOS results are discussed in detail following the tables. Study intersections forecast to operate at non-compliant LOS (LOS D, E, or F for City and WSDOT intersections and LOS E or F for Kittitas County intersections) are shown in bold text in the tables. Study intersections forecast to operate at non-compliant LOS with the Revised Proposal that were not identified to operate at a non-compliant LOS with SEIS Alternative 6 are shown as bold, purple text with purple highlight in **Tables 7 to 9** in this updated analysis.

Study intersections forecast to operate at non-compliant LOS during the weekday summer PM peak hour with the Revised Proposal are identified for potential improvements to meet the adopted LOS standards under the **Mitigation Measures** section of this report (pages 26-35).

LOS worksheets are included in **Appendix F**.

Table 7
REVISED PROPOSAL
INTERSECTION LOS SUMMARY – WEEKDAY PM PEAK HOUR (SUMMER)

		Weekday PM Peak Hour Conditions (Summer Peak)																	
		Year 2025						Year 2031						Year 2037					
		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal	
Study Intersection	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
Signalized																			
14. S Cle Elum Way / Stafford / W 1st St	C	B	11.5	B	12.0	B	12.4	B	12.8	B	13.7	B	13.6	B	13.8	B	14.6	B	14.6
16. N Oakes Ave / W 1st St (SR 903)	C	B	10.4	B	10.8	B	11.1	B	11.7	B	13.0	B	13.0	B	15.9	C	21.1	C	21.6
18. Pennsylvania Ave / 1st St (SR 903)	C	A	7.6	A	7.5	A	7.7	A	8.0	A	8.6	A	9.3	A	9.1	B	10.7	B	10.8
Roundabout																			
4. Bullfrog Rd / Suncadia Trail [2]	D	A	6.3	A	5.6	A	7.3	A	7.2	A	7.5	A	9.9	A	8.9	B	10.3	B	13.1
6. Bullfrog Rd / W 2nd St (SR 903) [2]	C	A	7.9	A	6.8	A	9.2	A	8.8	A	8.0	B	11.4	B	10.1	A	9.7	B	13.4
All-Way Stop-Controlled																			
17. Pennsylvania Ave / 2nd St	C	A	9.6	B	10.1	B	10.4	B	11.9	B	14.3	B	13.6	C	16.8	C	20.6	C	21.0
Two-Way Stop-Controlled [3]																			
1. Bullfrog Rd / I-90 EB Ramps[2]	C	C	15.8	C	15.3	C	21.4	C	24.1	**D**	30.4	**F**	88.7	**F**	54.8	**F**	> 100	**F**	> 100
2. Bullfrog Rd / I-90 WB Ramps [2]	C	B	11.8	B	11.7	B	13.4	B	15.0	C	16.9	C	24.8	**D**	28.4	**E**	42.1	**F**	88.0
3. Bullfrog Rd / Tumble Creek Dr [2]	D	C	16.3	B	13.9	C	20.0	C	20.3	C	23.9	**E**	39.9	D	33.6	**F**	61.1	**F**	> 100
5. Bullfrog Rd / Firehouse Rd [2]	D	C	15.3	B	12.5	C	18.0	B	14.6	B	13.4	C	17.9	B	14.9	B	14.0	C	18.4
7. Denny Ave / W 2nd St (SR 903)	C	C	16.6	C	23.3	**D**	28.2	C	20.1	**E**	38.1	**E**	42.6	**D**	25.8	**F**	65.5	**F**	70.5
8. Ranger Sta Rd / Miller / W 2nd (SR 903)	C	**D**	26.1	**F**	95.7	**F**	> 100	**E**	47.8	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
9. N Pine St / W 2nd St (SR 903)	C	C	18.1	**D**	33.3	**F**	53.3	C	23.5	**F**	> 100	**F**	> 100	**D**	27.4	**F**	> 100	**F**	> 100
10. Douglas Munro Blvd / Ranger Sta Rd	C	A	7.7	A	7.9	A	8.0	A	7.9	A	8.3	A	8.4	A	8.4	A	9.0	A	9.0
11. Douglas Munro Blvd / W 1st St	C	**E**	46.2	**F**	56.1	**F**	67.3	**F**	74.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
12. Pine St / W 1st St	C	**D**	27.9	**D**	30.4	**D**	32.9	**D**	27.9	**D**	32.9	**E**	38.5	**E**	35.2	**F**	51.7	**F**	53.8
13. N Stafford Ave / W 2nd St (SR 903)	C	**E**	46.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
15. N Oakes Ave / W 2nd St (SR 903)	C	C	20.3	**D**	33.3	**E**	42.4	**E**	45.0	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
19. Oakes Ave / I-90 EB Off-Ramp	C	A	9.7	A	9.8	A	9.9	B	10.2	B	10.6	B	10.6	B	10.8	B	11.3	B	11.3
20. Oakes Ave / I-90 EB On-Ramp	C	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
21. SR 903 / E Pennsylvania Ave	C	C	19.3	C	21.7	C	22.1	C	22.1	**D**	**29.3**	**E**	36.1	**D**	25.4	**E**	42.6	**E**	45.0
22. SR 903 / Pacific Ave	C	B	12.0	B	12.8	B	12.9	B	14.5	C	16.8	C	17.9	C	17.2	C	22.2	C	22.5
23. Rock Rose Rd / Morrel Rd / SR 903	C	B	10.7	B	11.0	B	11.0	B	11.2	B	11.9	B	12.2	B	12.2	B	13.2	B	13.3

1. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the FSEIS.
2. Include changes to LOS results from the FSEIS as a result of updated 'Baseline' traffic volumes along Bullfrog Road.
3. LOS at two-way stop-controlled intersections is reported for the stop-controlled movement with the highest delay.

Table 8
REVISED PROPOSAL
INTERSECTION LOS SUMMARY – FRIDAY PM PEAK HOUR (SUMMER)

		Friday PM Peak Hour Conditions (Summer Peak)																	
		Year 2025						Year 2031						Year 2037					
		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal	
Study Intersection	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
Signalized																			
14. S Cle Elum Way / Stafford / W 1st St	C	B	15.5	B	16.1	B	16.5	B	17.5	B	18.6	B	18.6	B	19.1	C	20.2	C	20.2
16. N Oakes Ave / W 1st St (SR 903)	C	B	13.3	B	14.0	B	14.5	B	15.1	B	16.7	B	16.7	C	20.9	C	27.9	C	28.5
18. Pennsylvania Ave / 1st St (SR 903)	C	A	7.7	A	8.3	A	8.8	A	8.9	A	9.9	B	11.4	B	10.5	B	12.8	B	13.0
Roundabout																			
4. Bullfrog Rd / Suncadia Trail [2]	D	A	7.0	A	8.1	A	8.3	A	9.8	C	15.0	C	15.4	B	14.0	D	31.4	D	28.2
6. Bullfrog Rd / W 2nd St (SR 903) [2]	C	A	8.1	A	8.0	A	9.5	A	9.5	B	11.5	B	12.4	B	10.9	B	14.8	B	14.8
All-Way Stop-Controlled																			
17. Pennsylvania Ave / 2nd St	C	A	9.5	B	10.1	B	10.3	B	12.3	B	14.7	B	14.1	C	20.2	**D**	**26.5**	**D**	**27.0**
Two-Way Stop-Controlled [3]																			
1. Bullfrog Rd / I-90 EB Ramps [2]	C	C	23.5	**E**	36.7	**E**	41.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
2. Bullfrog Rd / I-90 WB Ramps [2]	C	C	15.9	C	19.4	C	20.0	**E**	41.5	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
3. Bullfrog Rd / Tumble Creek Dr [2]	D	B	12.5	B	14.2	B	14.5	C	17.3	D	28.0	D	32.9	C	24.6	**F**	71.7	**F**	79.1
5. Bullfrog Rd / Firehouse Rd [2]	D	B	12.2	B	13.4	B	13.7	B	12.5	B	14.3	C	15.0	B	12.5	B	14.7	B	14.9
7. Denny Ave / W 2nd St (SR 903)	C	C	19.6	**D**	28.3	**D**	34.9	**D**	25.0	**F**	52.3	**F**	57.6	**E**	36.3	**F**	> 100	**F**	> 100
8. Ranger Sta Rd / Miller / W 2nd (SR 903)	C	**F**	62.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
9. N Pine St / W 2nd St (SR 903)	C	C	21.6	**E**	44.7	**F**	71.7	**E**	43.5	**F**	> 100	**F**	> 100	**F**	57.2	**F**	> 100	**F**	> 100
10. Douglas Munro Blvd / Ranger Sta Rd	C	A	8.2	A	8.5	A	8.7	A	8.6	A	9.1	A	9.2	A	9.5	B	10.4	B	10.5
11. Douglas Munro Blvd / W 1st St	C	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
12. Pine St / W 1st St	C	**E**	38.1	**E**	43.4	**E**	48.4	**E**	42.5	**F**	57.3	**F**	87.2	**F**	54.0	**F**	> 100	**F**	> 100
13. N Stafford Ave / W 2nd St (SR 903)	C	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
15. N Oakes Ave / W 2nd St (SR 903)	C	C	24.7	**E**	48.0	**F**	67.4	**F**	95.1	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
19. Oakes Ave / I-90 EB Off-Ramp	C	A	9.8	A	9.9	B	10.0	B	10.2	B	10.6	B	10.6	B	11.1	B	11.7	B	11.7
20. Oakes Ave / I-90 EB On-Ramp	C	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
21. SR 903 / E Pennsylvania Ave	C	C	20.0	C	22.8	C	23.3	C	23.4	**D**	**31.2**	**E**	**39.7**	**D**	34.4	**F**	64.3	**F**	69.3
22. SR 903 / Pacific Ave	C	B	11.6	B	12.2	B	12.3	B	13.9	C	16.0	C	16.9	C	16	C	20.1	C	20.4
23. Rock Rose Rd / Morrel Rd / SR 903	C	B	10.7	B	10.8	B	10.9	B	10.9	B	11.7	B	12.0	B	12.5	B	13.6	B	13.7

1. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the FSEIS.
2. Include changes to LOS results from the FSEIS as a result of updated 'Baseline' traffic volumes along Bullfrog Road.
3. LOS at two-way stop-controlled intersections is reported for the stop-controlled movement with the highest delay.

Table 9
REVISED PROPOSAL
INTERSECTION LOS SUMMARY – SUNDAY PM PEAK HOUR (SUMMER)

		Sunday PM Peak Hour Conditions (Summer Peak)																	
		Year 2025						Year 2031						Year 2037					
		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal		'Baseline'		With SEIS Alt 6		With Revised Proposal	
Study Intersection	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
Signalized																			
14. S Cle Elum Way / Stafford / W 1st St	C	B	13.9	B	14.7	B	15.2	B	15.7	B	17.3	B	17.6	B	16.9	B	18.4	B	18.7
16. N Oakes Ave / W 1st St (SR 903)	C	B	17.1	B	18.0	B	18.7	C	21.2	C	25.5	C	27.4	**D**	**45.0**	**E**	**56.5**	**E**	**59.2**
18. Pennsylvania Ave / 1st St (SR 903)	C	A	9.2	B	10.5	B	11.3	A	9.8	B	11.2	B	12.9	B	10.6	B	13.3	B	13.8
Roundabout																			
4. Bullfrog Rd / Suncadia Trail [2]	D	B	13.0	C	15.7	C	15.5	C	20.0	**E**	37.0	**E**	36.9	**F**	56.2	**F**	90.2	**F**	91.7
6. Bullfrog Rd / W 2nd St (SR 903) [2]	C	C	17.6	C	22.4	C	23.8	C	23.5	**E**	40.4	**E**	48.3	**D**	31.8	**F**	60.7	**F**	61.3
All-Way Stop-Controlled																			
17. Pennsylvania Ave / 2nd St	C	A	8.5	A	8.9	A	9.2	B	10.1	B	10.9	B	11.1	B	12.9	B	14.7	C	15.1
Two-Way Stop-Controlled [3]																			
1. Bullfrog Rd / I-90 EB Ramps [2]	C	B	11.9	B	13.0	B	13.4	C	15.3	C	20.9	C	23.0	C	19.7	**D**	32.3	**E**	37.2
2. Bullfrog Rd / I-90 WB Ramps [2]	C	B	10.6	B	11.0	B	11.1	B	12.4	B	14.5	C	15.0	C	18.5	**D**	26.9	**D**	29.6
3. Bullfrog Rd / Tumble Creek Dr [2]	D	C	22.2	D	26.1	D	27.4	D	32.7	**F**	57.7	**F**	68.0	**F**	63.3	**F**	> 100	**F**	> 100
5. Bullfrog Rd / Firehouse Rd [2]	D	C	22.5	D	25.1	D	26.6	C	22.1	D	25.7	D	26.3	D	25.7	D	29.7	D	30.8
7. Denny Ave / W 2nd St (SR 903)	C	C	23.4	**D**	31.4	**E**	38.2	**D**	29.6	**F**	56.6	**F**	61.3	**E**	43.9	**F**	> 100	**F**	> 100
8. Ranger Sta Rd / Miller / W 2nd (SR 903)	C	**F**	56.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
9. N Pine St / W 2nd St (SR 903)	C	**F**	60.1	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
10. Douglas Munro Blvd / Ranger Sta Rd	C	A	7.4	A	7.6	A	7.7	A	7.6	A	7.9	A	8.0	A	7.9	A	8.4	A	8.5
11. Douglas Munro Blvd / W 1st St	C	**E**	46.7	**F**	58.0	**F**	68.1	**F**	83.2	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
12. Pine St / W 1st St	C	**E**	49.6	**F**	56.3	**F**	61.9	**E**	48.5	**F**	65.8	**F**	70.2	**F**	54.3	**F**	76.4	**F**	83.5
13. N Stafford Ave / W 2nd St (SR 903)	C	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
15. N Oakes Ave / W 2nd St (SR 903)	C	**F**	91.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
19. Oakes Ave / I-90 EB Off-Ramp	C	B	14.4	C	15.0	C	15.3	C	18.1	C	20.2	C	20.8	**E**	35.3	**E**	44.0	**E**	45.8
20. Oakes Ave / I-90 EB On-Ramp	C	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0
21. SR 903 / E Pennsylvania Ave	C	C	17.2	C	19.2	C	19.7	C	22.5	**D**	30.7	**E**	36.0	**D**	28.3	**E**	45.1	**F**	51.5
22. SR 903 / Pacific Ave	C	B	12.0	B	12.3	B	12.4	B	13.3	B	14.5	B	14.9	C	16.6	C	18.6	C	19.0
23. Rock Rose Rd / Morrel Rd / SR 903	C	B	10.6	B	10.7	B	10.8	B	11.1	B	11.5	B	11.8	B	12.1	B	12.8	B	12.9
24. SR 903 / SR 903 Ramp	C	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
25. White Road I/C / I-90 WB Ramps	C	C	15.7	C	16.0	C	16.1	C	23.9	**D**	25.9	**D**	26.3	**F**	52.5	**F**	60.0	**F**	61.5
26. White Road I/C / I-90 EB Ramps	C	A	9.4	A	9.4	A	9.4	B	10.1	B	10.3	B	10.3	B	11.1	B	11.3	B	11.3
27. SR 970 / SR 970 Ramp	C	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100

1. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the FSEIS.
2. Include changes to LOS results from the FSEIS as a result of updated 'Baseline' traffic volumes along Bullfrog Road.
3. LOS at two-way stop-controlled intersections is reported for the stop-controlled movement with the highest delay.

Weekday Summer PM Peak Hour

As shown in **Table 7**, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS for future 'Baseline' conditions during the summer weekday PM peak hour would continue to operate at non-compliant LOS under the Revised Proposal. The intersections are as follows:

- #8 - Ranger Station Rd / Miller Ave / W 2nd Street (SR 903) – LOS D by 2025
- #11 - Douglas Munro Blvd / W 1st Street – LOS E by 2025
- #12 - N Pine Street / W 1st Street – LOS D by 2025
- #13 - N Stafford Ave / W 2nd Street (SR 903) – LOS E by 2025

As a result of the updated future 'Baseline' traffic volume forecasts along Bullfrog Road, the following intersection is anticipated to operate at a non-compliant LOS for future 'Baseline' conditions in this analysis:

- #2 - Bullfrog Road/I-90 WB Ramps – LOS D by 2037 (*identified as LOS E by 2037 with SEIS Alternative 6 in the 47° North FSEIS*)

Additionally, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS during the summer weekday PM peak hour with SEIS Alternative 6 would continue to operate at non-complaint LOS with the Revised Proposal. The intersections are as follows:

- #1 - Bullfrog Road / I-90 EB Ramps – LOS F by 2031 (*identified as LOS D by 2031 with SEIS Alternative 6 in the 47° North FSEIS*)
- #3 - Bullfrog Road / Tumble Creek – LOS E by 2031 (*identified as LOS F by 2037 with SEIS Alternative 6 in the 47° North FSEIS*)
- #7 - Denny Ave / W 2nd Street (SR 903) – LOS D by 2025 *(identified as LOS E by 2031 with SEIS Alternative 6 in the 47° North FSEIS)*
- #9 - N Pine Street / W 2nd Street (SR 903) – LOS F by 2025 *(identified as LOS D by 2025 with SEIS Alternative 6 in the 47° North FSEIS)*
- #15 - N Oakes Ave / W 2nd Street (SR 903) – LOS E by 2025 *(identified as LOS D by 2025 with SEIS Alternative 6 in the 47° North FSEIS)*
- #21 - Pennsylvania Ave / N 1st Street (SR 903) in Roslyn – LOS E by 2031 *(identified as LOS D by 2031 with SEIS Alternative 6 in the 47° North FSEIS)*

It should be noted that although overall intersection delay may have increased at some locations and the year mitigation is needed at intersections may have changed with the Revised Proposal relative to SEIS Alternative 6, there are no new intersections operating at non-compliant LOS during the summer weekday PM peak hour when compared to what was reported in the *47° North FSEIS* with SEIS Alternative 6. Additionally, as a result of the updated future 'Baseline' traffic volume forecasts along Bullfrog Road, one of the intersections that was previously reported to operate at a non-compliant LOS with SEIS Alternative 6 in the *47° North FSEIS* now operates at a non-compliant LOS under the future 'Baseline' condition.

Friday Summer PM Peak Hour

As shown in **Table 8**, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS for future 'Baseline' conditions during the summer Friday PM peak hour continue to operate at non-compliant LOS in this updated analysis *(i.e., future 'Baseline' traffic volumes and LOS results are consistent with the 47° North FSEIS during the Friday PM peak hour)*. The intersections are as follows:

- #2 - Bullfrog Rd / I-90 WB Ramps – LOS E by 2031
- #8 - Ranger Station Rd / Miller / W 2nd Street (SR 903) – LOS F by 2025
- #11 - Douglas Munro Blvd / W 1st Street – LOS F by 2025
- #12 - N Pine Street / W 1st Street – LOS E by 2025
- #13 - N Stafford Ave / W 2nd Street (SR 903) – LOS F by 2025

Additionally, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS during the summer Friday PM peak hour with SEIS Alternative 6 continue to operate at non-complaint LOS with the Revised Proposal. The intersections are as follows:

- #1 - Bullfrog Rd / I-90 EB Ramps – LOS E by 2025
- #3 - Bullfrog Rd / Tumble Creek Dr – LOS F by 2037
- #7 - Denny Ave / W 2nd Street (SR 903) – LOS D by 2025
- #9 - N Pine Street / W 2nd Street (SR 903) – LOS F by 2025 *(identified as non-compliant for future 'Baseline' conditions in 2025 in 47° North FSEIS)*
- #15 - N Oakes Ave / W 2nd Street (SR 903) – LOS F by 2025 *(identified as LOS E by 2025 with SEIS Alternative 6 in the 47° North FSEIS).*
- #17 - Pennsylvania Ave / 2nd Street – LOS D by 2037
- #21 - Pennsylvania Ave / N 1st Street (SR 903) in Roslyn – LOS E by 2031 (*identified as LOS D by 2031 with SEIS Alternative 6 in the 47° North FSEIS)*

It should be noted that although overall intersection delay may have increased at some locations with the Revised Proposal, there are no new intersections operating at non-compliant LOS during the summer Friday PM peak hour when compared to what was reported in the *47° North FSEIS* with SEIS Alternative 6.

Sunday Summer PM Peak Hour

As shown in **Table 9**, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS for future 'Baseline' conditions during the summer Sunday PM peak hour continue to operate at non-compliant LOS in this updated analysis *(i.e., future 'Baseline' traffic volumes and LOS results are consistent with the 47° North FSEIS during the Sunday PM peak hour)*. The intersections are as follows:

- #8 - Ranger Station Rd / Miller / W 2nd Street (SR 903) – LOS F by 2025
- #9 - N Pine Street / W 2nd Street (SR 903) – LOS F by 2025
- #11 - Douglas Munro Blvd / W 1st Street – LOS E by 2025
- #12 - N Pine Street / W 1st Street by 2025 – LOS E by 2025

- #13 - N Stafford Ave / W 2nd Street (SR 903) – LOS F by 2025
- #15 - N Oakes Ave / W 2nd Street (SR 903) – LOS F by 2025
- #16 - N Oakes Ave / W 1st Street (SR 903) – LOS D by 2037
- #19 - Oakes Ave / I-90 EB Off-Ramp – LOS E by 2037
- #24 - SR 903 / SR 903 Ramp – LOS F by 2025
- #27 - SR 907 / SR 907 Ramp – LOS F by 2025

Additionally, the same intersections that were reported in the *47° North FSEIS* to operate at non-compliant LOS during the summer Sunday PM peak hour with SEIS Alternative 6 continue to operate at non-complaint LOS with the Revised Proposal. The intersections are as follows:

- #1 - Bullfrog Rd / I-90 EB Ramps – LOS E by 2037 *(identified as LOS D by 2037 with SEIS Alternative 6 in the 47° North FSEIS)*
- #2 - Bullfrog Rd / I-90 WB Ramps – LOS D by 2037
- #3 - Bullfrog Rd / Tumble Creek Dr – LOS F by 2031
- #4 - Bullfrog Rd / Suncadia Trail – LOS E by 2031
- #6 - Bullfrog Rd / W 2nd Street (SR 903) – LOS E by 2031
- #7 - Denny Ave / W 2nd Street (SR 903) – LOS E by 2025 *(identified as LOS D by 2025 with SEIS Alternative 6 in the 47° North FSEIS)*
- #21 - Pennsylvania Ave / N 1st Street (SR 903) in Roslyn – LOS E by 2031 *(identified as LOS D by 2031 with SEIS Alternative 6 in the 47° North FSEIS)*
- #25 - White Road I/C / I-90 WB Ramps – LOS D by 2031

It should be noted that although overall intersection delay may have increased at some locations with the Revised Proposal, there are no new intersections operating at non-compliant LOS during the summer Sunday PM peak hour when compared to what was reported in the 47° North FSEIS with SEIS Alternative 6.

Future Year Roadway LOS

Roadway capacity was also evaluated on roadways within the 47° North project vicinity. The roadway capacity evaluation is consistent with the City of Cle Elum LOS policy for roadways and assumptions identified in Table 4-4 of the *City of Cle Elum 2019-2037 Comprehensive Plan*. The roadway peak hour volume and LOS calculations are included in **Appendix G**. In general, the LOS results shown in **Appendix G** are consistent with impacts shown in the *47° North FSEIS* in that there would be traffic congestion throughout the City, primarily along W 2nd Street (SR 903); congestion is anticipated to be highest on summer weekends and would be expected to continue to deteriorate over time if no improvements are made. The LOS results are discussed in detail below.

It should be noted that 47° North is expected to be built out by 2031. Therefore, any non-compliant LOS by 2037 with the Revised Proposal is a result of an increase in background traffic from 2031 to 2037.

Weekday Summer PM Peak Hour.

The results identified in **Appendix G** show that the evaluated roadway sections are anticipated to operate at compliant levels of service (LOS C or better) during the summer weekday PM peak hour with SEIS Alternative 6 and the Revised Proposal by 2031. However, W 2nd Street (SR 903) west of N Stafford Ave is anticipated to operate at LOS D by 2037 during the summer weekday PM peak hour with SEIS Alternative 6 and the Revised Proposal.

Friday Summer PM Peak Hour

The results identified in **Appendix G** show that the evaluated roadway sections are anticipated to operate at compliant levels of service (LOS C or better) during the summer Friday PM peak hour with SEIS Alternative 6 and the Revised Proposal, with the exception of the following:

- W 2nd Street (SR 903) west of N Oakes Ave – LOS D by 2037 (*with the Revised Proposal)*; it should be noted that the difference between the 2037 with Revised Proposal volumes and the 2037 with SEIS Alternative 6 volumes on SR 903 west of N Oakes Ave is 12 trips.
- W 2nd Street (SR 903) west of N Stafford Ave – LOS D by 2031 (*with SEIS Alternative 6 and the Revised Proposal)*; LOS E by 2037 (*with SEIS Alternative 6 and the Revised Proposal)*

Sunday Summer PM Peak Hour

The results identified in **Appendix G** show that the evaluated roadway sections are anticipated to operate at compliant levels of service (LOS C or better) during the summer Sunday PM peak hour with SEIS Alternative 6 and the Revised Proposal, with the exception of the following:

- I-90 Westbound Off-Ramp (Exit 84A) – LOS D by 2037 (*with SEIS Alternative 6 and the Revised Proposal)*
- W 2nd Street (SR 903) west of N Oakes Ave – LOS D by 2037 (*with SEIS Alternative 6 and the Revised Proposal)*
- W 2nd Street (SR 903) west of N Stafford Ave – LOS E by 2031 (*with SEIS Alternative 6 and the Revised Proposal)*; LOS F by 2037 (*with SEIS Alternative 6 and the Revised Proposal);* it should be noted that W 2nd Street (SR 903) west of N Stafford Ave is anticipated to operate at non-compliant LOS D for future 'Baseline' conditions during the summer Sunday PM peak hour by 2037.

Future Year Site Access LOS with the Revised Proposal

The LOS analyses results at the site access intersections for future years 2025, 2031, and 2037 with the Revised Proposal are summarized in **Table 11** for the weekday PM peak hour, Friday PM peak hour, and Sunday PM peak hour (all for the summer peak period). The LOS analyses

for the site access locations assumes that all site access locations would be two-way stop-controlled with the major street (Bullfrog Road or SR 903) free-flow.

Site access locations forecast to operate at non-compliant LOS (LOS D, E, or F for the SR 903/Main Access Road site access and LOS E or F for the proposed Bullfrog Road site accesses) are shown in bold text in the tables. Site access locations forecast to operate at non-compliant LOS with the Revised Proposal that were not identified to operate at a non-compliant LOS with SEIS Alternative 6 are shown as bold, purple text and purple highlight in **Table 11**. The LOS results are discussed in detail following the table. Mitigation has been identified under the **Mitigation Measures** section of this report (pages 26-35) if the site access intersection is expected to operate at non-compliant LOS.

LOS calculations are included in **Appendix F**.

Table 10
SITE ACCESS LOS SUMMARY

		Future Conditions (Summer Peak)											
		2025				2031				2037			
		With SEIS Alt 6		With Revised Proposal		With SEIS Alt 6		With SEIS Alt 6 Revised		With SEIS Alt 6		With Revised Proposal	
Site Access Intersection [1]	LOS Standard	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]	LOS[1]	Delay[1]
WEEKDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	C	16.6	C	18.6	C	24.0	**E**	**40.1**	D	28.6	**F**	65.1
29. Bullfrog Road / Main Access Road	D	B	13.5	C	18.5	C	16.2	D	33.8	C	23.2	D	33.0
30. SR 903 / Main Access Road	C	**F**	55.9	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
FRIDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	D	25.2	C	22.0	**F**	53.7	**F**	64.2	**F**	65.1	**F**	> 100
29. Bullfrog Road / Main Access Road	D	C	16.2	C	17.2	C	24.8	D	32.5	D	34.7	D	31.6
30. SR 903 / Main Access Road	C	**F**	82.6	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
SUNDAY PM PEAK HOUR CONDITIONS													
28. Bullfrog Road / RV Access Road	D	**E**	48.9	**E**	35.2	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
29. Bullfrog Road / Main Access Road	D	D	29.4	**E**	35.5	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100
30. SR 903 / Main Access Road	C	**F**	89.7	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100	**F**	> 100

1. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. LOS analysis at site access intersections assumes two-way stop control with major roadway (Bullfrog Road and SR 903) being free flow. Bold indicates does not meet LOS standard. Bold, purple text with purple highlight indicates changes in non-compliant LOS intersections compared to the FSEIS.

Weekday Summer PM Peak Hour. As shown in **Table 11**, during the weekday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS E by 2031 *(identified as compliant LOS D with SEIS Alternative 6 in the 47° North FSEIS)*
- #30 - SR 903 / Main Access Road – LOS F by 2025

Friday Summer PM Peak Hour. As shown in **Table 11**, during the Friday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS F by 2031
- #30 - SR 903 / Main Access Road – LOS F by 2025

Sunday Summer PM Peak Hour. As shown in **Table 11**, during the Sunday summer PM peak hour with the Revised Proposal, the following site access intersections are anticipated to operate at non-compliant LOS:

- #28 - Bullfrog Road / RV Access Road – LOS E by 2025
- #29 - Bullfrog Road / Main Access Road – LOS E by 2025 *(identified as LOS F by 2031 with SEIS Alternative 6 in the 47° North FSEIS)*
- #30 - SR 903 / Main Access Road – LOS F by 2025

As a result of non-compliant LOS at the site access locations, mitigation measures are identified and discussed in a later section of the report. Mitigation measures such as a compact roundabout and/or widening and turn lane improvements have been identified to ensure that the site access locations would operate at compliant LOS during the weekday summer PM peak hour.

Mitigation Measures

Introduction

This section identifies potential measures at the study intersections and site access intersections necessary to mitigate adverse transportation impacts of the Revised Proposal. This section of the updated analysis is consistent with the mitigation measures section of the *47° North FSEIS* and addresses the following elements.

- Mitigation for 'Baseline' Conditions
- Mitigation for the Revised Proposal
- Costs of Mitigation Measures
- Comparison of Mitigation in this *47° North Updated Transportation Analysis* vs. the *47° North FSEIS*
- Application of Pro-Rata Share Mitigation
- Alternative Pro-Rata Share Calculation Methods
- Site Access Mitigation
- Other Mitigation

Table 12 identifies potential mitigation measures at the 11 study intersections that are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour conditions in 2025, 2031, or 2037 as a result of 'Baseline' conditions or the Revised Proposal project traffic. It should be noted that Table 10 of the *47° North FSEIS Transportation Analysis Addendum* identified the same 11 off-site study intersections included in **Table 12** of this *47° North Updated Transportation Analysis* that are forecast to operate at non-compliant LOS in future years 2025, 2031, or 2037 without or with full buildout of 47° North during the weekday summer PM peak hour.

Consistent with the *47° North FSEIS*, **Table 12** also identifies two different approaches to calculating pro-rata shares to fund the identified mitigating improvements. Method A (Solely Developer Responsibility) and Method B (Shared City/Developer Responsibility) are both presented. The alternative methodologies are discussed in greater detail below. However, the pro-rata shares identified in Table 11 have been updated when compared Table 10 of the *47° North FSEIS Transportation Analysis Addendum* to reflect the updated 'Baseline' traffic volumes at the six study intersections on Bullfrog Road, the updated trip generation of the Revised Proposal, and incorporation of the commercial parcel share into the 47° North share.

While **Table 12** identifies potential improvements (i.e. compact roundabout or signal) to mitigate future non-compliant LOS, and potential pro-rata share methods and estimates for the cost of improvements, the specific form of mitigation, the pro-rata share cost of the mitigation, and the timing of the improvements will be evaluated, discussed and adopted based on discussions between and among the project Applicant, the City of Cle Elum and affected agencies and jurisdictions including Kittitas County, WSDOT, and the City of Roslyn. The selected mitigation improvement for each affected intersection, pro-rata share

methodology, and timing of the mitigation will be incorporated into conditions of approval and a new or updated Development Agreement between the project Applicant and the City of Cle Elum. Improvement needs and mitigation will also be addressed in subsequent updates to the appropriate jurisdiction's transportation plans and capital improvement programs.

To assist in identifying the type of appropriate improvements for study intersections that require mitigation and are within WSDOT's jurisdiction (i.e., SR 903 and Bullfrog Road at I-90 interchange), Intersection Control Evaluations (ICE) have been performed and technical reports have been submitted to WSDOT. Criteria addressed in the ICE documents include LOS operations, safety, right-of-way acquisition, engineering criteria and feasibility, and context for sustainable design. WSDOT has stated its preference for construction of compact roundabouts rather than traffic signals on SR 903.

Table 11
REVISED PROPOSAL
SUMMARY OF MITIGATION MEASURES AND PRELIMINARY ESTIMATED PRO-RATA SHARE

Off-Site Study Intersection	Estimated Year Improvement Required (Forecast LOS)	Potential Improvement to Mitigate Weekday PM Peak Hour LOS Deficiency [1]	Estimated Pro-Rata Share			
			METHOD A [2]		METHOD B [2]	
			Background Share [3]	47° North Share (Revised Proposal)	Background Share [3]	47° North Share (Revised Proposal)
IMPROVEMENTS NEEDED FOR 'BASELINE'/BACKGROUND CONDITIONS						
#2 – Bullfrog Road / I-90 WB Ramps [5, 6]	2037 (LOS D)	Compact Roundabout	n/a	n/a	82.9%	17.1%
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903)	2025 (LOS E)	Restrict Northbound and Southbound Left-Turns	68.7%	31.3%	68.7%	31.3%
#11 – Douglas Munro Blvd / W 1st Street	2025 (LOS E)	Signalization[9]	94.4%	5.6%	94.4%	5.6%
#12 – N Pine St / W 1st Street	2025 (LOS D)	Compact Roundabout	95.5%	4.5%	95.5%	4.5%
#13 – N Stafford Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout [10]	74.7%	25.3%	74.7%	25.3%
IMPROVEMENTS NEEDED FOR CONDITIONS WITH REVISED PROPOSAL [4]						
By Year 2025:						
#7 – Denny Ave / W 2nd Street (SR 903) [7]	2025 (LOS D)	Restrict Northbound Left/ Southbound-Left Turns	n/a	100%	64.1%	33.9%
#9 – N Pine Street / W 2nd Street (SR 903)	2025 (LOS F)	Compact Roundabout	n/a	100%	69.9%	30.1%
#15 – N Oakes Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout	n/a	100%	78.4%	21.6%
By Year 2031:						
#1 – Bullfrog Road / I-90 EB Ramps	2031 (LOS F)	Compact Roundabout	n/a	100%	77.2%	22.8%
#3 – Bullfrog Road / Tumble Creek Dr [6]	2031 (LOS F)	Refuge/merge lane on Bullfrog Rd	n/a	100%	78.0%	22.0%
#21 – Pennsylvania Ave / 1st Street (SR 903)	2031 (LOS E)	All-Way Stop	n/a	100%	84.9%	15.1%
By Year 2037: [5]						
N/A[8]	--	--	--	--	--	--

1) Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; LOS results with mitigation are included in Table 13. WSDOT preference is a roundabout which is assumed unless identified otherwise.
2) Estimated pro-rata share for 47° North is preliminary and will be adjusted based on a future Monitoring Program. The pro-rata share for Method A would be the full responsibility of 47° North for any improvements needed with the Revised Proposal. The pro-rata share for Method B would be shared between the background traffic and 47° North Revised Proposal project traffic.
3) Share of future traffic volumes associated with 'Baseline'/background traffic growth, excluding Revised Proposal.
4) Mitigation not triggered by 'Baseline' conditions but triggered by traffic generated by Revised Proposal.
5) 47° North is anticipated to be built out by 2031. Thus, the pro-rata share for Method A would not be applicable for intersection #2 which is estimated to be non-compliant in 2037 under the baseline scenario.
6) Reported as non-compliant by Year 2037 with SEIS Alternative 6 in the FSEIS.
7) Reported as non-compliant by Year 2031 with SEIS Alternative 6 in the FSEIS.
8) No additional intersections are reported to operate at non-compliant levels of service by 2037 with the Revised Proposal.
9) The City has plans to install a traffic signal at intersection #11.
10) The City has plans to install a compact roundabout at intersection #13.

Mitigation Measures for 'Baseline' Conditions

As shown in **Table 12**, five study intersections are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour 'Baseline' conditions (without the Revised Proposal). The City has recently received grant funding to install a full traffic signal at study intersection #11 (Douglas Munro Blvd/W 1st Street) and a compact roundabout at intersection #13 (N Stafford Ave / W 2nd Street (SR 903)). However, no improvements are currently identified at the other three study intersections by City of Cle Elum or WSDOT.

Potential improvements to mitigate non-compliant LOS at the other three study intersections under future weekday summer PM peak hour 'Baseline' conditions are identified in **Table 12** and include a compact (single-lane) roundabout or left-turn restrictions.

For the five intersections where improvements would be needed based on forecast 'Baseline' conditions (without the Revised Proposal), the 47° North project would contribute a pro-rata share towards intersection improvements since additional traffic would be added by the project. Additional discussion of pro-rata share methodology is included below.

Mitigation Measures for Revised Proposal

As shown in **Table 12**, in addition to the five study intersections anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour 'Baseline' conditions, six additional study intersections are anticipated to operate at a non-compliant LOS as a result of the Revised Proposal in either 2025, 2031, or 2037 during the summer weekday PM peak hour.

Potential improvements to mitigate non-compliant LOS at the six study intersections under future weekday summer PM peak hour conditions with the Revised Proposal are identified in **Table 12** and include a compact (single-lane) roundabout, all-way stop control, roadway widening to add refuge/merge lanes, or left-turn restrictions.

The 47° North project would complete the intersection improvements or contribute a pro-rata share.

Comparison of Off-Site Mitigation Measures identified in this Updated Analysis vs 47° North FSEIS Transportation Analysis

It should be noted that Table 10 of the *47° North FSEIS Transportation Analysis Addendum* identified the same 11 off-site study intersections included in **Table 12** of this *47° North Updated Transportation Analysis* that are forecast to operate at non-compliant LOS in future years 2025, 2031, or 2037 without or with full buildout of 47° North during the weekday summer PM peak hour.

The key differences between **Table 12** in this *47° North Updated Transportation Analysis* and Table 10 in the *47° North FSEIS Transportation Analysis Addendum* are as follows:

- #2 – Bullfrog Road / I-90 WB Ramps is anticipated to operate at a non-compliant LOS under future 2037 'Baseline' conditions instead of with SEIS Alternative 6 conditions.
- #3 – Bullfrog Road / Tumble Creek Drive is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2025 instead of 2031.
- #7 – Denny Ave / W 2nd Street (SR 903) is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2031 instead of 2037.

Future Year Intersection LOS with Mitigation

Intersection LOS analyses were evaluated with potential improvements to mitigate the 11 study intersections and 2 site access intersections that are anticipated to operate at non-compliant LOS under future weekday summer PM peak hour conditions in 2025, 2031, or 2037. LOS was evaluated for weekday, Friday, and Sunday summer PM peak hour conditions in 2031 with the Revised Proposal. The LOS analyses results are summarized in **Table 13**. The LOS calculations with 2031 weekday Revised Proposal project mitigation are included in **Appendix H**.

As shown in **Table 13**, the potential improvements identified at the 11 off-site study intersections and 2 site access intersections are expected to improve conditions to compliant levels of service at all intersections during the weekday and Friday summer PM peak hours. During the Sunday summer PM peak hour, the potential improvements are expected to improve conditions to compliant levels of service at all intersections with exception to the following:

- #7 – Denny Ave / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under Revised Proposal conditions in 2031 during the Sunday summer PM peak hour.
- #8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under Revised Proposal conditions in 2031 during the Sunday summer PM peak hour.
- #9 – N Pine St / W 2nd St (SR 903): as a compact roundabout, the off-site intersection is anticipated to operate at LOS E under Revised Proposal conditions in 2031 during the Sunday summer PM peak hour.
- #30 – SR 903 / Main Access Road: as a compact roundabout, the site access intersection is anticipated to operate at LOS F under Revised Proposal conditions in 2031 during the Sunday summer PM peak hour.

Table 12
REVISED PROPOSAL
FUTURE YEAR INTERSECTION LOS SUMMARY WITH MITIGATION

Location	Potential Improvement to Mitigate Weekday LOS Deficiency [1]	Weekday PM Peak Hour				Friday PM Peak Hour				Sunday PM Peak Hour			
		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation	
		Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]
Off-Site Study Intersection:													
#1 – Bullfrog Road / I-90 EB Ramps [6]	Compact Roundabout	2031	Project	A	9.6	2025	Project	B	11.7	2037	Project	A	9.1
#2 – Bullfrog Road / I-90 WB Ramps [5, 6, 7]	Compact Roundabout	2037	Baseline	A	5.4	2031	Baseline	A	8.6	2037	Project	A	5.2
#3 – Bullfrog Road / Tumble Creek Dr [7]	Refuge/merge lane on Bullfrog Rd	2031	Project	C	20.1	2037	Project	C	18.6	2031	Project	D	34.5
#7 – Denny Ave / W 2nd Street (SR 903) [6, 8]	Restrict Northbound Left/ Southbound-Left Turns	2025	Project	C	16.1	2025	Project	C	18.7	2025	Project	**D**	**28.5**
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903) [6]	Restrict Northbound Left/ Southbound-Left Turns	2025	Baseline	C	18.8	2025	Baseline	C	22.5	2025	Baseline	**D**	**26.2**
#9 – N Pine Street / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	7.7	2025	Project	B	11.5	2025	Baseline	**E**	**56.6**
#11 – Douglas Munro Blvd / W 1st Street	Signalization[3]	2025	Baseline	--	--	--	--	--	--	--	--	--	--
#12 – N Pine St / W 1st Street	Compact Roundabout	2025	Baseline	A	7.4	2025	Baseline	A	8.1	2025	Baseline	A	7.6
#13 – N Stafford Ave / W 2nd Street (SR 903) [6]	Compact Roundabout [4]	2025	Baseline	--	--	--	--	--	--	--	--	--	--
#15 – N Oakes Ave / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	3.7	2025	Project	A	3.9	2025	Baseline	A	5.9
#21 – Pennsylvania Ave / 1st Street (SR 903) [6]	All-Way Stop	2031	Project	C	20.5	2031	Project	C	22.5	2031	Project	B	14.5
Site Access:													
#28 – Bullfrog Road / RV Access Road	Compact Roundabout	2031	Project	A	10.0	2031	Project	C	19.6	2025	Project	D	31.8
#30 – SR 903 / Main Access Road	Compact Roundabout	2025	Project	B	17.3	2025	Project	C	32.8	2025	Project	**F**	**>100**

1. Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; WSDOT preference is a roundabout which is assumed unless identified otherwise; DASHES indicate LOS was not evaluated because improvements are funded and planned by the City.
2. LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard.
3. The City has plans to install a traffic signal at intersection #11.
4. The City has plans to install a compact roundabout at intersection #13.

Methodologies for Determining Pro-Rata Share of Mitigation

For all transportation mitigation measures identified at the 11 study intersections anticipated to operate at a non-compliant LOS in the future without or with the project, preliminary pro-rata share contributions are estimated in **Table 12** for the 47° North project trips relative to the background traffic growth component of the total future forecast weekday summer PM peak hour traffic volumes. Consistent with Table 10 of the *47° North FSEIS Transportation Analysis Addendum*, **Table 12** in this document includes two different methods to estimate proportionate (pro-rata) shares (Method A and Method B) of the mitigation measures. The primary difference between the two methods is whether and/or to what extent background/ non-project traffic is factored into the project's calculation of proportionate share. Both methods are identified for discussion and are described in greater detail below. It should be noted that **Table 12** of this document is consistent with Table 10 of the *47° North FSEIS Transportation Analysis Addendum* with the following differences:

- Revised pro-rata share contributions based on updated future 'Baseline' traffic volumes at the 6 intersections along Bullfrog Road and the updated trip generation/trip assignment at all study intersections.
- Conservatively assumed only 100% occupancy of the 47° North RV resort during the summer weekday PM peak hour and not an alternative occupancy rate.
- Included pro-rata share for the commercial parcel with the Revised Proposal rather than showing it separately, given the 47° North project now includes the commercial parcel.

The next two sub-sections describe pro-rata share separately for intersections requiring mitigation as a result of 'Baseline' conditions versus intersections requiring mitigation with the Revised Proposal.

Determining Pro-Rata Share for Intersections Requiring Mitigation as a Result of 'Baseline' Conditions

For the five intersections where improvements would be needed to meet adopted LOS standards based on forecast 'Baseline' conditions by 2031 (i.e., without the Revised Proposal), the 47° North development would also contribute a pro-rata share towards intersection improvements since additional traffic would be added by the project.

This pro-rata share methodology places the appropriate proportional responsibility for needed improvements on background traffic, since intersections are anticipated to be non-compliant for 'baseline' conditions due to background traffic growth (without the project). The preliminary pro-rata share calculations identified in **Table 12** for intersections anticipated to operate at a non-compliant LOS under future weekday PM peak hour 'Baseline' conditions is calculated by dividing the total weekday PM peak hour project traffic associated with the Revised Proposal by the total forecast future with-project weekday PM peak hour traffic

volumes ('Baseline' plus Revised Proposal project traffic). The detailed pro-rata share calculations are included in **Appendix I**.

Determining Pro-Rata Share for Intersections Requiring Mitigation with the Revised Proposal

For the six intersections where improvements would be needed to meet adopted LOS standards based on the additional traffic generated by the Revised Proposal, a preliminary estimate of the pro-rata share for 47° North is included in **Table 12**. The preliminary pro-rata share calculations in **Table 12** are based on forecast total future traffic volumes with the Revised Proposal during the year in which mitigation is necessary to maintain compliant LOS (i.e., 2025, 2031, or 2037).

Consistent with the *47° North FSEIS Transportation Analysis Addendum*, two different methods are identified that could be used to calculate pro-rata shares for mitigation anticipated to be needed as a result of the Revised Proposal, and both methods are described again below. The detailed pro-rata share calculations for both Methods shown in **Table 12** are included in **Appendix I**.

Method A (Solely Developer Responsibility)

For intersections where improvements would be needed by 2025 or 2031 due only to the additional traffic generated by Revised Proposal, using Method A, the pro-rata share in **Table 12** would be the full responsibility of the 47° North Master Site Plan. For intersections where improvements would be needed by 2037, there would be no pro-rata share for 47° North since the project is anticipated to be built out by 2031.

Method B (Shared Agency/Developer Responsibility)

The Method B pro-rata share calculations in **Table 12** for study intersections anticipated to require mitigation due to the additional traffic generated by the Revised Proposal in either 2025 or 2031 are calculated by dividing the weekday PM peak hour project traffic associated with the Revised Proposal by the total forecast future weekday PM peak hour traffic volumes (i.e., including both background traffic and Revised Proposal). This identifies the share of the 47° North as a portion of the mitigation responsibility and shares the remaining portion with background growth that may also benefit from increased capacity at the intersection. This method assumes that the governmental agency(s) responsible for the intersection would contribute funds proportionate to their share(s) of the future forecast traffic at the intersection.

Additional 50 Affordable Housing Units

The 50 affordable units are assumed to be included with the Revised Proposal for purposes of analysis. It is estimated that the 50 affordable housing units account for approximately 1.4 to 1.6% of the 47° North pro-rata share contributions.

Site Access Mitigation Measures

The 47° North development will construct new on-site roadways and intersections at its two access points with Bullfrog Road and its single access onto SR 903 (public roads). All on-site roads will be private and will be constructed and maintained by 47º North. The facilities will be constructed to City of Cle Elum standards, or standards that may be included in a new or updated Development Agreement. The 47° North development will also ensure that design of the new on-site roadways meets minimum requirements for emergency vehicle access and school bus access.

Based on the results of the weekday PM peak hour LOS analysis documented in **Table 10** and the forecast LOS with proposed mitigation at the site access locations documented in **Table 13**, the traffic control at the new 47° North site access points on Bullfrog Road and SR 903 is proposed as follows:

- **#28 – Bullfrog Road / RV Access Road** is anticipated to operate at LOS E during the weekday summer PM Peak hour in 2031 with the Revised Proposal as a side street stop-controlled intersection. Potential mitigation is a compact (single-lane) roundabout. It should be noted that this intersection was reported to operate at a compliant level of service in the *47° North FSEIS,* thus this is a new mitigation measure.

- **#29 – Bullfrog Road / Main Access Road** is anticipated to operate at compliant LOS during the weekday summer PM peak hour in 2025 and 2031 with the Revised Proposal as a side street stop-controlled intersection with the Main Access Road being stop-controlled.

- **#30 - SR 903 / Main Access Road** is anticipated to operate at LOS F during the weekday summer PM peak hour in 2025 and 2031 with the Revised Proposal as a side street stop-controlled intersection. Potential mitigation is a compact (single-lane) roundabout.

Other Mitigation Measures

The following mitigation measures still apply with the Revised Proposal and are generally consistent with the *47° North FSEIS Transportation Analysis Addendum*:

Traffic Monitoring Program

The 47° North development would prepare and implement a traffic monitoring program as part of a new or updated Development Agreement. It is expected that the traffic monitoring program would be similar in format and function to the previously established program documented in the 2002 Bullfrog Flats Development Agreement (Condition 92). The monitoring program would be coordinated with the City in cooperation with Kittitas County and WSDOT. The traffic monitoring program would have the following objectives:

A. Document traffic volumes at key locations (roadways and/or intersections) in the local transportation network that would be impacted by traffic generated by the 47° North development.
B. Separate traffic volumes at key locations by background traffic and 47° North development traffic.
C. Establish the methodology by which to determine the timing and pro-rata share financial contributions for implementing transportation improvements required for mitigation.

The specific details of the traffic monitoring program, including the number of phases of monitoring, appropriate timing of phases of monitoring (i.e., at defined development years or relative to percent or number of units constructed), time periods to be counted, key locations to be counted, and reporting requirements will be coordinated with the City and identified as part of a new or updated 47° North Development Agreement.

Construction Management Plan

The 47° North development should prepare a Construction Management Plan prior to beginning construction to minimize construction traffic impacts. Truck routes and haul route agreements for construction-related traffic would be established in coordination with the City of Cle Elum, Kittitas County, and WSDOT, as necessary. Additionally, provisions should be made in the new or updated Development Agreement between the project Applicant and City of Cle Elum for restoration of road surfaces damaged by construction traffic, if any.

Trail System and Sidewalks

The 47° North development would provide an approximately 6-mile network of trails and sidewalks throughout the site, including: hike/bike, equestrian, and golf cart paths. These trails would generally be located around the periphery of the proposed development, and would connect to on-site development, as well as to existing off-site trails in Suncadia to the north, the Coal Mines Trail to the northeast, and the Horse Park to the south). Sidewalks would also be provided along one side of the on-site road connecting SR-903 and Bullfrog Road for non-motorized circulation.

Significant Unavoidable Adverse Impacts

Proposed development of 47° North would increase traffic volumes and congestion on area roadways (e.g., in the City, County, and on state facilities such as SR 903, SR 970, and I-90); this is an unavoidable effect of urban development. However, although level of service and the year mitigation is needed at the intersections may have changed with the Revised Proposal, there are no new off-site mitigation requirements when compared to the off-site mitigation measures identified with SEIS Alternative 6 as reported in the *47° North FSEIS Transportation Analysis Addendum*. It should be noted that the Bullfrog Road/RV Access Road intersection is a new mitigation measure in this updated analysis as a result of additional

background growth on Bullfrog Road. However, all intersections providing access to *47° North* will be designed to meet applicable level of service standards.

The LOS analyses indicates that several of the studied intersections would exceed LOS standards during the summer PM peak hours in the future analysis years with the additional traffic generated by the Revised Proposal; some of these intersections would also exceed the LOS standards without the 47° North project due to continued growth in background traffic. The mitigation measures listed above in **Table 12** would offset or reduce the significant adverse impacts under the Revised Proposal during the weekday summer PM peak hour. The specific mitigation measures and the 47° North project's proportionate share of the required improvements will ultimately be included in a new or updated Development Agreement between the Applicant and the City.

APPENDIX A

Project Site Vicinity and Study Intersections

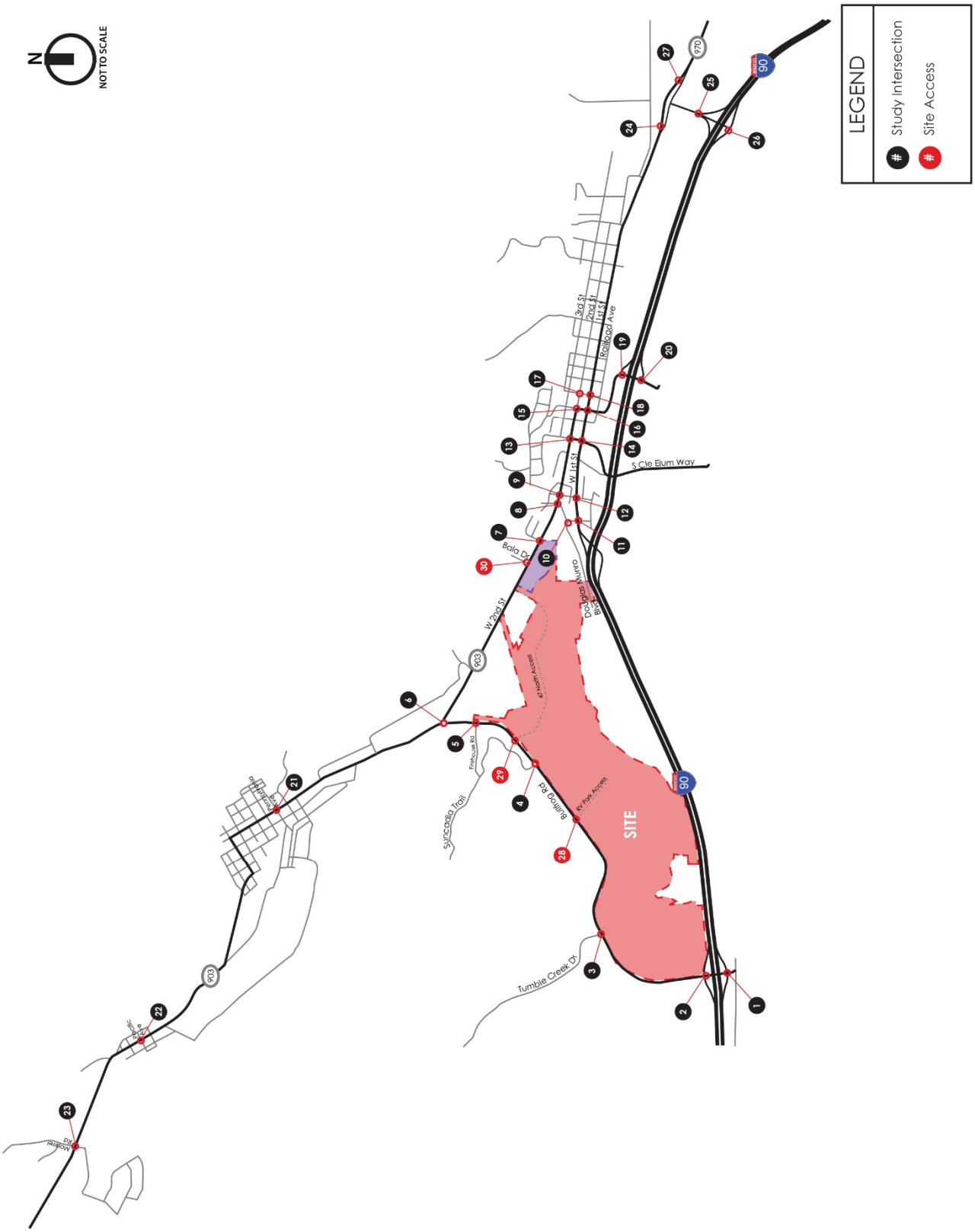


Figure 1: Project Site Vicinity and Study Intersections

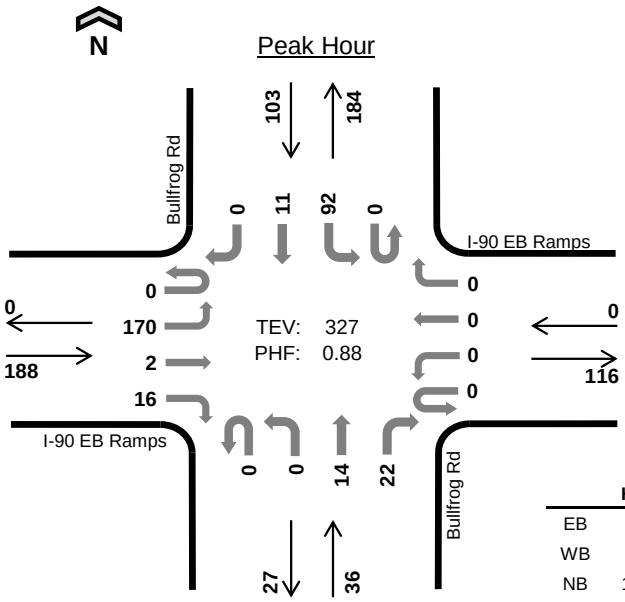
APPENDIX B

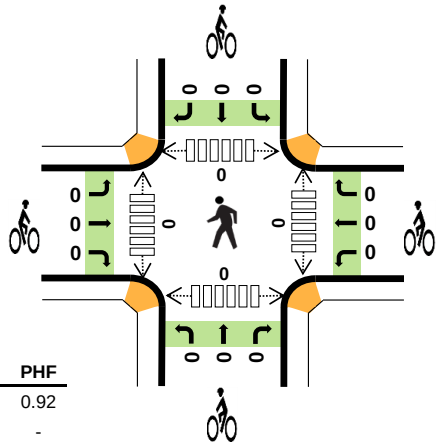
2022 Traffic Counts

Weekday (Thursday) Data Sheets

Bullfrog Rd
I-90 EB Ramps

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	5.3%	0.92
WB	-	-
NB	11.1%	0.69
SB	8.7%	0.80
TOTAL	7.0%	0.88

Three-Hour Count Summaries

Interval Start		I-90 EB Ramps Eastbound				I-90 EB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	34	0	4	0	0	0	0	0	0	5	2	0	28	4	0	77	0
3:15 PM		0	42	2	7	0	0	0	0	0	0	3	5	0	14	2	0	75	0
3:30 PM		0	46	0	2	0	0	0	0	0	0	2	6	0	24	2	0	82	0
3:45 PM		0	48	0	3	0	0	0	0	0	0	4	9	0	26	3	0	93	327
Peak Hour	All	0	170	2	16	0	0	0	0	0	0	14	22	0	92	11	0	327	0
	HV	0	10	0	0	0	0	0	0	0	0	3	1	0	7	2	0	23	0
	HV%	-	6%	0%	0%	-	-	-	-	-	-	21%	5%	-	8%	18%	-	7%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	2	0	1	3	*6*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	4	0	1	2	*7*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	2	0	1	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	2	0	1	4	*7*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	10	0	4	9	*23*	0	0	0	0	*0*	0	0	0	0	*0*

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Three-Hour Count Summaries

Interval Start	I-90 EB Ramps				I-90 EB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**34**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**2**	**0**	**28**	**4**	**0**	**77**	0
3:15 PM	**0**	**42**	**2**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**5**	**0**	**14**	**2**	**0**	**75**	0
3:30 PM	**0**	**46**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**6**	**0**	**24**	**2**	**0**	**82**	0
3:45 PM	**0**	**48**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**9**	**0**	**26**	**3**	**0**	**93**	**327**
4:00 PM	0	25	0	5	0	0	0	0	0	0	1	9	0	16	1	0	57	307
4:15 PM	0	44	0	5	0	0	0	0	0	0	4	2	1	19	3	0	78	310
4:30 PM	0	27	1	1	0	0	0	0	0	0	5	4	0	22	0	0	60	288
4:45 PM	0	35	0	8	0	0	0	0	0	0	2	6	0	14	2	0	67	262
5:00 PM	0	28	1	3	0	0	0	0	0	0	2	7	0	27	0	0	68	273
5:15 PM	0	37	0	5	0	0	0	0	0	0	0	6	0	24	0	0	72	267
5:30 PM	0	23	1	5	0	0	0	0	0	0	2	4	0	22	0	0	57	264
5:45 PM	0	30	1	0	0	0	0	0	0	0	0	3	0	14	3	0	51	248
Count Total	0	419	6	48	0	0	0	0	0	0	30	63	1	250	20	0	837	0
Peak Hour All	**0**	**170**	**2**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**22**	**0**	**92**	**11**	**0**	**327**	**0**
Peak Hour HV	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**7**	**2**	**0**	**23**	**0**
Peak Hour HV%	**-**	**6%**	**0%**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**21%**	**5%**	**-**	**8%**	**18%**	**-**	**7%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**2**	**0**	**1**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**4**	**0**	**1**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**2**	**0**	**1**	**4**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	1	0	0	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	3	0	0	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	2	0	0	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	1	0	1	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	1	0	0	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	18	0	7	21	*46*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**10**	**0**	**4**	**9**	***23***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 EB Ramps				I-90 EB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**2**	**0**	**6**	0
3:15 PM	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**7**	0
3:30 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	0
3:45 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	**0**	**0**	**7**	**23**
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	19
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	13
4:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	3	13
4:45 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1	0	5	11
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	11
5:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	3	13
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	2	0	0	4	14
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3	12
Count Total	0	13	0	5	0	0	0	0	0	0	4	3	0	17	4	0	46	0
Peak Hour	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**7**	**2**	**0**	**23**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	I-90 EB Ramps			I-90 EB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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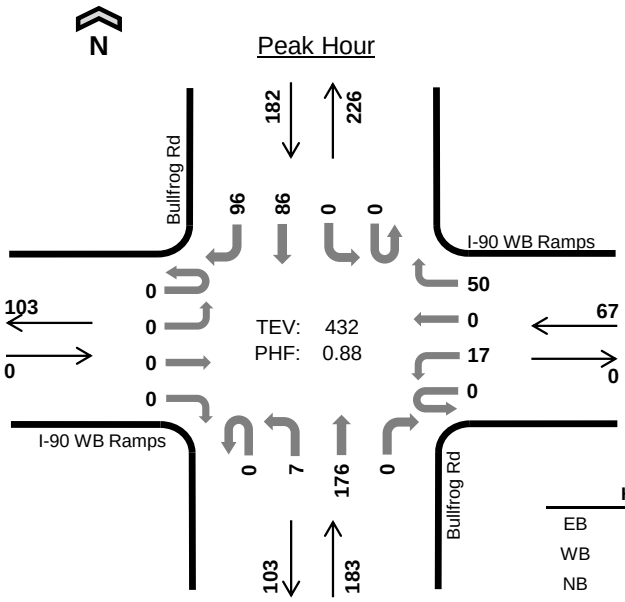
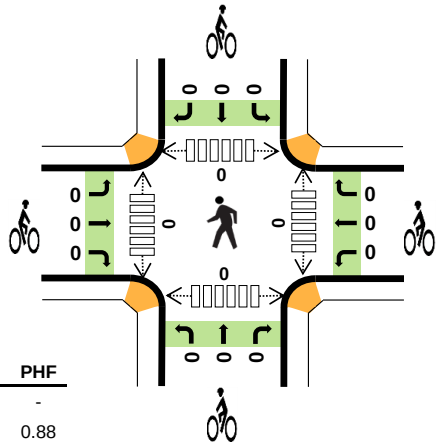
Bullfrog Rd
I-90 WB Ramps

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	-	-
WB	9.0%	0.88
NB	6.0%	0.88
SB	6.6%	0.88
TOTAL	6.7%	0.88

Three-Hour Count Summaries

Interval Start		I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	0	0	0	6	0	10	0	1	38	0	0	0	26	24	105	0
3:15 PM		0	0	0	0	0	4	0	13	0	4	40	0	0	0	12	20	93	0
3:30 PM		0	0	0	0	0	3	0	16	0	1	51	0	0	0	23	29	123	0
3:45 PM		0	0	0	0	0	4	0	11	0	1	47	0	0	0	25	23	111	432
Peak Hour	All	0	0	0	0	0	17	0	50	0	7	176	0	0	0	86	96	432	0
	HV	0	0	0	0	0	2	0	4	0	2	9	0	0	0	7	5	29	0
	HV%	-	-	-	-	-	12%	-	8%	-	29%	5%	-	-	-	8%	5%	7%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	3	3	3	*9*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	0	3	4	2	*9*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	0	0	2	5	*7*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	0	6	11	12	*29*	0	0	0	0	*0*	0	0	0	0	*0*

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Three-Hour Count Summaries

Interval Start	I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**10**	**0**	**1**	**38**	**0**	**0**	**0**	**26**	**24**	**105**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**13**	**0**	**4**	**40**	**0**	**0**	**0**	**12**	**20**	**93**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**16**	**0**	**1**	**51**	**0**	**0**	**0**	**23**	**29**	**123**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**11**	**0**	**1**	**47**	**0**	**0**	**0**	**25**	**23**	**111**	**432**
4:00 PM	0	0	0	0	0	1	1	10	0	2	27	0	0	0	16	22	79	406
4:15 PM	0	0	0	0	0	4	0	11	1	4	46	0	0	0	18	26	110	423
4:30 PM	0	0	0	0	0	2	0	6	0	1	29	0	0	0	20	17	75	375
4:45 PM	0	0	0	0	0	2	0	5	0	0	37	0	0	0	14	7	65	329
5:00 PM	0	0	0	0	0	0	0	5	0	0	27	0	0	0	27	20	79	329
5:15 PM	0	0	0	0	0	1	0	3	0	1	38	0	0	0	23	26	92	311
5:30 PM	0	0	0	0	0	2	1	6	0	0	24	0	0	0	21	22	76	312
5:45 PM	0	0	0	0	0	2	1	9	0	0	29	0	0	0	14	16	71	318
Count Total	0	0	0	0	0	31	3	105	1	15	433	0	0	0	239	252	1,079	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**50**	**0**	**7**	**176**	**0**	**0**	**0**	**86**	**96**	**432**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**4**	**0**	**2**	**9**	**0**	**0**	**0**	**7**	**5**	**29**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**12%**	**-**	**8%**	**-**	**29%**	**5%**	**-**	**-**	**-**	**8%**	**5%**	**7%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	**0**	**3**	**3**	**3**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**3**	**4**	**2**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**0**	**2**	**5**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	0	0	0	4	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	1	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	1	0	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	1	1	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	1	5	*6*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	2	1	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	10	15	31	*56*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**6**	**11**	**12**	***29***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 WB Ramps				I-90 WB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**2**	**9**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**9**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**4**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**1**	**7**	**29**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	24
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	17
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3	16
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	11
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	9
5:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0	4	11
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	1	6	14
5:45 PM	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	0	4	16
Count Total	0	0	0	0	0	4	1	5	0	2	13	0	0	0	20	11	56	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**4**	**0**	**2**	**9**	**0**	**0**	**0**	**7**	**5**	**29**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	I-90 WB Ramps			I-90 WB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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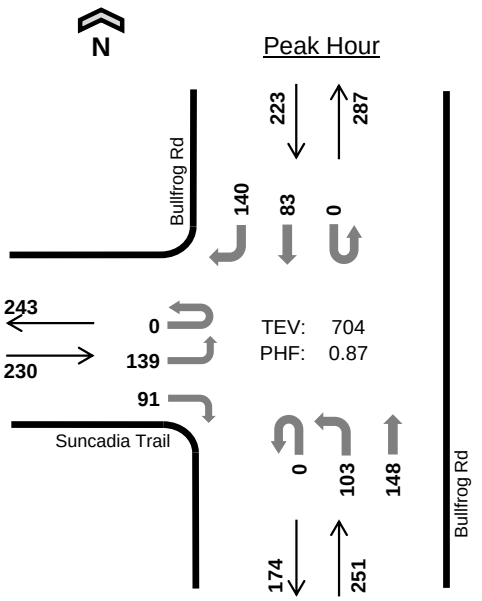
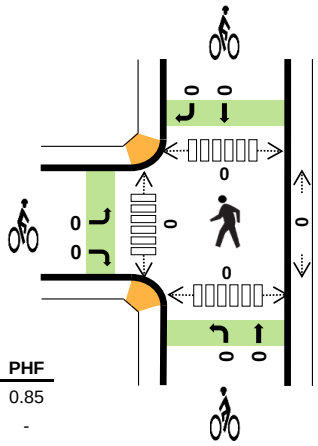
Bullfrog Rd
Suncadia Trail

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	11.3%	0.85
WB	-	-
NB	5.6%	0.79
SB	6.3%	0.86
TOTAL	7.7%	0.87

Three-Hour Count Summaries

Interval Start		Suncadia Trail Eastbound				0 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	29	0	27	0	0	0	0	0	18	31	0	0	0	21	40	166	0
3:15 PM		0	36	0	19	0	0	0	0	0	26	27	0	0	0	19	34	161	0
3:30 PM		0	41	0	27	0	0	0	0	0	27	43	0	0	0	22	43	203	0
3:45 PM		0	33	0	18	0	0	0	0	0	32	47	0	0	0	21	23	174	704
Peak Hour	All	0	139	0	91	0	0	0	0	0	103	148	0	0	0	83	140	704	0
	HV	0	21	0	5	0	0	0	0	0	5	9	0	0	0	8	6	54	0
	HV%	-	15%	-	5%	-	-	-	-	-	5%	6%	-	-	-	10%	4%	8%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	4	0	3	1	*8*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	8	0	4	3	*15*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	6	0	1	3	*10*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	8	0	6	7	*21*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	26	0	14	14	*54*	0	0	0	0	*0*	0	0	0	0	*0*

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Three-Hour Count Summaries

Interval Start	Suncadia Trail				0				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**29**	**0**	**27**	**0**	**0**	**0**	**0**	**0**	**18**	**31**	**0**	**0**	**0**	**21**	**40**	**166**	0
3:15 PM	**0**	**36**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	**26**	**27**	**0**	**0**	**0**	**19**	**34**	**161**	0
3:30 PM	**0**	**41**	**0**	**27**	**0**	**0**	**0**	**0**	**0**	**27**	**43**	**0**	**0**	**0**	**22**	**43**	**203**	0
3:45 PM	**0**	**33**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**32**	**47**	**0**	**0**	**0**	**21**	**23**	**174**	**704**
4:00 PM	0	44	0	24	0	0	0	0	0	22	27	0	0	0	16	27	160	698
4:15 PM	0	25	0	28	0	0	0	0	0	20	33	0	0	0	16	16	138	675
4:30 PM	1	31	0	14	0	0	0	0	0	21	25	0	0	0	16	19	127	599
4:45 PM	0	38	0	14	0	0	0	0	0	17	22	0	0	0	8	15	114	539
5:00 PM	0	45	0	20	0	0	0	0	0	12	21	0	0	0	17	34	149	528
5:15 PM	0	40	0	18	0	0	0	0	0	18	35	0	1	0	20	38	170	560
5:30 PM	0	39	0	23	0	0	0	0	0	16	22	0	0	0	15	32	147	580
5:45 PM	0	21	0	15	0	0	0	0	0	18	24	0	2	0	14	23	117	583
Count Total	1	422	0	247	0	0	0	0	0	247	357	0	3	0	205	344	1,826	0
Peak Hour All	**0**	**139**	**0**	**91**	**0**	**0**	**0**	**0**	**0**	**103**	**148**	**0**	**0**	**0**	**83**	**140**	**704**	**0**
Peak Hour HV	**0**	**21**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**5**	**9**	**0**	**0**	**0**	**8**	**6**	**54**	**0**
Peak Hour HV%	**-**	**15%**	**-**	**5%**	**-**	**-**	**-**	**-**	**-**	**5%**	**6%**	**-**	**-**	**-**	**10%**	**4%**	**8%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**4**	**0**	**3**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**8**	**0**	**4**	**3**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**6**	**0**	**1**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**8**	**0**	**6**	**7**	***21***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	2	0	2	2	*6*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	3	0	1	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	3	0	1	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	5	0	0	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	4	0	0	2	*6*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	1	0	2	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	8	0	1	1	*10*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	2	0	1	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	54	0	22	21	*97*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**26**	**0**	**14**	**14**	***54***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	Suncadia Trail				0				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**0**	**8**	0
3:15 PM	**0**	**5**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**1**	**2**	**15**	0
3:30 PM	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**10**	0
3:45 PM	**0**	**7**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**4**	**3**	**21**	**54**
4:00 PM	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	2	6	52
4:15 PM	0	1	0	2	0	0	0	0	0	0	1	0	0	0	1	0	5	42
4:30 PM	0	2	0	1	0	0	0	0	0	0	1	0	0	0	0	0	4	36
4:45 PM	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	20
5:00 PM	0	3	0	1	0	0	0	0	0	0	0	0	0	0	2	0	6	20
5:15 PM	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	3	18
5:30 PM	0	4	0	4	0	0	0	0	0	1	0	0	0	0	0	1	10	24
5:45 PM	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1	0	4	23
Count Total	0	38	0	16	0	0	0	0	0	8	14	0	0	0	12	9	97	0
Peak Hour	**0**	**21**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**5**	**9**	**0**	**0**	**0**	**8**	**6**	**54**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	Suncadia Trail			0			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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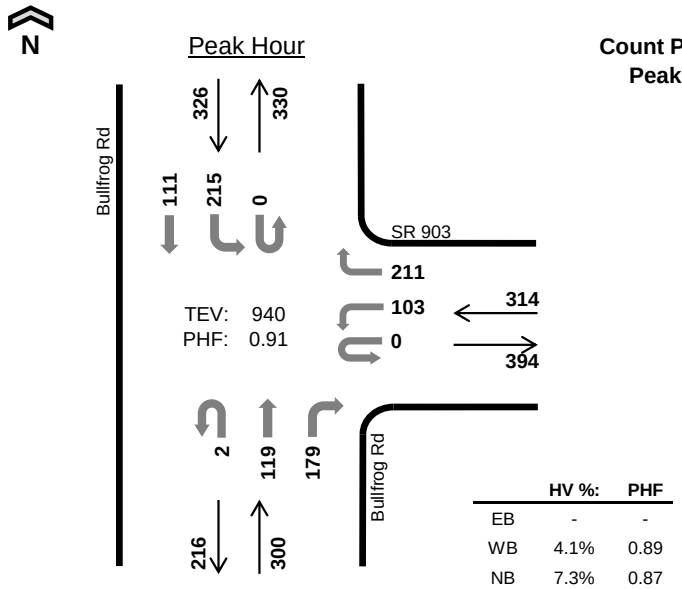
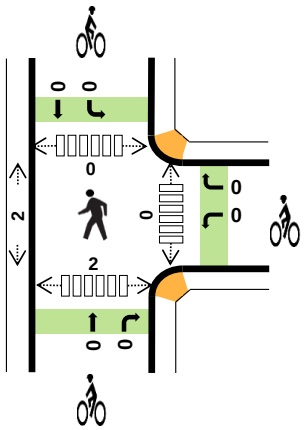
Bullfrog Rd
SR 903

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM



	HV %:	PHF
EB	-	-
WB	4.1%	0.89
NB	7.3%	0.87
SB	3.7%	0.96
TOTAL	5.0%	0.91



Three-Hour Count Summaries

Interval Start		0 Eastbound				SR 903 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	0	0	0	28	0	45	0	0	30	41	0	47	35	0	226	0
3:15 PM		0	0	0	0	0	23	0	43	0	0	24	44	0	57	24	0	215	0
3:30 PM		0	0	0	0	0	32	0	55	2	0	29	55	0	59	26	0	258	0
3:45 PM		0	0	0	0	0	20	0	68	0	0	36	39	0	52	26	0	241	940
Peak Hour	All	0	0	0	0	0	103	0	211	2	0	119	179	0	215	111	0	940	0
	HV	0	0	0	0	0	10	0	3	0	0	3	19	0	9	3	0	47	0
	HV%	-	-	-	-	-	10%	-	1%	0%	-	3%	11%	-	4%	3%	-	5%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	0	2	5	*7*	0	0	0	0	*0*	0	2	0	2	*4*
3:15 PM	0	4	5	3	*12*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	4	4	1	*9*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	0	5	11	3	*19*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	0	13	22	12	*47*	0	0	0	0	*0*	0	2	0	2	*4*

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Three-Hour Count Summaries

Interval Start	0				SR 903				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**45**	**0**	**0**	**30**	**41**	**0**	**47**	**35**	**0**	**226**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**23**	**0**	**43**	**0**	**0**	**24**	**44**	**0**	**57**	**24**	**0**	**215**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**55**	**2**	**0**	**29**	**55**	**0**	**59**	**26**	**0**	**258**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**68**	**0**	**0**	**36**	**39**	**0**	**52**	**26**	**0**	**241**	**940**
4:00 PM	0	0	0	0	0	21	0	66	0	0	25	47	0	44	20	0	223	937
4:15 PM	0	0	0	0	0	14	0	49	0	0	32	32	1	50	20	0	198	920
4:30 PM	0	0	0	0	0	7	0	57	1	0	23	37	1	54	18	0	198	860
4:45 PM	0	0	0	0	0	10	0	53	1	0	22	45	0	43	8	0	182	801
5:00 PM	0	0	0	0	0	24	0	54	0	0	24	51	0	50	28	0	231	809
5:15 PM	0	0	0	0	0	30	0	48	0	0	28	45	0	56	20	0	227	838
5:30 PM	0	0	0	0	0	25	0	46	0	0	18	33	0	36	17	0	175	815
5:45 PM	0	0	0	0	0	30	0	56	0	0	22	24	0	23	10	0	165	798
Count Total	0	0	0	0	0	264	0	640	4	0	313	493	2	571	252	0	2,539	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**103**	**0**	**211**	**2**	**0**	**119**	**179**	**0**	**215**	**111**	**0**	**940**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**3**	**0**	**0**	**3**	**19**	**0**	**9**	**3**	**0**	**47**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**10%**	**-**	**1%**	**0%**	**-**	**3%**	**11%**	**-**	**4%**	**3%**	**-**	**5%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**0**	**0**	**2**	**5**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**2**	*4*
3:15 PM	**0**	**4**	**5**	**3**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**4**	**4**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**5**	**11**	**3**	***19***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	0	2	3	1	*6*	0	1	0	0	*1*	0	0	0	0	*0*
4:15 PM	0	1	2	5	*8*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	2	3	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	2	5	1	*8*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	0	2	2	4	*8*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	3	2	4	*9*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	2	2	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	3	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	27	44	29	*100*	0	1	0	0	*1*	0	2	0	2	*4*
Peak Hr	**0**	**13**	**22**	**12**	***47***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**2**	***4***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	0				SR 903				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	**2**	**0**	**7**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**5**	**0**	**3**	**0**	**0**	**12**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**1**	**3**	**0**	**1**	**0**	**0**	**9**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**2**	**9**	**0**	**2**	**1**	**0**	**19**	**47**
4:00 PM	0	0	0	0	0	0	0	2	0	0	0	3	0	0	1	0	6	46
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	5	0	0	8	42
4:30 PM	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	5	38
4:45 PM	0	0	0	0	0	0	0	2	0	0	1	4	0	1	0	0	8	27
5:00 PM	0	0	0	0	0	0	0	2	0	0	0	2	0	1	3	0	8	29
5:15 PM	0	0	0	0	0	0	0	3	0	0	0	2	0	4	0	0	9	30
5:30 PM	0	0	0	0	0	1	0	1	0	0	0	2	0	1	0	0	5	30
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	4	26
Count Total	0	0	0	0	0	12	0	15	0	0	5	39	0	22	7	0	100	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**3**	**0**	**0**	**3**	**19**	**0**	**9**	**3**	**0**	**47**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	0			SR 903			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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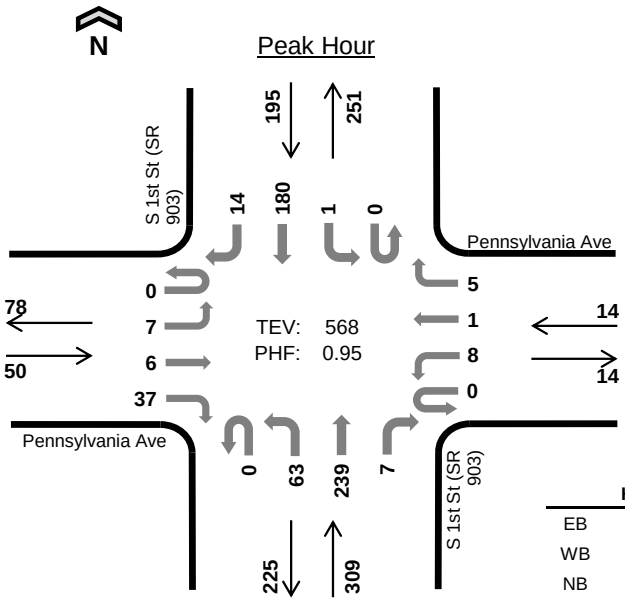
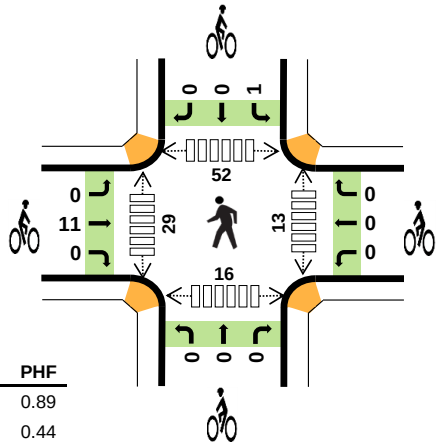
S 1st St (SR 903)
Pennsylvania Ave



Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:45 PM to 4:45 PM



	HV %:	PHF
EB	2.0%	0.89
WB	0.0%	0.44
NB	0.6%	0.88
SB	3.1%	0.87
TOTAL	1.6%	0.95

Three-Hour Count Summaries

Interval Start		Pennsylvania Ave Eastbound				Pennsylvania Ave Westbound				S 1st St (SR 903) Northbound				S 1st St (SR 903) Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:45 PM		0	3	1	10	0	2	0	1	0	15	68	1	0	0	42	1	144	0
4:00 PM		0	1	0	10	0	1	0	0	0	20	67	1	0	0	46	4	150	0
4:15 PM		0	2	4	8	0	1	1	0	0	17	51	2	0	0	42	4	132	0
4:30 PM		0	1	1	9	0	4	0	4	0	11	53	3	0	1	50	5	142	568
Peak Hour	All	0	7	6	37	0	8	1	5	0	63	239	7	0	1	180	14	568	0
	HV	0	0	0	1	0	0	0	0	0	0	2	0	0	0	6	0	9	0
	HV%	-	0%	0%	3%	-	0%	0%	0%	-	0%	1%	0%	-	0%	3%	0%	2%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:45 PM	1	0	1	2	*4*	0	0	0	0	*0*	0	12	17	4	*33*
4:00 PM	0	0	1	0	*1*	0	0	0	0	*0*	5	7	7	7	*26*
4:15 PM	0	0	0	4	*4*	11	0	0	0	*11*	4	7	21	0	*32*
4:30 PM	0	0	0	0	*0*	0	0	0	1	*1*	4	3	7	5	*19*
Peak Hour	1	0	2	6	*9*	11	0	0	1	*12*	13	29	52	16	*110*

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Three-Hour Count Summaries

Interval Start	Pennsylvania Ave Eastbound				Pennsylvania Ave Westbound				S 1st St (SR 903) Northbound				S 1st St (SR 903) Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	2	0	8	0	1	0	1	0	15	55	5	0	1	42	1	131	0
3:15 PM	0	1	0	13	0	3	0	0	0	11	45	1	0	1	48	4	127	0
3:30 PM	0	1	0	15	0	0	1	2	0	9	57	1	0	1	46	1	134	0
3:45 PM	**0**	**3**	**1**	**10**	**0**	**2**	**0**	**1**	**0**	**15**	**68**	**1**	**0**	**0**	**42**	**1**	**144**	536
4:00 PM	**0**	**1**	**0**	**10**	**0**	**1**	**0**	**0**	**0**	**20**	**67**	**1**	**0**	**0**	**46**	**4**	**150**	555
4:15 PM	**0**	**2**	**4**	**8**	**0**	**1**	**1**	**0**	**0**	**17**	**51**	**2**	**0**	**0**	**42**	**4**	**132**	560
4:30 PM	**0**	**1**	**1**	**9**	**0**	**4**	**0**	**4**	**0**	**11**	**53**	**3**	**0**	**1**	**50**	**5**	**142**	**568**
4:45 PM	0	1	0	4	0	0	1	0	0	9	47	2	0	0	33	2	99	523
5:00 PM	0	4	1	8	0	1	0	0	0	14	53	4	0	2	53	5	145	518
5:15 PM	0	4	2	9	0	4	0	0	0	14	63	2	0	0	46	3	147	533
5:30 PM	0	3	0	7	0	6	0	1	0	9	46	1	0	0	36	2	111	502
5:45 PM	0	0	0	6	0	0	1	0	0	5	61	1	0	0	16	4	94	497
Count Total	0	23	9	107	0	23	4	9	0	149	666	24	0	6	500	36	1,556	0
Peak Hour All	**0**	**7**	**6**	**37**	**0**	**8**	**1**	**5**	**0**	**63**	**239**	**7**	**0**	**1**	**180**	**14**	**568**	**0**
Peak Hour HV	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**6**	**0**	**9**	**0**
Peak Hour HV%	**-**	**0%**	**0%**	**3%**	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**1%**	**0%**	**-**	**0%**	**3%**	**0%**	**2%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	0	1	6	*7*	0	0	0	0	*0*	9	5	12	7	*33*
3:15 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	15	17	12	*44*
3:30 PM	0	0	2	0	*2*	1	0	0	0	*1*	0	6	23	2	*31*
3:45 PM	**1**	**0**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**12**	**17**	**4**	*33*
4:00 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**5**	**7**	**7**	**7**	*26*
4:15 PM	**0**	**0**	**0**	**4**	***4***	**11**	**0**	**0**	**0**	***11***	**4**	**7**	**21**	**0**	*32*
4:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***	**4**	**3**	**7**	**5**	***19***
4:45 PM	0	0	1	0	*1*	0	0	0	0	*0*	8	11	20	5	*44*
5:00 PM	0	0	2	2	*4*	0	0	0	0	*0*	4	2	24	3	*33*
5:15 PM	0	0	2	2	*4*	0	0	0	0	*0*	0	14	9	2	*25*
5:30 PM	0	0	2	1	*3*	0	0	0	0	*0*	3	5	14	11	*33*
5:45 PM	1	0	1	1	*3*	0	0	1	0	*1*	0	16	9	1	*26*
Count Total	2	0	14	19	*35*	12	0	1	1	*14*	37	103	180	59	*379*
Peak Hour	**1**	**0**	**2**	**6**	***9***	**11**	**0**	**0**	**1**	***12***	**13**	**29**	**52**	**16**	***110***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	Pennsylvania Ave				Pennsylvania Ave				S 1st St (SR 903)				S 1st St (SR 903)				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	7	0
3:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0
3:45 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**4**	15
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	9
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**4**	11
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	6
5:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	4	9
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	4	9
5:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	3	12
5:45 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	3	14
Count Total	0	0	0	2	0	0	0	0	0	2	12	0	0	0	19	0	35	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**6**	**0**	**9**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	Pennsylvania Ave			Pennsylvania Ave			S 1st St (SR 903)			S 1st St (SR 903)			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:15 PM	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	12
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**12**
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	12
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	12
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Count Total	0	12	0	0	0	0	0	1	0	1	0	0	14	0
Peak Hour	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**12**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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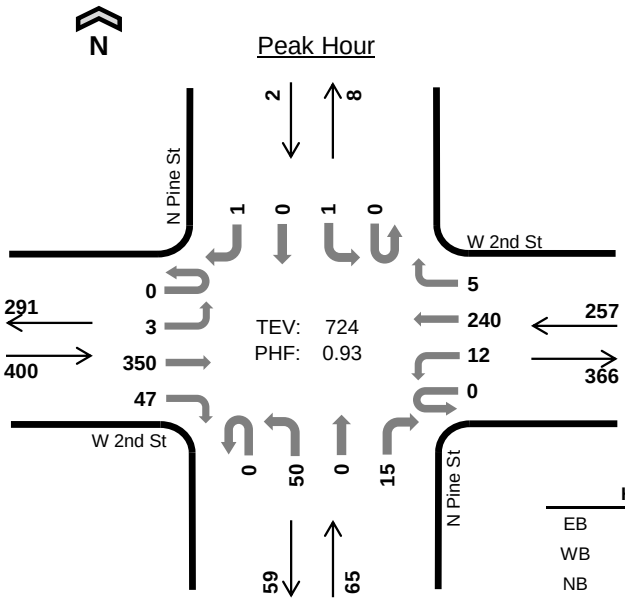
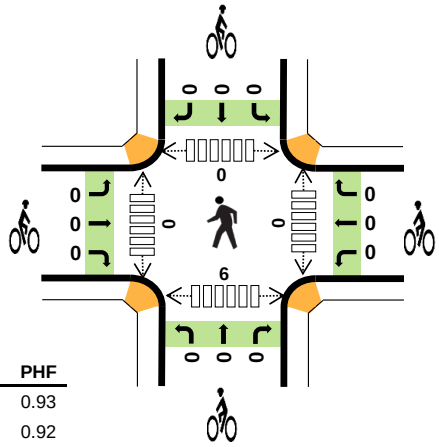
N Pine St
W 2nd St

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	6.3%	0.93
WB	5.1%	0.92
NB	0.0%	0.86
SB	0.0%	0.25
TOTAL	5.2%	0.93

Three-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	1	95	12	0	6	63	1	0	13	0	4	0	0	0	0	195	0
3:15 PM		0	1	73	17	0	1	55	0	0	9	0	6	0	0	0	0	162	0
3:30 PM		0	0	95	9	0	3	57	2	0	18	0	1	0	1	0	1	187	0
3:45 PM		0	1	87	9	0	2	65	2	0	10	0	4	0	0	0	0	180	724
Peak Hour	All	0	3	350	47	0	12	240	5	0	50	0	15	0	1	0	1	724	0
	HV	0	0	24	1	0	0	13	0	0	0	0	0	0	0	0	0	38	0
	HV%	-	0%	7%	2%	-	0%	5%	0%	-	0%	-	0%	-	0%	-	0%	5%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	6	2	0	0	*8*	0	0	0	0	*0*	0	0	0	2	*2*
3:15 PM	8	3	0	0	*11*	0	0	0	0	*0*	0	0	0	1	*1*
3:30 PM	3	4	0	0	*7*	0	0	0	0	*0*	0	0	0	1	*1*
3:45 PM	8	4	0	0	*12*	0	0	0	0	*0*	0	0	0	2	*2*
Peak Hour	25	13	0	0	*38*	0	0	0	0	*0*	0	0	0	6	*6*

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Three-Hour Count Summaries

Interval Start	W 2nd St Eastbound				W 2nd St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**1**	**95**	**12**	**0**	**6**	**63**	**1**	**0**	**13**	**0**	**4**	**0**	**0**	**0**	**0**	**195**	0
3:15 PM	**0**	**1**	**73**	**17**	**0**	**1**	**55**	**0**	**0**	**9**	**0**	**6**	**0**	**0**	**0**	**0**	**162**	0
3:30 PM	**0**	**0**	**95**	**9**	**0**	**3**	**57**	**2**	**0**	**18**	**0**	**1**	**0**	**1**	**0**	**1**	**187**	0
3:45 PM	**0**	**1**	**87**	**9**	**0**	**2**	**65**	**2**	**0**	**10**	**0**	**4**	**0**	**0**	**0**	**0**	**180**	**724**
4:00 PM	0	0	79	14	0	5	73	2	0	16	0	0	0	0	0	0	189	718
4:15 PM	0	0	68	8	0	0	49	1	0	8	0	4	0	0	0	0	138	694
4:30 PM	0	0	77	15	0	2	57	0	0	9	1	3	0	0	0	0	164	671
4:45 PM	0	0	85	12	0	0	50	0	0	10	0	2	0	1	0	0	160	651
5:00 PM	0	1	71	8	0	0	58	1	0	13	0	5	0	0	0	0	157	619
5:15 PM	0	0	98	11	0	3	66	1	0	13	0	6	0	1	0	0	199	680
5:30 PM	0	0	69	13	0	2	48	0	0	8	0	0	0	0	1	0	141	657
5:45 PM	0	1	42	3	0	2	66	1	0	14	2	2	0	2	0	0	135	632
Count Total	0	5	939	131	0	26	707	11	0	141	3	37	0	5	1	1	2,007	0
Peak Hour All	**0**	**3**	**350**	**47**	**0**	**12**	**240**	**5**	**0**	**50**	**0**	**15**	**0**	**1**	**0**	**1**	**724**	**0**
Peak Hour HV	**0**	**0**	**24**	**1**	**0**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38**	**0**
Peak Hour HV%	**-**	**0%**	**7%**	**2%**	**-**	**0%**	**5%**	**0%**	**-**	**0%**	**-**	**0%**	**-**	**0%**	**-**	**0%**	**5%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**6**	**2**	**0**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	*2*
3:15 PM	**8**	**3**	**0**	**0**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
3:30 PM	**3**	**4**	**0**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
3:45 PM	**8**	**4**	**0**	**0**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**2**	***2***
4:00 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	6	0	0	0	*6*	0	0	1	0	*1*	0	0	0	0	*0*
4:30 PM	2	2	0	0	*4*	0	0	0	0	*0*	1	0	0	0	*1*
4:45 PM	6	2	0	0	*8*	0	0	0	0	*0*	0	0	0	1	*1*
5:00 PM	3	3	0	0	*6*	0	0	0	0	*0*	0	0	0	1	*1*
5:15 PM	7	3	0	0	*10*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	2	1	0	0	*3*	0	0	0	0	*0*	2	0	0	0	*2*
5:45 PM	2	0	0	0	*2*	0	0	0	0	*0*	2	0	0	0	*2*
Count Total	55	24	0	0	*79*	0	0	1	0	*1*	5	0	0	8	*13*
Peak Hour	**25**	**13**	**0**	**0**	***38***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**6**	***6***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St				W 2nd St				N Pine St				N Pine St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**5**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	0
3:15 PM	**0**	**0**	**8**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	0
3:30 PM	**0**	**0**	**3**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	0
3:45 PM	**0**	**0**	**8**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**38**
4:00 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	32
4:15 PM	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6	27
4:30 PM	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	4	24
4:45 PM	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	8	20
5:00 PM	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	6	24
5:15 PM	0	0	7	0	0	0	3	0	0	0	0	0	0	0	0	0	10	28
5:30 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3	27
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	21
Count Total	0	0	53	2	0	0	24	0	0	0	0	0	0	0	0	0	79	0
Peak Hour	**0**	**0**	**24**	**1**	**0**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	W 2nd St			W 2nd St			N Pine St			N Pine St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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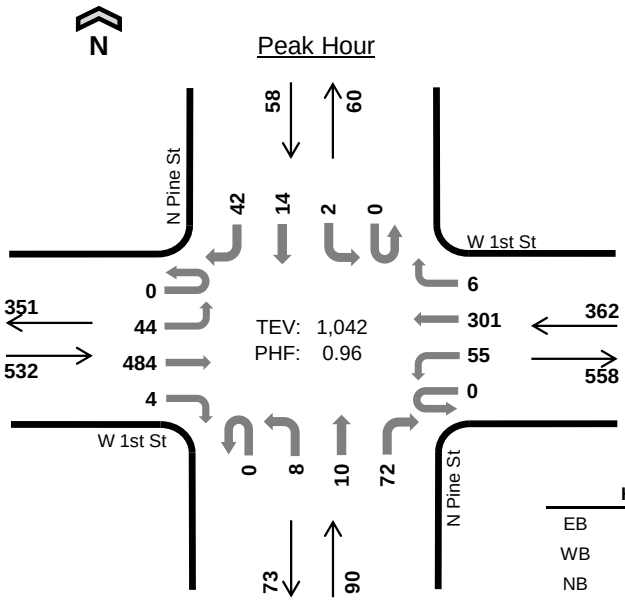
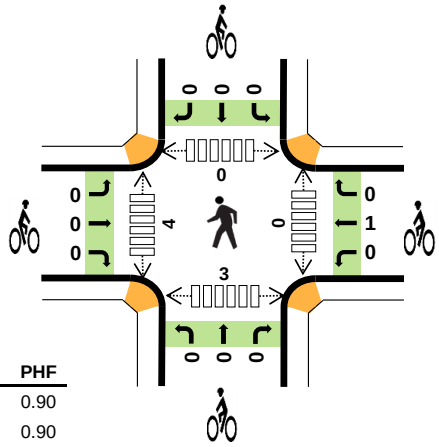
N Pine St
W 1st St

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:45 PM to 4:45 PM





	HV %:	PHF
EB	4.3%	0.90
WB	2.8%	0.90
NB	2.2%	0.80
SB	0.0%	0.69
TOTAL	3.4%	0.96

Three-Hour Count Summaries

Interval Start		W 1st St Eastbound				W 1st St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:45 PM		0	9	107	0	0	15	85	1	0	2	2	17	0	1	3	8	250	0
4:00 PM		0	10	114	2	0	11	80	2	0	1	3	15	0	1	6	14	259	0
4:15 PM		0	13	133	1	0	16	76	1	0	3	4	15	0	0	1	9	272	0
4:30 PM		0	12	130	1	0	13	60	2	0	2	1	25	0	0	4	11	261	1,042
Peak Hour	All	0	44	484	4	0	55	301	6	0	8	10	72	0	2	14	42	1,042	0
	HV	0	0	23	0	0	2	8	0	0	0	0	2	0	0	0	0	35	0
	HV%	-	0%	5%	0%	-	4%	3%	0%	-	0%	0%	3%	-	0%	0%	0%	3%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:45 PM	2	2	0	0	*4*	0	1	0	0	*1*	0	0	0	0	*0*
4:00 PM	8	5	0	0	*13*	0	0	0	0	*0*	0	1	0	3	*4*
4:15 PM	7	1	0	0	*8*	0	0	0	0	*0*	0	3	0	0	*3*
4:30 PM	6	2	2	0	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	23	10	2	0	*35*	0	1	0	0	*1*	0	4	0	3	*7*

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Three-Hour Count Summaries

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	14	111	1	0	16	76	5	0	2	4	19	0	2	2	14	266	0
3:15 PM	0	13	117	0	0	13	79	2	0	2	4	31	0	3	6	9	279	0
3:30 PM	0	7	102	0	0	10	85	2	0	0	1	25	0	1	4	7	244	0
3:45 PM	**0**	**9**	**107**	**0**	**0**	**15**	**85**	**1**	**0**	**2**	**2**	**17**	**0**	**1**	**3**	**8**	**250**	1,039
4:00 PM	**0**	**10**	**114**	**2**	**0**	**11**	**80**	**2**	**0**	**1**	**3**	**15**	**0**	**1**	**6**	**14**	**259**	1,032
4:15 PM	**0**	**13**	**133**	**1**	**0**	**16**	**76**	**1**	**0**	**3**	**4**	**15**	**0**	**0**	**1**	**9**	**272**	1,025
4:30 PM	**0**	**12**	**130**	**1**	**0**	**13**	**60**	**2**	**0**	**2**	**1**	**25**	**0**	**0**	**4**	**11**	**261**	**1,042**
4:45 PM	0	12	121	3	0	13	73	1	0	0	2	12	0	2	3	7	249	1,041
5:00 PM	0	16	96	2	0	9	79	2	0	1	3	27	0	4	0	6	245	1,027
5:15 PM	0	6	86	2	0	14	68	1	0	1	2	22	0	2	3	9	216	971
5:30 PM	0	7	78	1	0	7	71	2	0	0	2	22	0	0	6	10	206	916
5:45 PM	0	12	66	0	0	5	71	5	0	1	3	17	0	1	0	5	186	853
Count Total	0	131	1,261	13	0	142	903	26	0	15	31	247	0	17	38	109	2,933	0
Peak Hour All	**0**	**44**	**484**	**4**	**0**	**55**	**301**	**6**	**0**	**8**	**10**	**72**	**0**	**2**	**14**	**42**	**1,042**	**0**
Peak Hour HV	**0**	**0**	**23**	**0**	**0**	**2**	**8**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**35**	**0**
Peak Hour HV%	**-**	**0%**	**5%**	**0%**	**-**	**4%**	**3%**	**0%**	**-**	**0%**	**0%**	**3%**	**-**	**0%**	**0%**	**0%**	**3%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	6	4	0	1	*11*	0	0	0	0	*0*	0	0	0	3	*3*
3:15 PM	4	4	0	0	*8*	0	0	0	0	*0*	0	0	0	3	*3*
3:30 PM	2	2	2	0	*6*	0	0	0	0	*0*	0	3	0	0	*3*
3:45 PM	**2**	**2**	**0**	**0**	***4***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:00 PM	**8**	**5**	**0**	**0**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**3**	*4*
4:15 PM	**7**	**1**	**0**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**0**	**0**	*3*
4:30 PM	**6**	**2**	**2**	**0**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:45 PM	9	0	0	0	*9*	0	0	0	0	*0*	0	1	0	0	*1*
5:00 PM	2	2	0	0	*4*	0	0	0	0	*0*	0	0	0	2	*2*
5:15 PM	0	4	0	0	*4*	0	0	0	0	*0*	0	3	0	0	*3*
5:30 PM	3	3	2	0	*8*	0	0	0	0	*0*	0	5	0	1	*6*
5:45 PM	3	2	0	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	52	31	6	1	*90*	0	1	0	0	*1*	0	16	0	12	*28*
Peak Hour	**23**	**10**	**2**	**0**	***35***	**0**	**1**	**0**	**0**	***1***	**0**	**4**	**0**	**3**	***7***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St				W 1st St				N Pine St				N Pine St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	3	3	0	0	0	4	0	0	0	0	0	0	0	0	1	11	0
3:15 PM	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	8	0
3:30 PM	0	0	2	0	0	1	1	0	0	0	0	2	0	0	0	0	6	0
3:45 PM	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	29
4:00 PM	**0**	**0**	**8**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	31
4:15 PM	**0**	**0**	**7**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	31
4:30 PM	**0**	**0**	**6**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**10**	**35**
4:45 PM	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	9	40
5:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	31
5:15 PM	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	4	27
5:30 PM	0	0	3	0	0	0	3	0	0	0	0	2	0	0	0	0	8	25
5:45 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	5	21
Count Total	0	4	48	0	0	4	27	0	0	0	0	6	0	0	0	1	90	0
Peak Hour	**0**	**0**	**23**	**0**	**0**	**2**	**8**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**35**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	W 1st St			W 1st St			N Pine St			N Pine St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	1
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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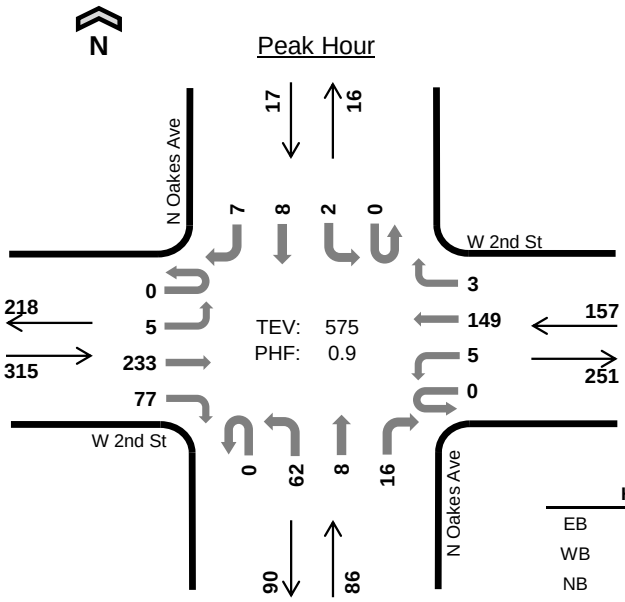
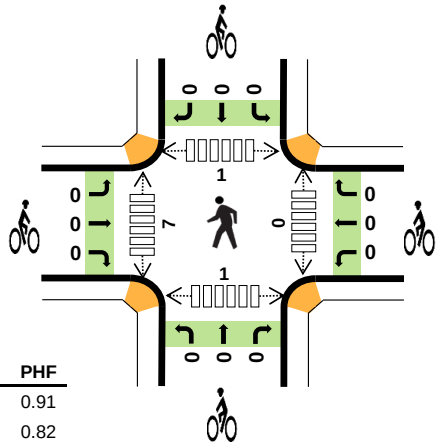
N Oakes Ave
W 2nd St

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	5.7%	0.91
WB	1.9%	0.82
NB	8.1%	0.90
SB	11.8%	0.71
TOTAL	5.2%	0.90

Three-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	1	57	23	0	2	46	0	0	16	4	4	0	1	3	2	159	0
3:15 PM		0	1	60	14	0	2	24	1	0	15	1	3	0	0	1	0	122	0
3:30 PM		0	2	62	23	0	1	40	0	0	17	1	5	0	1	2	2	156	0
3:45 PM		0	1	54	17	0	0	39	2	0	14	2	4	0	0	2	3	138	575
Peak Hour	All	0	5	233	77	0	5	149	3	0	62	8	16	0	2	8	7	575	0
	HV	0	0	13	5	0	0	2	1	0	4	2	1	0	1	0	1	30	0
	HV%	-	0%	6%	6%	-	0%	1%	33%	-	6%	25%	6%	-	50%	0%	14%	5%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	4	0	0	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	4	0	2	0	*6*	0	0	0	0	*0*	0	2	0	1	*3*
3:30 PM	5	1	2	1	*9*	0	0	0	0	*0*	0	2	0	0	*2*
3:45 PM	5	2	3	0	*10*	0	0	0	0	*0*	0	3	1	0	*4*
Peak Hour	18	3	7	2	*30*	0	0	0	0	*0*	0	7	1	1	*9*

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Three-Hour Count Summaries

Interval Start	W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**1**	**57**	**23**	**0**	**2**	**46**	**0**	**0**	**16**	**4**	**4**	**0**	**1**	**3**	**2**	**159**	0
3:15 PM	**0**	**1**	**60**	**14**	**0**	**2**	**24**	**1**	**0**	**15**	**1**	**3**	**0**	**0**	**1**	**0**	**122**	0
3:30 PM	**0**	**2**	**62**	**23**	**0**	**1**	**40**	**0**	**0**	**17**	**1**	**5**	**0**	**1**	**2**	**2**	**156**	0
3:45 PM	**0**	**1**	**54**	**17**	**0**	**0**	**39**	**2**	**0**	**14**	**2**	**4**	**0**	**0**	**2**	**3**	**138**	**575**
4:00 PM	0	2	47	20	0	6	40	1	0	23	2	3	0	0	1	1	146	562
4:15 PM	0	1	38	20	0	1	17	1	1	18	4	2	0	1	0	2	106	546
4:30 PM	0	0	40	26	0	0	32	2	0	14	2	4	0	2	2	0	124	514
4:45 PM	0	1	46	26	0	1	27	0	0	19	4	4	0	0	1	3	132	508
5:00 PM	0	6	34	14	0	1	43	1	1	16	2	2	0	0	1	0	121	483
5:15 PM	0	1	46	18	0	2	30	0	0	14	1	4	0	2	1	2	121	498
5:30 PM	0	2	39	16	0	3	29	0	0	11	2	0	0	0	1	1	104	478
5:45 PM	0	4	22	17	0	0	28	0	0	17	1	3	0	0	3	2	97	443
Count Total	0	22	545	234	0	19	395	8	2	194	26	38	0	7	18	18	1,526	0
Peak Hour All	**0**	**5**	**233**	**77**	**0**	**5**	**149**	**3**	**0**	**62**	**8**	**16**	**0**	**2**	**8**	**7**	**575**	**0**
Peak Hour HV	**0**	**0**	**13**	**5**	**0**	**0**	**2**	**1**	**0**	**4**	**2**	**1**	**0**	**1**	**0**	**1**	**30**	**0**
Peak Hour HV%	**-**	**0%**	**6%**	**6%**	**-**	**0%**	**1%**	**33%**	**-**	**6%**	**25%**	**6%**	**-**	**50%**	**0%**	**14%**	**5%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**4**	**0**	**0**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**4**	**0**	**2**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**1**	*3*
3:30 PM	**5**	**1**	**2**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	*2*
3:45 PM	**5**	**2**	**3**	**0**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**1**	**0**	***4***
4:00 PM	4	0	1	1	*6*	0	1	0	0	*1*	0	2	0	0	*2*
4:15 PM	3	0	0	0	*3*	0	0	0	0	*0*	0	0	0	3	*3*
4:30 PM	3	0	0	1	*4*	9	0	0	0	*9*	0	0	0	3	*3*
4:45 PM	7	1	0	0	*8*	0	0	0	0	*0*	0	0	0	1	*1*
5:00 PM	5	1	0	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	7	0	0	0	*7*	0	0	0	0	*0*	0	0	0	1	*1*
5:30 PM	2	2	0	0	*4*	0	0	1	0	*1*	0	0	0	0	*0*
5:45 PM	2	0	1	0	*3*	0	0	0	0	*0*	0	0	0	1	*1*
Count Total	51	7	9	4	*71*	9	1	1	0	*11*	0	9	1	10	*20*
Peak Hour	**18**	**3**	**7**	**2**	***30***	**0**	**0**	**0**	**0**	***0***	**0**	**7**	**1**	**1**	***9***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**5**	0
3:15 PM	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	0
3:30 PM	**0**	**0**	**2**	**3**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**9**	0
3:45 PM	**0**	**0**	**5**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**10**	**30**
4:00 PM	0	0	3	1	0	0	0	0	0	0	0	1	0	0	1	0	6	31
4:15 PM	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	28
4:30 PM	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	4	23
4:45 PM	0	0	3	4	0	0	1	0	0	0	0	0	0	0	0	0	8	21
5:00 PM	0	0	2	3	0	0	1	0	0	0	0	0	0	0	0	0	6	21
5:15 PM	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	7	25
5:30 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	25
5:45 PM	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	3	20
Count Total	0	0	34	17	0	0	6	1	0	4	3	2	0	2	1	1	71	0
Peak Hour	**0**	**0**	**13**	**5**	**0**	**0**	**2**	**1**	**0**	**4**	**2**	**1**	**0**	**1**	**0**	**1**	**30**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	W 2nd St Eastbound			W 2nd St Westbound			N Oakes Ave Northbound			N Oakes Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	1	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	9	0	0	0	0	0	0	0	0	0	0	9	10
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	10
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	9
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	9
5:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	9	0	1	0	0	0	0	1	0	0	0	11	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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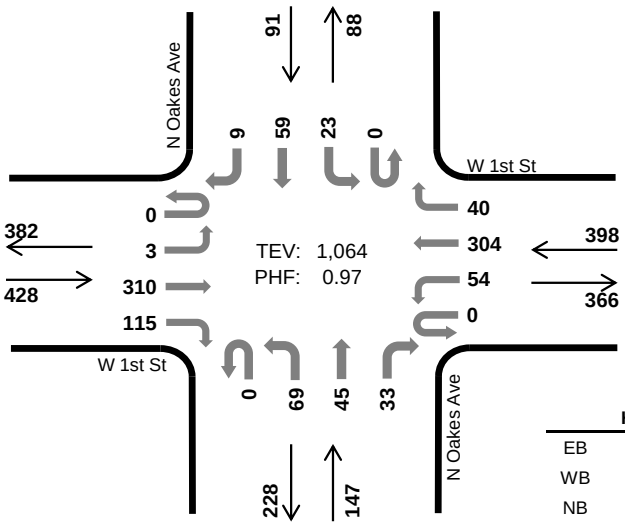
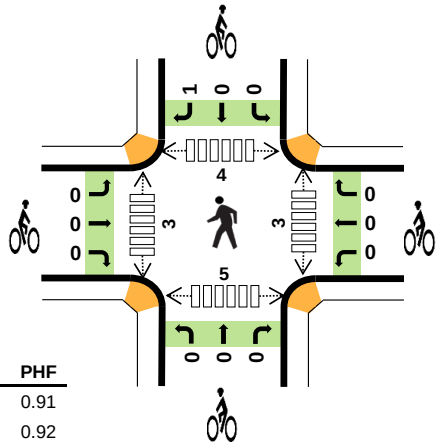
N Oakes Ave
W 1st St

Date: 06/23/2022
Count Period: 3:00 PM to 6:00 PM
Peak Hour: 3:15 PM to 4:15 PM

Peak Hour





	HV %:	PHF
EB	6.3%	0.91
WB	3.3%	0.92
NB	4.8%	0.85
SB	4.4%	0.88
TOTAL	4.8%	0.97

Three-Hour Count Summaries

Interval Start		W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:15 PM		0	1	81	35	0	17	80	11	0	12	7	12	0	3	15	1	275	0
3:30 PM		0	2	68	33	0	10	75	11	0	16	12	9	0	5	17	3	261	0
3:45 PM		0	0	78	21	0	12	73	5	0	24	14	5	0	10	8	3	253	0
4:00 PM		0	0	83	26	0	15	76	13	0	17	12	7	0	5	19	2	275	1,064
Peak Hour	All	0	3	310	115	0	54	304	40	0	69	45	33	0	23	59	9	1,064	0
	HV	0	0	17	10	0	5	6	2	0	2	5	0	0	1	3	0	51	0
	HV%	-	0%	5%	9%	-	9%	2%	5%	-	3%	11%	0%	-	4%	5%	0%	5%	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:15 PM	7	7	1	0	*15*	0	0	0	0	*0*	3	0	1	3	*7*
3:30 PM	7	1	4	3	*15*	0	0	0	0	*0*	0	0	2	0	*2*
3:45 PM	7	5	2	0	*14*	0	0	0	0	*0*	0	0	1	0	*1*
4:00 PM	6	0	0	1	*7*	0	0	0	1	*1*	0	3	0	2	*5*
Peak Hour	27	13	7	4	*51*	0	0	0	1	*1*	3	3	4	5	*15*

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Three-Hour Count Summaries

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	85	22	0	13	71	12	0	13	11	8	0	6	16	3	260	0
3:15 PM	**0**	**1**	**81**	**35**	**0**	**17**	**80**	**11**	**0**	**12**	**7**	**12**	**0**	**3**	**15**	**1**	**275**	0
3:30 PM	**0**	**2**	**68**	**33**	**0**	**10**	**75**	**11**	**0**	**16**	**12**	**9**	**0**	**5**	**17**	**3**	**261**	0
3:45 PM	**0**	**0**	**78**	**21**	**0**	**12**	**73**	**5**	**0**	**24**	**14**	**5**	**0**	**10**	**8**	**3**	**253**	1,049
4:00 PM	**0**	**0**	**83**	**26**	**0**	**15**	**76**	**13**	**0**	**17**	**12**	**7**	**0**	**5**	**19**	**2**	**275**	**1,064**
4:15 PM	0	5	81	27	0	9	68	5	0	15	14	11	0	10	9	5	259	1,048
4:30 PM	0	3	78	34	0	9	62	6	0	18	11	7	0	8	14	6	256	1,043
4:45 PM	0	3	67	29	0	5	71	10	0	16	12	11	0	7	18	3	252	1,042
5:00 PM	0	0	76	16	0	12	69	7	0	21	10	4	0	4	15	2	236	1,003
5:15 PM	0	1	77	28	0	9	58	6	0	14	12	10	0	8	10	2	235	979
5:30 PM	0	1	83	19	0	7	58	5	0	20	7	7	0	8	11	2	228	951
5:45 PM	0	0	70	28	0	3	73	7	0	19	12	4	0	7	9	0	232	931
Count Total	0	16	927	318	0	121	834	98	0	205	134	95	0	81	161	32	3,022	0
Peak Hour All	**0**	**3**	**310**	**115**	**0**	**54**	**304**	**40**	**0**	**69**	**45**	**33**	**0**	**23**	**59**	**9**	**1,064**	**0**
Peak Hour HV	**0**	**0**	**17**	**10**	**0**	**5**	**6**	**2**	**0**	**2**	**5**	**0**	**0**	**1**	**3**	**0**	**51**	**0**
Peak Hour HV%	**-**	**0%**	**5%**	**9%**	**-**	**9%**	**2%**	**5%**	**-**	**3%**	**11%**	**0%**	**-**	**4%**	**5%**	**0%**	**5%**	**0**

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	5	3	1	2	*11*	0	0	0	0	*0*	2	0	0	1	*3*
3:15 PM	**7**	**7**	**1**	**0**	***15***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**1**	**3**	*7*
3:30 PM	**7**	**1**	**4**	**3**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	*2*
3:45 PM	**7**	**5**	**2**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
4:00 PM	**6**	**0**	**0**	**1**	***7***	**0**	**0**	**0**	**1**	***1***	**0**	**3**	**0**	**2**	***5***
4:15 PM	7	1	0	1	*9*	0	0	0	0	*0*	0	3	6	0	*9*
4:30 PM	5	2	2	0	*9*	0	0	0	0	*0*	1	2	2	5	*10*
4:45 PM	5	0	1	4	*10*	1	0	0	0	*1*	0	2	2	0	*4*
5:00 PM	1	1	2	3	*7*	0	0	0	0	*0*	0	0	3	0	*3*
5:15 PM	7	4	2	2	*15*	0	0	0	0	*0*	0	2	1	0	*3*
5:30 PM	5	4	1	1	*11*	0	0	0	0	*0*	0	0	1	0	*1*
5:45 PM	6	1	2	1	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	68	29	18	18	*133*	1	0	0	1	*2*	6	12	19	11	*48*
Peak Hour	**27**	**13**	**7**	**4**	***51***	**0**	**0**	**0**	**1**	***1***	**3**	**3**	**4**	**5**	***15***

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Three-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	3	2	0	0	3	0	0	1	0	0	0	1	1	0	11	0
3:15 PM	**0**	**0**	**3**	**4**	**0**	**3**	**3**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**15**	0
3:30 PM	**0**	**0**	**4**	**3**	**0**	**1**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**3**	**0**	**15**	0
3:45 PM	**0**	**0**	**5**	**2**	**0**	**1**	**3**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**14**	55
4:00 PM	**0**	**0**	**5**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**7**	**51**
4:15 PM	0	0	4	3	0	0	1	0	0	0	0	0	0	1	0	0	9	45
4:30 PM	0	0	3	2	0	0	2	0	0	1	0	1	0	0	0	0	9	39
4:45 PM	0	0	2	3	0	0	0	0	0	1	0	0	0	0	4	0	10	35
5:00 PM	0	0	0	1	0	0	1	0	0	2	0	0	0	0	3	0	7	35
5:15 PM	0	0	5	2	0	0	4	0	0	1	0	1	0	1	1	0	15	41
5:30 PM	0	0	3	2	0	1	3	0	0	1	0	0	0	0	1	0	11	43
5:45 PM	0	0	4	2	0	0	1	0	0	1	1	0	0	0	1	0	10	43
Count Total	0	0	41	27	0	6	21	2	0	10	6	2	0	4	14	0	133	0
Peak Hour	**0**	**0**	**17**	**10**	**0**	**5**	**6**	**2**	**0**	**2**	**5**	**0**	**0**	**1**	**3**	**0**	**51**	**0**

Three-Hour Count Summaries - Bikes

Interval Start	W 1st St Eastbound			W 1st St Westbound			N Oakes Ave Northbound			N Oakes Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	1	0	0	0	0	0	0	0	0	0	1	2	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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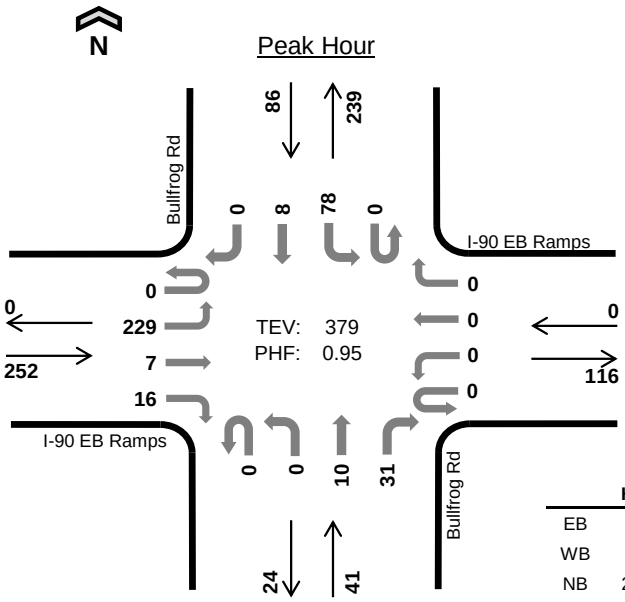
APPENDIX B (continued)

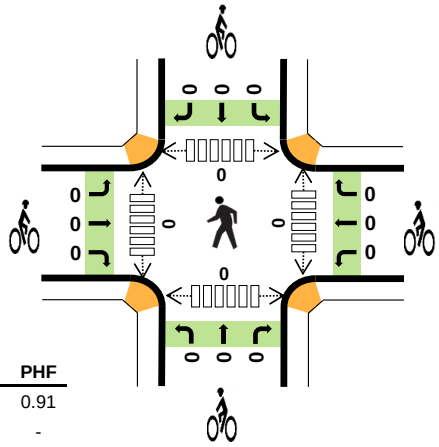
2022 Traffic Counts

Friday Data Sheets

Bullfrog Rd
I-90 EB Ramps

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	4.0%	0.91
WB	-	-
NB	22.0%	0.73
SB	10.5%	0.77
TOTAL	7.4%	0.95

Two-Hour Count Summaries

Interval Start		I-90 EB Ramps Eastbound				I-90 EB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	56	0	3	0	0	0	0	0	0	0	4	0	9	5	0	77	0
2:15 PM		0	38	0	6	0	0	0	0	0	0	2	4	0	19	1	0	70	0
2:30 PM		0	52	2	8	0	0	0	0	0	0	0	6	0	12	3	0	83	0
2:45 PM		0	51	1	6	0	0	0	0	0	0	4	5	0	19	1	0	87	317
3:00 PM		**0**	**60**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**10**	**0**	**20**	**2**	**0**	**97**	337
3:15 PM		**0**	**55**	**2**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**0**	**15**	**2**	**0**	**85**	352
3:30 PM		**0**	**48**	**3**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**25**	**3**	**0**	**97**	366
3:45 PM		**0**	**66**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**8**	**0**	**18**	**1**	**0**	**100**	**379**
Count Total		0	426	10	39	0	0	0	0	0	0	16	50	0	137	18	0	696	0
Peak Hour	**All**	**0**	**229**	**7**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**31**	**0**	**78**	**8**	**0**	**379**	**0**
	HV	**0**	**8**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**6**	**0**	**8**	**1**	**0**	**28**	**0**
	HV%	**-**	**3%**	**0%**	**13%**	**-**	**-**	**-**	**-**	**-**	**-**	**30%**	**19%**	**-**	**10%**	**13%**	**-**	**7%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
2:00 PM	1	0	0	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
2:15 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	4	0	0	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
2:45 PM	2	0	0	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
3:00 PM	**2**	**0**	**3**	**4**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**2**	**0**	**2**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**4**	**0**	**1**	**4**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**2**	**0**	**3**	**1**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	18	0	10	14	*42*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**10**	**0**	**9**	**9**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 EB Ramps				I-90 EB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3	0
2:15 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0
2:30 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	1	0	5	0
2:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	4	14
3:00 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**3**	**1**	**0**	**9**	20
3:15 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**4**	22
3:30 PM	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	**0**	**0**	**9**	26
3:45 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**1**	**0**	**0**	**6**	**28**
Count Total	0	13	0	5	0	0	0	0	0	0	4	6	0	10	4	0	42	0
Peak Hour	**0**	**8**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**6**	**0**	**8**	**1**	**0**	**28**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	I-90 EB Ramps			I-90 EB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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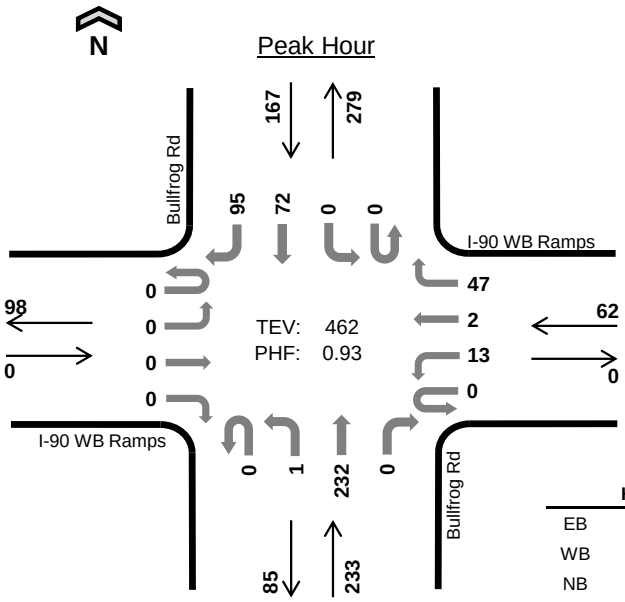
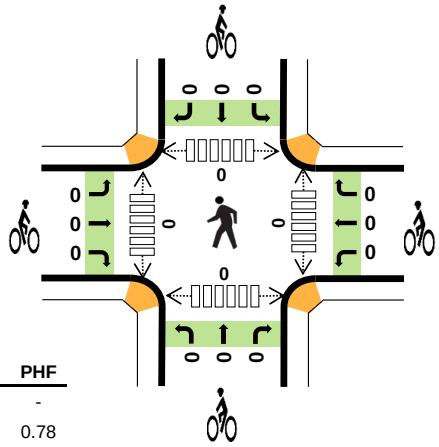
Bullfrog Rd
I-90 WB Ramps

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	-	-
WB	6.5%	0.78
NB	4.3%	0.91
SB	8.4%	0.82
TOTAL	6.1%	0.93

Two-Hour Count Summaries

Interval Start		I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	0	0	0	0	3	0	11	0	0	59	0	0	0	11	30	114	0
2:15 PM		0	0	0	0	0	2	0	19	0	1	37	0	0	0	18	24	101	0
2:30 PM		0	0	0	0	0	1	0	22	0	4	51	0	0	0	15	31	124	0
2:45 PM		0	0	0	0	0	4	1	15	0	0	55	0	0	0	16	23	114	453
3:00 PM		**0**	**0**	**0**	**0**	**0**	**3**	**1**	**14**	**0**	**0**	**63**	**0**	**0**	**0**	**18**	**23**	**122**	461
3:15 PM		**0**	**0**	**0**	**0**	**0**	**3**	**1**	**4**	**0**	**0**	**53**	**0**	**0**	**0**	**15**	**20**	**96**	456
3:30 PM		**0**	**0**	**0**	**0**	**0**	**5**	**0**	**15**	**0**	**1**	**52**	**0**	**0**	**0**	**22**	**29**	**124**	456
3:45 PM		**0**	**0**	**0**	**0**	**0**	**2**	**0**	**14**	**0**	**0**	**64**	**0**	**0**	**0**	**17**	**23**	**120**	**462**
Count Total		0	0	0	0	0	23	3	114	0	6	434	0	0	0	132	203	915	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**13**	**2**	**47**	**0**	**1**	**232**	**0**	**0**	**0**	**72**	**95**	**462**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**10**	**0**	**0**	**0**	**10**	**4**	**28**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**8%**	**0%**	**6%**	**-**	**0%**	**4%**	**-**	**-**	**-**	**14%**	**4%**	**6%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	0	1	2	3	*6*	0	0	0	0	*0*	0	0	0	0	*0*
2:15 PM	0	1	1	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	0	2	2	4	*8*	0	0	0	0	*0*	0	0	0	0	*0*
2:45 PM	0	1	2	3	*6*	0	0	0	0	*0*	0	0	0	0	*0*
3:00 PM	**0**	**0**	**3**	**4**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**1**	**1**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**1**	**3**	**6**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**2**	**3**	**3**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	9	17	25	*51*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**4**	**10**	**14**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 WB Ramps				I-90 WB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	0	0	0	1	0	0	0	0	2	0	0	0	1	2	6	0
2:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	3	0
2:30 PM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	1	3	8	0
2:45 PM	0	0	0	0	0	1	0	0	0	0	2	0	0	0	2	1	6	23
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**1**	**7**	24
3:15 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	24
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**4**	**2**	**10**	26
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**1**	**8**	**28**
Count Total	0	0	0	0	0	3	0	6	0	1	16	0	0	0	14	11	51	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**10**	**0**	**0**	**0**	**10**	**4**	**28**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	I-90 WB Ramps			I-90 WB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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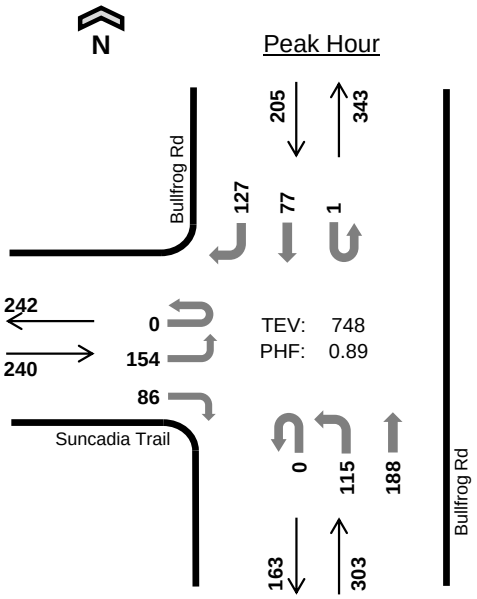
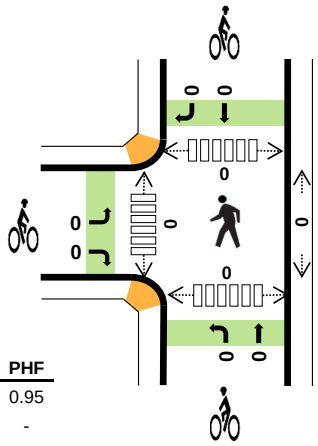
Bullfrog Rd
Suncadia Trail

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 2:15 PM to 3:15 PM





	HV %:	PHF
EB	6.3%	0.95
WB	-	-
NB	4.0%	0.88
SB	2.0%	0.84
TOTAL	4.1%	0.89

Two-Hour Count Summaries

Interval Start		Suncadia Trail Eastbound				0 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		1	40	0	11	0	0	0	0	0	27	48	0	0	0	25	24	176	0
2:15 PM		**0**	**34**	**0**	**21**	**0**	**0**	**0**	**0**	**0**	**20**	**42**	**0**	**0**	**0**	**15**	**35**	**167**	0
2:30 PM		**0**	**43**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**34**	**52**	**0**	**0**	**0**	**28**	**33**	**210**	0
2:45 PM		**0**	**39**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**33**	**46**	**0**	**1**	**0**	**20**	**27**	**186**	739
3:00 PM		**0**	**38**	**0**	**25**	**0**	**0**	**0**	**0**	**0**	**28**	**48**	**0**	**0**	**0**	**14**	**32**	**185**	**748**
3:15 PM		0	42	0	20	0	0	0	0	0	21	36	0	0	0	16	32	167	748
3:30 PM		1	49	0	21	0	0	0	0	0	30	35	0	0	0	19	36	191	729
3:45 PM		0	36	0	14	0	0	0	0	0	36	49	0	0	0	17	36	188	731
Count Total		2	321	0	152	0	0	0	0	0	229	356	0	1	0	154	255	1,470	0
Peak Hour	**All**	**0**	**154**	**0**	**86**	**0**	**0**	**0**	**0**	**0**	**115**	**188**	**0**	**1**	**0**	**77**	**127**	**748**	**0**
	HV	**0**	**9**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**3**	**9**	**0**	**0**	**0**	**2**	**2**	**31**	**0**
	HV%	**-**	**6%**	**-**	**7%**	**-**	**-**	**-**	**-**	**-**	**3%**	**5%**	**-**	**0%**	**-**	**3%**	**2%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
2:00 PM	3	0	5	3	*11*	5	0	0	0	*5*	0	0	0	0	*0*
2:15 PM	**6**	**0**	**2**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
2:30 PM	**4**	**0**	**3**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
2:45 PM	**3**	**0**	**2**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:00 PM	**2**	**0**	**5**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
3:15 PM	5	0	2	3	*10*	0	0	0	2	*2*	0	0	0	0	*0*
3:30 PM	3	0	3	2	*8*	1	0	0	0	*1*	0	0	0	0	*0*
3:45 PM	1	0	4	3	*8*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	27	0	26	15	*68*	6	0	0	2	*8*	0	0	0	0	*0*
Peak Hr	**15**	**0**	**12**	**4**	***31***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Suncadia Trail				0				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	3	0	0	0	0	0	0	0	1	4	0	0	0	0	3	11	0
2:15 PM	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**8**	0
2:30 PM	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**1**	**2**	**10**	0
2:45 PM	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**5**	34
3:00 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**1**	**0**	**8**	**31**
3:15 PM	0	5	0	0	0	0	0	0	0	0	2	0	0	0	2	1	10	33
3:30 PM	0	2	0	1	0	0	0	0	0	1	2	0	0	0	2	0	8	31
3:45 PM	0	1	0	0	0	0	0	0	0	2	2	0	0	0	2	1	8	34
Count Total	0	20	0	7	0	0	0	0	0	7	19	0	0	0	8	7	68	0
Peak Hour	**0**	**9**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**3**	**9**	**0**	**0**	**0**	**2**	**2**	**31**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Suncadia Trail			0			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	5	0	0	0	0	0	0	0	0	0	5	0
2:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	5
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	2	2
3:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	3
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Count Total	1	0	5	0	0	0	0	0	0	0	0	2	8	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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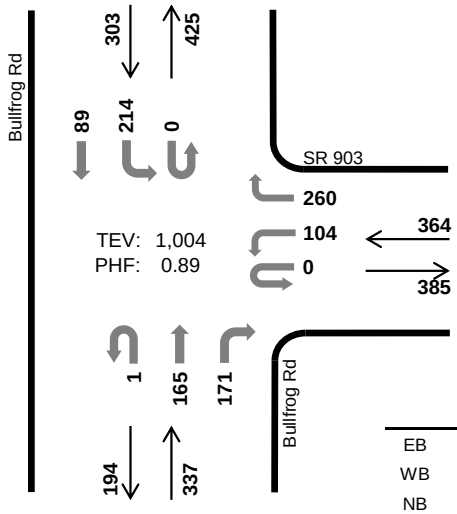
Bullfrog Rd
SR 903

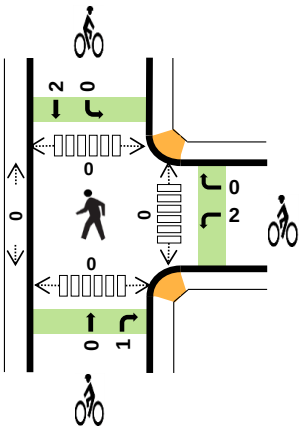
Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 3:00 PM to 4:00 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	4.4%	0.86
NB	5.3%	0.94
SB	2.3%	0.81
TOTAL	4.1%	0.89



Two-Hour Count Summaries

Interval Start		0 Eastbound				SR 903 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	0	0	0	0	30	0	52	0	0	33	49	0	44	23	0	231	0
2:15 PM		0	0	0	0	0	22	0	63	0	0	35	37	0	65	25	0	247	0
2:30 PM		0	0	0	0	0	30	0	61	1	0	44	53	0	40	23	0	252	0
2:45 PM		0	0	0	0	0	23	0	63	0	0	38	46	0	50	18	0	238	968
3:00 PM		**0**	**0**	**0**	**0**	**0**	**23**	**0**	**51**	**0**	**0**	**48**	**42**	**0**	**40**	**15**	**0**	**219**	956
3:15 PM		**0**	**0**	**0**	**0**	**0**	**22**	**0**	**61**	**0**	**0**	**36**	**44**	**0**	**61**	**28**	**0**	**252**	961
3:30 PM		**0**	**0**	**0**	**0**	**0**	**28**	**0**	**73**	**1**	**0**	**30**	**55**	**0**	**47**	**18**	**0**	**252**	961
3:45 PM		**0**	**0**	**0**	**0**	**0**	**31**	**0**	**75**	**0**	**0**	**51**	**30**	**0**	**66**	**28**	**0**	**281**	**1,004**
Count Total		0	0	0	0	0	209	0	499	2	0	315	356	0	413	178	0	1,972	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**104**	**0**	**260**	**1**	**0**	**165**	**171**	**0**	**214**	**89**	**0**	**1,004**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**11**	**1**	**0**	**5**	**12**	**0**	**5**	**2**	**0**	**41**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**5%**	**-**	**4%**	**100%**	**-**	**3%**	**7%**	**-**	**2%**	**2%**	**-**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	0	2	3	0	*5*	0	1	0	0	*1*	5	0	0	0	*5*
2:15 PM	0	2	4	1	*7*	0	0	0	0	*0*	0	1	0	0	*1*
2:30 PM	0	7	6	4	*17*	0	0	0	0	*0*	0	0	0	1	*1*
2:45 PM	0	3	2	3	*8*	0	0	0	0	*0*	0	1	0	1	*2*
3:00 PM	**0**	**4**	**5**	**1**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**3**	**6**	**2**	***11***	**0**	**2**	**1**	**2**	***5***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**4**	**4**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**5**	**3**	**2**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	30	33	15	*78*	0	3	1	2	*6*	5	2	0	2	*9*
Peak Hr	**0**	**16**	**18**	**7**	***41***	**0**	**2**	**1**	**2**	***5***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				SR 903				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	5	0
2:15 PM	0	0	0	0	0	0	0	2	0	0	0	4	0	1	0	0	7	0
2:30 PM	0	0	0	0	0	4	0	3	0	0	2	4	0	3	1	0	17	0
2:45 PM	0	0	0	0	0	1	0	2	0	0	0	2	0	3	0	0	8	37
3:00 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**0**	**5**	**0**	**0**	**1**	**0**	**10**	42
3:15 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**2**	**4**	**0**	**2**	**0**	**0**	**11**	46
3:30 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**1**	**0**	**1**	**2**	**0**	**2**	**0**	**0**	**10**	39
3:45 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	**0**	**0**	**2**	**1**	**0**	**1**	**1**	**0**	**10**	**41**
Count Total	0	0	0	0	0	12	0	18	1	0	7	25	0	12	3	0	78	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**11**	**1**	**0**	**5**	**12**	**0**	**5**	**2**	**0**	**41**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	0			SR 903			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**5**	5
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	5
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**
Count Total	0	0	0	2	0	1	0	0	1	0	2	0	6	0
Peak Hour	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**5**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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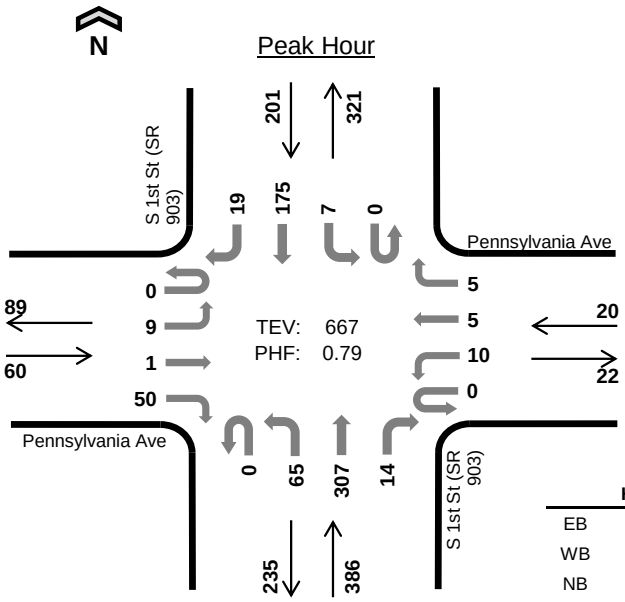
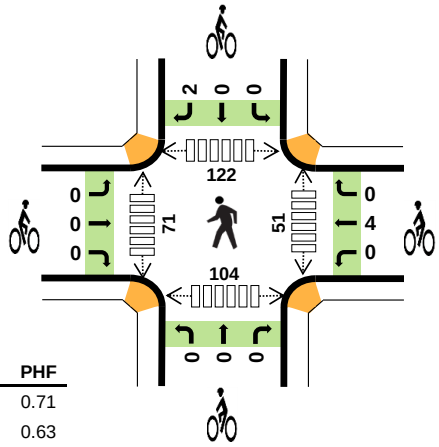
S 1st St (SR 903)
Pennsylvania Ave



Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 3:00 PM to 4:00 PM



	HV %:	PHF
EB	1.7%	0.71
WB	0.0%	0.63
NB	3.9%	0.84
SB	4.0%	0.75
TOTAL	3.6%	0.79

Two-Hour Count Summaries

Interval Start		Pennsylvania Ave Eastbound				Pennsylvania Ave Westbound				S 1st St (SR 903) Northbound				S 1st St (SR 903) Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	5	1	10	0	2	1	0	0	5	68	4	0	1	45	3	145	0
2:15 PM		0	0	0	14	0	3	1	3	1	11	52	5	0	2	47	5	144	0
2:30 PM		0	4	2	7	0	1	2	0	0	17	64	3	0	0	41	2	143	0
2:45 PM		0	2	0	13	0	2	1	1	0	15	76	3	0	4	42	2	161	593
3:00 PM		**0**	**1**	**0**	**12**	**0**	**2**	**0**	**1**	**0**	**13**	**80**	**3**	**0**	**1**	**33**	**0**	**146**	594
3:15 PM		**0**	**0**	**0**	**15**	**0**	**6**	**1**	**1**	**0**	**18**	**63**	**5**	**0**	**3**	**39**	**6**	**157**	607
3:30 PM		**0**	**3**	**0**	**8**	**0**	**0**	**1**	**1**	**0**	**15**	**72**	**2**	**0**	**2**	**47**	**3**	**154**	618
3:45 PM		**0**	**5**	**1**	**15**	**0**	**2**	**3**	**2**	**0**	**19**	**92**	**4**	**0**	**1**	**56**	**10**	**210**	**667**
Count Total		0	20	4	94	0	18	10	9	1	113	567	29	0	14	350	31	1,260	0
Peak Hour	**All**	**0**	**9**	**1**	**50**	**0**	**10**	**5**	**5**	**0**	**65**	**307**	**14**	**0**	**7**	**175**	**19**	**667**	**0**
	HV	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**13**	**0**	**0**	**0**	**8**	**0**	**24**	**0**
	HV%	**-**	**11%**	**0%**	**0%**	**-**	**0%**	**0%**	**0%**	**-**	**3%**	**4%**	**0%**	**-**	**0%**	**5%**	**0%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	0	0	2	2	*4*	0	0	0	0	*0*	7	20	12	37	*76*
2:15 PM	0	0	2	2	*4*	0	0	3	0	*3*	5	13	19	12	*49*
2:30 PM	1	1	4	1	*7*	0	0	0	0	*0*	8	2	19	12	*41*
2:45 PM	1	0	2	4	*7*	0	0	0	0	*0*	8	17	16	11	*52*
3:00 PM	**0**	**0**	**5**	**1**	***6***	**0**	**0**	**0**	**2**	***2***	**19**	**14**	**27**	**14**	*74*
3:15 PM	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**5**	**17**	**15**	**25**	*62*
3:30 PM	**1**	**0**	**2**	**3**	***6***	**0**	**2**	**0**	**0**	***2***	**12**	**11**	**46**	**47**	*116*
3:45 PM	**0**	**0**	**5**	**3**	***8***	**0**	**2**	**0**	**0**	***2***	**15**	**29**	**34**	**18**	***96***
Count Total	3	1	25	17	*46*	0	4	3	2	*9*	79	123	188	176	*566*
Peak Hour	**1**	**0**	**15**	**8**	***24***	**0**	**4**	**0**	**2**	***6***	**51**	**71**	**122**	**104**	***348***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Pennsylvania Ave				Pennsylvania Ave				S 1st St (SR 903)				S 1st St (SR 903)				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	4	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	4	0
2:30 PM	0	0	0	1	0	1	0	0	0	0	3	1	0	0	1	0	7	0
2:45 PM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	4	0	7	22
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**6**	24
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**0**	**4**	24
3:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**0**	**6**	23
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**3**	**0**	**8**	**24**
Count Total	0	1	0	2	0	1	0	0	0	2	22	1	0	0	16	1	46	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**13**	**0**	**0**	**0**	**8**	**0**	**24**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Pennsylvania Ave			Pennsylvania Ave			S 1st St (SR 903)			S 1st St (SR 903)			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	3	0	0	0	0	0	3	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	5
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	2
3:30 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	4
3:45 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**6**
Count Total	0	0	0	0	4	0	3	0	0	0	0	2	9	0
Peak Hour	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**6**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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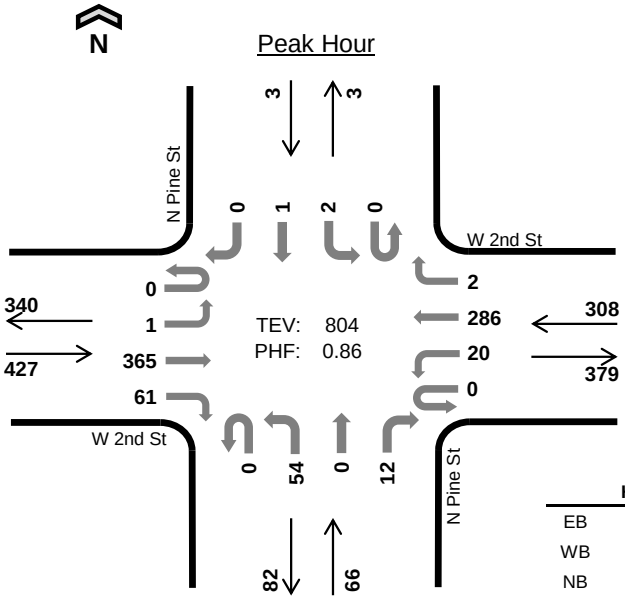
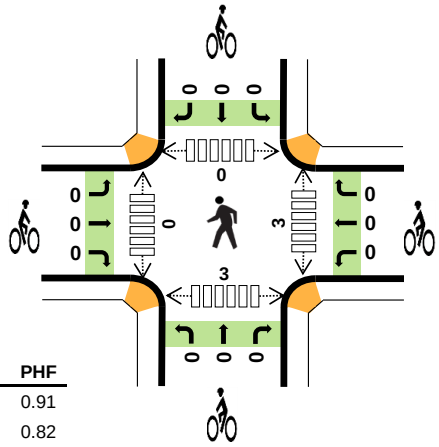
N Pine St
W 2nd St

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 2:45 PM to 3:45 PM

Peak Hour





	HV %:	PHF
EB	5.2%	0.91
WB	3.9%	0.82
NB	0.0%	0.75
SB	0.0%	0.38
TOTAL	4.2%	0.86

Two-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	1	73	17	0	5	67	0	0	9	0	3	0	0	0	0	175	0
2:15 PM		0	0	102	13	0	2	79	1	0	20	0	5	0	0	0	0	222	0
2:30 PM		0	0	75	12	0	3	82	2	0	9	0	2	0	0	1	0	186	0
2:45 PM		**0**	**1**	**88**	**19**	**0**	**6**	**76**	**0**	**0**	**9**	**0**	**2**	**0**	**0**	**1**	**0**	**202**	785
3:00 PM		**0**	**0**	**83**	**15**	**0**	**0**	**65**	**1**	**0**	**11**	**0**	**4**	**0**	**2**	**0**	**0**	**181**	791
3:15 PM		**0**	**0**	**91**	**13**	**0**	**5**	**61**	**0**	**0**	**14**	**0**	**4**	**0**	**0**	**0**	**0**	**188**	757
3:30 PM		**0**	**0**	**103**	**14**	**0**	**9**	**84**	**1**	**0**	**20**	**0**	**2**	**0**	**0**	**0**	**0**	**233**	**804**
3:45 PM		0	0	84	16	0	4	77	0	0	12	0	2	0	1	0	0	196	798
Count Total		0	2	699	119	0	34	591	5	0	104	0	24	0	3	2	0	1,583	0
Peak Hour	**All**	**0**	**1**	**365**	**61**	**0**	**20**	**286**	**2**	**0**	**54**	**0**	**12**	**0**	**2**	**1**	**0**	**804**	**0**
	HV	**0**	**0**	**20**	**2**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**34**	**0**
	HV%	**-**	**0%**	**5%**	**3%**	**-**	**0%**	**4%**	**0%**	**-**	**0%**	**-**	**0%**	**-**	**0%**	**0%**	**-**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	5	0	0	0	*5*	0	0	0	0	*0*	0	0	0	1	*1*
2:15 PM	6	2	0	0	*8*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	4	9	1	0	*14*	0	0	0	0	*0*	0	0	0	2	*2*
2:45 PM	**5**	**2**	**0**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	*1*
3:00 PM	**7**	**6**	**0**	**0**	***13***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**2**	*3*
3:15 PM	**6**	**0**	**0**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**4**	**4**	**0**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	***2***
3:45 PM	2	4	0	0	*6*	0	0	0	0	*0*	1	0	0	1	*2*
Count Total	39	27	1	0	*67*	0	0	0	0	*0*	4	0	0	7	*11*
Peak Hour	**22**	**12**	**0**	**0**	***34***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**3**	***6***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St				W 2nd St				N Pine St				N Pine St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
2:15 PM	0	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	8	0
2:30 PM	0	0	4	0	0	0	9	0	0	1	0	0	0	0	0	0	14	0
2:45 PM	**0**	**0**	**4**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	34
3:00 PM	**0**	**0**	**6**	**1**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	42
3:15 PM	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	40
3:30 PM	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**34**
3:45 PM	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	6	33
Count Total	0	0	37	2	0	0	27	0	0	1	0	0	0	0	0	0	67	0
Peak Hour	**0**	**0**	**20**	**2**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**34**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 2nd St			W 2nd St			N Pine St			N Pine St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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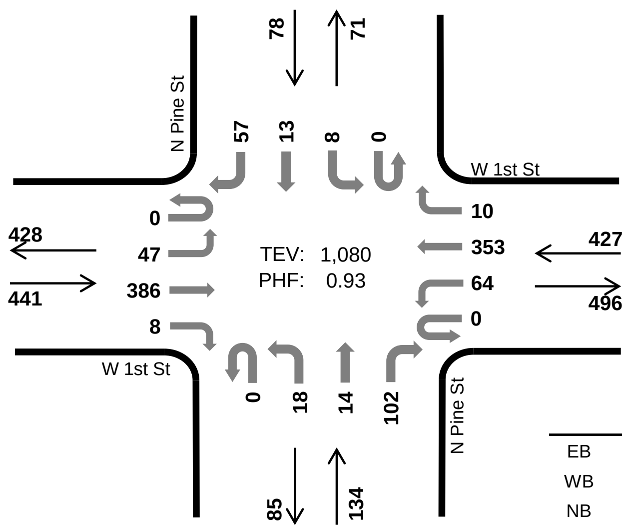
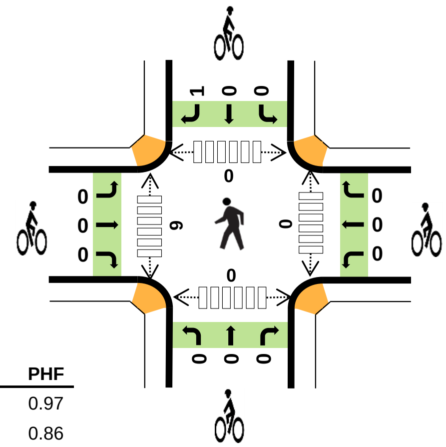
N Pine St
W 1st St

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 3:00 PM to 4:00 PM

Peak Hour





	HV %:	PHF
EB	4.3%	0.97
WB	2.1%	0.86
NB	1.5%	0.82
SB	1.3%	0.81
TOTAL	2.9%	0.93

Two-Hour Count Summaries

Interval Start		W 1st St Eastbound UT	LT	TH	RT	W 1st St Westbound UT	LT	TH	RT	N Pine St Northbound UT	LT	TH	RT	N Pine St Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
2:00 PM		0	11	81	0	0	9	94	5	0	1	1	22	0	2	2	19	247	0
2:15 PM		0	18	74	1	0	4	102	6	0	2	6	29	0	1	3	13	259	0
2:30 PM		0	12	78	2	0	12	95	2	0	5	1	25	0	3	2	9	246	0
2:45 PM		0	12	50	0	0	17	100	3	0	3	2	22	0	1	6	20	236	988
3:00 PM		**0**	**10**	**88**	**3**	**0**	**17**	**78**	**3**	**0**	**4**	**5**	**28**	**0**	**3**	**1**	**10**	**250**	991
3:15 PM		**0**	**10**	**101**	**2**	**0**	**9**	**91**	**2**	**0**	**1**	**2**	**23**	**0**	**2**	**3**	**12**	**258**	990
3:30 PM		**0**	**15**	**97**	**1**	**0**	**17**	**103**	**4**	**0**	**5**	**6**	**19**	**0**	**1**	**2**	**21**	**291**	1,035
3:45 PM		**0**	**12**	**100**	**2**	**0**	**21**	**81**	**1**	**0**	**8**	**1**	**32**	**0**	**2**	**7**	**14**	**281**	**1,080**
Count Total		0	100	669	11	0	106	744	26	0	29	24	200	0	15	26	118	2,068	0
Peak Hour	**All**	**0**	**47**	**386**	**8**	**0**	**64**	**353**	**10**	**0**	**18**	**14**	**102**	**0**	**8**	**13**	**57**	**1,080**	**0**
	HV	**0**	**0**	**19**	**0**	**0**	**2**	**7**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**31**	**0**
	HV%	**-**	**0%**	**5%**	**0%**	**-**	**3%**	**2%**	**0%**	**-**	**0%**	**0%**	**2%**	**-**	**0%**	**0%**	**2%**	**3%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
2:00 PM	2	4	1	0	*7*	0	0	0	0	*0*	0	0	0	4	*4*
2:15 PM	4	0	2	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
2:30 PM	3	2	0	0	*5*	0	0	0	0	*0*	0	0	0	1	*1*
2:45 PM	0	7	0	1	*8*	0	0	0	0	*0*	0	0	0	3	*3*
3:00 PM	**3**	**0**	**1**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	*2*
3:15 PM	**7**	**1**	**1**	**0**	***9***	**0**	**0**	**0**	**1**	***1***	**0**	**4**	**0**	**0**	*4*
3:30 PM	**6**	**5**	**0**	**0**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
3:45 PM	**3**	**3**	**0**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	*2*
Count Total	28	22	5	2	*57*	0	0	0	1	*1*	0	9	0	8	*17*
Peak Hour	**19**	**9**	**2**	**1**	***31***	**0**	**0**	**0**	**1**	***1***	**0**	**9**	**0**	**0**	***9***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St				W 1st St				N Pine St				N Pine St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	2	0	0	1	3	0	0	0	0	1	0	0	0	0	7	0
2:15 PM	0	0	4	0	0	0	0	0	0	0	1	1	0	0	0	0	6	0
2:30 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	5	0
2:45 PM	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	1	8	26
3:00 PM	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**5**	24
3:15 PM	**0**	**0**	**7**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**9**	27
3:30 PM	**0**	**0**	**6**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	33
3:45 PM	**0**	**0**	**3**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**31**
Count Total	0	0	28	0	0	4	18	0	0	0	1	4	0	0	0	2	57	0
Peak Hour	**0**	**0**	**19**	**0**	**0**	**2**	**7**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**31**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 1st St			W 1st St			N Pine St			N Pine St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	1
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Count Total	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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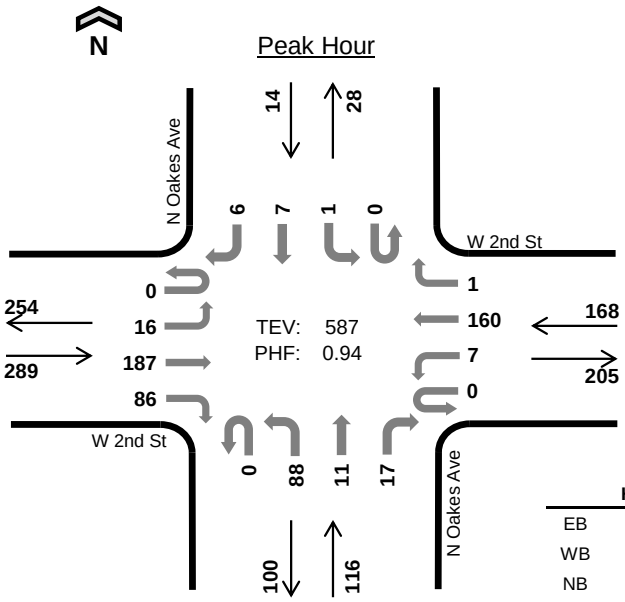
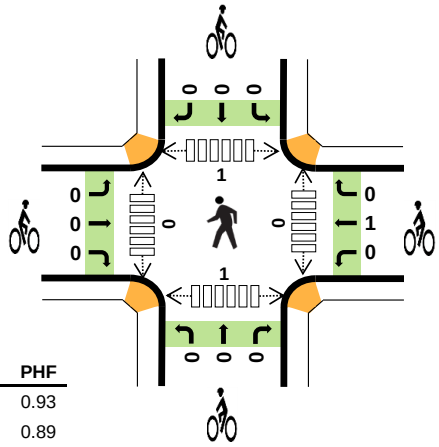
N Oakes Ave
W 2nd St



Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 2:00 PM to 3:00 PM



	HV %:	PHF
EB	3.8%	0.93
WB	3.6%	0.89
NB	2.6%	0.85
SB	7.1%	0.58
TOTAL	3.6%	0.94

Two-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		**0**	**1**	**42**	**19**	**0**	**4**	**42**	**1**	**0**	**22**	**2**	**5**	**0**	**0**	**3**	**2**	**143**	0
2:15 PM		**0**	**5**	**48**	**25**	**0**	**2**	**43**	**0**	**0**	**23**	**2**	**2**	**0**	**1**	**2**	**3**	**156**	0
2:30 PM		**0**	**6**	**48**	**23**	**0**	**0**	**34**	**0**	**0**	**25**	**4**	**5**	**0**	**0**	**0**	**0**	**145**	0
2:45 PM		**0**	**4**	**49**	**19**	**0**	**1**	**41**	**0**	**0**	**18**	**3**	**5**	**0**	**0**	**2**	**1**	**143**	**587**
3:00 PM		0	3	40	20	0	1	30	1	0	22	4	1	0	0	2	1	125	569
3:15 PM		0	5	60	15	0	1	36	2	0	14	4	1	0	1	0	2	141	554
3:30 PM		0	0	53	20	0	1	58	0	0	22	3	3	0	0	0	1	161	570
3:45 PM		0	1	47	17	0	0	45	0	0	19	1	3	0	2	3	7	145	572
Count Total		0	25	387	158	0	10	329	4	0	165	23	25	0	4	12	17	1,159	0
Peak Hour	**All**	**0**	**16**	**187**	**86**	**0**	**7**	**160**	**1**	**0**	**88**	**11**	**17**	**0**	**1**	**7**	**6**	**587**	**0**
	HV	**0**	**0**	**5**	**6**	**0**	**0**	**6**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**1**	**0**	**21**	**0**
	HV%	**-**	**0%**	**3%**	**7%**	**-**	**0%**	**4%**	**0%**	**-**	**3%**	**0%**	**0%**	**-**	**0%**	**14%**	**0%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	**1**	**1**	**1**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
2:15 PM	**3**	**1**	**0**	**0**	***4***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
2:30 PM	**4**	**3**	**2**	**0**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
2:45 PM	**3**	**1**	**0**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
3:00 PM	6	1	2	0	*9*	0	0	0	0	*0*	0	0	0	1	*1*
3:15 PM	1	0	0	0	*1*	1	0	0	0	*1*	0	0	0	0	*0*
3:30 PM	5	1	2	0	*8*	0	0	1	0	*1*	0	0	0	1	*1*
3:45 PM	2	4	1	1	*8*	0	0	0	0	*0*	5	0	0	0	*5*
Count Total	25	12	8	2	*47*	1	1	1	0	*3*	5	0	1	3	*9*
Peak Hour	**11**	**6**	**3**	**1**	***21***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**1**	**1**	***2***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	0
2:15 PM	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	0
2:30 PM	**0**	**0**	**2**	**2**	**0**	**0**	**3**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	0
2:45 PM	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**21**
3:00 PM	0	1	3	2	0	0	1	0	0	2	0	0	0	0	0	0	9	26
3:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	23
3:30 PM	0	0	3	2	0	0	1	0	0	1	1	0	0	0	0	0	8	22
3:45 PM	0	0	2	0	0	0	4	0	0	1	0	0	0	0	1	0	8	26
Count Total	0	1	14	10	0	0	12	0	0	7	1	0	0	0	2	0	47	0
Peak Hour	**0**	**0**	**5**	**6**	**0**	**0**	**6**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**1**	**0**	**21**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 2nd St Eastbound			W 2nd St Westbound			N Oakes Ave Northbound			N Oakes Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:15 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
2:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	1
3:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	2
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	1	0	1	0	1	0	0	0	0	0	3	0
Peak Hour	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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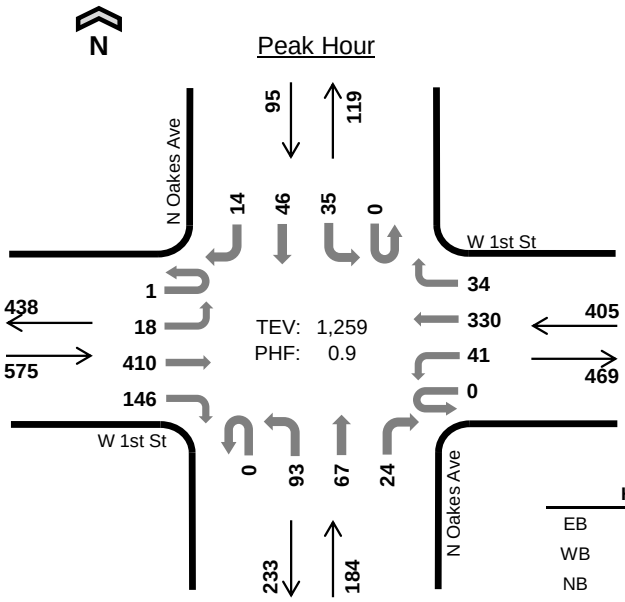
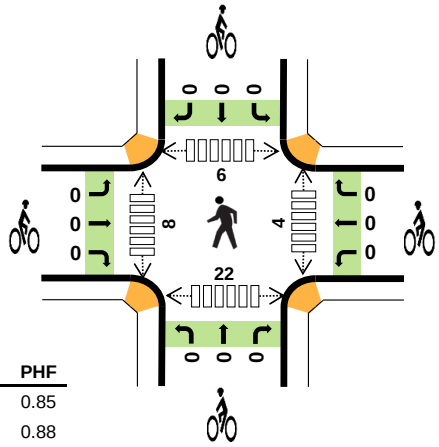
N Oakes Ave
W 1st St

Date: 06/24/2022
Count Period: 2:00 PM to 4:00 PM
Peak Hour: 2:15 PM to 3:15 PM





	HV %:	PHF
EB	5.0%	0.85
WB	3.0%	0.88
NB	5.4%	0.82
SB	10.5%	0.82
TOTAL	4.8%	0.90

Two-Hour Count Summaries

Interval Start		W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM		0	2	84	23	0	9	84	14	0	14	12	9	0	5	15	6	277	0
2:15 PM		**0**	**5**	**119**	**45**	**0**	**12**	**94**	**9**	**0**	**19**	**14**	**5**	**0**	**10**	**16**	**3**	**351**	0
2:30 PM		**0**	**5**	**93**	**30**	**0**	**8**	**83**	**12**	**0**	**27**	**17**	**4**	**0**	**8**	**10**	**1**	**298**	0
2:45 PM		**0**	**6**	**91**	**40**	**0**	**12**	**78**	**5**	**0**	**31**	**17**	**8**	**0**	**8**	**10**	**6**	**312**	1,238
3:00 PM		**1**	**2**	**107**	**31**	**0**	**9**	**75**	**8**	**0**	**16**	**19**	**7**	**0**	**9**	**10**	**4**	**298**	**1,259**
3:15 PM		0	2	101	41	0	17	86	7	0	16	8	10	0	7	7	2	304	1,212
3:30 PM		0	2	121	33	0	8	91	14	0	19	12	7	0	5	12	2	326	1,240
3:45 PM		0	3	103	42	0	9	66	7	0	25	14	9	0	4	10	5	297	1,225
Count Total		1	27	819	285	0	84	657	76	0	167	113	59	0	56	90	29	2,463	0
Peak Hour	**All**	**1**	**18**	**410**	**146**	**0**	**41**	**330**	**34**	**0**	**93**	**67**	**24**	**0**	**35**	**46**	**14**	**1,259**	**0**
	HV	**0**	**0**	**25**	**4**	**0**	**0**	**11**	**1**	**0**	**4**	**2**	**4**	**0**	**3**	**6**	**1**	**61**	**0**
	HV%	**0%**	**0%**	**6%**	**3%**	**-**	**0%**	**3%**	**3%**	**-**	**4%**	**3%**	**17%**	**-**	**9%**	**13%**	**7%**	**5%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
2:00 PM	2	6	3	2	*13*	0	0	0	0	*0*	5	0	5	1	*11*
2:15 PM	**8**	**2**	**0**	**3**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**2**	*4*
2:30 PM	**4**	**5**	**4**	**2**	***15***	**0**	**0**	**0**	**0**	***0***	**2**	**2**	**2**	**5**	*11*
2:45 PM	**7**	**4**	**4**	**3**	***18***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**1**	**7**	*9*
3:00 PM	**10**	**1**	**2**	**2**	***15***	**0**	**0**	**0**	**0**	***0***	**1**	**4**	**3**	**8**	***16***
3:15 PM	7	3	1	0	*11*	0	0	0	0	*0*	1	1	3	4	*9*
3:30 PM	13	2	4	3	*22*	0	0	0	0	*0*	0	0	0	3	*3*
3:45 PM	10	5	1	1	*17*	0	0	0	0	*0*	2	3	6	0	*11*
Count Total	61	28	19	16	*124*	0	0	0	0	*0*	12	12	20	30	*74*
Peak Hour	**29**	**12**	**10**	**10**	***61***	**0**	**0**	**0**	**0**	***0***	**4**	**8**	**6**	**22**	***40***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
2:00 PM	0	0	0	2	0	1	5	0	0	2	1	0	0	0	2	0	13	0
2:15 PM	**0**	**0**	**7**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**13**	0
2:30 PM	**0**	**0**	**4**	**0**	**0**	**0**	**5**	**0**	**0**	**1**	**1**	**2**	**0**	**0**	**2**	**0**	**15**	0
2:45 PM	**0**	**0**	**5**	**2**	**0**	**0**	**4**	**0**	**0**	**3**	**0**	**1**	**0**	**1**	**1**	**1**	**18**	59
3:00 PM	**0**	**0**	**9**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**0**	**15**	**61**
3:15 PM	0	0	2	5	0	1	2	0	0	1	0	0	0	0	0	0	11	59
3:30 PM	0	0	11	2	0	0	2	0	0	3	1	0	0	0	3	0	22	66
3:45 PM	0	0	9	1	0	1	3	1	0	1	0	0	0	0	1	0	17	65
Count Total	0	0	47	14	0	3	23	2	0	11	4	4	0	3	12	1	124	0
Peak Hour	**0**	**0**	**25**	**4**	**0**	**0**	**11**	**1**	**0**	**4**	**2**	**4**	**0**	**3**	**6**	**1**	**61**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 1st St Eastbound			W 1st St Westbound			N Oakes Ave Northbound			N Oakes Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
2:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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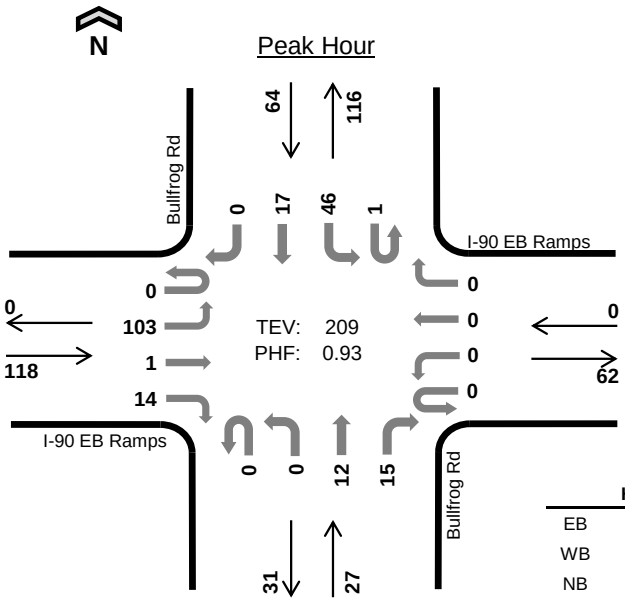
APPENDIX B (continued)

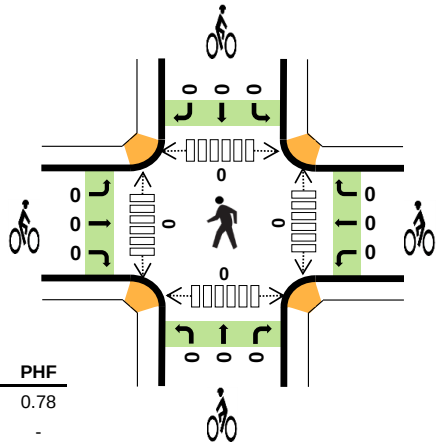
2022 Traffic Counts

Sunday Data Sheets

Bullfrog Rd
I-90 EB Ramps

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	0.8%	0.78
WB	-	-
NB	0.0%	0.61
SB	0.0%	0.62
TOTAL	0.5%	0.93

Two-Hour Count Summaries

Interval Start		I-90 EB Ramps Eastbound				I-90 EB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		**0**	**19**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**22**	**4**	**0**	**54**	0
3:15 PM		**0**	**27**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**4**	**1**	**9**	**3**	**0**	**51**	0
3:30 PM		**0**	**23**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**7**	**0**	**8**	**5**	**0**	**48**	0
3:45 PM		**0**	**34**	**1**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**7**	**5**	**0**	**56**	**209**
4:00 PM		0	20	0	3	0	0	0	0	0	0	5	0	0	4	3	0	35	190
4:15 PM		0	23	3	3	0	0	0	0	0	0	2	5	0	7	3	0	46	185
4:30 PM		0	19	1	2	0	0	0	0	0	0	4	2	0	8	2	0	38	175
4:45 PM		0	11	0	4	0	0	0	0	0	0	3	3	0	5	8	0	34	153
Count Total		0	176	5	26	0	0	0	0	0	0	26	25	1	70	33	0	362	0
Peak Hour	**All**	**0**	**103**	**1**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**15**	**1**	**46**	**17**	**0**	**209**	**0**
	HV	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
	HV%	**-**	**1%**	**0%**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**0%**	**0%**	**0%**	**0%**	**-**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	1	0	0	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	4	0	0	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 EB Ramps				I-90 EB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2	4
Count Total	0	3	0	1	0	0	0	0	0	0	0	0	0	0	1	0	5	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	I-90 EB Ramps			I-90 EB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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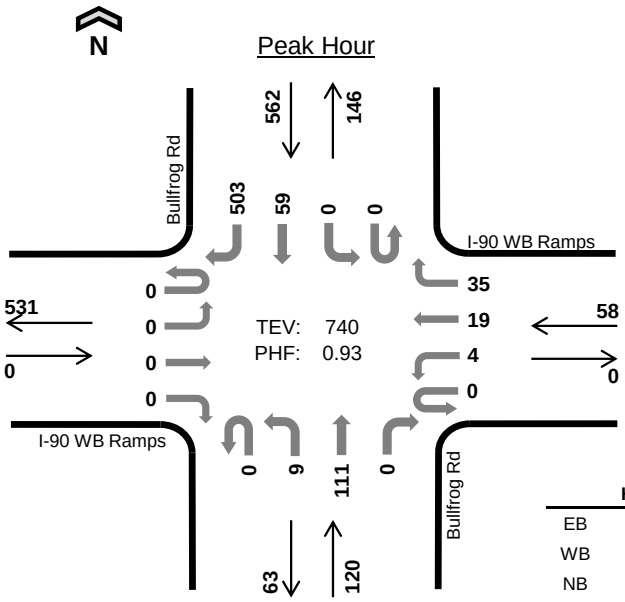
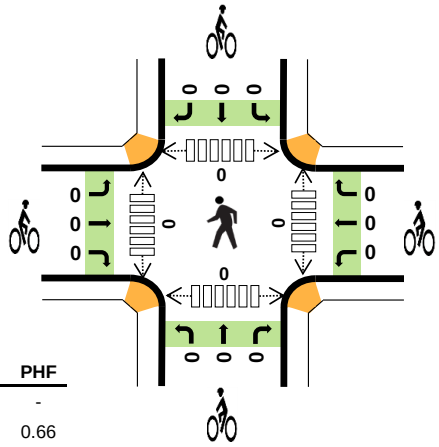
Bullfrog Rd
I-90 WB Ramps

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	-	-
WB	5.2%	0.66
NB	0.0%	0.79
SB	2.0%	0.91
TOTAL	1.9%	0.93

Two-Hour Count Summaries

Interval Start		I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		**0**	**0**	**0**	**0**	**0**	**2**	**10**	**10**	**0**	**3**	**21**	**0**	**0**	**0**	**24**	**130**	**200**	0
3:15 PM		**0**	**0**	**0**	**0**	**0**	**0**	**4**	**10**	**0**	**3**	**28**	**0**	**0**	**0**	**13**	**124**	**182**	0
3:30 PM		**0**	**0**	**0**	**0**	**0**	**1**	**3**	**8**	**0**	**2**	**25**	**0**	**0**	**0**	**12**	**128**	**179**	0
3:45 PM		**0**	**0**	**0**	**0**	**0**	**1**	**2**	**7**	**0**	**1**	**37**	**0**	**0**	**0**	**10**	**121**	**179**	**740**
4:00 PM		0	0	0	0	0	1	3	9	0	1	23	0	0	0	7	126	170	710
4:15 PM		0	0	0	0	0	1	4	3	0	1	26	0	0	0	9	146	190	718
4:30 PM		0	0	0	0	0	2	0	4	0	1	19	0	0	0	8	156	190	729
4:45 PM		0	0	0	0	0	2	5	5	0	4	13	0	0	0	11	125	165	715
Count Total		0	0	0	0	0	10	31	56	0	16	192	0	0	0	94	1,056	1,455	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**4**	**19**	**35**	**0**	**9**	**111**	**0**	**0**	**0**	**59**	**503**	**740**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**10**	**14**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**11%**	**3%**	**-**	**0%**	**0%**	**-**	**-**	**-**	**2%**	**2%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**1**	**0**	**4**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**2**	**0**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	0	5	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	1	1	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	4	3	22	*29*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**3**	**0**	**11**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 WB Ramps				I-90 WB Ramps				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**3**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**5**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**4**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**14**
4:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	4	15
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	12
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	13
4:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	4	15
Count Total	0	0	0	0	0	0	3	1	0	2	1	0	0	0	3	19	29	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**10**	**14**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	I-90 WB Ramps			I-90 WB Ramps			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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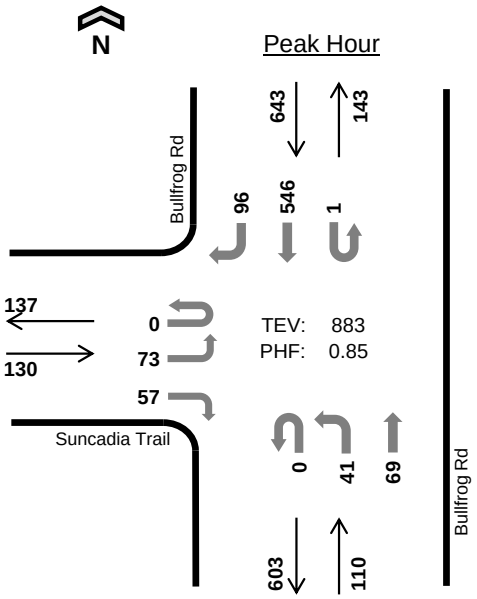
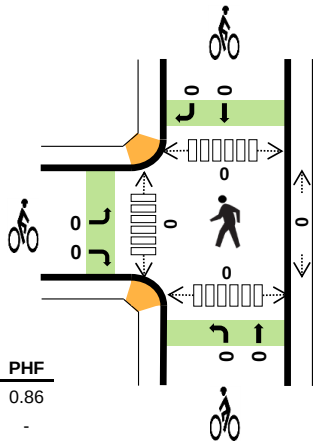
Bullfrog Rd
Suncadia Trail



Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	1.5%	0.86
WB	-	-
NB	2.7%	0.83
SB	1.6%	0.83
TOTAL	1.7%	0.85

Two-Hour Count Summaries

Interval Start		Suncadia Trail Eastbound				0 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	22	0	21	0	0	0	0	0	16	22	0	0	0	114	19	214	0
3:15 PM		0	21	0	19	0	0	0	0	0	13	18	0	0	0	118	18	207	0
3:30 PM		0	21	0	28	0	0	0	0	0	14	17	0	0	0	112	24	216	0
3:45 PM		0	22	0	16	0	0	0	0	0	18	15	0	1	0	104	20	196	833
4:00 PM		**0**	**14**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**13**	**17**	**0**	**0**	**0**	**118**	**23**	**198**	817
4:15 PM		**0**	**19**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**12**	**21**	**0**	**0**	**0**	**165**	**28**	**259**	869
4:30 PM		**0**	**19**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**12**	**17**	**0**	**0**	**0**	**127**	**24**	**212**	865
4:45 PM		**0**	**21**	**0**	**17**	**0**	**0**	**0**	**0**	**0**	**4**	**14**	**0**	**1**	**0**	**136**	**21**	**214**	**883**
Count Total		0	159	0	141	0	0	0	0	0	102	141	0	2	0	994	177	1,716	0
Peak Hour	**All**	**0**	**73**	**0**	**57**	**0**	**0**	**0**	**0**	**0**	**41**	**69**	**0**	**1**	**0**	**546**	**96**	**883**	**0**
	HV	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**10**	**0**	**15**	**0**
	HV%	**-**	**3%**	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**5%**	**1%**	**-**	**0%**	**-**	**2%**	**0%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	0	0	0	4	*4*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	0	1	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	0	0	1	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:00 PM	**1**	**0**	**0**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**1**	**0**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**0**	**2**	**3**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	2	0	5	19	*26*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**2**	**0**	**3**	**10**	***15***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Suncadia Trail				0				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	4	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	3	0
3:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	3	11
4:00 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	13
4:15 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**4**	13
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	**0**	**5**	15
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**15**
Count Total	0	2	0	0	0	0	0	0	0	3	2	0	0	0	17	2	26	0
Peak Hour	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**10**	**0**	**15**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Suncadia Trail			0			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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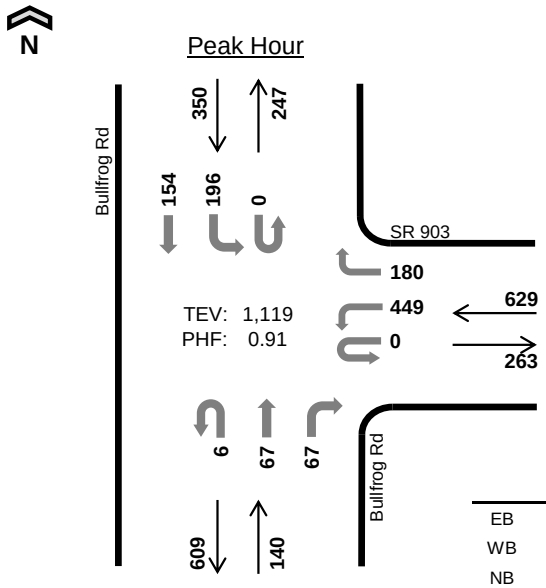
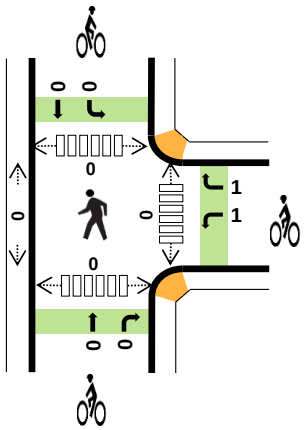
Bullfrog Rd
SR 903

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	-	-
WB	1.3%	0.94
NB	1.4%	0.85
SB	1.4%	0.90
TOTAL	1.3%	0.91



Two-Hour Count Summaries

Interval Start		0 Eastbound				SR 903 Westbound				Bullfrog Rd Northbound				Bullfrog Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	0	0	0	80	0	40	1	0	25	19	0	59	56	0	280	0
3:15 PM		0	0	0	0	0	90	0	42	0	0	19	22	0	52	37	0	262	0
3:30 PM		0	0	0	0	0	96	0	45	0	0	20	21	0	54	38	0	274	0
3:45 PM		0	0	0	0	0	92	0	43	1	0	15	29	0	46	43	0	269	1,085
4:00 PM		**0**	**0**	**0**	**0**	**0**	**103**	**0**	**48**	**0**	**0**	**15**	**16**	**0**	**50**	**36**	**0**	**268**	1,073
4:15 PM		**0**	**0**	**0**	**0**	**0**	**127**	**0**	**41**	**5**	**0**	**12**	**24**	**0**	**55**	**42**	**0**	**306**	1,117
4:30 PM		**0**	**0**	**0**	**0**	**0**	**106**	**0**	**36**	**1**	**0**	**21**	**10**	**0**	**40**	**34**	**0**	**248**	1,091
4:45 PM		**0**	**0**	**0**	**0**	**0**	**113**	**0**	**55**	**0**	**0**	**19**	**17**	**0**	**51**	**42**	**0**	**297**	**1,119**
Count Total		0	0	0	0	0	807	0	350	8	0	146	158	0	407	328	0	2,204	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**449**	**0**	**180**	**6**	**0**	**67**	**67**	**0**	**196**	**154**	**0**	**1,119**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**3**	**2**	**0**	**15**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**2%**	**-**	**1%**	**0%**	**-**	**1%**	**1%**	**-**	**2%**	**1%**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	0	2	1	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	0	4	0	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	2	1	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	0	0	0	3	*3*	0	0	1	0	*1*	0	0	0	0	*0*
4:00 PM	**0**	**2**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**3**	**0**	**1**	***4***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**2**	**0**	**2**	***4***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
Count Total	0	16	4	10	*30*	0	2	1	0	*3*	0	0	0	0	*0*
Peak Hr	**0**	**8**	**2**	**5**	***15***	**0**	**2**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				SR 903				Bullfrog Rd				Bullfrog Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	1	1	0	5	0
3:15 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	0
3:30 PM	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	15
4:00 PM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**3**	13
4:15 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**4**	13
4:30 PM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**4**	14
4:45 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**4**	**15**
Count Total	0	0	0	0	0	15	0	1	0	0	2	2	0	4	6	0	30	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**3**	**2**	**0**	**15**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	0			SR 903			Bullfrog Rd			Bullfrog Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	1
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:30 PM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	2
4:45 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**
Count Total	0	0	0	1	0	1	0	1	0	0	0	0	3	0
Peak Hour	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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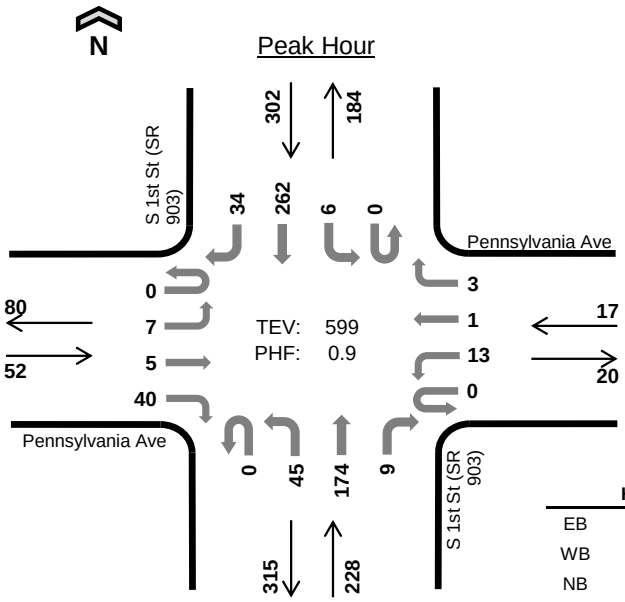
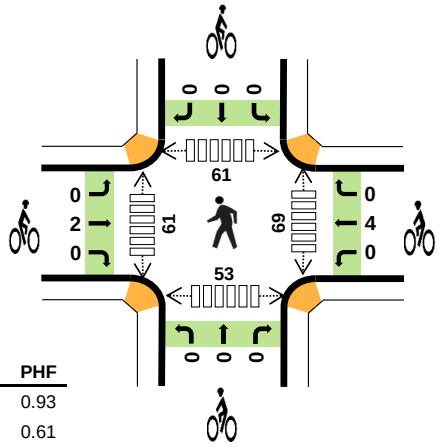
S 1st St (SR 903)
Pennsylvania Ave



Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	0.0%	0.93
WB	0.0%	0.61
NB	1.8%	0.88
SB	1.0%	0.92
TOTAL	1.2%	0.90

Two-Hour Count Summaries

Interval Start		Pennsylvania Ave Eastbound				Pennsylvania Ave Westbound				S 1st St (SR 903) Northbound				S 1st St (SR 903) Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	0	5	0	7	0	1	0	0	57	5	0	1	57	0	133	0
3:15 PM		0	2	1	6	0	1	0	1	0	6	45	4	0	1	53	2	122	0
3:30 PM		0	5	2	10	0	4	0	1	0	10	50	4	0	2	51	6	145	0
3:45 PM		0	1	0	10	0	0	1	0	0	12	37	3	0	1	55	5	125	525
4:00 PM		**0**	**0**	**0**	**14**	**0**	**5**	**0**	**0**	**0**	**11**	**52**	**2**	**0**	**1**	**73**	**8**	**166**	558
4:15 PM		**0**	**4**	**3**	**6**	**0**	**5**	**1**	**1**	**0**	**6**	**44**	**2**	**0**	**1**	**62**	**7**	**142**	578
4:30 PM		**0**	**2**	**0**	**12**	**0**	**0**	**0**	**1**	**0**	**16**	**29**	**2**	**0**	**1**	**65**	**11**	**139**	572
4:45 PM		**0**	**1**	**2**	**8**	**0**	**3**	**0**	**1**	**0**	**12**	**49**	**3**	**0**	**3**	**62**	**8**	**152**	**599**
Count Total		0	15	8	71	0	25	2	6	0	73	363	25	0	11	478	47	1,124	0
Peak Hour	**All**	**0**	**7**	**5**	**40**	**0**	**13**	**1**	**3**	**0**	**45**	**174**	**9**	**0**	**6**	**262**	**34**	**599**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**7**	**0**
	HV%	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**2%**	**0%**	**-**	**0%**	**1%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	0	0	0	1	*1*	0	0	0	0	*0*	7	9	22	28	*66*
3:15 PM	1	0	0	0	*1*	0	0	0	0	*0*	22	19	13	21	*75*
3:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	22	7	34	36	*99*
3:45 PM	0	0	1	1	*2*	2	2	0	0	*4*	22	20	23	28	*93*
4:00 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**11**	**12**	**12**	**5**	*40*
4:15 PM	**0**	**0**	**1**	**1**	***2***	**0**	**2**	**0**	**0**	***2***	**8**	**11**	**16**	**12**	*47*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**2**	**2**	**0**	**0**	***4***	**20**	**22**	**20**	**17**	*79*
4:45 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**30**	**16**	**13**	**19**	***78***
Count Total	1	0	5	5	*11*	4	6	0	0	*10*	142	116	153	166	*577*
Peak Hour	**0**	**0**	**4**	**3**	***7***	**2**	**4**	**0**	**0**	***6***	**69**	**61**	**61**	**53**	***244***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Pennsylvania Ave				Pennsylvania Ave				S 1st St (SR 903)				S 1st St (SR 903)				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
3:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	4
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	5
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	6
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	7
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**7**
Count Total	0	0	1	0	0	0	0	0	0	0	4	1	0	0	5	0	11	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**7**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	Pennsylvania Ave			Pennsylvania Ave			S 1st St (SR 903)			S 1st St (SR 903)			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	2	0	0	0	2	0	0	0	0	0	0	4	4
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	4
4:15 PM	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	6
4:30 PM	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	10
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**
Count Total	0	4	0	0	4	2	0	0	0	0	0	0	10	0
Peak Hour	**0**	**2**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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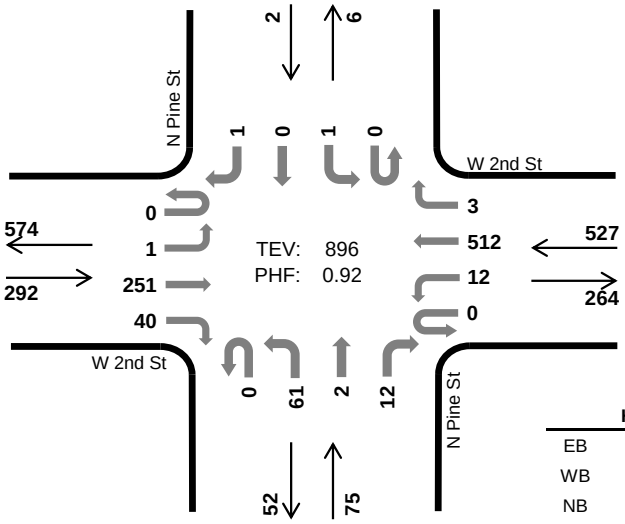
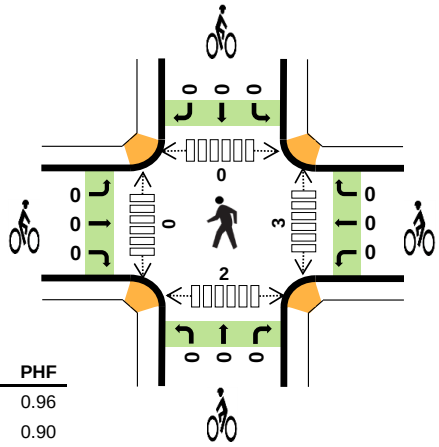
N Pine St
W 2nd St

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:30 PM to 4:30 PM

Peak Hour





	HV %:	PHF
EB	0.7%	0.96
WB	0.8%	0.90
NB	1.3%	0.82
SB	0.0%	0.50
TOTAL	0.8%	0.92

Two-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	75	5	0	2	101	1	0	15	0	2	0	0	0	0	201	0
3:15 PM		0	1	73	11	0	4	135	1	0	13	0	1	0	1	0	0	240	0
3:30 PM		**0**	**0**	**61**	**11**	**0**	**3**	**123**	**0**	**0**	**10**	**1**	**2**	**0**	**1**	**0**	**0**	**212**	0
3:45 PM		**0**	**1**	**69**	**6**	**0**	**4**	**121**	**0**	**0**	**13**	**0**	**6**	**0**	**0**	**0**	**1**	**221**	874
4:00 PM		**0**	**0**	**60**	**10**	**0**	**0**	**129**	**1**	**0**	**17**	**1**	**2**	**0**	**0**	**0**	**0**	**220**	893
4:15 PM		**0**	**0**	**61**	**13**	**0**	**5**	**139**	**2**	**0**	**21**	**0**	**2**	**0**	**0**	**0**	**0**	**243**	**896**
4:30 PM		0	0	55	3	0	2	135	0	0	16	0	1	0	0	0	0	212	896
4:45 PM		0	0	54	8	0	1	133	0	0	21	0	4	0	0	0	0	221	896
Count Total		0	2	508	67	0	21	1,016	5	0	126	2	20	0	2	0	1	1,770	0
Peak Hour	**All**	**0**	**1**	**251**	**40**	**0**	**12**	**512**	**3**	**0**	**61**	**2**	**12**	**0**	**1**	**0**	**1**	**896**	**0**
	HV	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**
	HV%	**-**	**0%**	**1%**	**0%**	**-**	**0%**	**1%**	**0%**	**-**	**2%**	**0%**	**0%**	**-**	**0%**	**-**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	1	1	0	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
3:15 PM	1	5	0	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**1**	*3*
4:00 PM	**1**	**1**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
4:15 PM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
4:30 PM	1	3	0	0	*4*	1	0	0	0	*1*	0	0	0	1	*1*
4:45 PM	1	3	0	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	6	16	1	0	*23*	1	0	0	0	*1*	3	0	0	3	*6*
Peak Hour	**2**	**4**	**1**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**2**	***5***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St				W 2nd St				N Pine St				N Pine St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0
3:15 PM	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	6	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	9
4:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	10
4:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**7**
4:30 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	10
4:45 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	14
Count Total	0	0	6	0	0	0	16	0	0	1	0	0	0	0	0	0	23	0
Peak Hour	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 2nd St			W 2nd St			N Pine St			N Pine St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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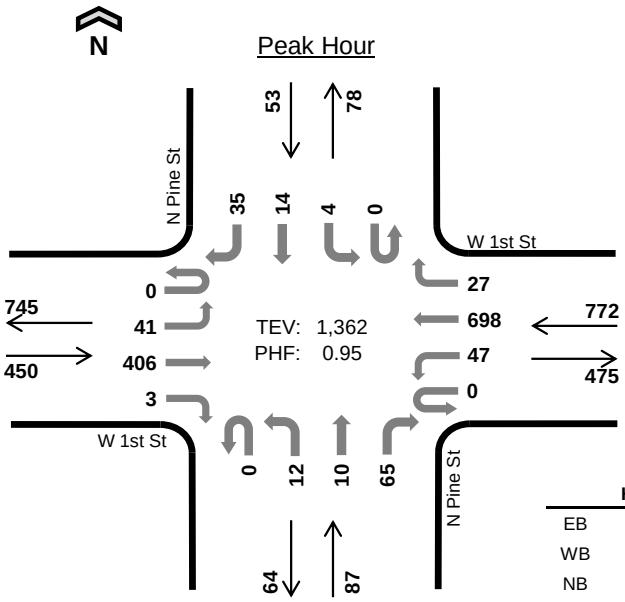
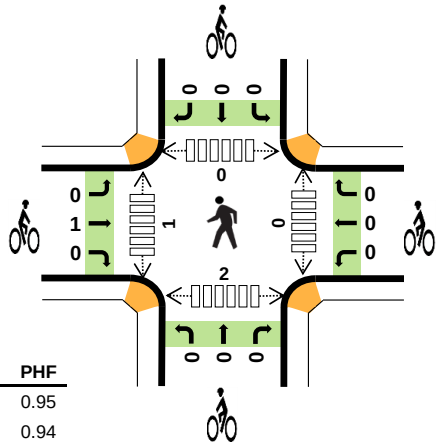
N Pine St
W 1st St

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:15 PM to 4:15 PM





	HV %:	PHF
EB	3.3%	0.95
WB	2.2%	0.94
NB	2.3%	0.81
SB	0.0%	0.88
TOTAL	2.5%	0.95

Two-Hour Count Summaries

Interval Start		W 1st St Eastbound				W 1st St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	9	95	3	0	12	186	3	0	1	1	21	0	1	2	5	339	0
3:15 PM		**0**	**7**	**107**	**1**	**0**	**17**	**165**	**7**	**0**	**5**	**1**	**21**	**0**	**2**	**4**	**9**	**346**	0
3:30 PM		**0**	**9**	**109**	**1**	**0**	**8**	**181**	**8**	**0**	**3**	**3**	**21**	**0**	**0**	**3**	**12**	**358**	0
3:45 PM		**0**	**12**	**102**	**0**	**0**	**10**	**165**	**5**	**0**	**1**	**1**	**9**	**0**	**2**	**2**	**6**	**315**	1,358
4:00 PM		**0**	**13**	**88**	**1**	**0**	**12**	**187**	**7**	**0**	**3**	**5**	**14**	**0**	**0**	**5**	**8**	**343**	**1,362**
4:15 PM		0	14	86	1	0	24	167	5	0	4	1	16	0	0	6	12	336	1,352
4:30 PM		0	4	85	1	0	11	194	2	0	4	2	10	0	0	2	6	321	1,315
4:45 PM		0	12	106	0	0	8	166	7	0	4	2	20	0	2	2	6	335	1,335
Count Total		0	80	778	8	0	102	1,411	44	0	25	16	132	0	7	26	64	2,693	0
Peak Hour	**All**	**0**	**41**	**406**	**3**	**0**	**47**	**698**	**27**	**0**	**12**	**10**	**65**	**0**	**4**	**14**	**35**	**1,362**	**0**
	HV	**0**	**0**	**15**	**0**	**0**	**0**	**17**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**34**	**0**
	HV%	**-**	**0%**	**4%**	**0%**	**-**	**0%**	**2%**	**0%**	**-**	**0%**	**10%**	**2%**	**-**	**0%**	**0%**	**0%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	3	7	0	0	*10*	0	0	0	0	*0*	0	0	0	1	*1*
3:15 PM	**6**	**6**	**1**	**0**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
3:30 PM	**3**	**2**	**0**	**0**	***5***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**2**	*2*
3:45 PM	**5**	**4**	**0**	**0**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:00 PM	**1**	**5**	**1**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:15 PM	4	9	1	0	*14*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	8	2	1	0	*11*	0	0	0	0	*0*	0	2	0	1	*3*
4:45 PM	6	10	0	0	*16*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	36	45	4	0	*85*	1	0	0	0	*1*	0	3	0	4	*7*
Peak Hour	**15**	**17**	**2**	**0**	***34***	**1**	**0**	**0**	**0**	***1***	**0**	**1**	**0**	**2**	***3***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Pine St Northbound				N Pine St Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	3	0	0	0	7	0	0	0	0	0	0	0	0	0	10	0
3:15 PM	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**13**	0
3:30 PM	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	0
3:45 PM	**0**	**0**	**5**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	37
4:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**7**	**34**
4:15 PM	0	0	4	0	0	0	9	0	0	0	0	1	0	0	0	0	14	35
4:30 PM	0	0	7	1	0	0	2	0	0	0	0	1	0	0	0	0	11	41
4:45 PM	0	0	6	0	0	0	10	0	0	0	0	0	0	0	0	0	16	48
Count Total	0	0	35	1	0	0	45	0	0	0	1	3	0	0	0	0	85	0
Peak Hour	**0**	**0**	**15**	**0**	**0**	**0**	**17**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**34**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 1st St Eastbound			W 1st St Westbound			N Pine St Northbound			N Pine St Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	1
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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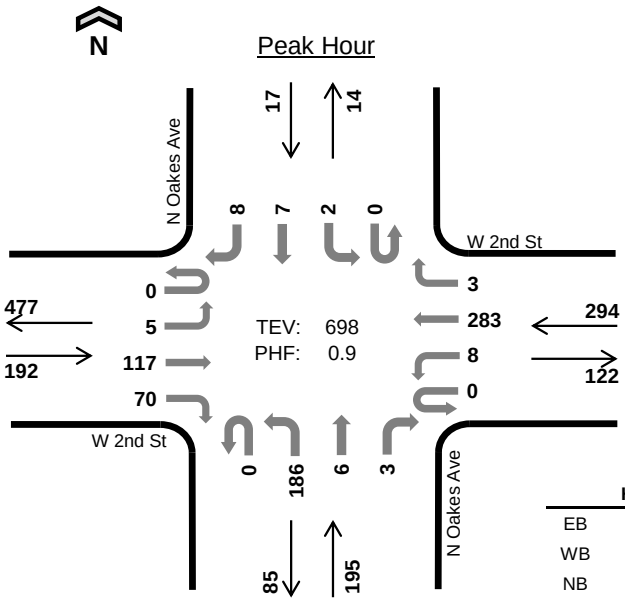
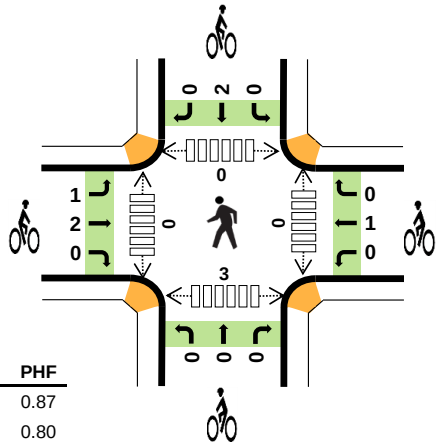
N Oakes Ave
W 2nd St

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:45 PM to 4:45 PM





	HV %:	PHF
EB	1.6%	0.87
WB	1.4%	0.80
NB	1.0%	0.86
SB	0.0%	0.47
TOTAL	1.3%	0.90

Two-Hour Count Summaries

Interval Start		W 2nd St Eastbound				W 2nd St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM		0	0	45	19	0	0	44	0	0	50	3	2	0	2	1	1	167	0
3:15 PM		0	3	18	24	0	2	45	1	0	63	1	1	0	0	1	0	159	0
3:30 PM		0	3	33	13	0	1	40	1	0	50	2	2	0	0	0	2	147	0
3:45 PM		**0**	**1**	**35**	**19**	**0**	**2**	**50**	**1**	**0**	**55**	**2**	**0**	**0**	**1**	**3**	**5**	**174**	647
4:00 PM		**0**	**1**	**23**	**20**	**0**	**2**	**54**	**1**	**0**	**47**	**3**	**0**	**0**	**0**	**1**	**1**	**153**	633
4:15 PM		**0**	**1**	**27**	**17**	**0**	**1**	**91**	**0**	**0**	**46**	**1**	**3**	**0**	**1**	**3**	**2**	**193**	667
4:30 PM		**0**	**2**	**32**	**14**	**0**	**3**	**88**	**1**	**0**	**38**	**0**	**0**	**0**	**0**	**0**	**0**	**178**	**698**
4:45 PM		0	2	31	14	0	3	59	2	0	55	0	2	0	0	0	0	168	692
Count Total		0	13	244	140	0	14	471	7	0	404	12	10	0	4	9	11	1,339	0
Peak Hour	**All**	**0**	**5**	**117**	**70**	**0**	**8**	**283**	**3**	**0**	**186**	**6**	**3**	**0**	**2**	**7**	**8**	**698**	**0**
	HV	**0**	**0**	**2**	**1**	**0**	**0**	**4**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**
	HV%	**-**	**0%**	**2%**	**1%**	**-**	**0%**	**1%**	**0%**	**-**	**1%**	**0%**	**0%**	**-**	**0%**	**0%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
3:00 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	1	*1*
3:15 PM	1	2	1	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
3:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
3:45 PM	**0**	**1**	**0**	**0**	***1***	**2**	**0**	**0**	**2**	***4***	**0**	**0**	**0**	**2**	*2*
4:00 PM	**1**	**0**	**1**	**0**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**1**	**1**	**1**	**0**	***3***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
4:45 PM	1	1	1	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	5	7	5	0	*17*	3	1	0	2	*6*	0	0	0	4	*4*
Peak Hour	**3**	**4**	**2**	**0**	***9***	**3**	**1**	**0**	**2**	***6***	**0**	**0**	**0**	**3**	***3***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 2nd St				W 2nd St				N Oakes Ave				N Oakes Ave				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
3:15 PM	0	0	0	1	0	0	2	0	0	1	0	0	0	0	0	0	4	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	6
4:00 PM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	7
4:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	6
4:30 PM	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**9**
4:45 PM	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	3	11
Count Total	0	0	2	3	0	0	7	0	0	5	0	0	0	0	0	0	17	0
Peak Hour	**0**	**0**	**2**	**1**	**0**	**0**	**4**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 2nd St			W 2nd St			N Oakes Ave			N Oakes Ave			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**4**	4
4:00 PM	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	5
4:15 PM	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	6
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	1	2	0	0	1	0	0	0	0	0	2	0	6	0
Peak Hour	**1**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**6**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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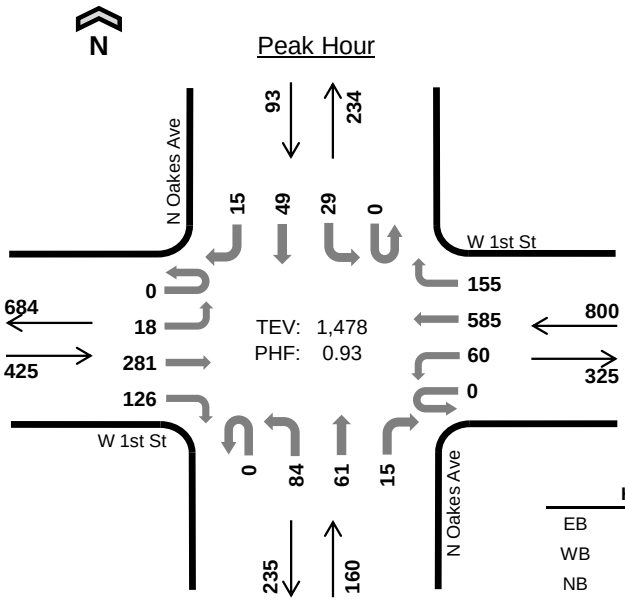
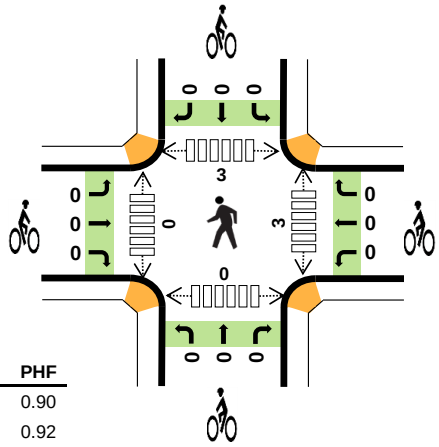
N Oakes Ave
W 1st St

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	1.6%	0.90
WB	2.1%	0.92
NB	2.5%	0.73
SB	1.1%	0.78
TOTAL	2.0%	0.93

Two-Hour Count Summaries

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**6**	**84**	**27**	**0**	**17**	**142**	**28**	**0**	**22**	**17**	**3**	**0**	**7**	**13**	**1**	**367**	0
3:15 PM	**0**	**3**	**74**	**41**	**0**	**18**	**149**	**50**	**0**	**15**	**13**	**4**	**0**	**10**	**14**	**6**	**397**	0
3:30 PM	**0**	**5**	**60**	**29**	**0**	**8**	**153**	**40**	**0**	**19**	**10**	**2**	**0**	**4**	**6**	**3**	**339**	0
3:45 PM	**0**	**4**	**63**	**29**	**0**	**17**	**141**	**37**	**0**	**28**	**21**	**6**	**0**	**8**	**16**	**5**	**375**	**1,478**
4:00 PM	0	1	58	25	0	8	174	36	0	14	10	5	0	8	16	0	355	1,466
4:15 PM	0	3	59	24	0	4	139	25	0	24	21	7	0	9	10	1	326	1,395
4:30 PM	0	2	47	34	0	7	139	25	0	36	12	3	0	6	11	0	322	1,378
4:45 PM	0	0	54	22	0	11	122	42	0	32	11	4	0	5	9	0	312	1,315
Count Total	0	24	499	231	0	90	1,159	283	0	190	115	34	0	57	95	16	2,793	0
Peak Hour All	**0**	**18**	**281**	**126**	**0**	**60**	**585**	**155**	**0**	**84**	**61**	**15**	**0**	**29**	**49**	**15**	**1,478**	**0**
Peak Hour HV	**0**	**1**	**4**	**2**	**0**	**1**	**15**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**0**	**29**	**0**
Peak Hour HV%	**-**	**6%**	**1%**	**2%**	**-**	**2%**	**3%**	**1%**	**-**	**4%**	**2%**	**0%**	**-**	**0%**	**2%**	**0%**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**2**	**4**	**1**	**0**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
3:15 PM	**1**	**6**	**1**	**1**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	*2*
3:30 PM	**1**	**2**	**1**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**3**	**5**	**1**	**0**	***9***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**0**	***3***
4:00 PM	2	4	1	1	*8*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	4	5	3	0	*12*	2	2	0	0	*4*	0	5	3	0	*8*
4:30 PM	5	1	1	1	*8*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	1	5	1	1	*8*	0	0	0	0	*0*	0	3	0	0	*3*
Count Total	19	32	10	4	*65*	2	2	0	0	*4*	3	8	6	0	*17*
Peak Hour	**7**	**17**	**4**	**1**	***29***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**3**	**0**	***6***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	W 1st St Eastbound				W 1st St Westbound				N Oakes Ave Northbound				N Oakes Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**1**	**1**	**0**	**0**	**0**	**4**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	0
3:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**9**	0
3:30 PM	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	0
3:45 PM	**0**	**0**	**2**	**1**	**0**	**0**	**5**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**29**
4:00 PM	0	0	0	2	0	0	3	1	0	1	0	0	0	0	1	0	8	30
4:15 PM	0	0	4	0	0	0	5	0	0	1	1	1	0	0	0	0	12	33
4:30 PM	0	0	4	1	0	0	1	0	0	0	0	1	0	1	0	0	8	37
4:45 PM	0	0	1	0	0	0	4	1	0	1	0	0	0	0	1	0	8	36
Count Total	0	1	13	5	0	1	28	3	0	6	2	2	0	1	3	0	65	0
Peak Hour	**0**	**1**	**4**	**2**	**0**	**1**	**15**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**0**	**29**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	W 1st St Eastbound			W 1st St Westbound			N Oakes Ave Northbound			N Oakes Ave Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	4	4
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Count Total	0	2	0	0	2	0	0	0	0	0	0	0	4	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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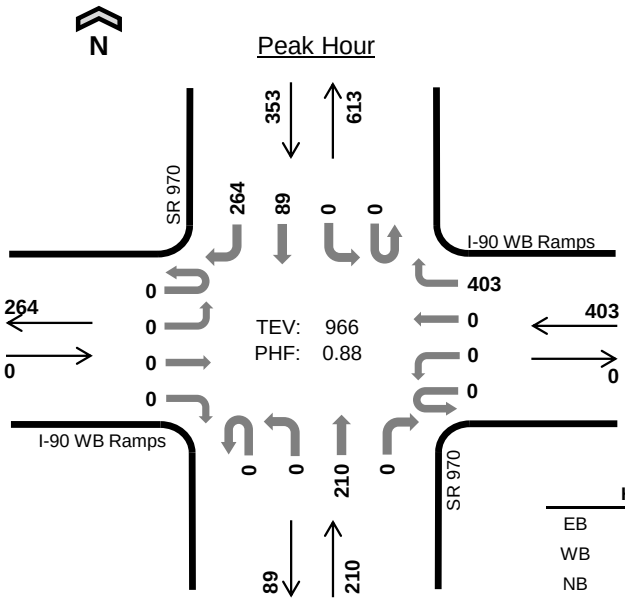
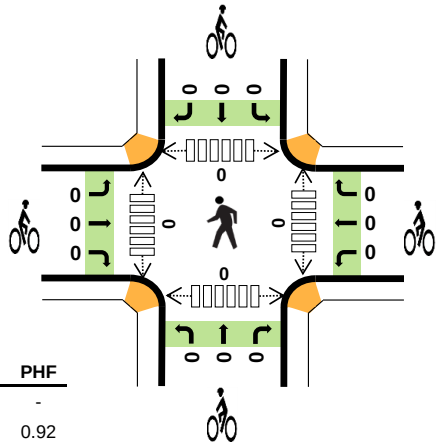
SR 970
I-90 WB Ramps

Date: 06/26/2022
Count Period: 3:00 PM to 5:00 PM
Peak Hour: 3:00 PM to 4:00 PM





	HV %:	PHF
EB	-	-
WB	4.0%	0.92
NB	1.9%	0.72
SB	4.0%	0.79
TOTAL	3.5%	0.88

Two-Hour Count Summaries

Interval Start	I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				SR 970 Northbound				SR 970 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**109**	**0**	**0**	**73**	**0**	**0**	**0**	**17**	**75**	**274**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**91**	**0**	**0**	**41**	**0**	**0**	**0**	**25**	**87**	**244**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**105**	**0**	**0**	**49**	**0**	**0**	**0**	**25**	**56**	**235**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**98**	**0**	**0**	**47**	**0**	**0**	**0**	**22**	**46**	**213**	**966**
4:00 PM	0	0	0	0	0	0	0	99	0	0	41	0	1	0	14	80	235	927
4:15 PM	0	0	0	0	0	0	0	88	0	0	52	0	0	0	22	49	211	894
4:30 PM	0	0	0	0	0	0	0	85	0	0	35	0	0	0	15	64	199	858
4:45 PM	0	0	0	0	0	0	0	124	0	0	23	0	0	0	10	41	198	843
Count Total	0	0	0	0	0	0	0	799	0	0	361	0	1	0	150	498	1,809	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**403**	**0**	**0**	**210**	**0**	**0**	**0**	**89**	**264**	**966**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**10**	**34**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4%**	**-**	**-**	**2%**	**-**	**-**	**-**	**4%**	**4%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:00 PM	**0**	**7**	**1**	**6**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:15 PM	**0**	**1**	**1**	**3**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:30 PM	**0**	**1**	**0**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
3:45 PM	**0**	**7**	**2**	**3**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
4:00 PM	0	3	0	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	4	2	1	*7*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	5	1	1	*7*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	6	0	2	*8*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	34	7	19	*60*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**16**	**4**	**14**	***34***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	I-90 WB Ramps Eastbound				I-90 WB Ramps Westbound				SR 970 Northbound				SR 970 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**3**	**14**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**2**	**5**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**3**	**12**	**34**
4:00 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	4	24
4:15 PM	0	0	0	0	0	0	0	4	0	0	2	0	0	0	1	0	7	26
4:30 PM	0	0	0	0	0	0	0	5	0	0	1	0	0	0	1	0	7	30
4:45 PM	0	0	0	0	0	0	0	6	0	0	0	0	0	0	1	1	8	26
Count Total	0	0	0	0	0	0	0	34	0	0	7	0	0	0	7	12	60	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**0**	**4**	**0**	**0**	**0**	**4**	**10**	**34**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	I-90 WB Ramps Eastbound			I-90 WB Ramps Westbound			SR 970 Northbound			SR 970 Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
3:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
3:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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APPENDIX C

Fehr & Peers Traffic Volume Forecast Methodology

FEHR PEERS

Memorandum

Date: October 25, 2022

To: Ben Annen, HLA

From: Daniel Dye, Fehr & Peers

Subject: 47° North Traffic Forecasts for 2022 Update

SE19-0680.00

This memo documents the methodology used to update traffic volume forecasts for the 47° North development in Cle Elum, Kittitas County, Washington. This forecasting builds on forecasts created for the SEIS, and accounts for changes in growth patterns observed in July 2022 traffic counts. These updated forecasts were needed for the updated transportation analysis that reflects a revised land use proposal and buildout timeline.

New Traffic Counts

TENW collected new traffic counts at ten representative intersections in July 2022 as part of efforts to update the 47° North Transportation Analysis for a revised land use proposal and buildout timeline. These counts were compared to summer 2019 counts collected at all study intersections as well as the forecasted traffic growth between 2019 and 2025.

Most 2022 counts were well aligned with the forecasted annual growth between 2019 and 2025. However, traffic volumes along Bullfrog Road outpaced the forecasted growth. This growth was unexpected since it occurred during the pandemic and overall growth in the City and County was in line with previous forecasts. Suncadia did experience greater than anticipated housing construction in this three-year period and overall recreational travel increased during the pandemic, which may account for this extra growth along Bullfrog Road. In order to reflect the faster than anticipated traffic growth, updated forecasts were developed for study intersections 1-6. Forecasts were not updated for the remaining study intersections.

Updated Forecast Methodology

2025 Forecasts

Traffic forecasts previously completed for intersections 1-6 and the 2025 horizon year were updated to reflect the faster growth observed in the 2022 counts in the following way:

- Approximately 12% annual growth in volumes from 2019-2022 (matching the approximate increase shown in the 2019-2022 traffic counts)
- Approximately 7% annual growth in volumes from 2023-2025 (matching the originally forecasted 2019-2025 growth)

This approach acknowledges that faster than expected growth has occurred but may not continue at the same elevated rate. The forecasted annual traffic growth rate of 7% on Bullfrog Road is considerably higher than most fast-growing areas, reflecting continued development at Suncadia and other recreational demand increases for areas served by Bullfrog Road.

2031 and 2037 Forecasts

Although 2022 counts demonstrated that growth has been faster than forecast since 2019, the overall growth between 2025-2037 is not anticipated to increase based on a few years of faster growth. Therefore, the increase in forecasted traffic volumes between 2025 and 2031 and between 2031 and 2037 were added to the new increased 2025 forecasts but the growth rates were not increased. This results in overall higher 2031 and 2037 baseline traffic volumes at study intersections 1-6 when added to the increased 2025 forecasts.

Adjustments were made to 2031 and 2037 future traffic forecasts entering and leaving Suncadia to reflect that although building permits have increased between 2019 and 2021 (approximately 100 housing units per year as opposed to the SEIS anticipated 45 units per year), Suncadia's total authorized unit amount is fixed.

Volume balancing

Updated forecasts at intersections 1-6 were manually adjusted or balanced to account for minor differences in volumes introduced through the updated forecasting process.

APPENDIX D

Traffic Volume Figures

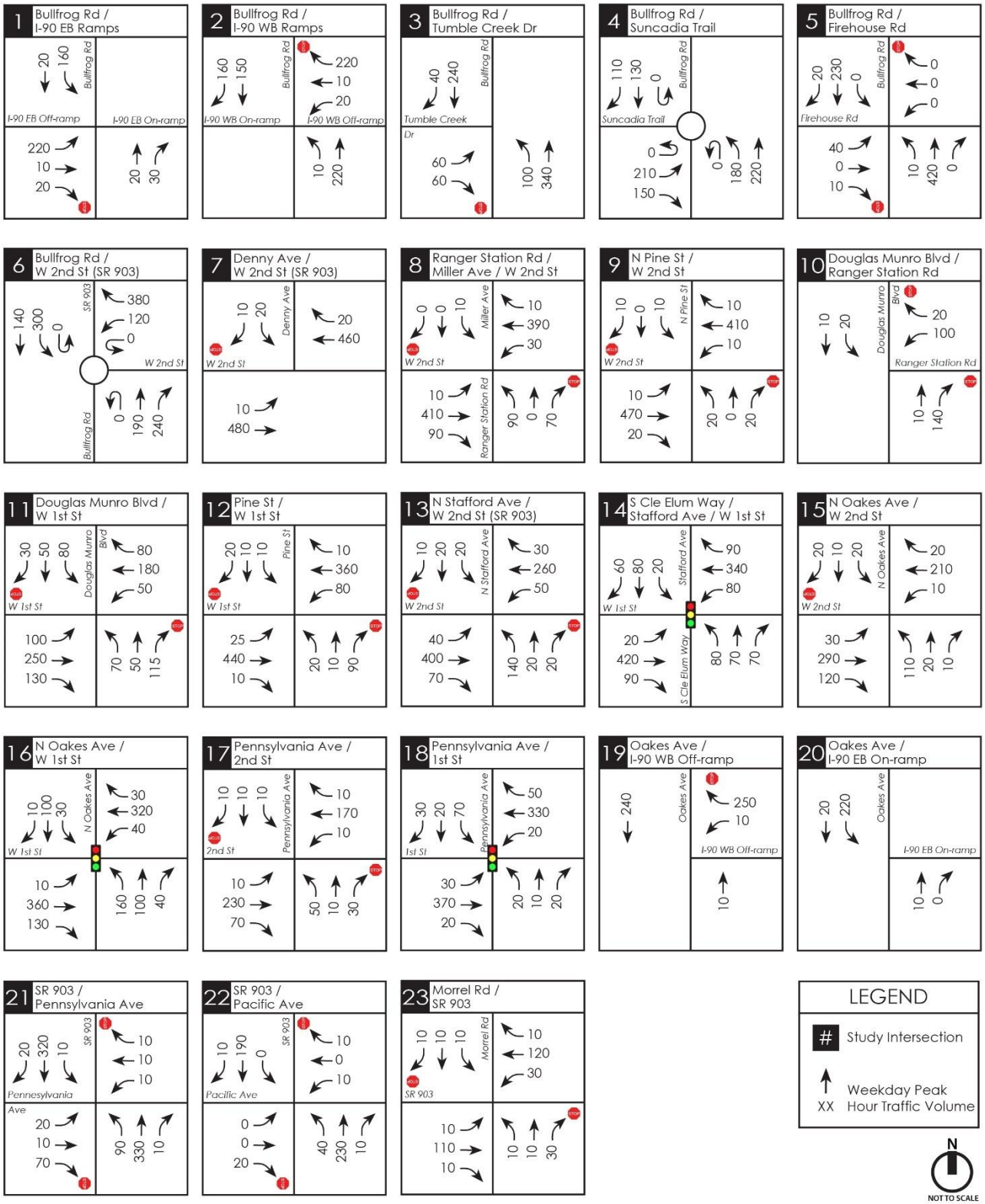


Figure 1: 2025 Baseline Weekday PM Peak Hour Traffic Volumes

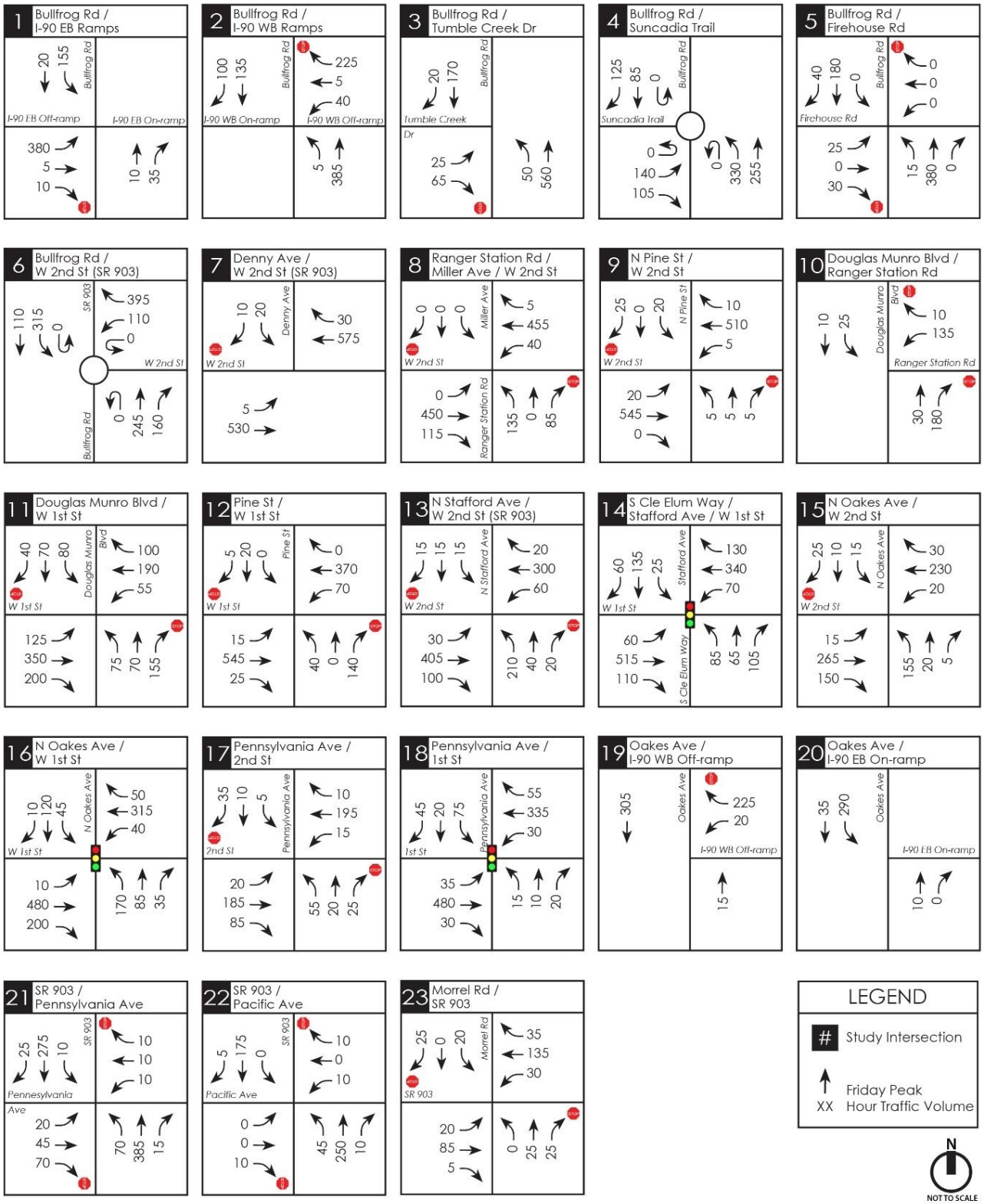


Figure 2: 2025 Baseline Friday PM Peak Hour Traffic Volumes

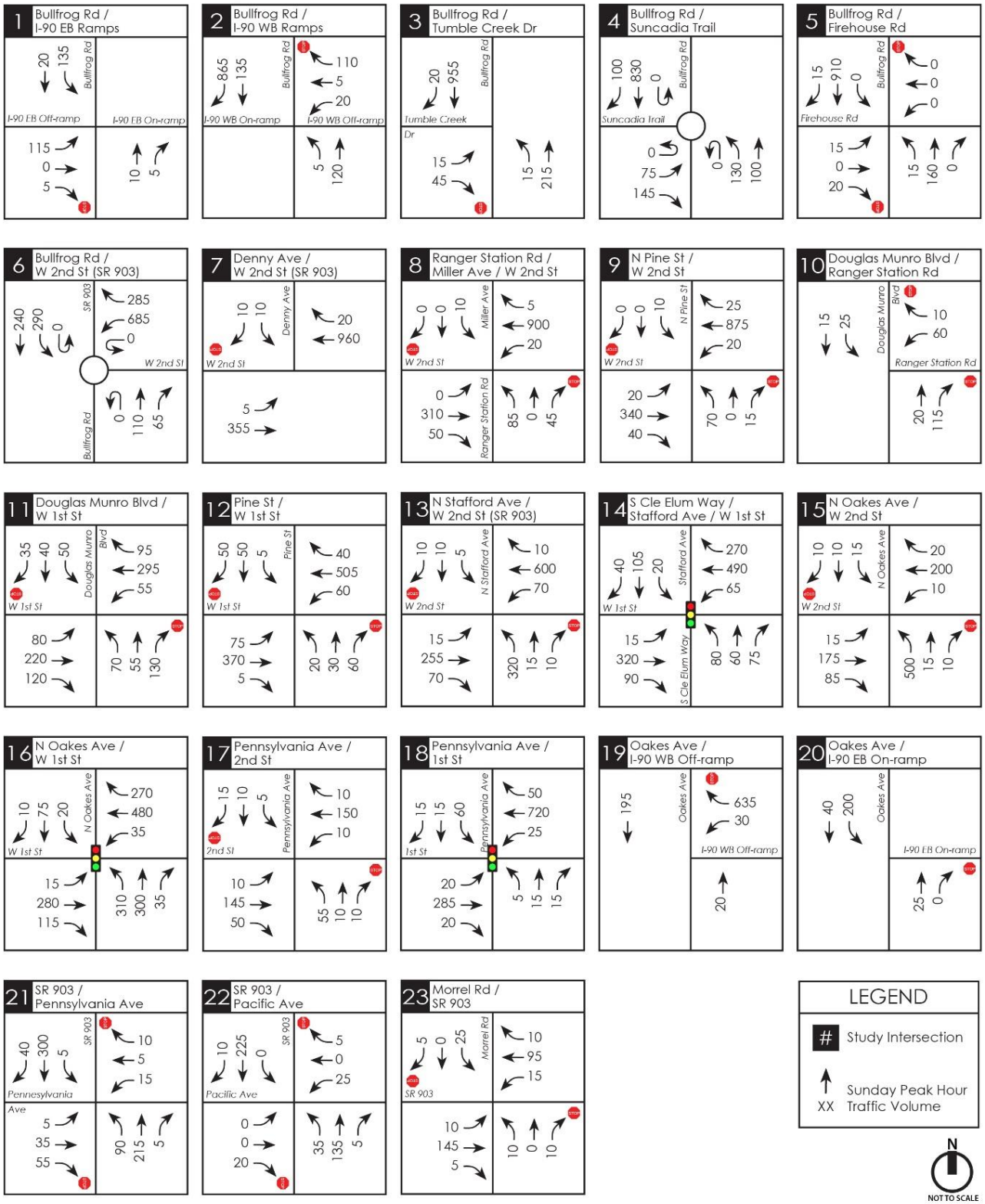


Figure 3: 2025 Baseline Sunday Peak Hour Traffic Volumes (Page 1)

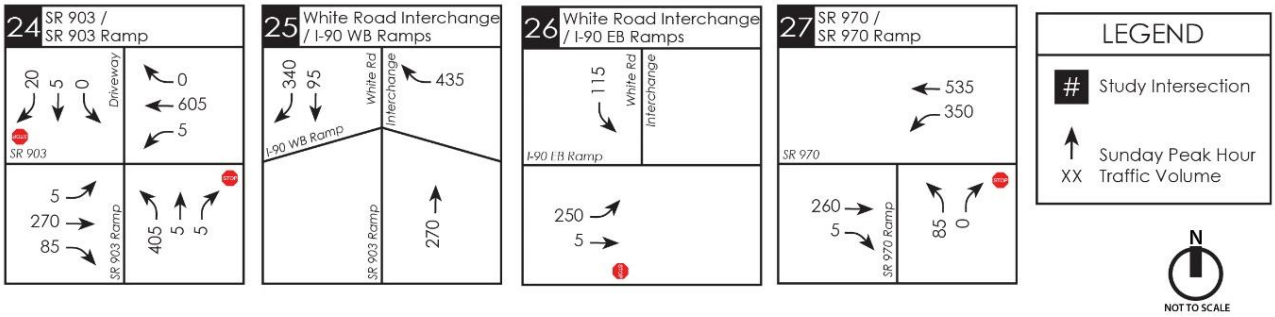


Figure 3: 2025 Baseline Sunday Peak Hour Traffic Volumes (Page 2)

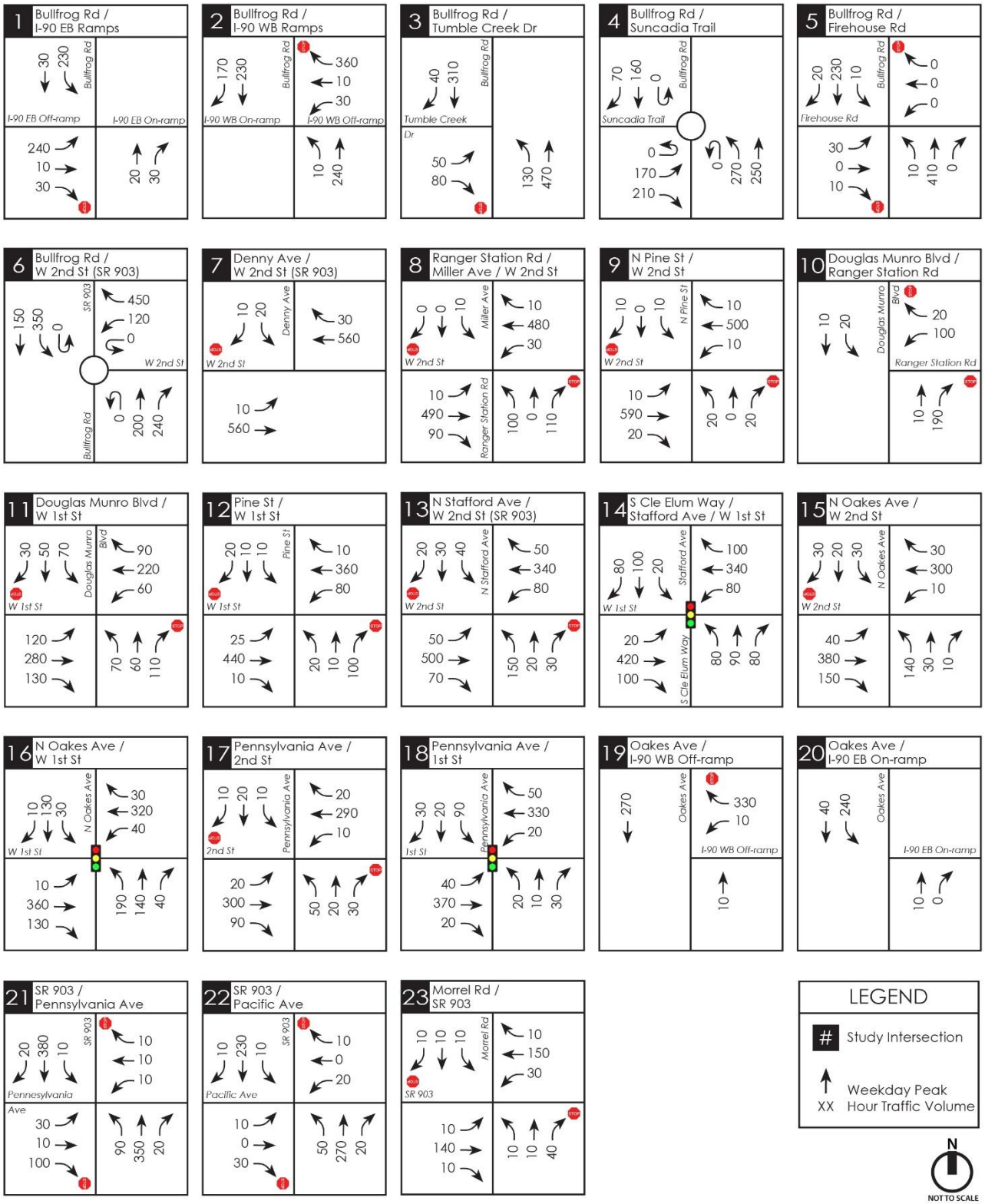


Figure 4: 2031 Baseline Weekday PM Peak Hour Traffic Volumes

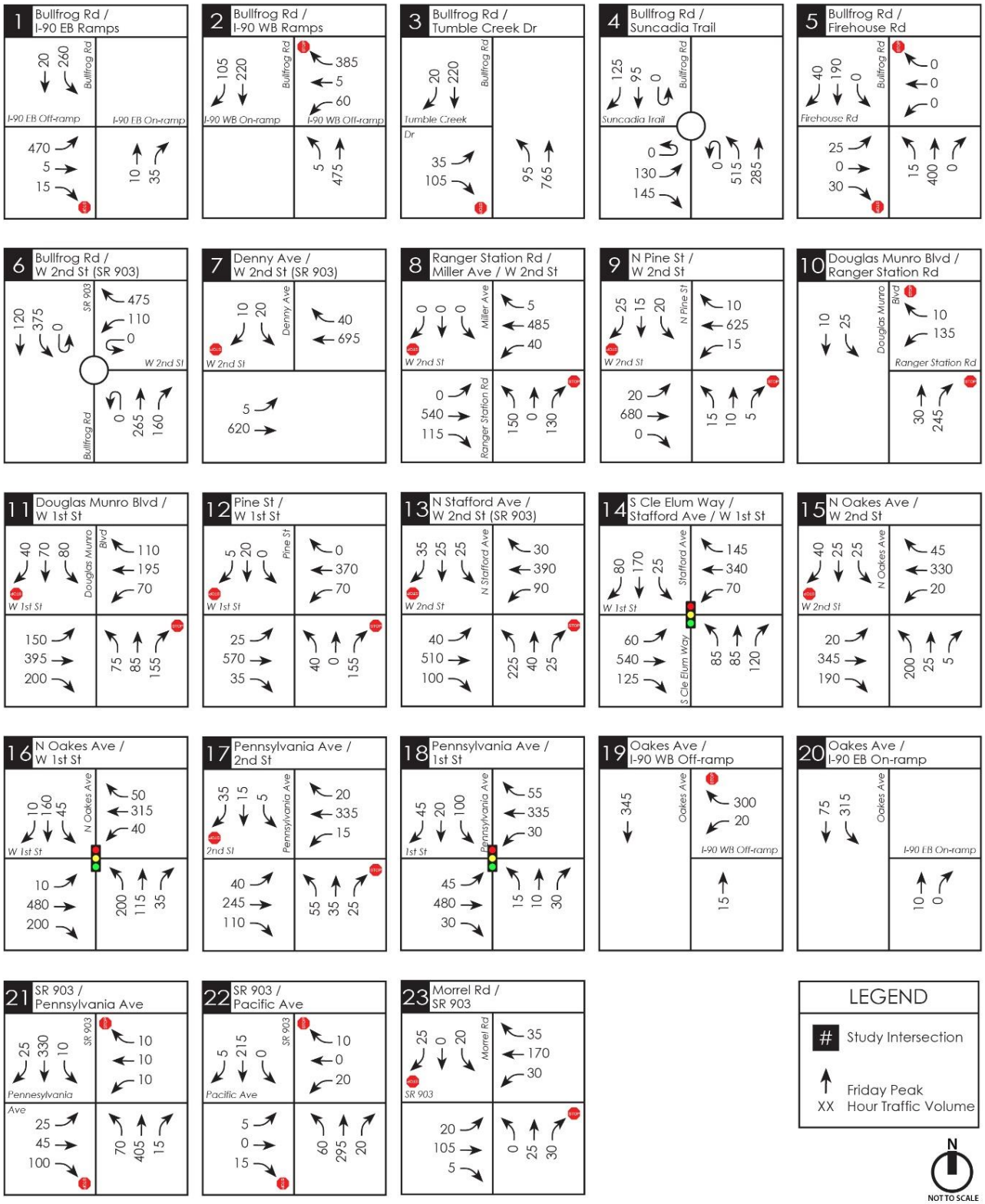


Figure 5: 2031 Baseline Friday PM Peak Hour Traffic Volumes

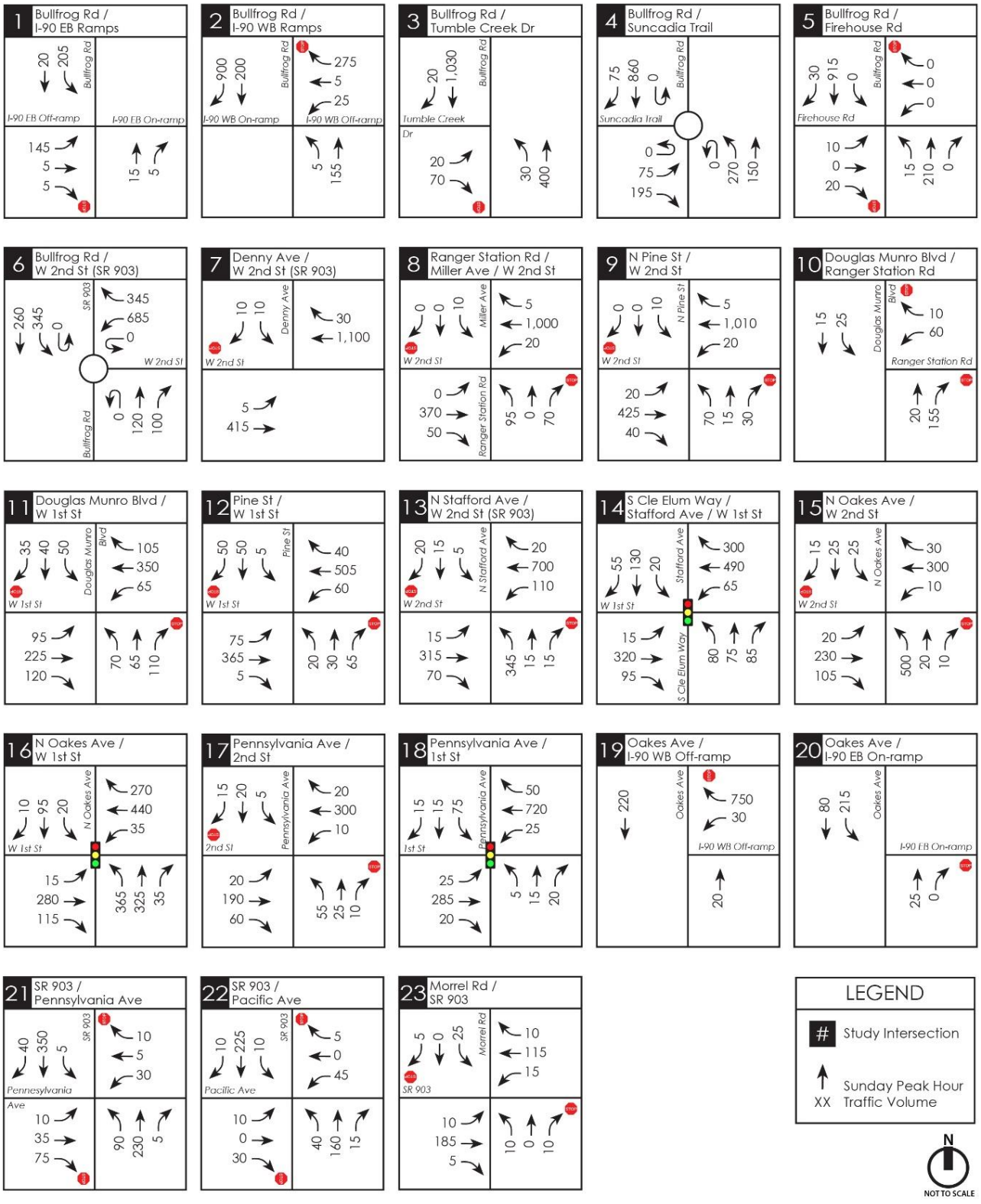


Figure 6: 2031 Baseline Sunday Peak Hour Traffic Volumes (Page 1)

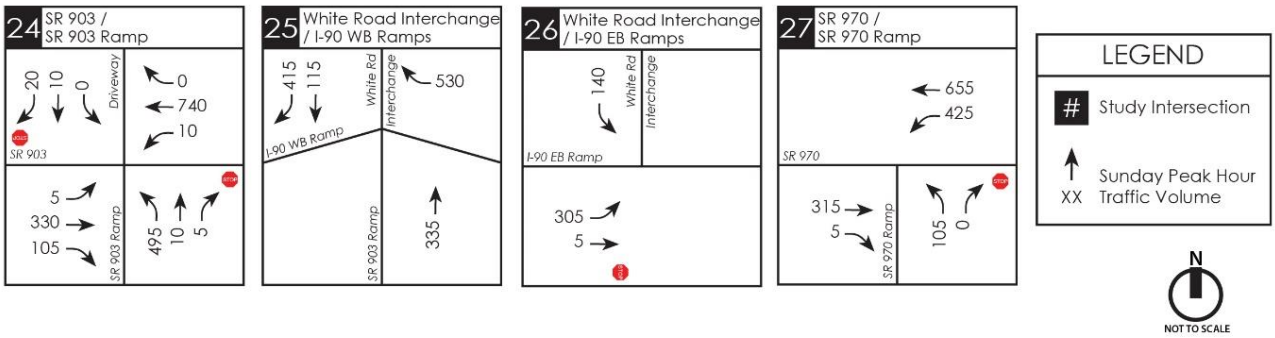


Figure 6: 2031 Baseline Sunday Peak Hour Traffic Volumes (Page 2)

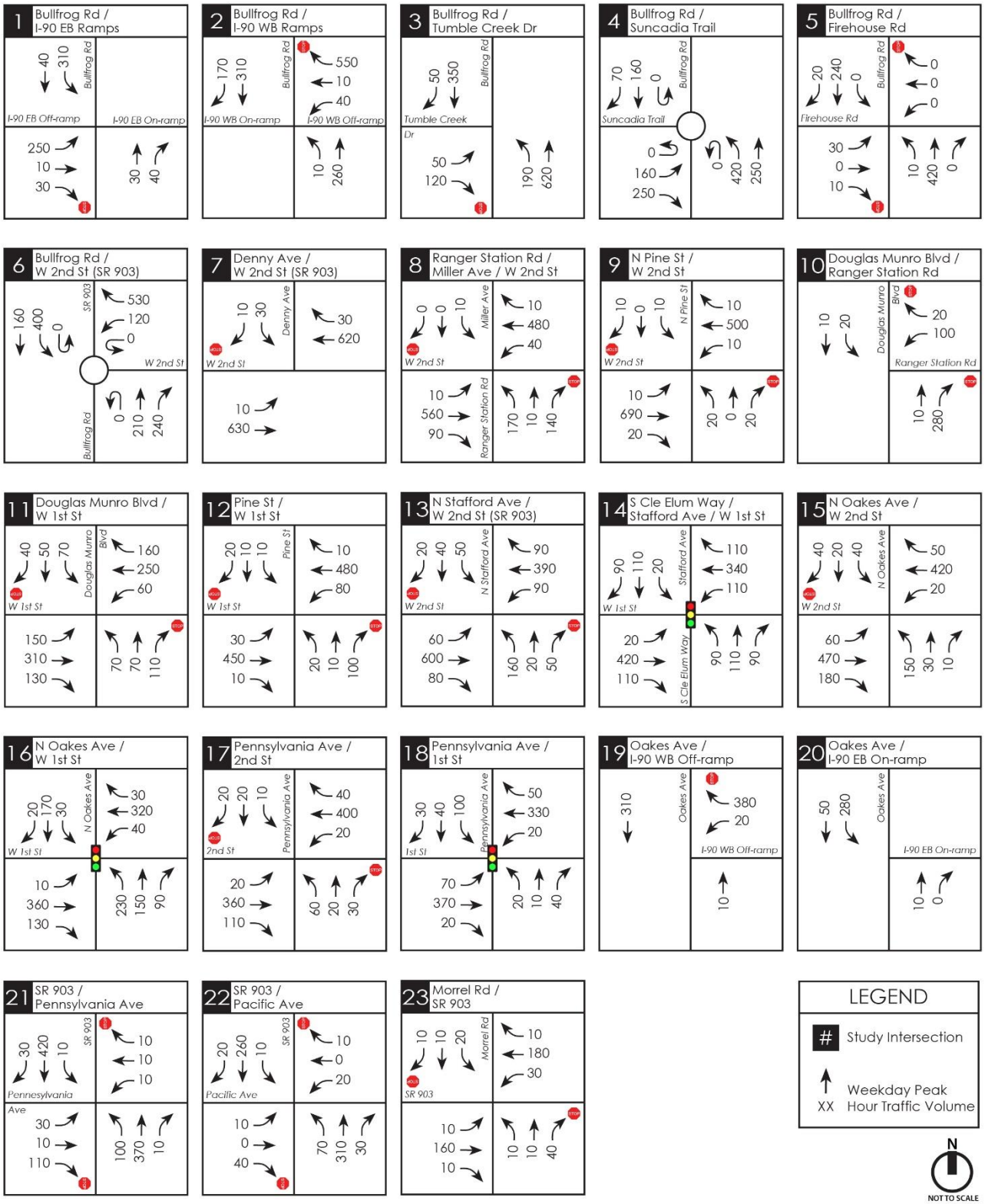


Figure 7: 2037 Baseline Weekday PM Peak Hour Traffic Volumes

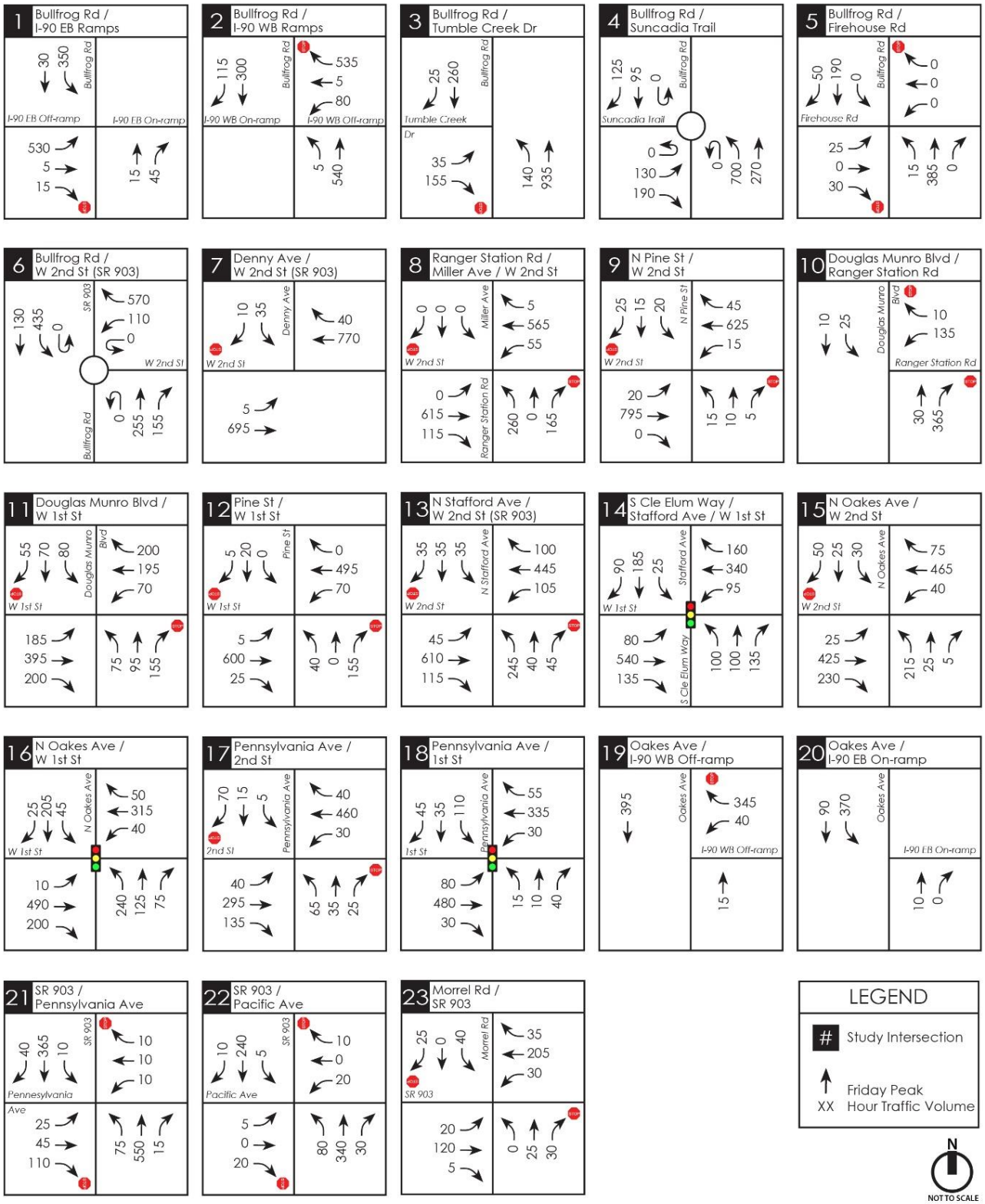


Figure 8: 2037 Baseline Friday PM Peak Hour Traffic Volumes

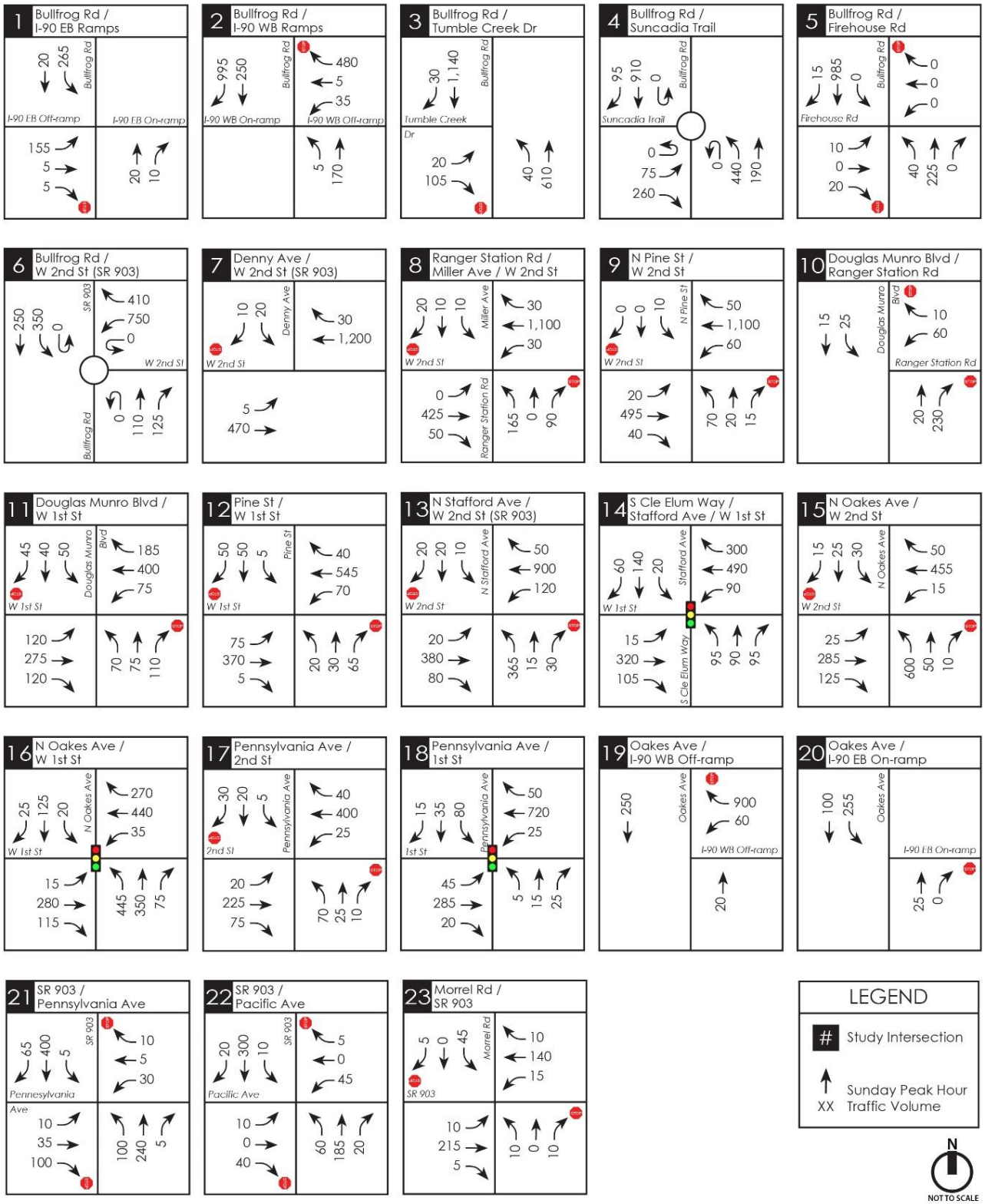


Figure 9: 2037 Baseline Sunday Peak Hour Traffic Volumes (Page 1)

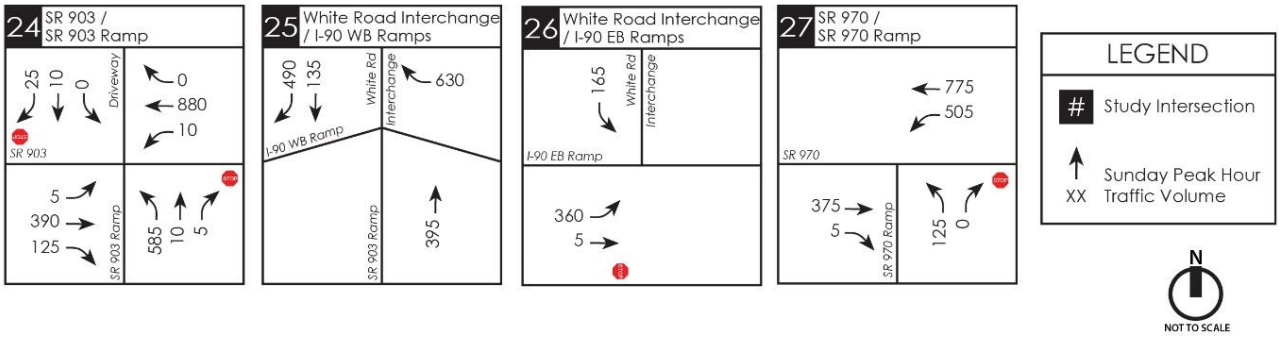


Figure 9: 2037 Baseline Sunday Peak Hour Traffic Volumes (Page 2)

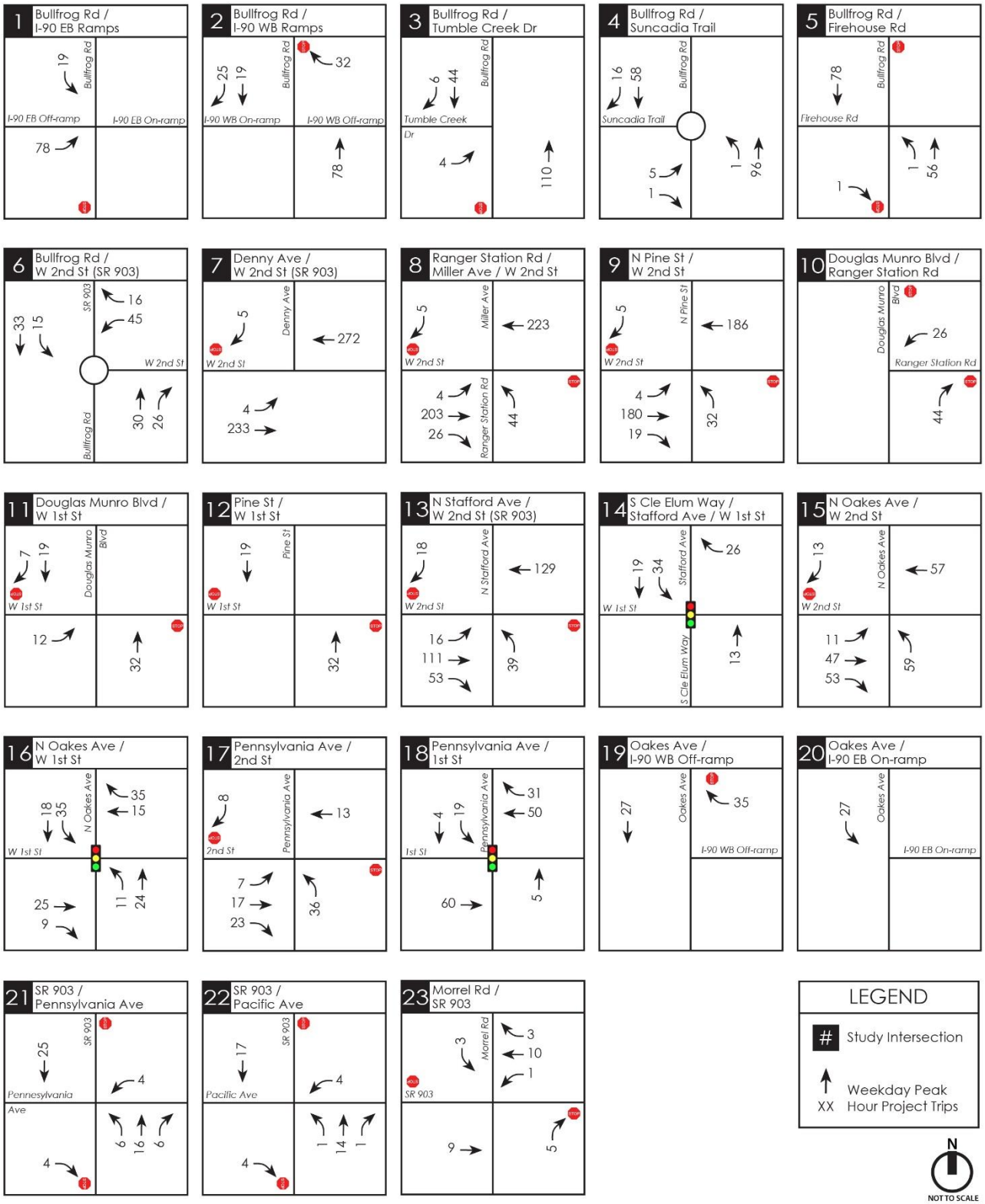


Figure 10: 2025 Weekday PM Peak Trip Assignment - Revised Proposal (Page 1)

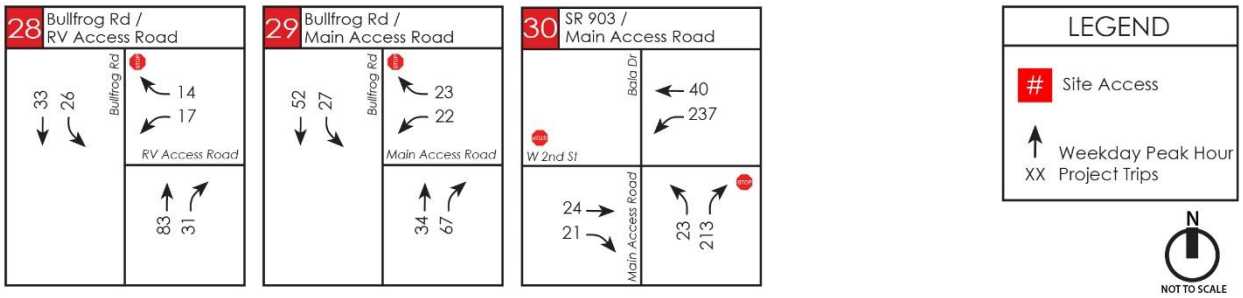


Figure 10: 2025 Weekday PM Peak Trip Assignment - Revised Proposal (Page 2)

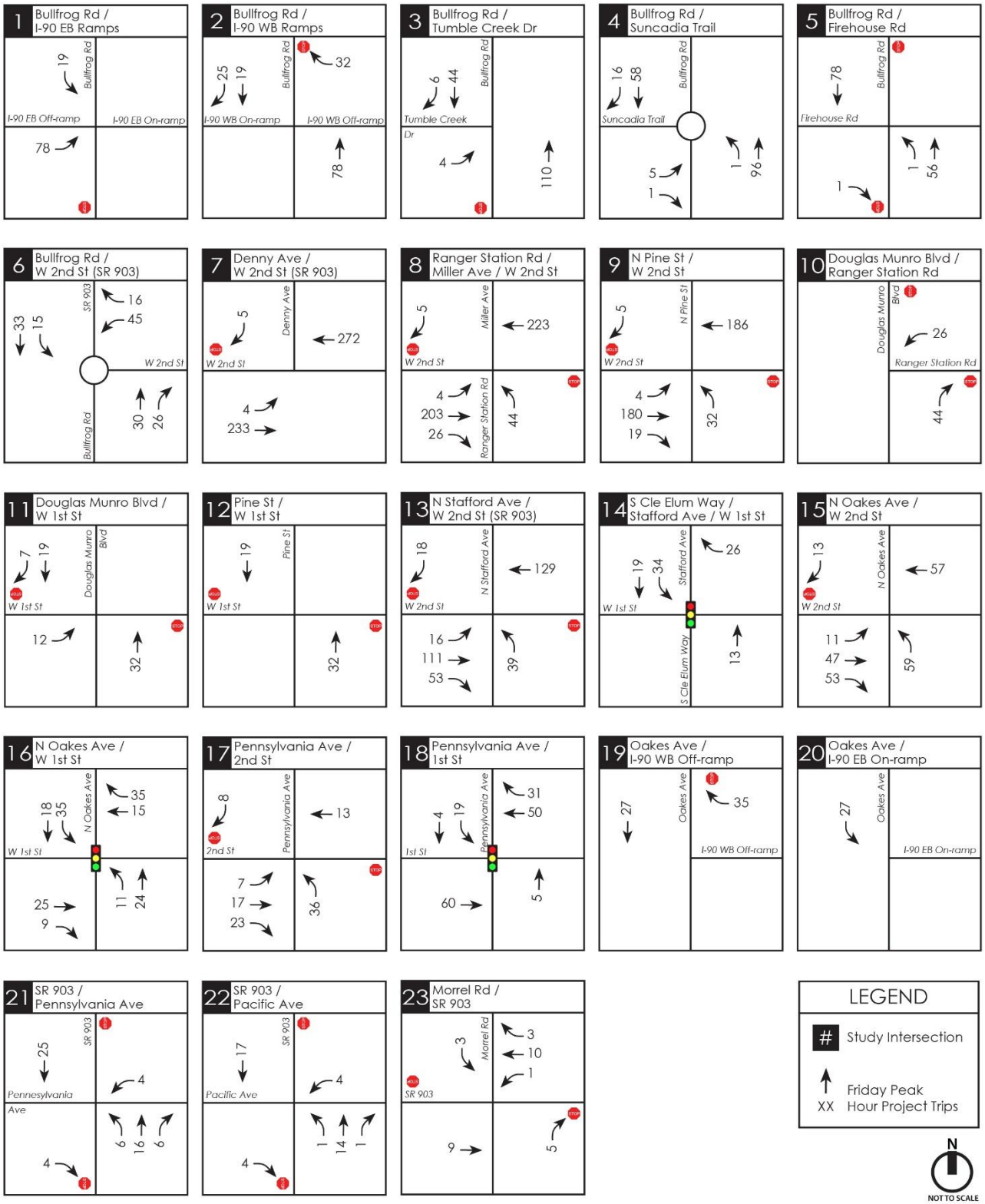


Figure 11: 2025 Friday PM Peak Trip Assignment - Revised Propossal (Page 1)

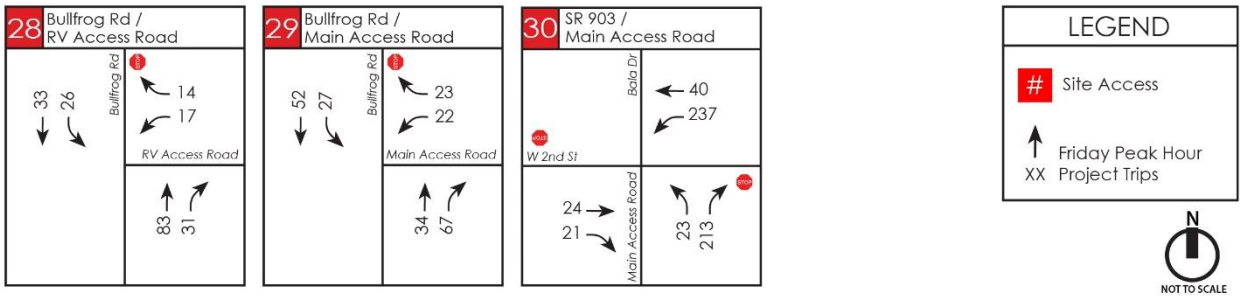


Figure 11: 2025 Friday PM Peak Trip Assignment - Revised Proposal (Page 2)

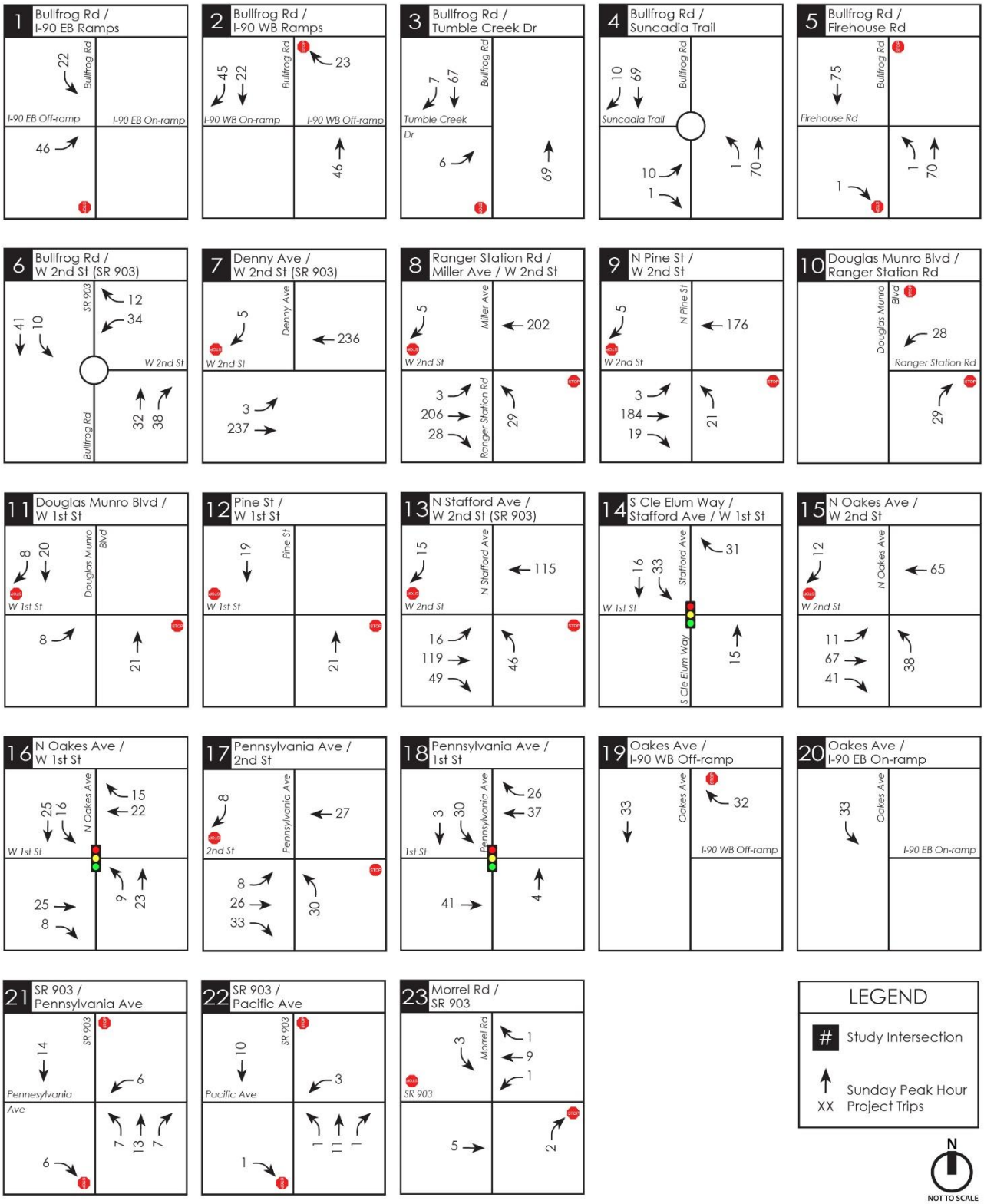


Figure 12: 2025 Sunday PM Peak Trip Assignment - Revised Proposal (Page 1)

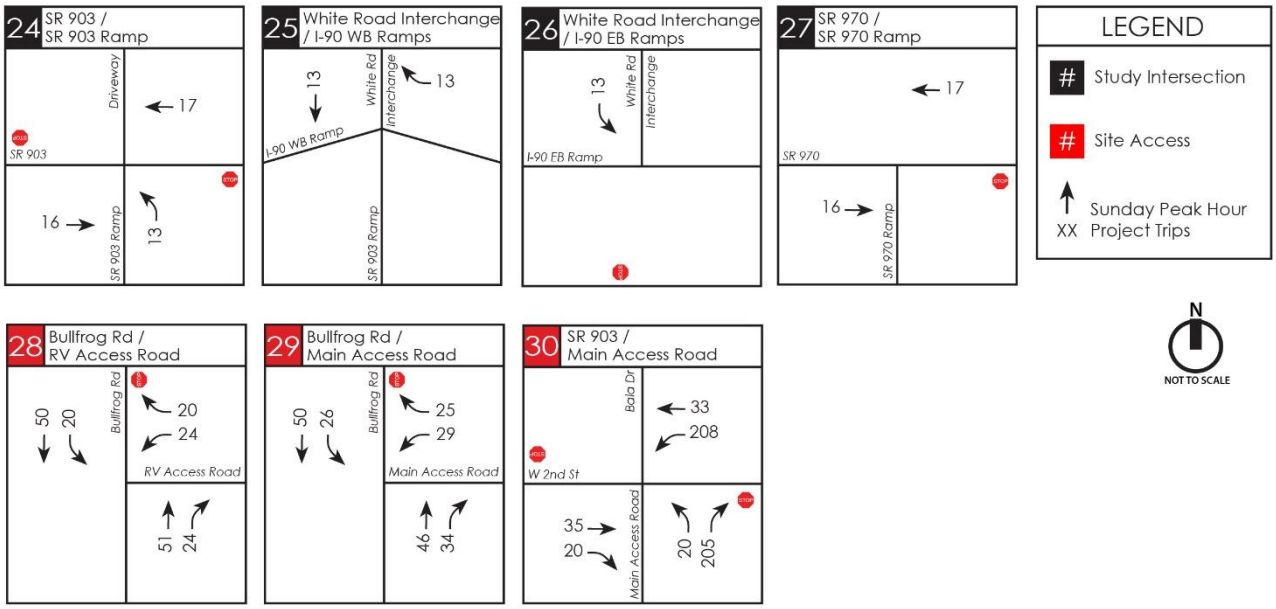


Figure 12: 2025 Sunday PM Peak Trip Assignment - Revised Proposal (Page 2)

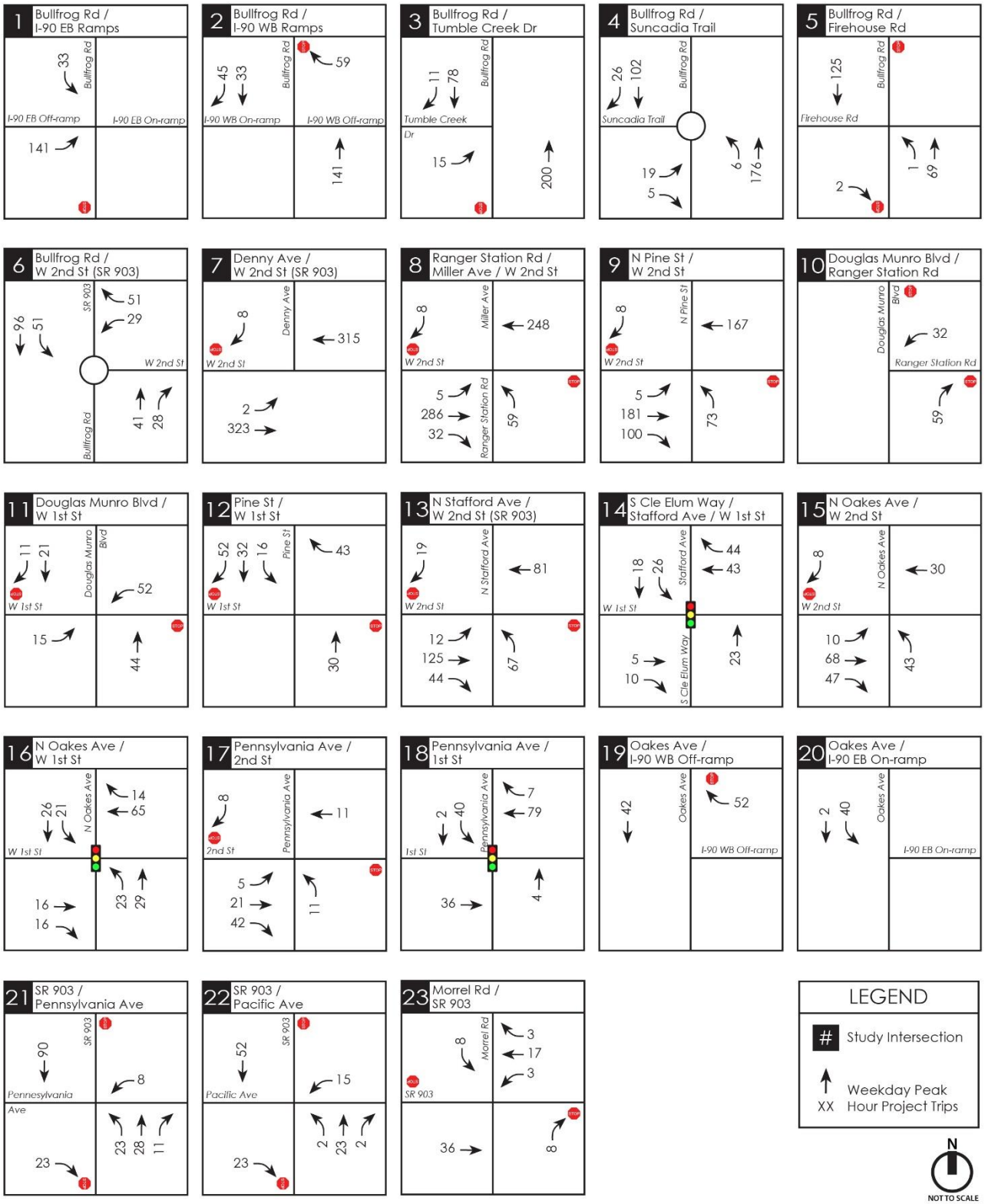


Figure 13: 2031 Weekday PM Peak Trip Assignment - Revised Proposal (Page 1)

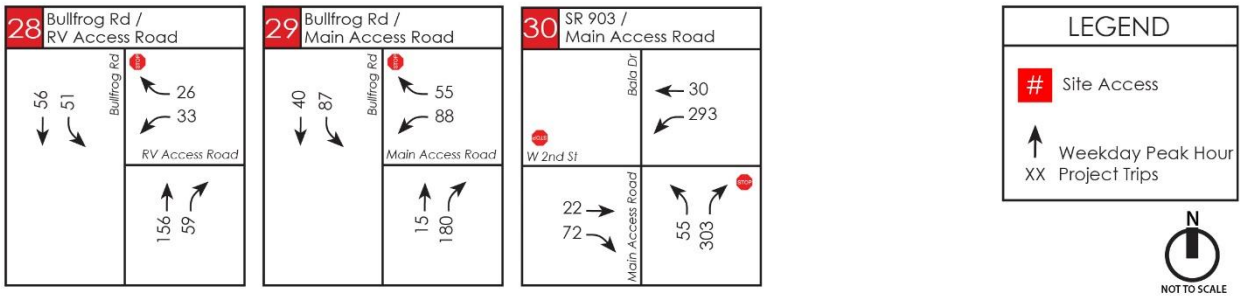


Figure 13: 2031 Weekday PM Peak Trip Assignment - Revised Proposal (Page 2)

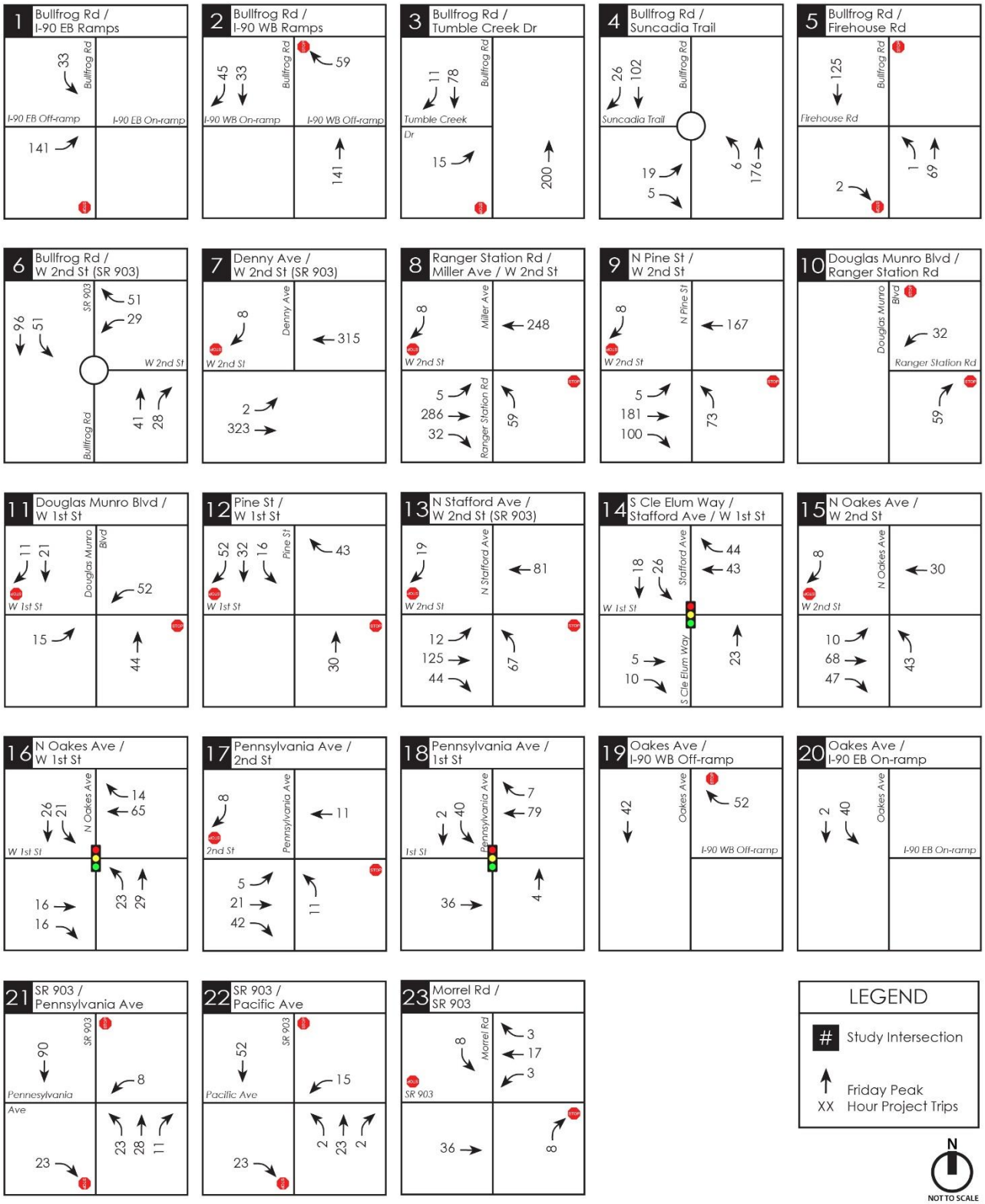


Figure 14: 2031 Friday PM Peak Trip Assignment - Revised Proposal (Page 1)

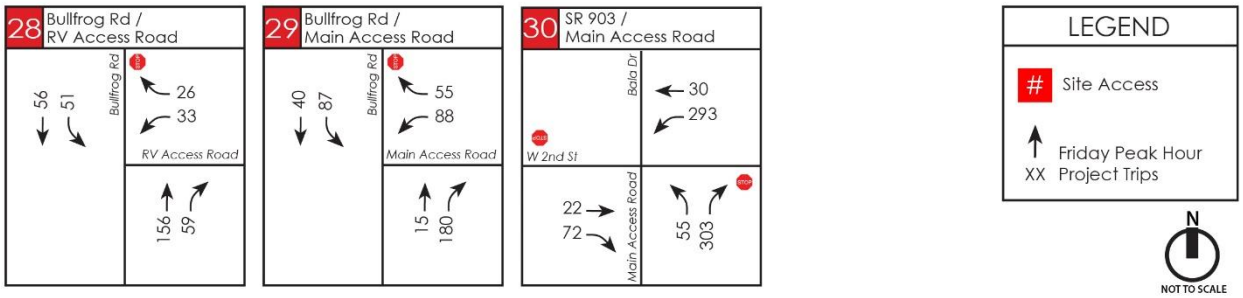


Figure 14: 2031 Friday PM Peak Trip Assignment - Revised Proposal (Page 2)

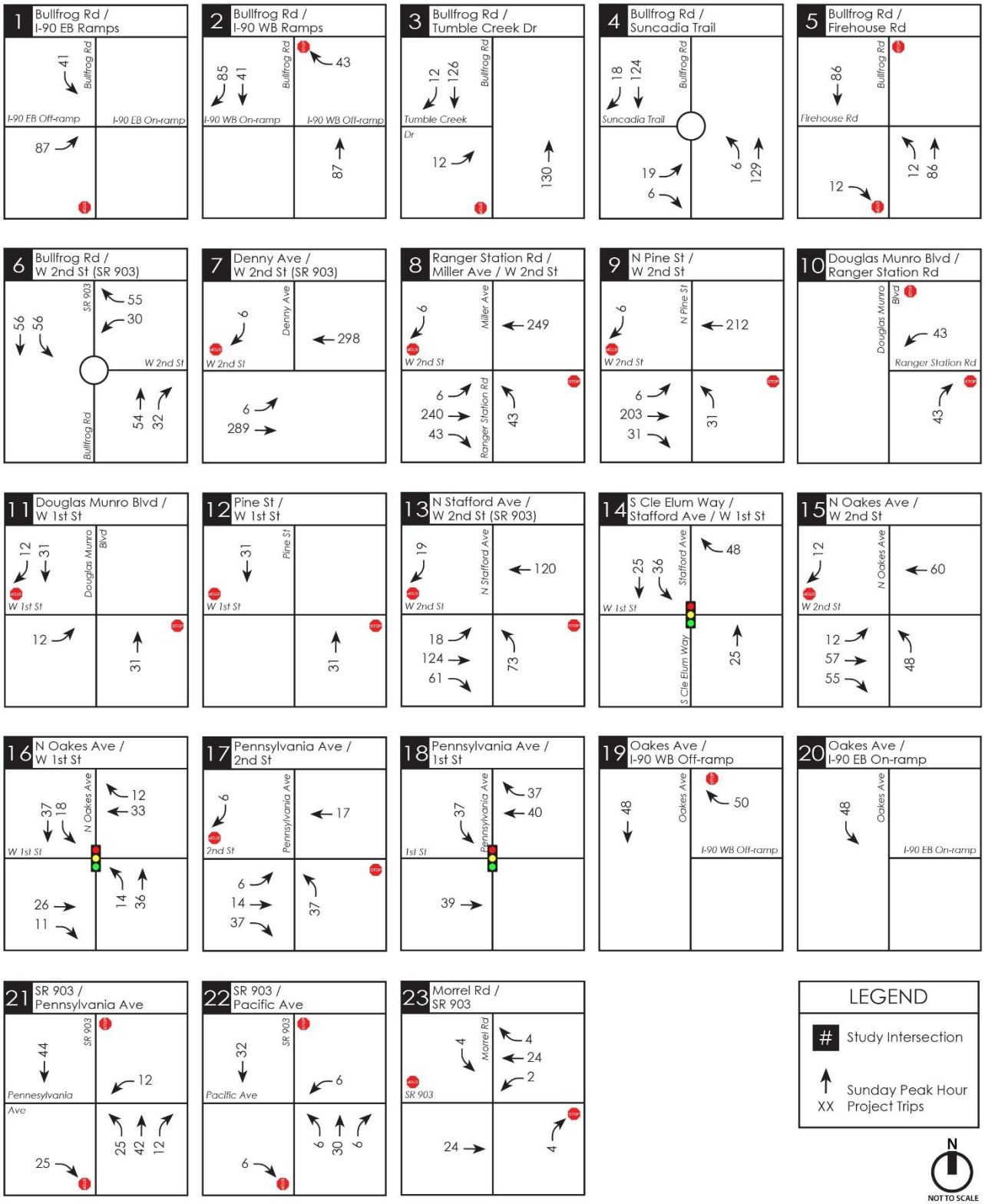


Figure 15: 2031 Sunday PM Peak Trip Assignment - Revised Proposal (Page 1)

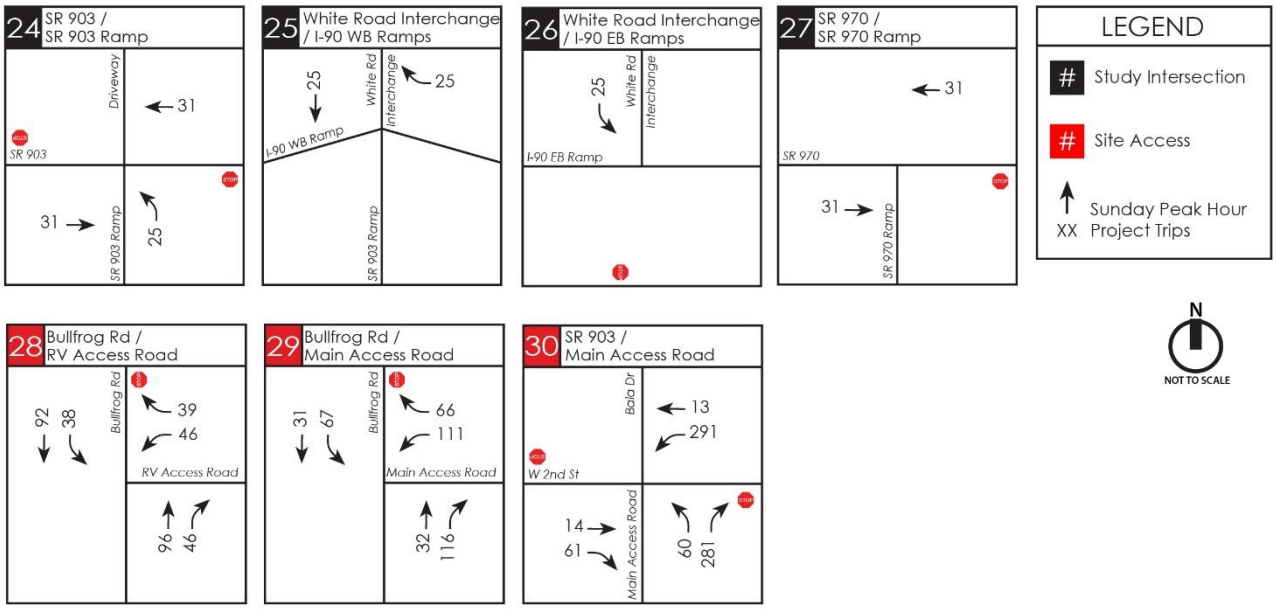


Figure 15: 2031 Sunday PM Peak Trip Assignment - Revised Proposal (Page 2)

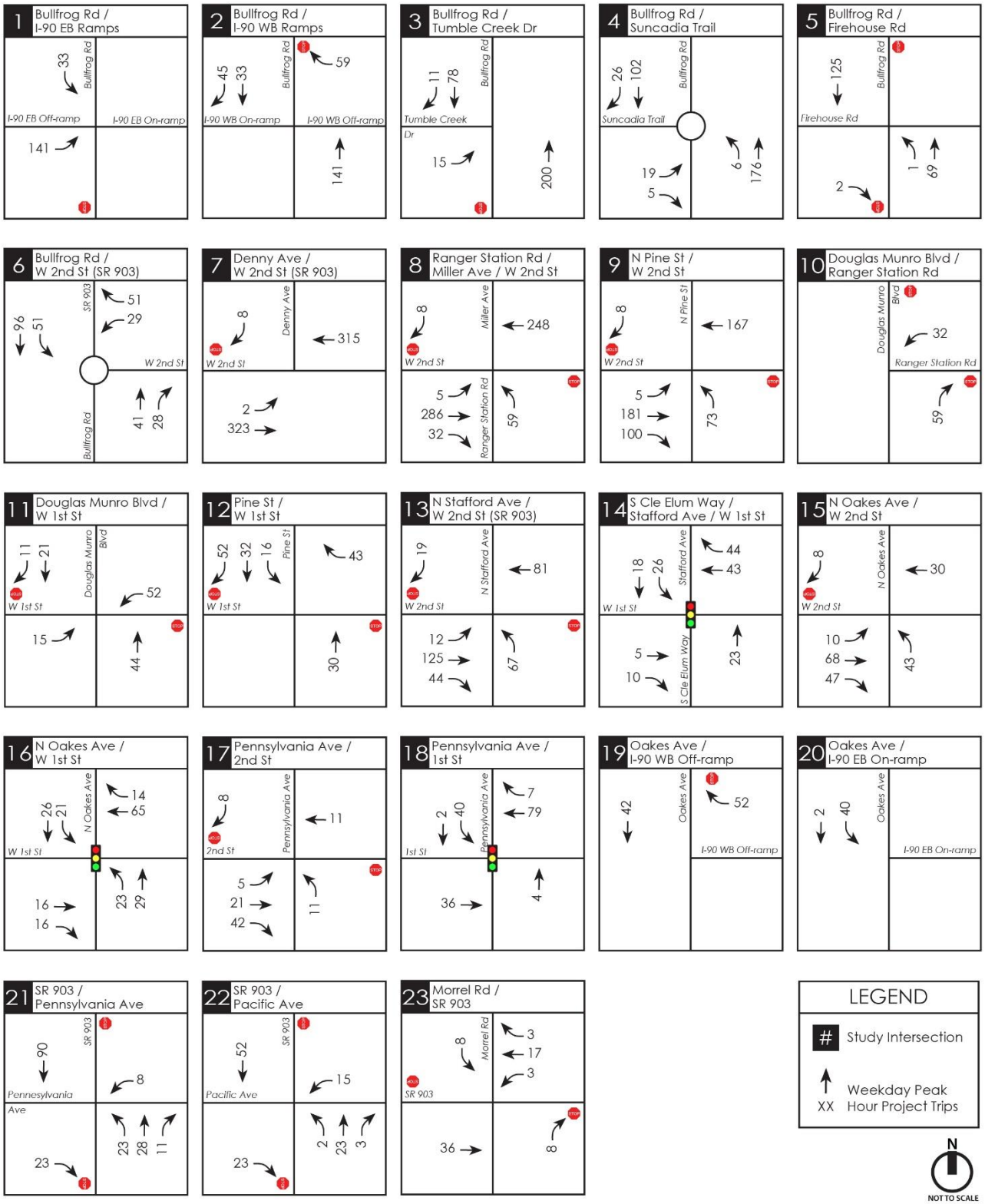


Figure 16: 2037 Weekday PM Peak Trip Assignment - Revised Proposal (Page 1)

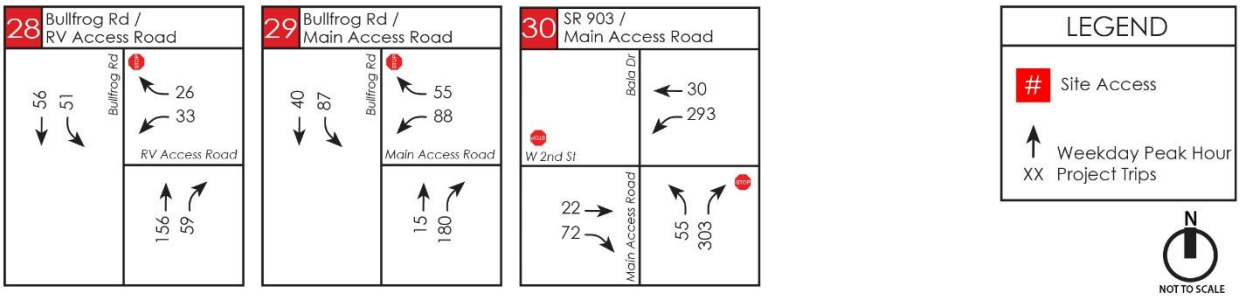


Figure 16: 2037 Weekday PM Peak Trip Assignment - Revised Proposal (Page 2)

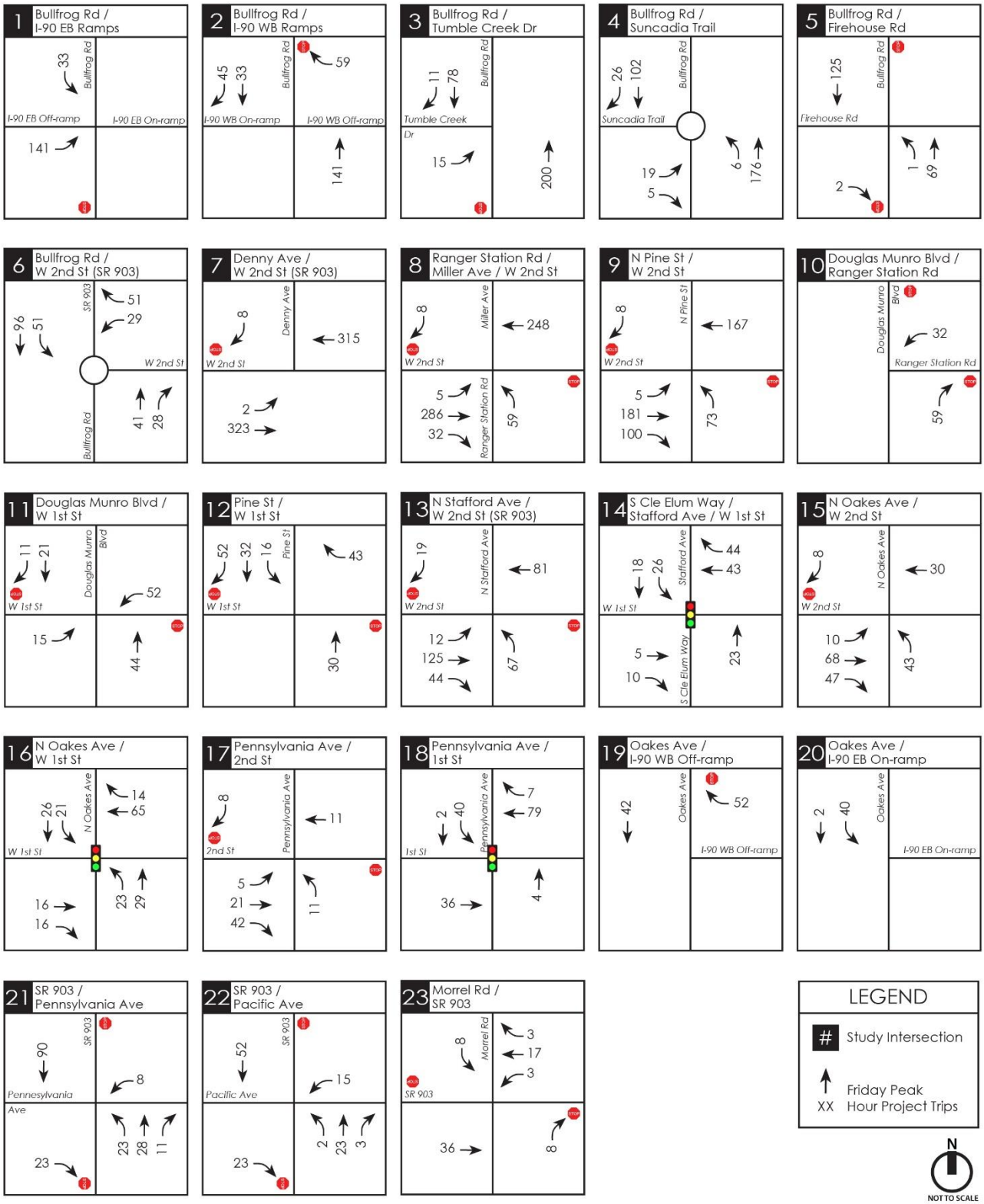


Figure 17: 2037 Friday Peak Hour Trip Assignment - Revised Proposal (Page 1)

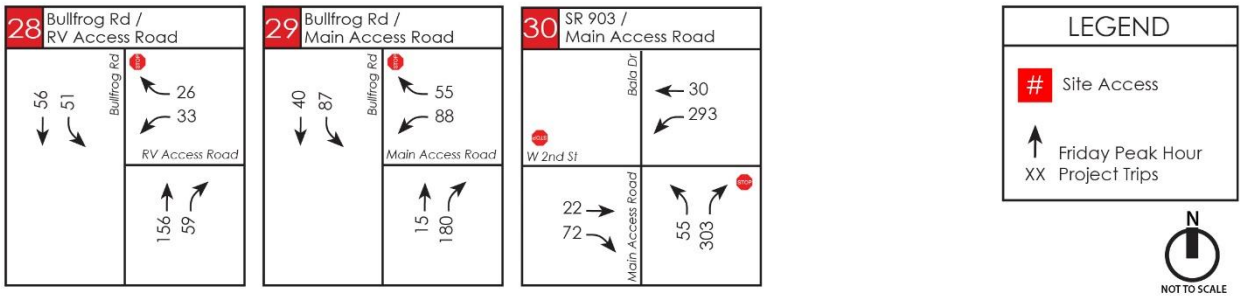


Figure 17: 2037 Friday Peak Hour Trip Assignment - Revised Proposal (Page 2)

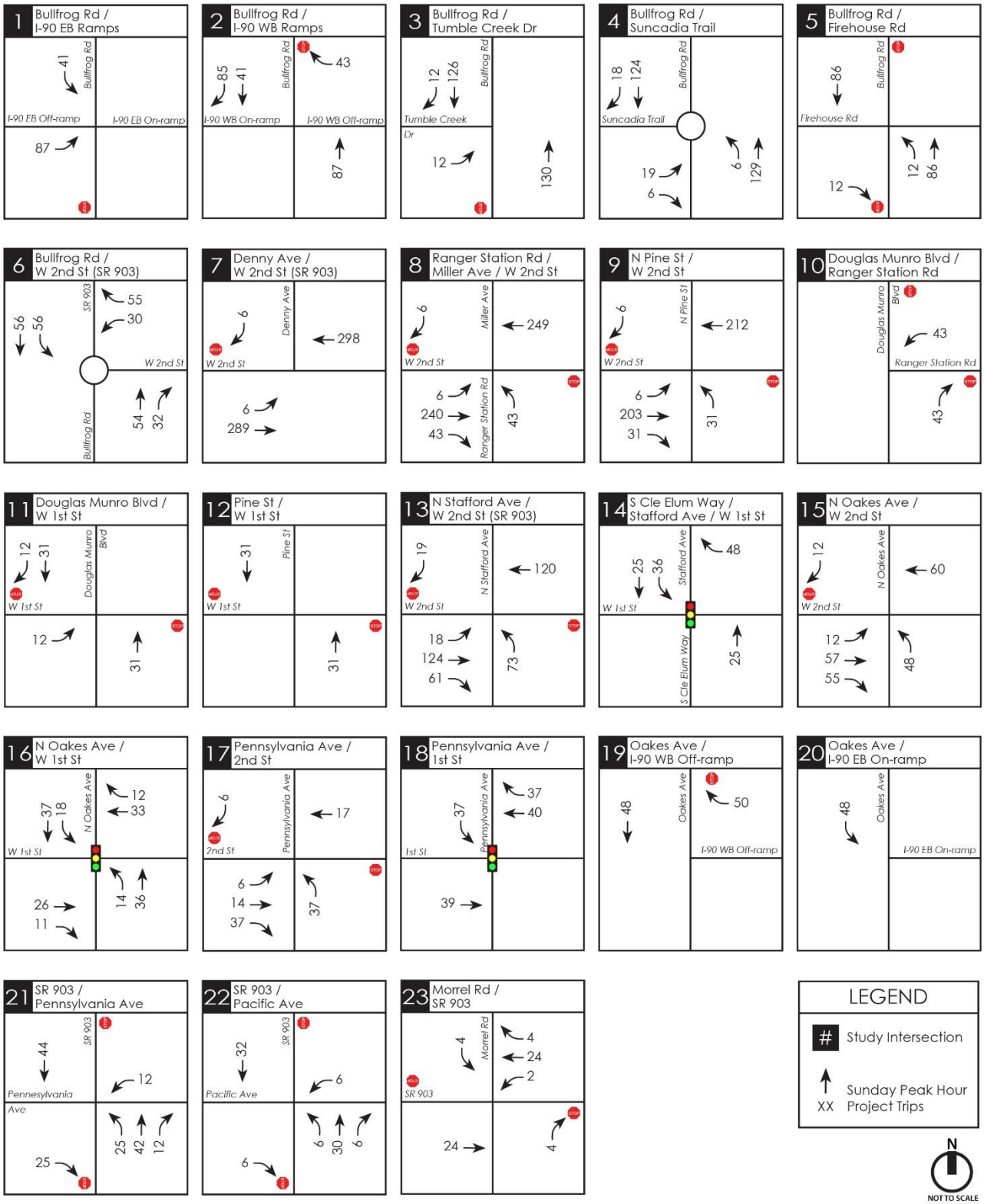


Figure 18: 2037 Sunday PM Peak Trip Assignment - Revised Proposal (Page 1)

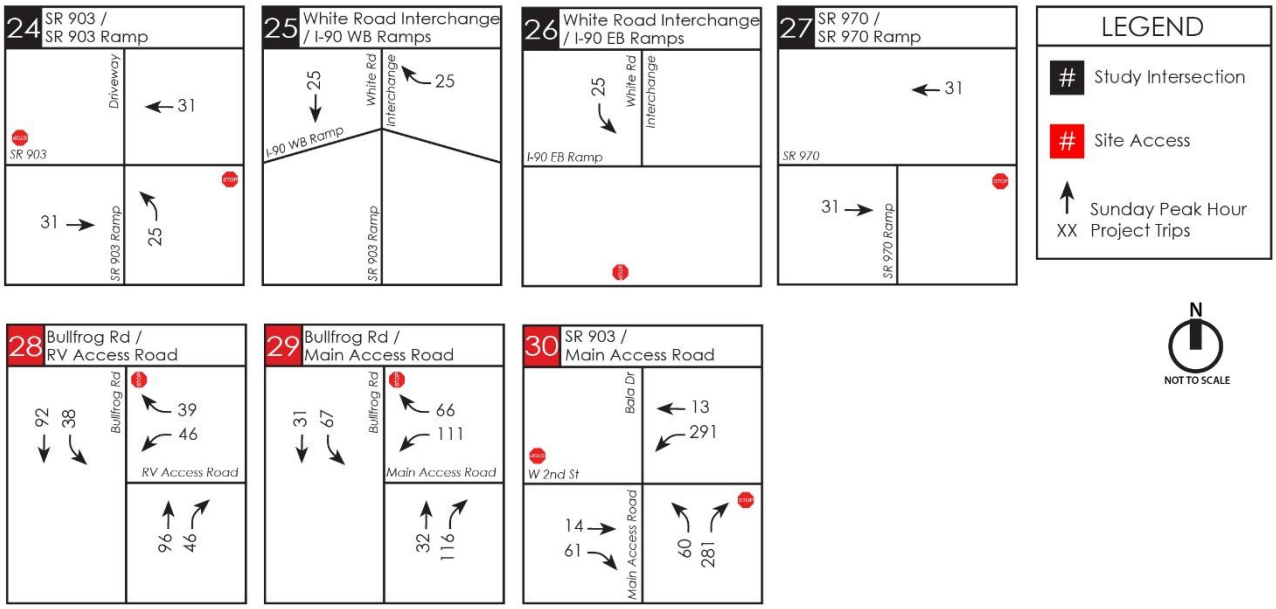


Figure 18: 2037 Sunday PM Peak Trip Assignment - Revised Proposal (Page 2)

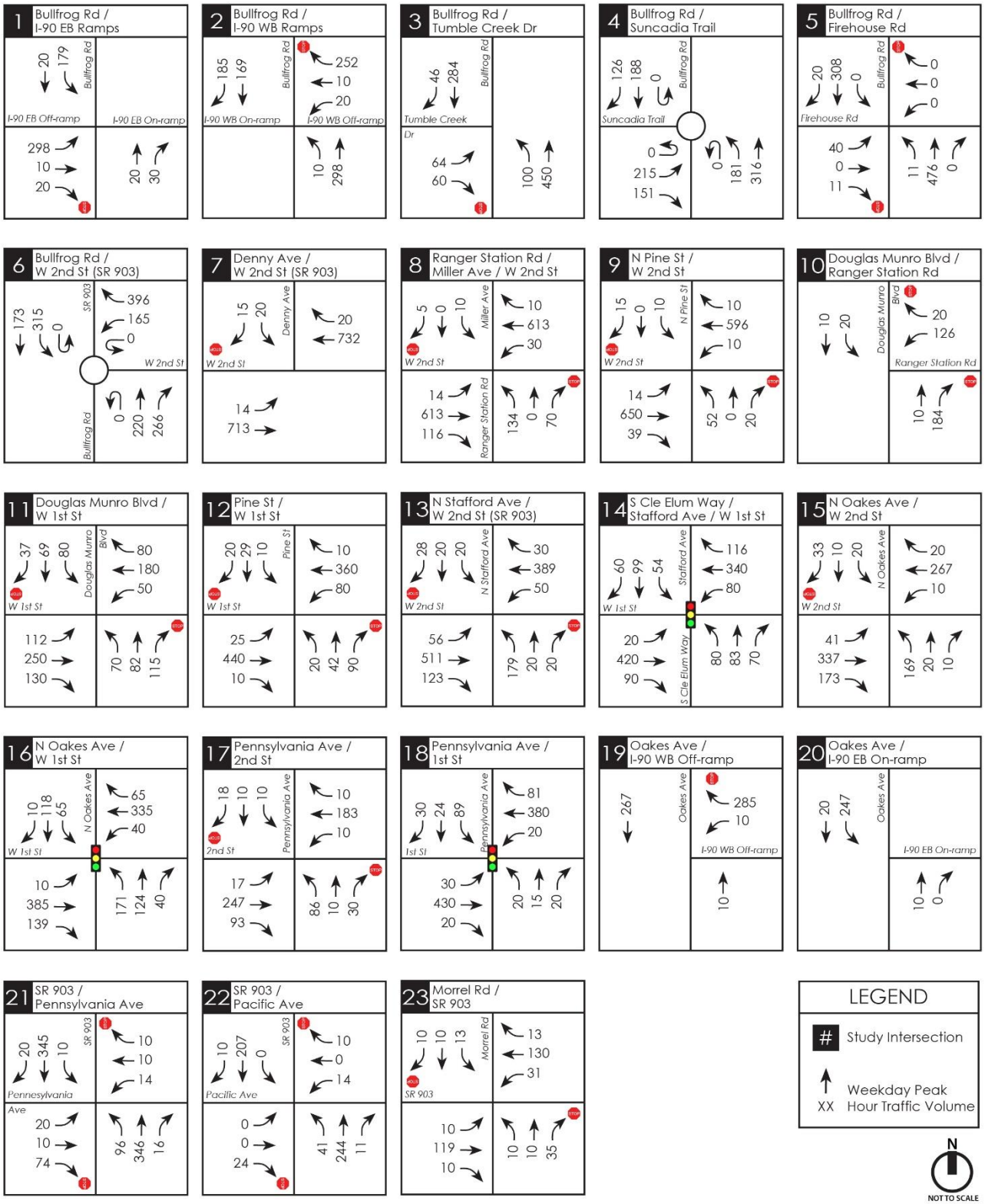


Figure 19: 2025 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 1)

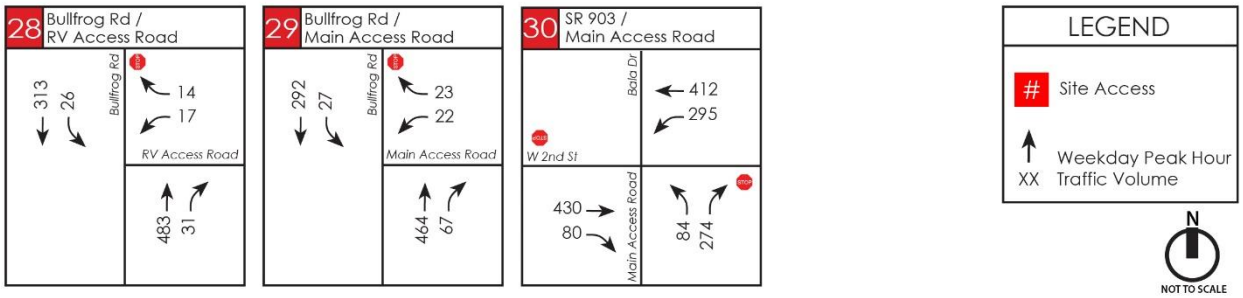


Figure 19: 2025 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 2)

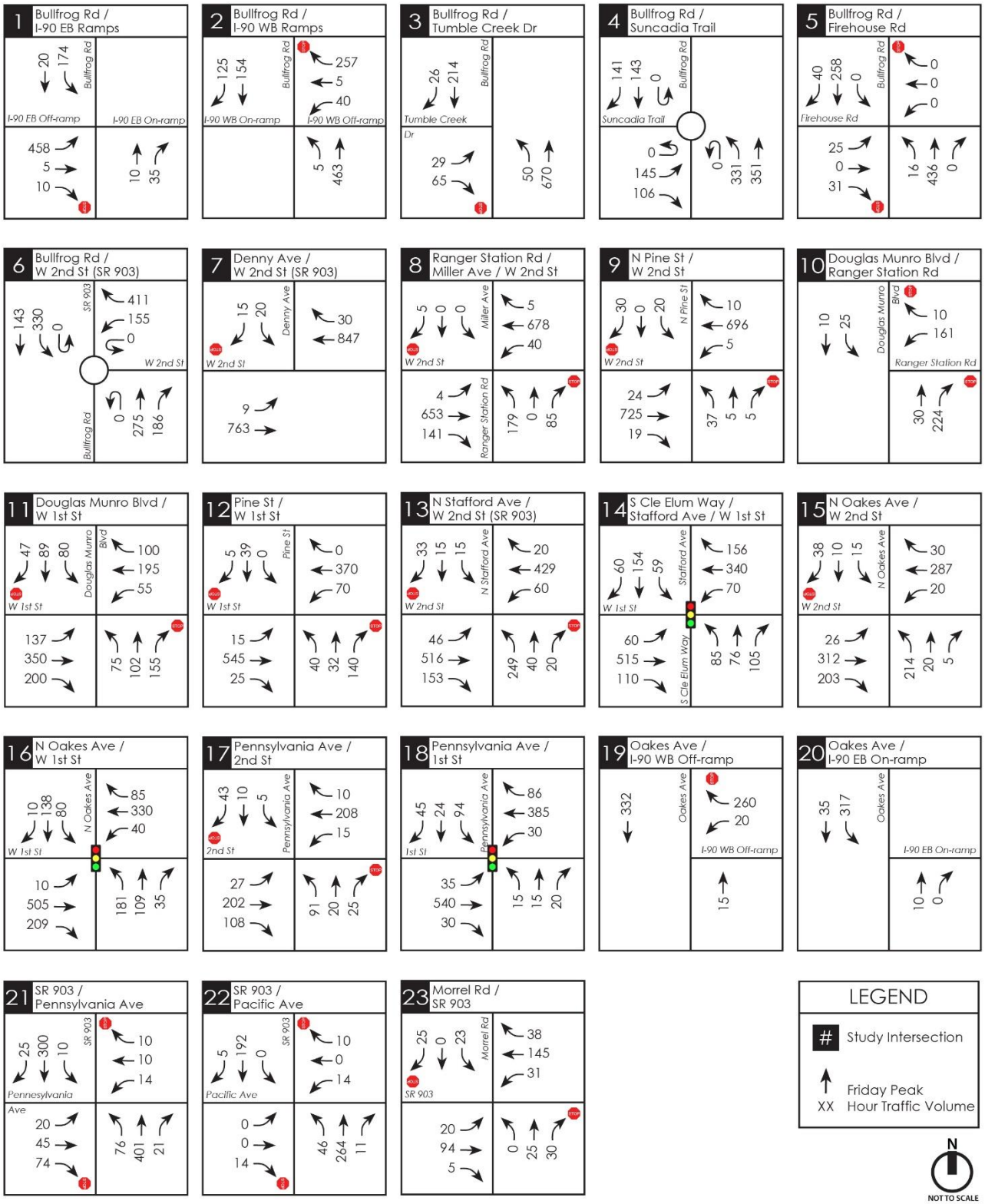


Figure 20: 2025 Friday PM Peak Traffic Volumes with Revised Proposal (Page 1)

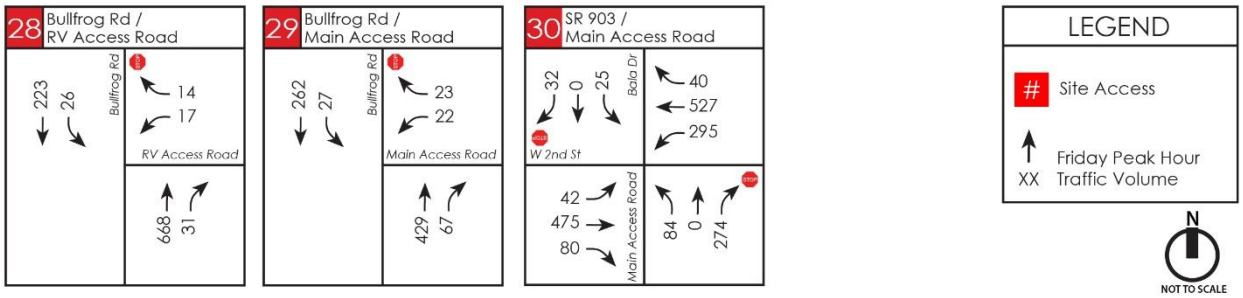


Figure 20: 2025 Friday PM Peak Traffic Volumes with Revised Proposal (Page 2)

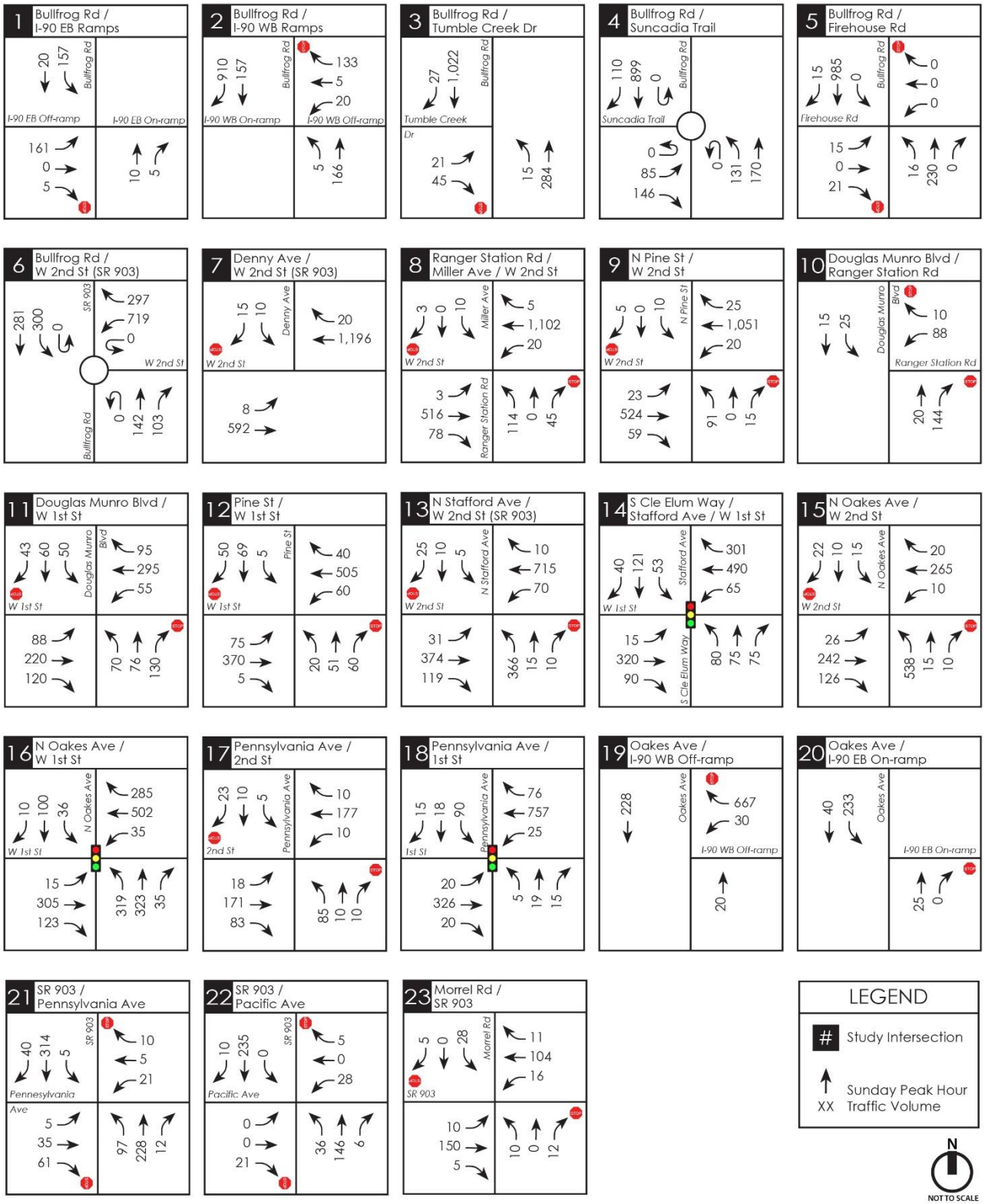


Figure 21: 2025 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 1)

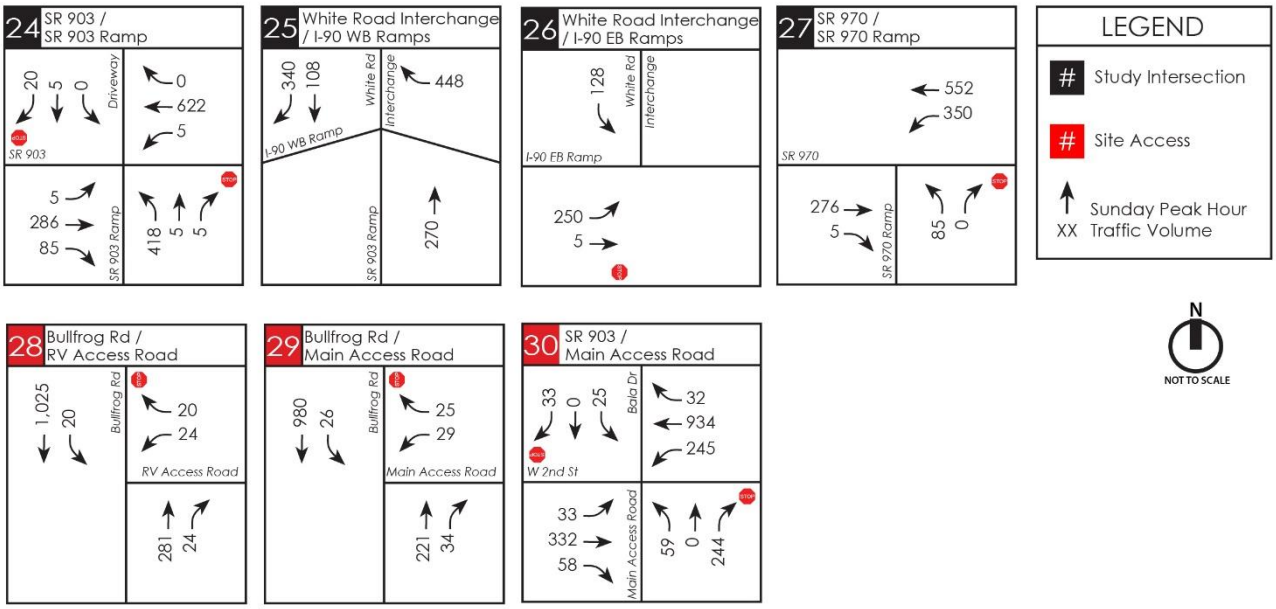


Figure 21: 2025 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 2)

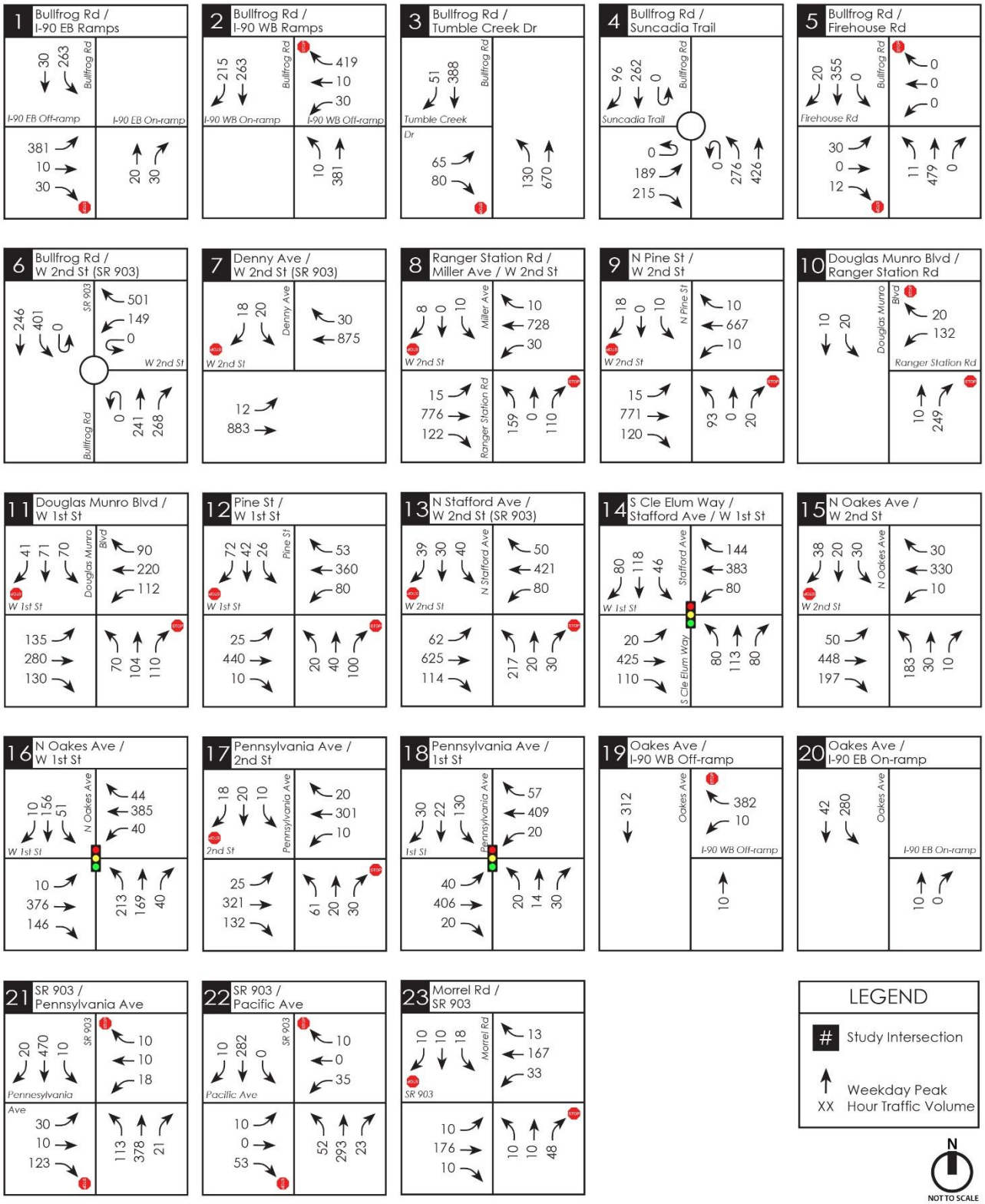


Figure 22: 2031 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 1)

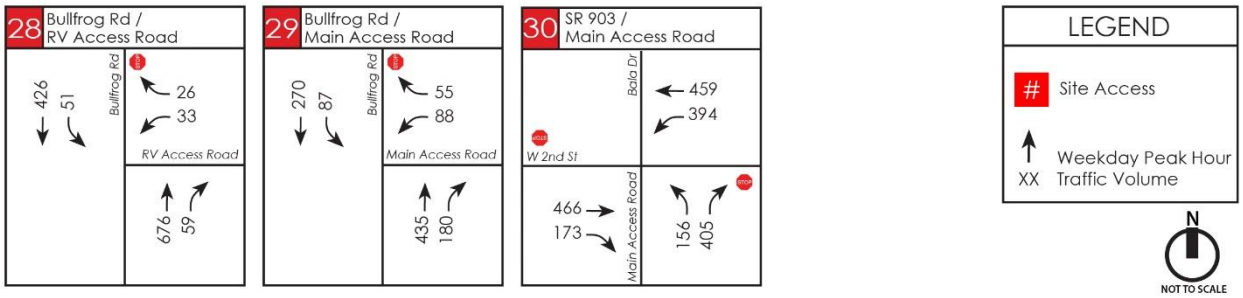


Figure 22: 2031 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 2)

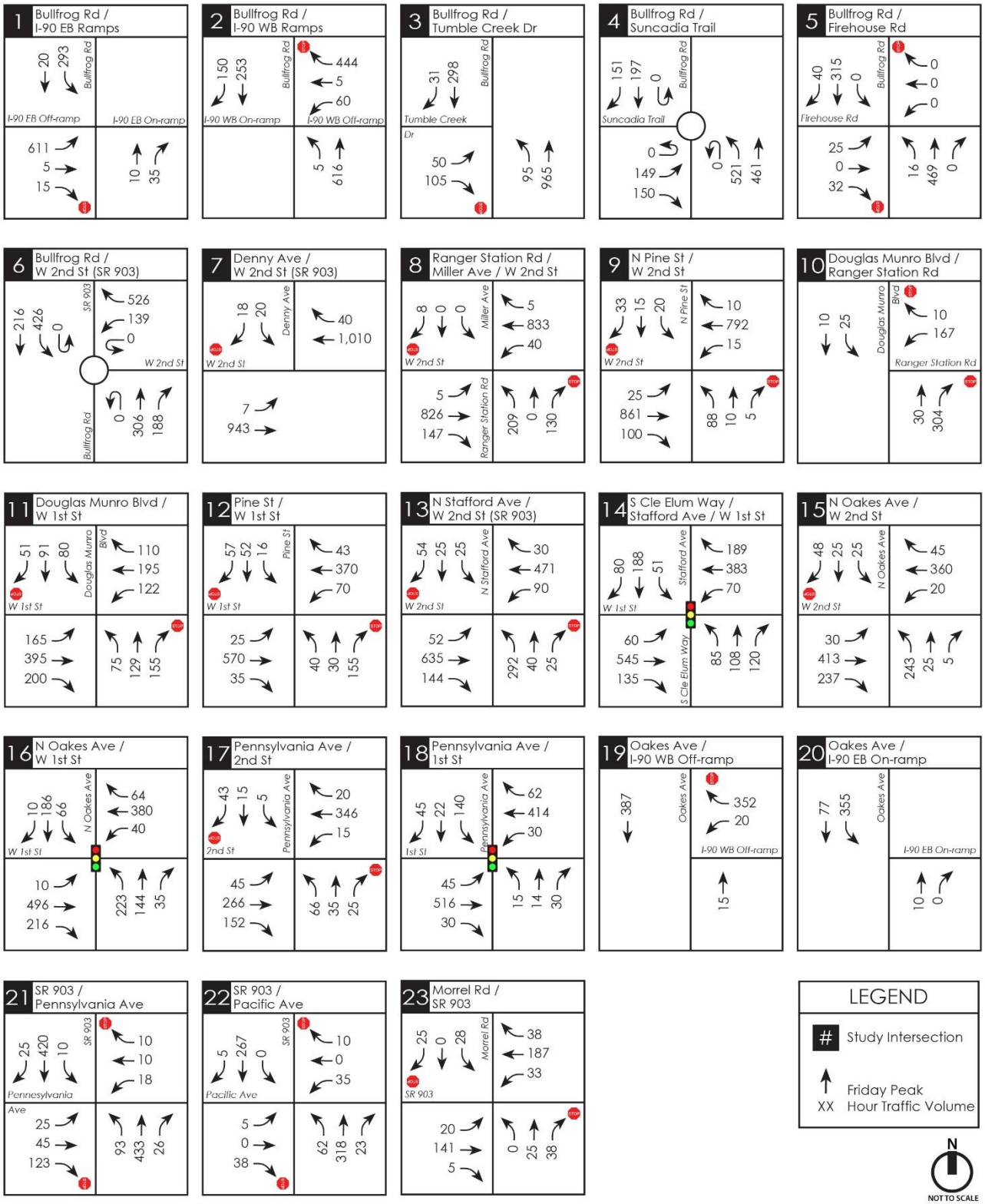


Figure 23: 2031 Friday PM Peak Traffic Volumes with Revised Proposal (Page 1)

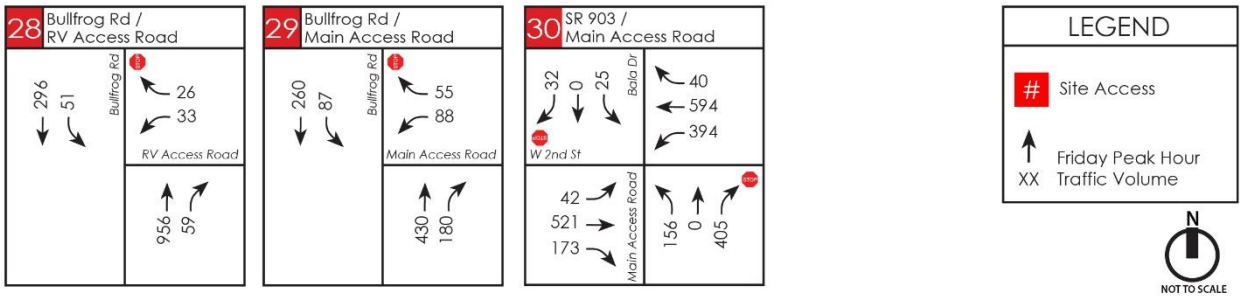


Figure 23: 2031 Friday PM Peak Traffic Volumes with Revised Proposal (Page 2)

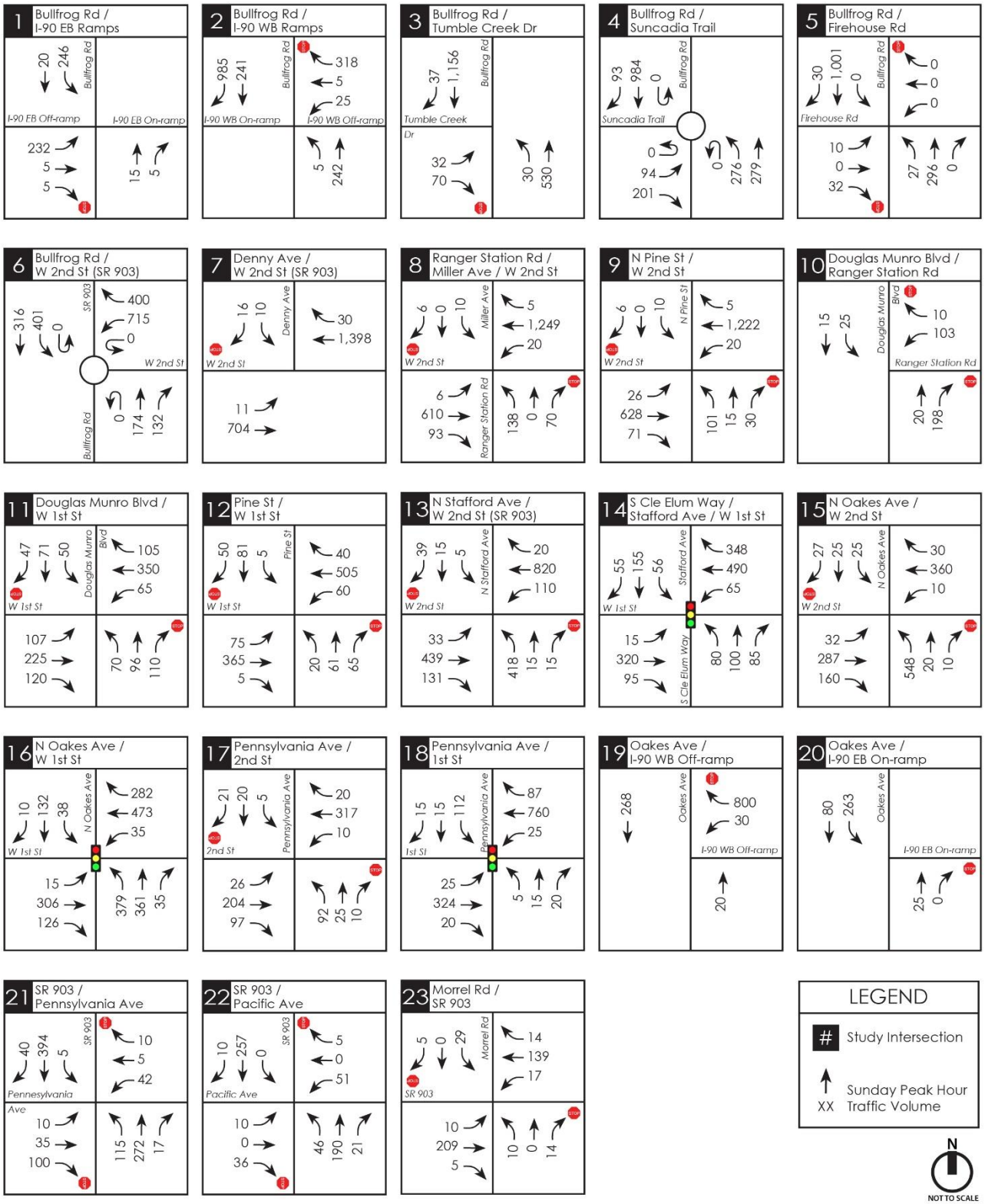


Figure 24: 2031 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 1)

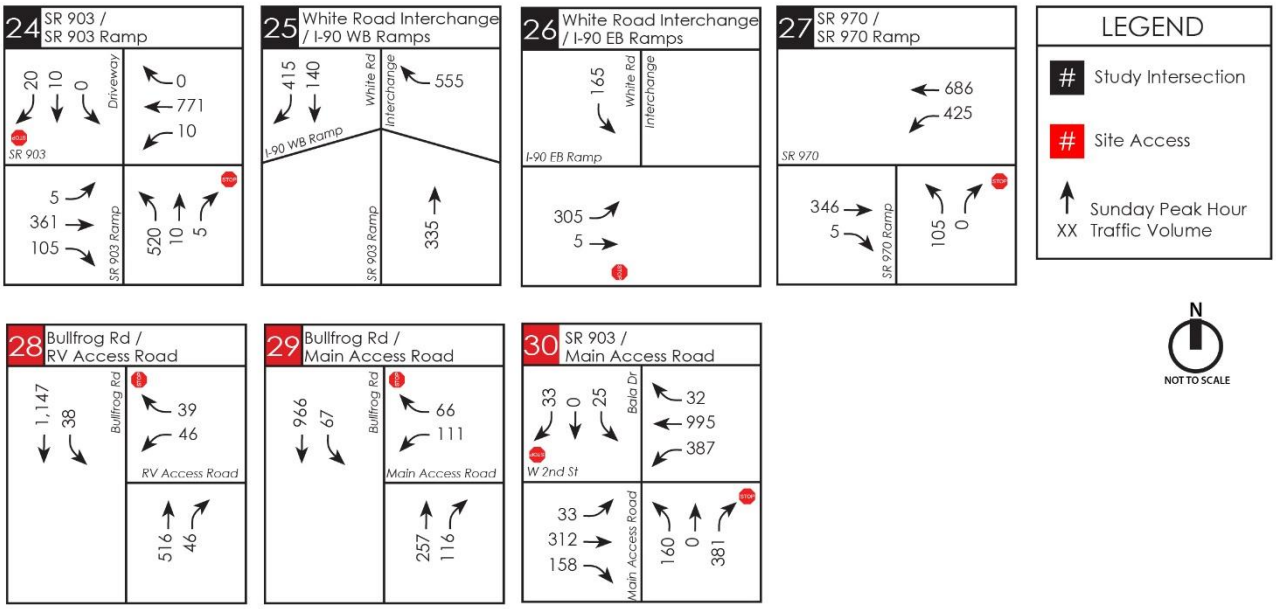


Figure 24: 2031 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 2)

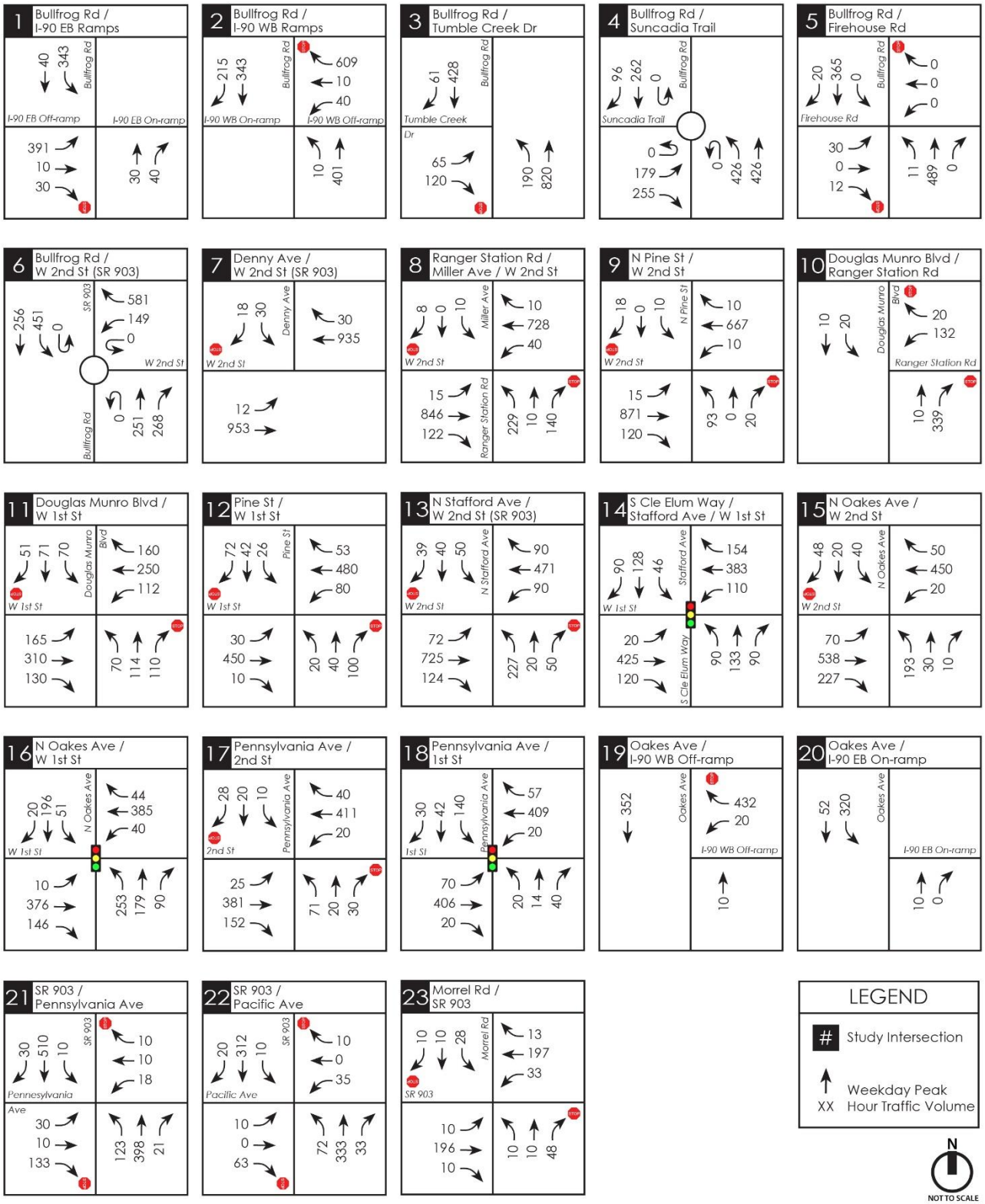


Figure 25: 2037 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 1)

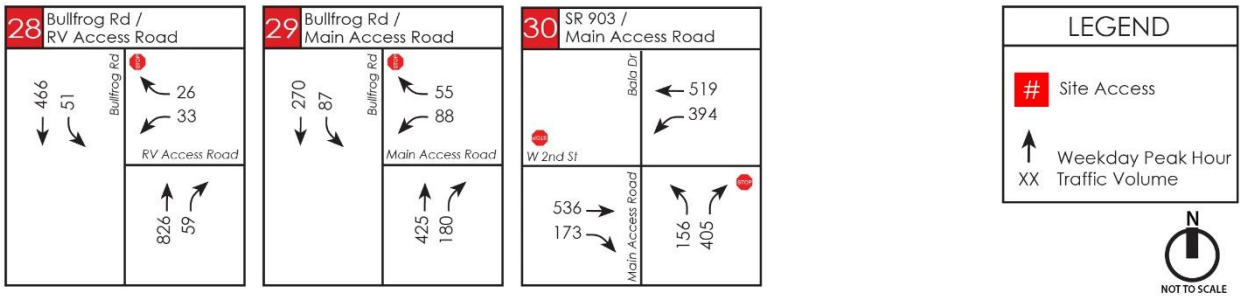


Figure 25: 2037 Weekday PM Peak Traffic Volumes with Revised Proposal (Page 2)

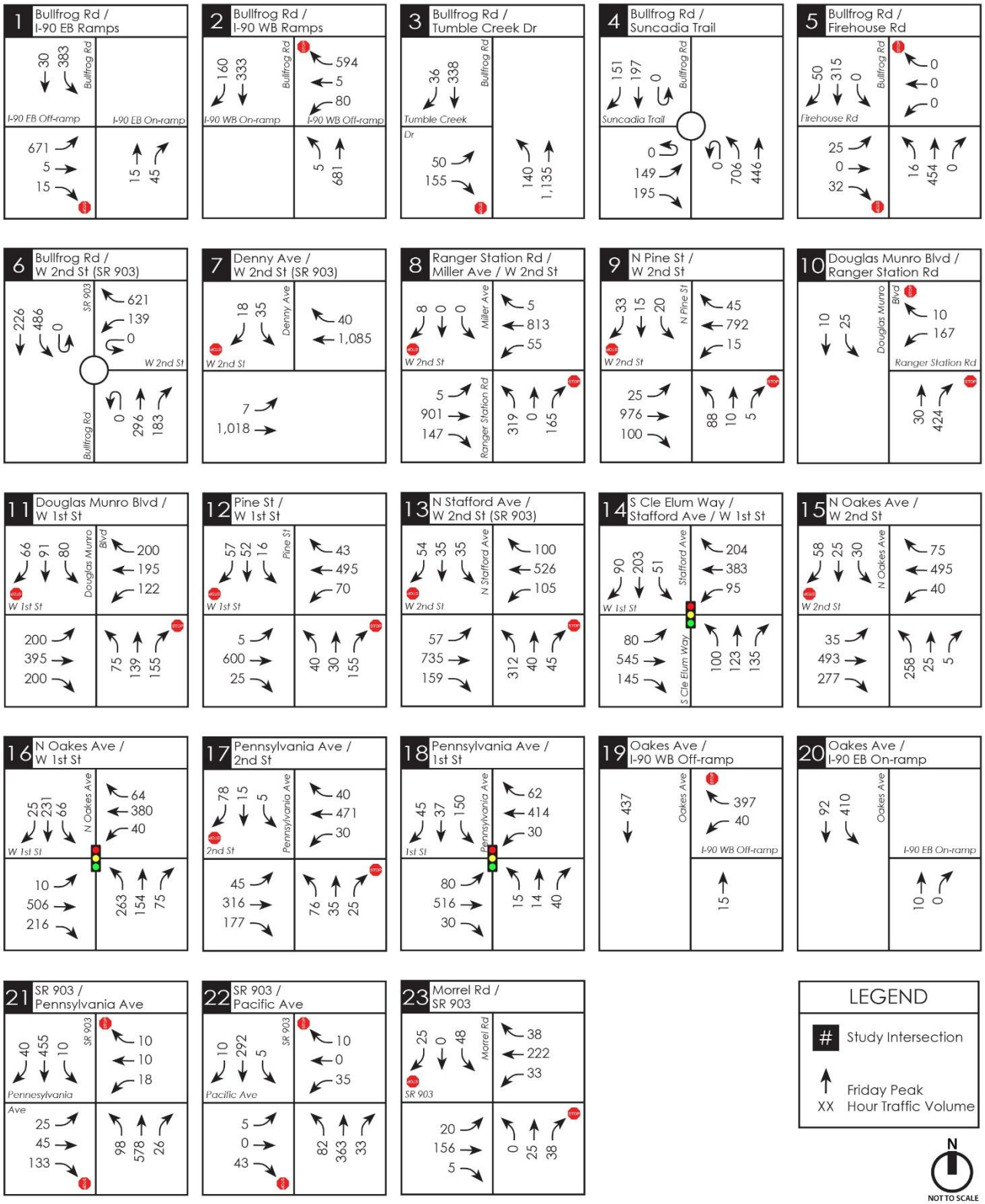


Figure 26: 2037 Friday PM Peak Traffic Volumes with Revised Proposal (Page 1)

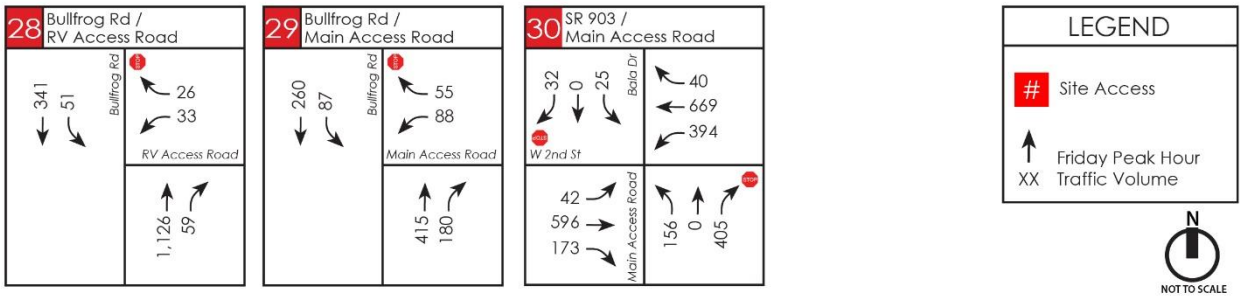


Figure 26: 2037 Friday PM Peak Traffic Volumes with Revised Proposal (Page 2)

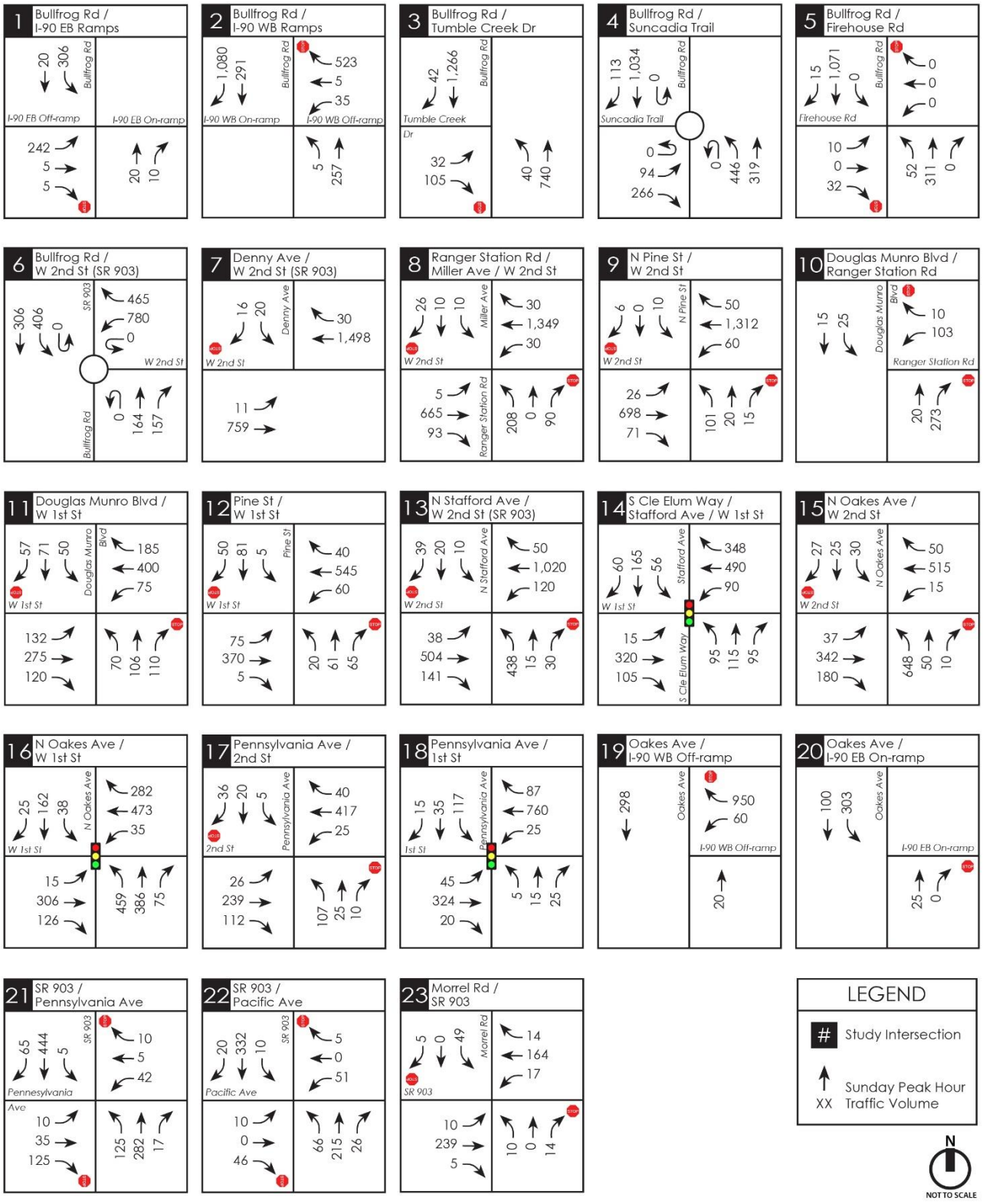


Figure 27: 2037 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 1)

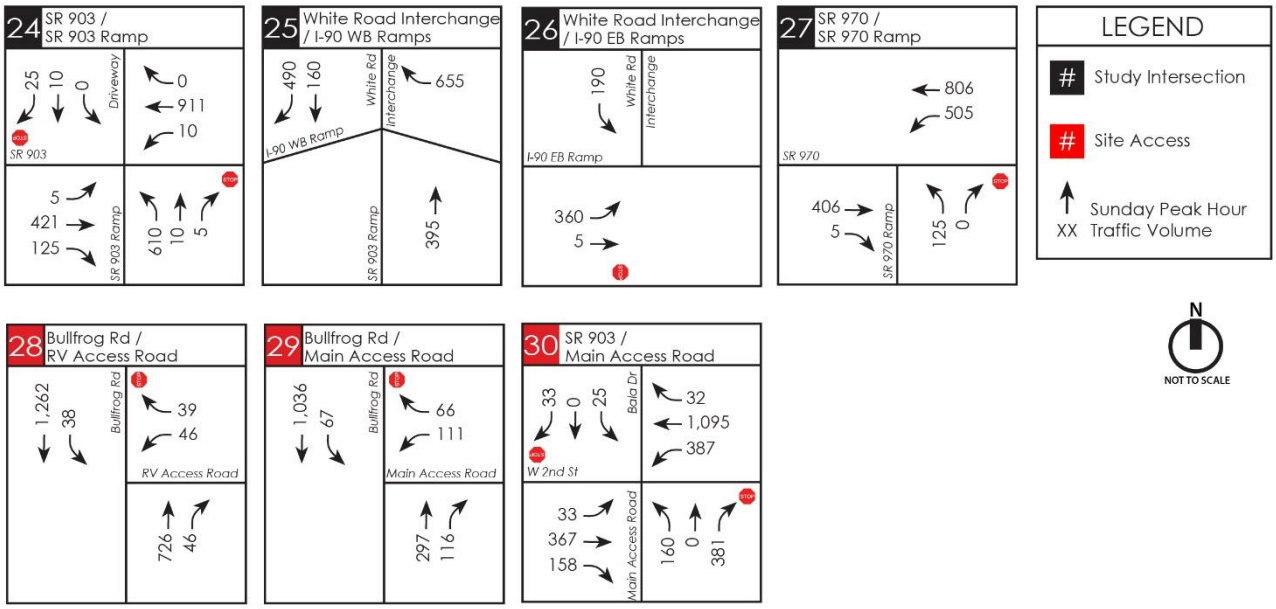


Figure 27: 2037 Sunday PM Peak Traffic Volumes with Revised Proposal (Page 2)

APPENDIX E

Trip Generation Summary

and Calculations for Revised Proposal

47 North
Current Land Use Plan (Revised Proposal) - YEAR 2025 SCENARIO
Weekday PM Peak Hour Trip Generation Summary

Land Use		Units[1]	ITE LUC[2]	Directional Distribution[2] In	Directional Distribution[2] Out	Trip Rate or Equation[2]	Trips Generated In	Trips Generated Out	Trips Generated Total
WEEKDAY PM PEAK HOUR									
Proposed Use:									
Single-Family Detached Housing		250 DU	210	63%	37%	Ln(T) = 0.94Ln(X)+0.27	148	87	235
	Internal Trips[3]						*-21*	*-2*	*-23*
						Subtotal (less internal) =	127	85	212
Multifamily Housing (Low-Rise)		96 DU	220	63%	37%	T = 0.43(X) + 20.55	39	23	62
	Internal Trips[3]						*-6*	*-1*	*-7*
						Subtotal (less internal) =	33	22	55
Affordable Housing		24 DU	223	59%	41%	0.46	6	5	11
	Internal Trips[3]						*-1*	*0*	*-1*
						Subtotal (less internal) =	5	5	10
RV Park		327 occ. sites	416	65%	35%	0.27	57	31	88
	Internal Trips[3]						*0*	*0*	*0*
						Subtotal (less internal) =	57	31	88
Retail (Shopping Plaza 40-150k) with Supermarket		64,000 SF	821	48%	52%	T = 7.67(X) + 118.86	293	317	610
	Internal Trips[3]						*-12*	*-37*	*-49*
	Passby Trips[4]	*40%*					*-108*	*-116*	*-224*
						Subtotal (less internal and passby) =	173	164	337
High-Turnover (Sit-Down) Restaurant		6,000 SF	932	61%	39%	9.05	33	21	54
	Internal Trips[3]						*-10*	*-10*	*-20*
	Passby Trips[4]	*43%*					*-9*	*-6*	*-15*
						Subtotal (less internal and passby) =	14	5	19
						Gross Proposed PM Peak Hour Trips =	**576**	**484**	**1,060**
						Less Total Internal Trips =	*-50*	*-50*	*-100*
						Less Total Pass-By Trips =	*-117*	*-122*	*-239*
						Net New PM Peak Hour Trips =	**409**	**312**	**721**

Notes:

[1] DU = Dwelling Units, Occ. Sites = Occupied Sites, SF = Square Feet.

[2] Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

[3] Internal trip reductions based on methodology documented in the ITE Trip Generation Handbook, 3rd Edition, 2017.

[4] Passby percent based on Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	47 North	**Organization:**	
Project Location:		**Performed By:**	TENW
Scenario Description:	Revised Proposal	**Date:**	6/28/2022
Analysis Year:	2025 Weekday PM Peak	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	821	64,000	SF	610	293	317
Restaurant	932	6,000	SF	54	33	21
Cinema/Entertainment				0		
Residential	210/220/223	370	DU's	308	193	115
Hotel				0		
All Other Land Uses[2]	416	327	occ. Sites	88	57	31
Total				1060	576	484

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office					3000	
Retail					3000	
Restaurant					3000	
Cinema/Entertainment						
Residential		3000	3000			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		10	0	27	0
Restaurant	0	9		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	3	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,060	576	484
Internal Capture Percentage	9%	9%	10%
External Vehicle-Trips[3]	960	526	434
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	4%	12%
Restaurant	30%	48%
Cinema/Entertainment	N/A	N/A
Residential	15%	3%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	47 North
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	293	293	1.00	317	317
Restaurant	1.00	33	33	1.00	21	21
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	193	193	1.00	115	115
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	6		92	13	27	16
Restaurant	1	9		2	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	5	5	2	0		3
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		23	1	0	8	0
Retail	0		10	0	89	0
Restaurant	0	147		0	31	0
Cinema/Entertainment	0	12	1		8	0
Residential	0	3	0	0		0
Hotel	0	6	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	12	281	293	281	0	0
Restaurant	10	23	33	23	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	28	165	193	165	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	57	57	57	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	37	280	317	280	0	0
Restaurant	10	11	21	11	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	112	115	112	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	31	31	31	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

47 North
Current Land Use Plan (Revised Proposal) - YEAR 2031 SCENARIO
Weekday PM Peak Hour Trip Generation Summary

Land Use	Units[1]	ITE LUC[2]	Directional Distribution[2] In	Directional Distribution[2] Out	Trip Rate or Equation[2]	Trips Generated In	Trips Generated Out	Trips Generated Total
WEEKDAY PM PEAK HOUR								
Proposed Use:								
Single-Family Detached Housing	527 DU	210	63%	37%	Ln(T) = 0.94Ln(X)+0.27	299	175	474
Internal Trips[3]						*-41*	*-8*	*-49*
					Subtotal (less internal) =	258	167	425
Multifamily Housing (Low-Rise)	180 DU	220	63%	37%	T = 0.43(X) + 20.55	62	36	98
Internal Trips[3]						*-8*	*-2*	*-10*
					Subtotal (less internal) =	54	34	88
Affordable Housing	50 DU	223	59%	41%	0.46	14	9	23
Internal Trips[3]						*-2*	*0*	*-2*
					Subtotal (less internal) =	12	9	21
RV Park	627 occ. sites	416	65%	35%	0.27	110	59	169
Internal Trips[3]						*0*	*0*	*0*
					Subtotal (less internal) =	110	59	169
Retail (Shopping Plaza 40-150k) with Supermarket	106,000 SF	821	48%	52%	T = 7.67(X) + 118.86	447	485	932
Internal Trips[3]						*-76*	*-103*	*-179*
Passby Trips[4]	*40%*					*-144*	*-157*	*-301*
					Subtotal (less internal and passby) =	227	225	452
High-Turnover (Sit-Down) Restaurant	18,000 SF	932	61%	39%	9.05	99	64	163
Internal Trips[3]						*-31*	*-31*	*-62*
Passby Trips[4]	*43%*					*-26*	*-17*	*-43*
					Subtotal (less internal and passby) =	42	16	58
Fast Food Restaurant with Drive-Through Window	6,000 SF	934	52%	48%	33.03	103	95	198
Internal Trips[3]						*-32*	*-45*	*-77*
Passby Trips[4]	*50%*					*-32*	*-29*	*-61*
					Subtotal (less internal and passby) =	39	21	60
General Office	20,000 SF	710	17%	83%	Ln(T) = 0.83Ln(X)+1.29	7	37	44
Internal Trips[3]						*-7*	*-8*	*-15*
					Subtotal (less internal) =	0	29	29
					Gross Proposed PM Peak Hour Trips =	**1,141**	**960**	**2,101**
					Less Total Internal Trips =	*-197*	*-197*	*-394*
					Less Total Pass-By Trips =	*-202*	*-203*	*-405*
					Net New PM Peak Hour Trips =	**742**	**560**	**1,302**

Notes:

[1] DU = Dwelling Units, Occ. Sites = Occupied Sites, SF = Square Feet.

[2] Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

[3] Internal trip reductions based on methodology documented in the ITE Trip Generation Handbook, 3rd Edition, 2017.

[4] Passby percent based on Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	47 North	**Organization:**	
Project Location:		**Performed By:**	TENW
Scenario Description:	Revised Proposal	**Date:**	6/28/2022
Analysis Year:	2031 Weekday PM Peak	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	720	20,000	SF	44	7	37
Retail	821	106,000	SF	932	447	485
Restaurant	932/934	24,000	SF	361	202	159
Cinema/Entertainment				0		
Residential	210/220/223	757	DU's	595	375	220
Hotel				0		
All Other Land Uses[2]	416	627	occ sites	169	110	59
Total				2101	1141	960

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office					3000	
Retail					3000	
Restaurant					3000	
Cinema/Entertainment						
Residential		3000	3000			
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		7	1	0	0	0
Retail	2		59	0	42	0
Restaurant	2	65		0	9	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	4	3	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	2,101	1,141	960
Internal Capture Percentage	19%	17%	21%
External Vehicle-Trips[3]	1,707	944	763
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	100%	22%
Retail	17%	21%
Restaurant	31%	48%
Cinema/Entertainment	N/A	N/A
Residential	14%	5%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	47 North
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	7	7	1.00	37	37
Retail	1.00	447	447	1.00	485	485
Restaurant	1.00	202	202	1.00	159	159
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	375	375	1.00	220	220
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		7	1	0	0	0
Retail	10		141	19	42	24
Restaurant	5	65		13	9	11
Cinema/Entertainment	0	0	0		0	0
Residential	9	9	5	0		7
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		36	4	0	15	0
Retail	2		59	0	173	0
Restaurant	2	224		0	60	0
Cinema/Entertainment	0	18	6		15	0
Residential	4	4	3	0		0
Hotel	0	9	10	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	7	0	7	0	0	0
Retail	76	371	447	371	0	0
Restaurant	63	139	202	139	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	51	324	375	324	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	110	110	110	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	8	29	37	29	0	0
Retail	103	382	485	382	0	0
Restaurant	76	83	159	83	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	10	210	220	210	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	59	59	59	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

47 North
Current Land Use Plan (Revised Proposal) - YEAR 2025 SCENARIO
Sunday Peak Hour Trip Generation Summary

Land Use		Units[1]	ITE LUC[2]	Directional Distribution[2] In	Directional Distribution[2] Out	Trip Rate or Equation[2]	Trips Generated In	Trips Generated Out	Trips Generated Total
SUNDAY PEAK HOUR									
Proposed Use:									
Single-Family Detached Housing		250 DU	210	53%	47%	(T) = 0.80(X)+4.76	109	96	205
	Internal Trips[3]	*10%*					*-11*	*-10*	*-21*
						Subtotal (less internal) =	98	86	184
Multifamily Housing (Low-Rise)		96 DU	220	50%	50%	0.36	17	18	35
	Internal Trips[3]	*10%*					*-2*	*-2*	*-4*
						Subtotal (less internal) =	15	16	31
Affordable Housing		24 DU	223	52%	48%	0.97	12	11	23
	Internal Trips[3]	*10%*					*-1*	*-1*	*-2*
						Subtotal (less internal) =	11	10	21
RV Park[5]		327 occ. sites	416	50%	50%	0.27	44	44	88
	Internal Trips[3]	*0%*					*0*	*0*	*0*
						Subtotal (less internal) =	44	44	88
Retail (Shopping Plaza 40-150k) with Supermarket		64,000 SF	821	49%	51%	7.59	238	248	486
	Internal Trips[3]	*from above*					*-12*	*-13*	*-25*
	Passby Trips[4]	*31%*					*-70*	*-73*	*-143*
						Subtotal (less internal and passby) =	156	162	318
High-Turnover (Sit-Down) Restaurant[6]		6,000 SF	932	55%	45%	4.14	14	11	25
	Internal Trips[3]	*from above*					*-1*	*-1*	*-2*
	Passby Trips[4]	*43%*					*-5*	*-5*	*-10*
						Subtotal (less internal and passby) =	8	5	13
						Gross Proposed Sunday Peak Hour Trips =	**434**	**428**	**862**
						Less Total Internal Trips =	*-27*	*-27*	*-54*
						Less Total Pass-By Trips =	*-75*	*-78*	*-153*
						Net New Sunday Peak Hour Trips =	**332**	**323**	**655**

Notes:

[1] DU = Dwelling Units, Occ. Sites = Occupied Sites, SF = Square Feet.

[2] Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

[3] Internal trip reductions based on methodology documented in the ITE Trip Generation Handbook, 3rd Edition, 2017 for weekday PM peak hour. Internal % for RV park assumed to be 0%.

[4] Passby percent based on studies documented in the ITE Trip Generation Manual, 11th Edition. Sunday peak hour pass-by rates assumed to be equal to weekday PM peak hour pass-by rate for LUC 932 and assumed to be equal to Saturday peak hour pass-by rate for LUC 821.

[5] There are no Sunday trip rates for an RV park. Therefore, the Sunday trip rates and directional distribution were assumed to be equal to the Weekday trip rates.

[6] Sunday peak hour trip rate for restaurant estimated based on hourly distribution data in the Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

47 North
Current Land Use Plan (Revised Proposal) - YEAR 2031 SCENARIO
Sunday Peak Hour Trip Generation Summary

Land Use		Units[1]	ITE LUC[2]	Directional Distribution[2] In	Directional Distribution[2] Out	Trip Rate or Equation[2]	Trips Generated In	Trips Generated Out	Trips Generated Total
SUNDAY PEAK HOUR									
Proposed Use:									
Single-Family Detached Housing		527 DU	210	53%	47%	(T) = 0.80(X)+4.76	226	200	426
	Internal Trips[3]	*10%*					*-23*	*-20*	*-43*
						Subtotal (less internal) =	203	180	383
Multifamily Housing (Low-Rise)		180 DU	220	50%	50%	0.36	32	33	65
	Internal Trips[3]	*10%*					*-3*	*-4*	*-7*
						Subtotal (less internal) =	29	29	58
Affordable Housing		50 DU	223	52%	48%	0.97	25	24	49
	Internal Trips[3]	*10%*					*-3*	*-2*	*-5*
						Subtotal (less internal) =	22	22	44
RV Park[5]		627 occ. sites	416	50%	50%	0.27	84	85	169
	Internal Trips[3]	*0%*					*0*	*0*	*0*
						Subtotal (less internal) =	84	85	169
Retail (Shopping Plaza 40-150k) with Supermarket		106,000 SF	821	49%	51%	7.59	394	411	805
	Internal Trips[3]	*from above*					*-19*	*-21*	*-40*
	Passby Trips[4]	*31%*					*-116*	*-121*	*-237*
						Subtotal (less internal and passby) =	259	269	528
High-Turnover (Sit-Down) Restaurant[6]		18,000 SF	932	55%	45%	4.14	41	34	75
	Internal Trips[3]	*from above*					*-2*	*-2*	*-4*
	Passby Trips[4]	*43%*					*-17*	*-14*	*-31*
						Subtotal (less internal and passby) =	22	18	40
Fast Food Restaurant with Drive-Through Window[6]		6,000 SF	934	48%	52%	39.70	114	124	238
	Internal Trips[3]	*from above*					*-5*	*-6*	*-11*
	Passby Trips[4]	*55%*					*-60*	*-65*	*-125*
						Subtotal (less internal and passby) =	49	53	102
General Office		20,000 SF	710	58%	42%	0.21	2	2	4
	Internal Trips[3]	*from above*					*0*	*0*	*0*
						Subtotal (less internal) =	2	2	4
						Gross Proposed Sunday Peak Hour Trips =	**918**	**913**	**1,831**
						Less Total Internal Trips =	*-55*	*-55*	*-110*
						Less Total Pass-By Trips =	*-193*	*-200*	*-393*
						Net New Sunday Peak Hour Trips =	**670**	**658**	**1,328**

Notes:

[1] DU = Dwelling Units, Occ. Sites = Occupied Sites, SF = Square Feet.

[2] Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

[3] Internal trip reductions based on methodology documented in the ITE Trip Generation Handbook, 3rd Edition, 2017 for weekday PM peak hour. Internal % for RV park assumed to be 0%.

[4] Passby percent based on studies documented in the ITE Trip Generation Manual, 11th Edition. Sunday peak hour pass-by rates assumed to be equal to weekday PM peak hour pass-by rate for LUC 932 and assumed to be equal to Saturday peak hour pass-by rate for LUC 821.

[5] There are no Sunday trip rates for an RV park. Therefore, the Sunday trip rates and directional distribution were assumed to be equal to the Weekday trip rates.

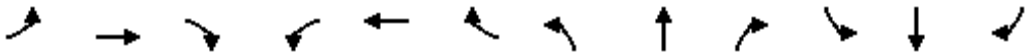
[6] Sunday peak hour trip rate for restaurant use estimated based on hourly distribution data in the Institute of Transportation Engineers, Trip Generation Manual, 11th Edition.

APPENDIX F

Intersection LOS Calculations

Weekday LOS Calculations

(2025 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	10	20	0	0	0	0	20	30	160	20	0
Future Volume (vph)	220	10	20	0	0	0	0	20	30	160	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

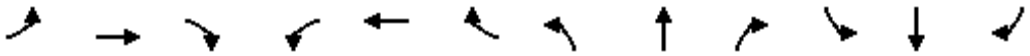
Intersection	
Int Delay, s/veh	10.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	220	10	20	0	0	0	0	20	30	160	20	0
Future Vol, veh/h	220	10	20	0	0	0	0	20	30	160	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	220	10	20	0	0	0	0	20	30	160	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	375	390	20	-	0	0	50	0	0
Stage 1	340	340	-	-	-	-	-	-	-
Stage 2	35	50	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	622	542	1052	0	-	-	1544	-	0
Stage 1	716	636	-	0	-	-	-	-	0
Stage 2	982	849	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	557	0	1052	-	-	-	1544	-	-
Mov Cap-2 Maneuver	557	0	-	-	-	-	-	-	-
Stage 1	716	0	-	-	-	-	-	-	-
Stage 2	879	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.8	0	6.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	580	1544	-
HCM Lane V/C Ratio	-	-	0.431	0.104	-
HCM Control Delay (s)	-	-	15.8	7.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	2.2	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	10	220	10	220	0	0	150	160
Future Volume (vph)	0	0	0	20	10	220	10	220	0	0	150	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

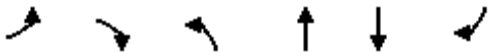
Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	10	220	10	220	0	0	150	160
Future Vol, veh/h	0	0	0	20	10	220	10	220	0	0	150	160
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	20	10	220	10	220	0	0	150	160

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	470	550	220	310	0	-	-	-	0	
Stage 1	240	240	-	-	-	-	-	-	-	
Stage 2	230	310	-	-	-	-	-	-	-	
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-	
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-	
Pot Cap-1 Maneuver	548	440	815	1239	-	0	0	-	-	
Stage 1	795	703	-	-	-	0	0	-	-	
Stage 2	803	655	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	543	0	815	1239	-	-	-	-	-	
Mov Cap-2 Maneuver	543	0	-	-	-	-	-	-	-	
Stage 1	788	0	-	-	-	-	-	-	-	
Stage 2	803	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1239	-	782	-	-
HCM Lane V/C Ratio	0.008	-	0.32	-	-
HCM Control Delay (s)	7.9	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	1.4	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	60	60	100	340	240	40
Future Volume (vph)	60	60	100	340	240	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	60	100	340	240	40
Future Vol, veh/h	60	60	100	340	240	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	60	60	100	340	240	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	800	260	280	0	-	0
Stage 1	260	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	337	748	1271	-	-	-
Stage 1	754	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	310	748	1271	-	-	-
Mov Cap-2 Maneuver	310	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	559	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1271	-	438	-	-
HCM Lane V/C Ratio	0.079	-	0.274	-	-
HCM Control Delay (s)	8.1	-	16.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

LANE LEVEL OF SERVICE

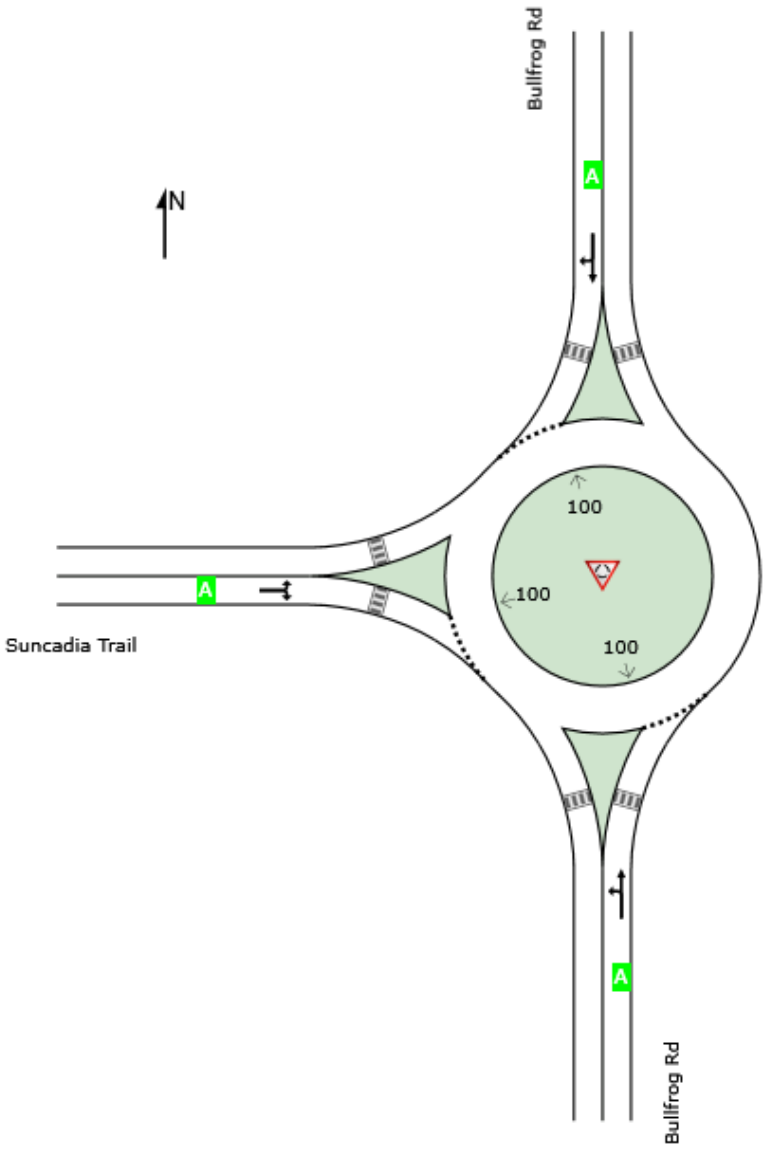
Lane Level of Service

Site: 4 [2025 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	400	4.3	400	4.3	1051	0.381	100	7.3	LOS A	2.1	54.7	Full	1600	0.0	0.0
Approach	400	4.3	400	4.3		0.381		7.3	LOS A	2.1	54.7				
North: Bullfrog Rd															
Lane 1[d]	240	2.1	240	2.1	1113	0.216	100	5.2	LOS A	1.0	26.6	Full	1600	0.0	0.0
Approach	240	2.1	240	2.1		0.216		5.2	LOS A	1.0	26.6				
West: Suncadia Trail															
Lane 1[d]	360	4.7	360	4.7	1148	0.313	100	6.0	LOS A	1.7	43.9	Full	1600	0.0	0.0
Approach	360	4.7	360	4.7		0.313		6.0	LOS A	1.7	43.9				
All Vehicles	1000	3.9	1000	3.9		0.381		6.3	LOS A	2.1	54.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	180	220	400	4.3	1051	0.381	100	NA	NA
Approach	180	220	400	4.3		0.381			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	130	110	240	2.1	1113	0.216	100	NA	NA
Approach	130	110	240	2.1		0.216			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	210	150	360	4.7	1148	0.313	100	NA	NA
Approach	210	150	360	4.7		0.313			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1000	3.9	0.381						

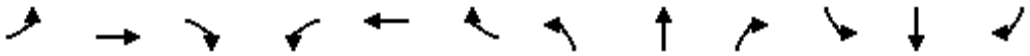
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	10	0	0	0	10	420	0	0	230	20
Future Volume (vph)	40	0	10	0	0	0	10	420	0	0	230	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	0	10	0	0	0	10	420	0	0	230	20
Future Vol, veh/h	40	0	10	0	0	0	10	420	0	0	230	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	40	0	10	0	0	0	10	420	0	0	230	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	681	681	241	685	691	420	251	0	0	420	0	0
Stage 1	241	241	-	440	440	-	-	-	-	-	-	-
Stage 2	440	440	-	245	251	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	358	366	786	365	370	638	1303	-	-	1139	-	-
Stage 1	751	697	-	600	581	-	-	-	-	-	-	-
Stage 2	586	569	-	763	703	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	355	362	785	358	366	638	1302	-	-	1139	-	-
Mov Cap-2 Maneuver	355	362	-	358	366	-	-	-	-	-	-	-
Stage 1	743	696	-	594	575	-	-	-	-	-	-	-
Stage 2	580	563	-	753	702	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	0	0.2	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1302	-	-	399	-	1139	-	-
HCM Lane V/C Ratio	0.008	-	-	0.125	-	-	-	-
HCM Control Delay (s)	7.8	0	-	15.3	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	0	-	-

LANE LEVEL OF SERVICE

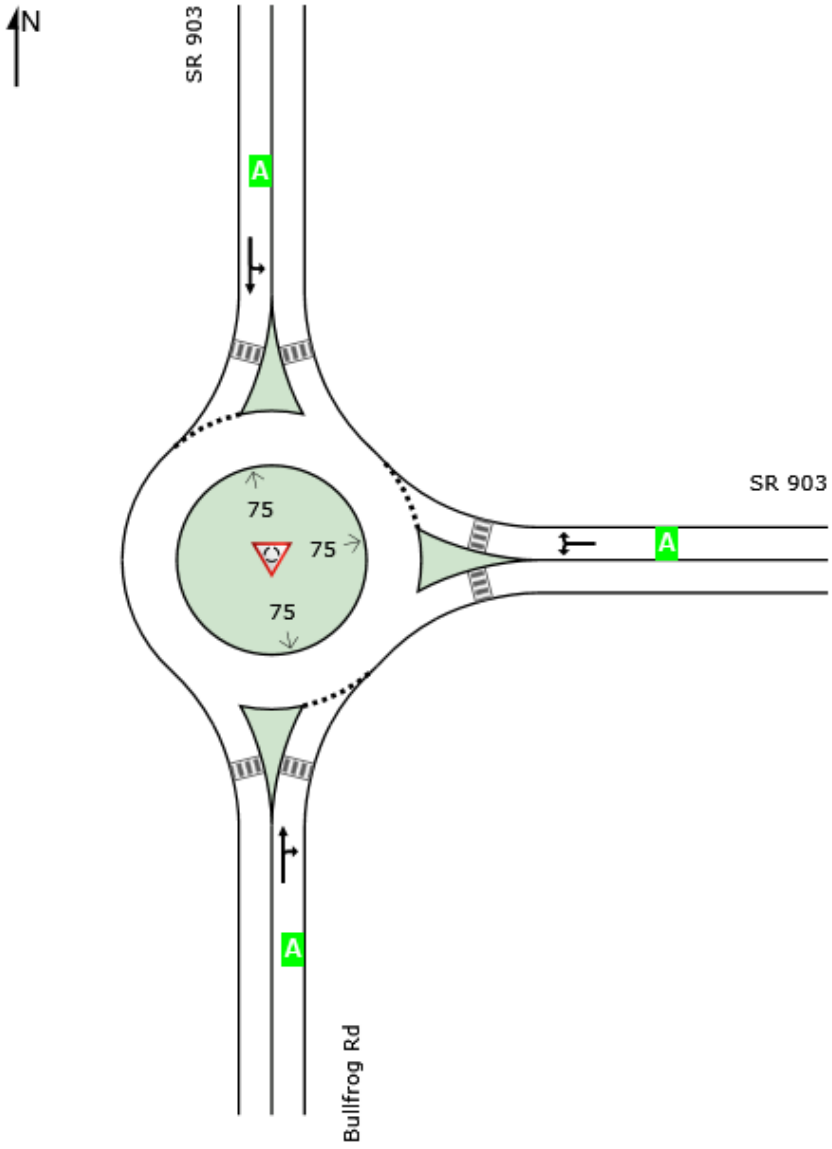
Lane Level of Service

Site: 6 [2025 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	430	4.3	430	4.3	958	0.449	100	8.9	LOS A	2.5	65.7	Full	1600	0.0	0.0
Approach	430	4.3	430	4.3		0.449		8.9	LOS A	2.5	65.7				
East: SR 903															
Lane 1[d]	500	2.8	500	2.8	1093	0.457	100	8.2	LOS A	2.9	73.7	Full	1600	0.0	0.0
Approach	500	2.8	500	2.8		0.457		8.2	LOS A	2.9	73.7				
North: SR 903															
Lane 1[d]	440	2.3	440	2.3	1188	0.370	100	6.5	LOS A	2.2	56.3	Full	1600	0.0	0.0
Approach	440	2.3	440	2.3		0.370		6.5	LOS A	2.2	56.3				
All Vehicles	1370	3.1	1370	3.1		0.457		7.9	LOS A	2.9	73.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd									
Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	190	240	430	4.3	958	0.449	100	NA	NA
Approach	190	240	430	4.3		0.449			
East: SR 903									
Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	120	380	500	2.8	1093	0.457	100	NA	NA
Approach	120	380	500	2.8		0.457			
North: SR 903									
Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	300	140	440	2.3	1188	0.370	100	NA	NA
Approach	300	140	440	2.3		0.370			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1370	3.1	0.457

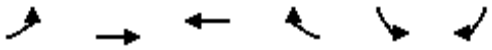
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	480	460	20	20	10
Future Volume (vph)	10	480	460	20	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

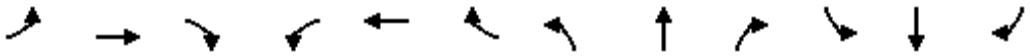
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	480	460	20	20	10
Future Vol, veh/h	10	480	460	20	20	10
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	10	480	460	20	20	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	480	0	-	0	970	473
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	500	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1062	-	-	-	283	595
Stage 1	-	-	-	-	633	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1062	-	-	-	279	593
Mov Cap-2 Maneuver	-	-	-	-	279	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	613	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1062	-	-	-	339
HCM Lane V/C Ratio	0.009	-	-	-	0.088
HCM Control Delay (s)	8.4	0	-	-	16.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	410	90	30	390	10	90	0	70	10	0	0
Future Volume (vph)	10	410	90	30	390	10	90	0	70	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

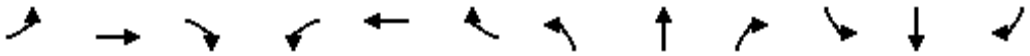
Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	410	90	30	390	10	90	0	70	10	0	0
Future Vol, veh/h	10	410	90	30	390	10	90	0	70	10	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	410	90	30	390	10	90	0	70	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	400	0	0	500	0	0	931	935	455	965	975	396
Stage 1	-	-	-	-	-	-	475	475	-	455	455	-
Stage 2	-	-	-	-	-	-	456	460	-	510	520	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1143	-	-	1059	-	-	249	267	609	236	253	658
Stage 1	-	-	-	-	-	-	574	561	-	589	572	-
Stage 2	-	-	-	-	-	-	588	569	-	550	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1143	-	-	1059	-	-	240	254	609	201	241	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	254	-	201	241	-
Stage 1	-	-	-	-	-	-	567	554	-	582	551	-
Stage 2	-	-	-	-	-	-	566	549	-	481	529	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.6	26.1	23.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	327	1143	-	-	1059	-	-	201
HCM Lane V/C Ratio	0.489	0.009	-	-	0.028	-	-	0.05
HCM Control Delay (s)	26.1	8.2	0	-	8.5	0	-	23.8
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.6	0	-	-	0.1	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	470	20	10	410	10	20	0	20	10	0	10
Future Volume (vph)	10	470	20	10	410	10	20	0	20	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	470	20	10	410	10	20	0	20	10	0	10
Future Vol, veh/h	10	470	20	10	410	10	20	0	20	10	0	10
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	10	470	20	10	410	10	20	0	20	10	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	420	0	0	494	0	0	944	944	484	945	949	415
Stage 1	-	-	-	-	-	-	504	504	-	435	435	-
Stage 2	-	-	-	-	-	-	440	440	-	510	514	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	1123	-	-	1070	-	-	228	247	553	244	262	642
Stage 1	-	-	-	-	-	-	523	517	-	604	584	-
Stage 2	-	-	-	-	-	-	568	553	-	550	539	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1123	-	-	1066	-	-	220	240	551	231	255	642
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	240	-	231	255	-
Stage 1	-	-	-	-	-	-	515	509	-	597	577	-
Stage 2	-	-	-	-	-	-	552	546	-	524	530	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	18.1	16.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	314	1123	-	-	1066	-	-	340
HCM Lane V/C Ratio	0.127	0.009	-	-	0.009	-	-	0.059
HCM Control Delay (s)	18.1	8.2	0	-	8.4	0	-	16.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	100	20	10	140
Future Volume (vph)	20	10	100	20	10	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

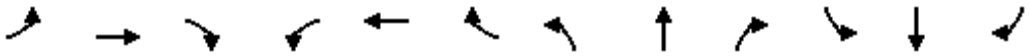
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	100	20	10	140
Future Vol, veh/h	20	10	100	20	10	140
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	100	20	10	140
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.3	8.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	83%
Vol Thru, %	0%	67%	17%
Vol Right, %	93%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	150	30	120
LT Vol	10	0	100
Through Vol	0	20	20
RT Vol	140	10	0
Lane Flow Rate	150	30	120
Geometry Grp	1	1	1
Degree of Util (X)	0.153	0.034	0.146
Departure Headway (Hd)	3.663	4.057	4.371
Convergence, Y/N	Yes	Yes	Yes
Cap	962	872	817
Service Time	1.751	2.132	2.417
HCM Lane V/C Ratio	0.156	0.034	0.147
HCM Control Delay	7.4	7.3	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.1	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	250	130	50	180	80	70	50	115	80	50	30
Future Volume (vph)	100	250	130	50	180	80	70	50	115	80	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

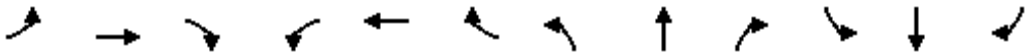
Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	100	250	130	50	180	80	70	50	115	80	50	30
Future Vol, veh/h	100	250	130	50	180	80	70	50	115	80	50	30
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	100	250	130	50	180	80	70	50	115	80	50	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	261	0	0	383	0	0	879	879	319	920	904	222
Stage 1	-	-	-	-	-	-	518	518	-	321	321	-
Stage 2	-	-	-	-	-	-	361	361	-	599	583	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1280	-	-	1165	-	-	267	285	719	253	278	820
Stage 1	-	-	-	-	-	-	539	532	-	693	653	-
Stage 2	-	-	-	-	-	-	655	624	-	490	500	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1279	-	-	1162	-	-	197	251	716	164	244	818
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	251	-	164	244	-
Stage 1	-	-	-	-	-	-	495	489	-	638	624	-
Stage 2	-	-	-	-	-	-	555	597	-	340	460	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	1.3	26.2	32.8
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	216	716	1279	-	-	1162	-	-	164	331
HCM Lane V/C Ratio	0.556	0.161	0.078	-	-	0.043	-	-	0.488	0.242
HCM Control Delay (s)	40.7	11	8.1	-	-	8.2	-	-	46.2	19.3
HCM Lane LOS	E	B	A	-	-	A	-	-	E	C
HCM 95th %tile Q(veh)	3	0.6	0.3	-	-	0.1	-	-	2.3	0.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	440	10	80	360	10	20	10	90	10	10	20
Future Volume (vph)	25	440	10	80	360	10	20	10	90	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

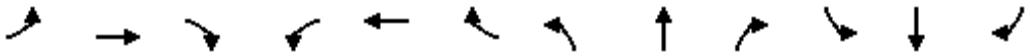
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	440	10	80	360	10	20	10	90	10	10	20
Future Vol, veh/h	25	440	10	80	360	10	20	10	90	10	10	20
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	25	440	10	80	360	10	20	10	90	10	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	375	0	0	452	0	0	1040	1032	447	1075	1032	373
Stage 1	-	-	-	-	-	-	497	497	-	530	530	-
Stage 2	-	-	-	-	-	-	543	535	-	545	502	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1162	-	-	1093	-	-	206	230	605	194	229	664
Stage 1	-	-	-	-	-	-	549	540	-	525	520	-
Stage 2	-	-	-	-	-	-	519	519	-	515	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1156	-	-	1091	-	-	178	207	604	147	206	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	207	-	147	206	-
Stage 1	-	-	-	-	-	-	536	527	-	511	479	-
Stage 2	-	-	-	-	-	-	455	479	-	421	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.5	16	20.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	187	604	1156	-	-	1091	-	-	272
HCM Lane V/C Ratio	0.16	0.149	0.022	-	-	0.073	-	-	0.147
HCM Control Delay (s)	27.9	12	8.2	-	-	8.6	-	-	20.5
HCM Lane LOS	D	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.5	0.1	-	-	0.2	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	400	70	50	260	30	140	20	20	20	20	10
Future Volume (vph)	40	400	70	50	260	30	140	20	20	20	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	400	70	50	260	30	140	20	20	20	20	10
Future Vol, veh/h	40	400	70	50	260	30	140	20	20	20	20	10
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	40	400	70	50	260	30	140	20	20	20	20	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	290	0	0	471	0	0	908	906	436	910	926	277
Stage 1	-	-	-	-	-	-	516	516	-	375	375	-
Stage 2	-	-	-	-	-	-	392	390	-	535	551	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1249	-	-	1091	-	-	256	276	620	258	271	767
Stage 1	-	-	-	-	-	-	542	534	-	650	621	-
Stage 2	-	-	-	-	-	-	633	608	-	533	519	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1249	-	-	1090	-	-	219	249	619	217	245	766
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	249	-	217	245	-
Stage 1	-	-	-	-	-	-	518	510	-	621	587	-
Stage 2	-	-	-	-	-	-	569	575	-	474	496	-

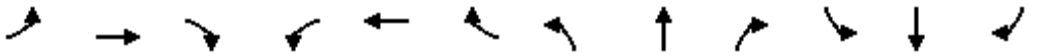
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.2	40	21.5
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	355	1249	-	-	1090	-	-	268
HCM Lane V/C Ratio	0.639	0.113	0.032	-	-	0.046	-	-	0.187
HCM Control Delay (s)	46.7	16.4	8	0	-	8.5	0	-	21.5
HCM Lane LOS	E	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.8	0.4	0.1	-	-	0.1	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	420	90	80	340	90	80	70	70	20	80	60
Future Volume (vph)	20	420	90	80	340	90	80	70	70	20	80	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 70.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



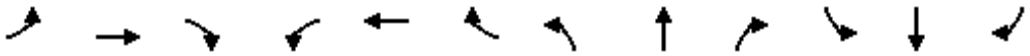
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	420	90	80	340	90	80	70	70	20	80	60
Future Volume (veh/h)	20	420	90	80	340	90	80	70	70	20	80	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	420	90	80	340	90	80	70	70	20	80	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	638	978	210	580	942	249	247	158	158	246	181	136
Arrive On Green	0.68	0.68	0.68	0.68	0.68	0.68	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	927	1445	310	868	1391	368	1237	850	850	1227	975	731
Grp Volume(v), veh/h	20	0	510	80	0	430	80	0	140	20	0	140
Grp Sat Flow(s),veh/h/ln	927	0	1755	868	0	1759	1237	0	1700	1227	0	1707
Q Serve(g_s), s	0.6	0.0	8.9	3.1	0.0	7.0	4.1	0.0	4.9	1.0	0.0	4.9
Cycle Q Clear(g_c), s	7.6	0.0	8.9	12.0	0.0	7.0	9.0	0.0	4.9	5.9	0.0	4.9
Prop In Lane	1.00		0.18	1.00		0.21	1.00		0.50	1.00		0.43
Lane Grp Cap(c), veh/h	638	0	1188	580	0	1191	247	0	316	246	0	317
V/C Ratio(X)	0.03	0.00	0.43	0.14	0.00	0.36	0.32	0.00	0.44	0.08	0.00	0.44
Avail Cap(c_a), veh/h	638	0	1188	580	0	1191	486	0	644	482	0	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.3	0.0	4.9	7.7	0.0	4.6	28.2	0.0	24.2	26.8	0.0	24.2
Incr Delay (d2), s/veh	0.1	0.0	1.1	0.5	0.0	0.9	1.1	0.0	1.4	0.2	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.8	0.6	0.0	2.2	1.3	0.0	2.0	0.3	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	0.0	6.1	8.2	0.0	5.5	29.3	0.0	25.6	27.0	0.0	25.6
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		530			510			220			160	
Approach Delay, s/veh		6.1			5.9			26.9			25.8	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	17.1	50.0	17.1
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	45.4	25.4	45.4	25.4
Max Q Clear Time (g_c+I1), s	10.9	7.9	14.0	11.0
Green Ext Time (p_c), s	4.2	1.1	3.8	1.3

Intersection Summary	
HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	290	120	10	210	20	110	20	10	20	10	20
Future Volume (vph)	30	290	120	10	210	20	110	20	10	20	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	290	120	10	210	20	110	20	10	20	10	20
Future Vol, veh/h	30	290	120	10	210	20	110	20	10	20	10	20
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	30	290	120	10	210	20	110	20	10	20	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	230	0	0	413	0	0	669	663	358	670	713	221
Stage 1	-	-	-	-	-	-	413	413	-	240	240	-
Stage 2	-	-	-	-	-	-	256	250	-	430	473	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1309	-	-	1135	-	-	373	383	689	365	352	809
Stage 1	-	-	-	-	-	-	618	595	-	755	700	-
Stage 2	-	-	-	-	-	-	751	702	-	596	552	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1309	-	-	1132	-	-	344	367	684	333	337	808
Mov Cap-2 Maneuver	-	-	-	-	-	-	344	367	-	333	337	-
Stage 1	-	-	-	-	-	-	598	575	-	732	693	-
Stage 2	-	-	-	-	-	-	714	695	-	547	534	-

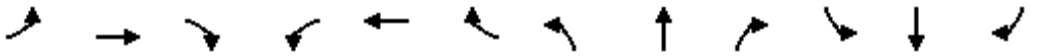
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	18.9	14.3
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	344	434	1309	-	-	1132	-	-	437
HCM Lane V/C Ratio	0.32	0.069	0.023	-	-	0.009	-	-	0.114
HCM Control Delay (s)	20.3	13.9	7.8	0	-	8.2	0	-	14.3
HCM Lane LOS	C	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.3	0.2	0.1	-	-	0	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	360	130	40	320	30	160	100	40	30	100	10
Future Volume (vph)	10	360	130	40	320	30	160	100	40	30	100	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



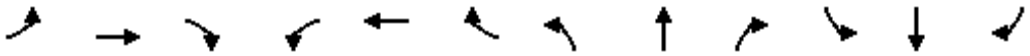
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	360	130	40	320	30	160	100	40	30	100	10
Future Volume (veh/h)	10	360	130	40	320	30	160	100	40	30	100	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	360	130	40	320	30	160	100	40	30	100	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	742	713	258	531	947	89	319	239	96	291	323	32
Arrive On Green	0.63	0.63	0.63	1.00	1.00	1.00	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	988	1132	409	898	1503	141	1218	1088	435	1215	1469	147
Grp Volume(v), veh/h	10	0	490	40	0	350	160	0	140	30	0	110
Grp Sat Flow(s),veh/h/ln	988	0	1541	898	0	1644	1218	0	1523	1215	0	1616
Q Serve(g_s), s	0.2	0.0	10.3	0.8	0.0	0.0	7.6	0.0	4.7	1.3	0.0	3.4
Cycle Q Clear(g_c), s	0.2	0.0	10.3	11.1	0.0	0.0	11.0	0.0	4.7	6.0	0.0	3.4
Prop In Lane	1.00		0.27	1.00		0.09	1.00		0.29	1.00		0.09
Lane Grp Cap(c), veh/h	742	0	971	531	0	1036	319	0	335	291	0	355
V/C Ratio(X)	0.01	0.00	0.50	0.08	0.00	0.34	0.50	0.00	0.42	0.10	0.00	0.31
Avail Cap(c_a), veh/h	742	0	971	531	0	1036	345	0	368	318	0	391
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	0.96	0.00	0.96	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.1	0.0	6.0	1.5	0.0	0.0	24.2	0.0	20.1	22.7	0.0	19.6
Incr Delay (d2), s/veh	0.0	0.0	1.7	0.3	0.0	0.8	0.5	0.0	0.3	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.0	0.1	0.0	0.2	2.1	0.0	1.6	0.4	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	0.0	7.7	1.8	0.0	0.8	24.7	0.0	20.4	22.8	0.0	19.8
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	B
Approach Vol, veh/h		500			390			300			140	
Approach Delay, s/veh		7.7			0.9			22.7			20.4	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	42.3	17.7	42.3	17.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	36.5	14.5	36.5	14.5
Max Q Clear Time (g_c+I1), s	12.3	8.0	13.1	13.0
Green Ext Time (p_c), s	3.6	0.2	2.5	0.1

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	230	70	10	170	10	50	10	30	10	10	10
Future Volume (vph)	10	230	70	10	170	10	50	10	30	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	230	70	10	170	10	50	10	30	10	10	10
Future Vol, veh/h	10	230	70	10	170	10	50	10	30	10	10	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	10	230	70	10	170	10	50	10	30	10	10	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.2	9.1	8.8	8.3
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	3%	5%	33%
Vol Thru, %	11%	74%	89%	33%
Vol Right, %	33%	23%	5%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	310	190	30
LT Vol	50	10	10	10
Through Vol	10	230	170	10
RT Vol	30	70	10	10
Lane Flow Rate	90	310	190	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.126	0.381	0.241	0.042
Departure Headway (Hd)	5.038	4.423	4.569	5.018
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	812	785	710
Service Time	3.085	2.452	2.603	3.071
HCM Lane V/C Ratio	0.127	0.382	0.242	0.042
HCM Control Delay	8.8	10.2	9.1	8.3
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	1.8	0.9	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	370	20	20	330	50	20	10	20	70	20	30
Future Volume (vph)	30	370	20	20	330	50	20	10	20	70	20	30
Satd. Flow (prot)	1719	1613	0	1736	1606	0	0	1752	1384	0	1759	1398
Flt Permitted	0.531			0.524				0.789			0.754	
Satd. Flow (perm)	958	1613	0	952	1606	0	0	1418	1354	0	1376	1353
Satd. Flow (RTOR)		8			23				27			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	390	0	20	380	0	0	30	20	0	90	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	43.4	43.4		43.4	43.4			11.0	43.4		11.0	43.4
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.18	0.72		0.18	0.72
v/c Ratio	0.04	0.33		0.03	0.33			0.12	0.02		0.36	0.03
Control Delay	5.3	5.3		5.6	6.0			18.9	2.6		23.8	2.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.3	5.3		5.6	6.0			18.9	2.6		23.8	2.9
LOS	A	A		A	A			B	A		C	A
Approach Delay		5.3			6.0			12.4			18.6	
Approach LOS		A			A			B			B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	250	10	0	0	240
Future Volume (vph)	10	250	10	0	0	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	250	10	0	0	240
Future Vol, veh/h	10	250	10	0	0	240
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	10	250	10	0	0	240

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	250	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	240	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	721	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	781	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	721	1048	-	-	-	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	781	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1030	-
HCM Lane V/C Ratio	-	0.252	-
HCM Control Delay (s)	-	9.7	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	220	20
Future Volume (vph)	0	0	10	0	220	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

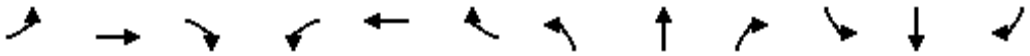
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	220	20
Future Vol, veh/h	0	0	10	0	220	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	220	20

Major/Minor	Minor2		Major2	
Conflicting Flow All	460	20	0	0
Stage 1	460	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	472	1008	-	-
Stage 1	537	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1008	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	70	10	10	10	90	330	10	10	320	20
Future Volume (vph)	20	10	70	10	10	10	90	330	10	10	320	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

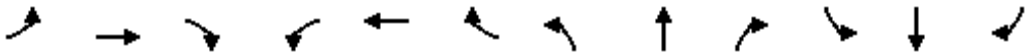
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	10	70	10	10	10	90	330	10	10	320	20
Future Vol, veh/h	20	10	70	10	10	10	90	330	10	10	320	20
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	20	10	70	10	10	10	90	330	10	10	320	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	899	894	353	930	899	361	351	0	0	353	0	0
Stage 1	361	361	-	528	528	-	-	-	-	-	-	-
Stage 2	538	533	-	402	371	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	262	283	695	250	281	688	1213	-	-	1200	-	-
Stage 1	662	629	-	538	531	-	-	-	-	-	-	-
Stage 2	531	528	-	629	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	226	248	680	196	247	671	1200	-	-	1185	-	-
Mov Cap-2 Maneuver	226	248	-	196	247	-	-	-	-	-	-	-
Stage 1	594	616	-	482	476	-	-	-	-	-	-	-
Stage 2	459	473	-	543	611	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	19.3	1.7	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1200	-	-	431	282	1185	-	-
HCM Lane V/C Ratio	0.075	-	-	0.232	0.106	0.008	-	-
HCM Control Delay (s)	8.2	0	-	15.9	19.3	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	20	10	0	10	40	230	10	0	190	10
Future Volume (vph)	0	0	20	10	0	10	40	230	10	0	190	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

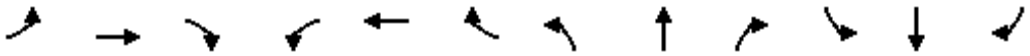
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	20	10	0	10	40	230	10	0	190	10
Future Vol, veh/h	0	0	20	10	0	10	40	230	10	0	190	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	0	0	20	10	0	10	40	230	10	0	190	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	515	515	195	520	515	235	200	0	0	240	0	0
Stage 1	195	195	-	315	315	-	-	-	-	-	-	-
Stage 2	320	320	-	205	200	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	474	466	851	432	432	750	1372	-	-	1327	-	-
Stage 1	811	743	-	650	616	-	-	-	-	-	-	-
Stage 2	696	656	-	747	695	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	456	450	851	411	417	750	1372	-	-	1327	-	-
Mov Cap-2 Maneuver	456	450	-	411	417	-	-	-	-	-	-	-
Stage 1	783	743	-	628	595	-	-	-	-	-	-	-
Stage 2	663	634	-	729	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	12	1.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	851	531	1327	-	-
HCM Lane V/C Ratio	0.029	-	-	0.024	0.038	-	-	-
HCM Control Delay (s)	7.7	0	-	9.3	12	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	110	10	30	120	10	10	10	30	10	10	10
Future Volume (vph)	10	110	10	30	120	10	10	10	30	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	110	10	30	120	10	10	10	30	10	10	10
Future Vol, veh/h	10	110	10	30	120	10	10	10	30	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	110	10	30	120	10	10	10	30	10	10	10

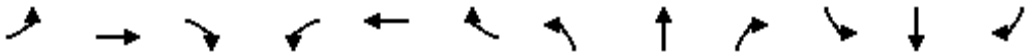
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	130	0	0	120	0	0	330	325	115	340	325	125
Stage 1	-	-	-	-	-	-	135	135	-	185	185	-
Stage 2	-	-	-	-	-	-	195	190	-	155	140	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1455	-	-	1462	-	-	627	596	943	618	596	931
Stage 1	-	-	-	-	-	-	873	789	-	821	751	-
Stage 2	-	-	-	-	-	-	811	747	-	852	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1455	-	-	1462	-	-	599	579	943	577	579	931
Mov Cap-2 Maneuver	-	-	-	-	-	-	599	579	-	577	579	-
Stage 1	-	-	-	-	-	-	867	783	-	815	734	-
Stage 2	-	-	-	-	-	-	774	731	-	809	780	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	1.4	10.1	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	760	1455	-	-	1462	-	-	662
HCM Lane V/C Ratio	0.066	0.007	-	-	0.021	-	-	0.045
HCM Control Delay (s)	10.1	7.5	0	-	7.5	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Weekday LOS Calculations

(2025 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	298	10	20	0	0	0	0	20	30	179	20	0
Future Volume (vph)	298	10	20	0	0	0	0	20	30	179	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

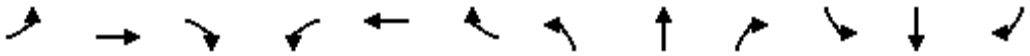
Intersection	
Int Delay, s/veh	14.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	298	10	20	0	0	0	0	20	30	179	20	0
Future Vol, veh/h	298	10	20	0	0	0	0	20	30	179	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	298	10	20	0	0	0	0	20	30	179	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	413	428	20	-	0	0	50	0	0
Stage 1	378	378	-	-	-	-	-	-	-
Stage 2	35	50	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	592	516	1052	0	-	-	1544	-	0
Stage 1	688	612	-	0	-	-	-	-	0
Stage 2	982	849	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	523	0	1052	-	-	-	1544	-	-
Mov Cap-2 Maneuver	523	0	-	-	-	-	-	-	-
Stage 1	688	0	-	-	-	-	-	-	-
Stage 2	867	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.4	0	6.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	540	1544	-
HCM Lane V/C Ratio	-	-	0.607	0.116	-
HCM Control Delay (s)	-	-	21.4	7.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	4	0.4	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	10	252	10	298	0	0	169	185
Future Volume (vph)	0	0	0	20	10	252	10	298	0	0	169	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

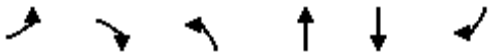
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	10	252	10	298	0	0	169	185
Future Vol, veh/h	0	0	0	20	10	252	10	298	0	0	169	185
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	2	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	20	10	252	10	298	0	0	169	185

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	580	672	298	354	0	-	-	-	0	
Stage 1	318	318	-	-	-	-	-	-	-	
Stage 2	262	354	-	-	-	-	-	-	-	
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-	
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-	
Pot Cap-1 Maneuver	473	375	737	1194	-	0	0	-	-	
Stage 1	733	650	-	-	-	0	0	-	-	
Stage 2	777	627	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	468	0	737	1194	-	-	-	-	-	
Mov Cap-2 Maneuver	468	0	-	-	-	-	-	-	-	
Stage 1	726	0	-	-	-	-	-	-	-	
Stage 2	777	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1194	-	707	-	-
HCM Lane V/C Ratio	0.008	-	0.399	-	-
HCM Control Delay (s)	8	0	13.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	1.9	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	64	60	100	450	284	46
Future Volume (vph)	64	60	100	450	284	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	60	100	450	284	46
Future Vol, veh/h	64	60	100	450	284	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	64	60	100	450	284	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	957	307	330	0	-	0
Stage 1	307	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	271	703	1218	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	496	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	249	703	1218	-	-	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	496	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1218	-	362	-	-
HCM Lane V/C Ratio	0.082	-	0.343	-	-
HCM Control Delay (s)	8.2	-	20	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	1.5	-	-

LANE LEVEL OF SERVICE

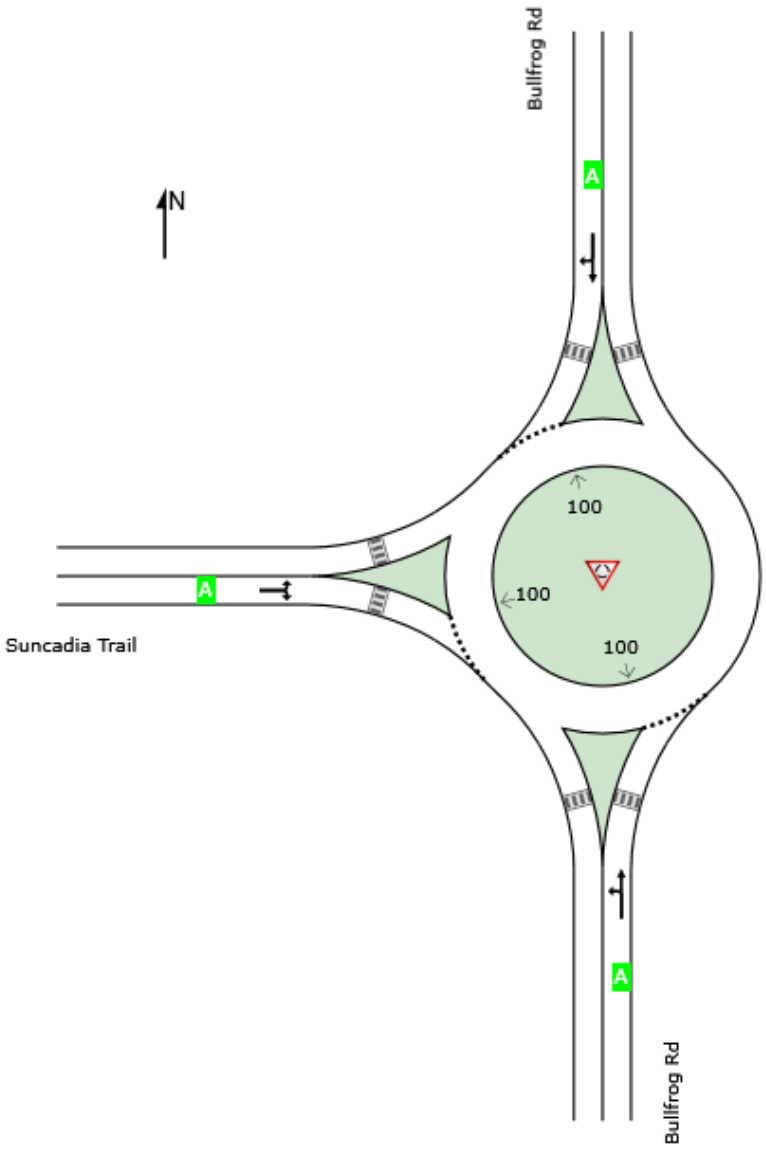
Lane Level of Service

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	497	4.3	497	4.3	1045	0.476	100	8.8	LOS A	3.0	76.4	Full	1600	0.0	0.0
Approach	497	4.3	497	4.3		0.476		8.8	LOS A	3.0	76.4				
North: Bullfrog Rd															
Lane 1[d]	314	2.1	314	2.1	1112	0.282	100	5.9	LOS A	1.5	37.3	Full	1600	0.0	0.0
Approach	314	2.1	314	2.1		0.282		5.9	LOS A	1.5	37.3				
West: Suncadia Trail															
Lane 1[d]	366	4.7	366	4.7	1078	0.339	100	6.7	LOS A	1.8	47.3	Full	1600	0.0	0.0
Approach	366	4.7	366	4.7		0.339		6.7	LOS A	1.8	47.3				
All Vehicles	1177	3.8	1177	3.8		0.476		7.3	LOS A	3.0	76.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	181	316	497	4.3	1045	0.476	100	NA	NA
Approach	181	316	497	4.3		0.476			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	188	126	314	2.1	1112	0.282	100	NA	NA
Approach	188	126	314	2.1		0.282			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	215	151	366	4.7	1078	0.339	100	NA	NA
Approach	215	151	366	4.7		0.339			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1177	3.8	0.476						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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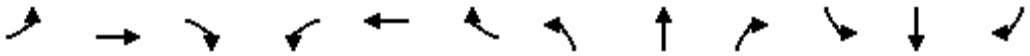


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	11	0	0	0	11	476	0	0	308	20
Future Volume (vph)	40	0	11	0	0	0	11	476	0	0	308	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	40	0	11	0	0	0	11	476	0	0	308	20
Future Vol, veh/h	40	0	11	0	0	0	11	476	0	0	308	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	40	0	11	0	0	0	11	476	0	0	308	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	817	817	319	822	827	476	329	0	0	476	0	0
Stage 1	319	319	-	498	498	-	-	-	-	-	-	-
Stage 2	498	498	-	324	329	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	289	305	710	295	309	593	1219	-	-	1086	-	-
Stage 1	682	644	-	558	548	-	-	-	-	-	-	-
Stage 2	545	536	-	692	650	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	286	301	709	288	305	593	1218	-	-	1086	-	-
Mov Cap-2 Maneuver	286	301	-	288	305	-	-	-	-	-	-	-
Stage 1	673	643	-	551	541	-	-	-	-	-	-	-
Stage 2	538	530	-	681	649	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18	0	0.2	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1218	-	-	328	-	1086	-	-
HCM Lane V/C Ratio	0.009	-	-	0.155	-	-	-	-
HCM Control Delay (s)	8	0	-	18	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

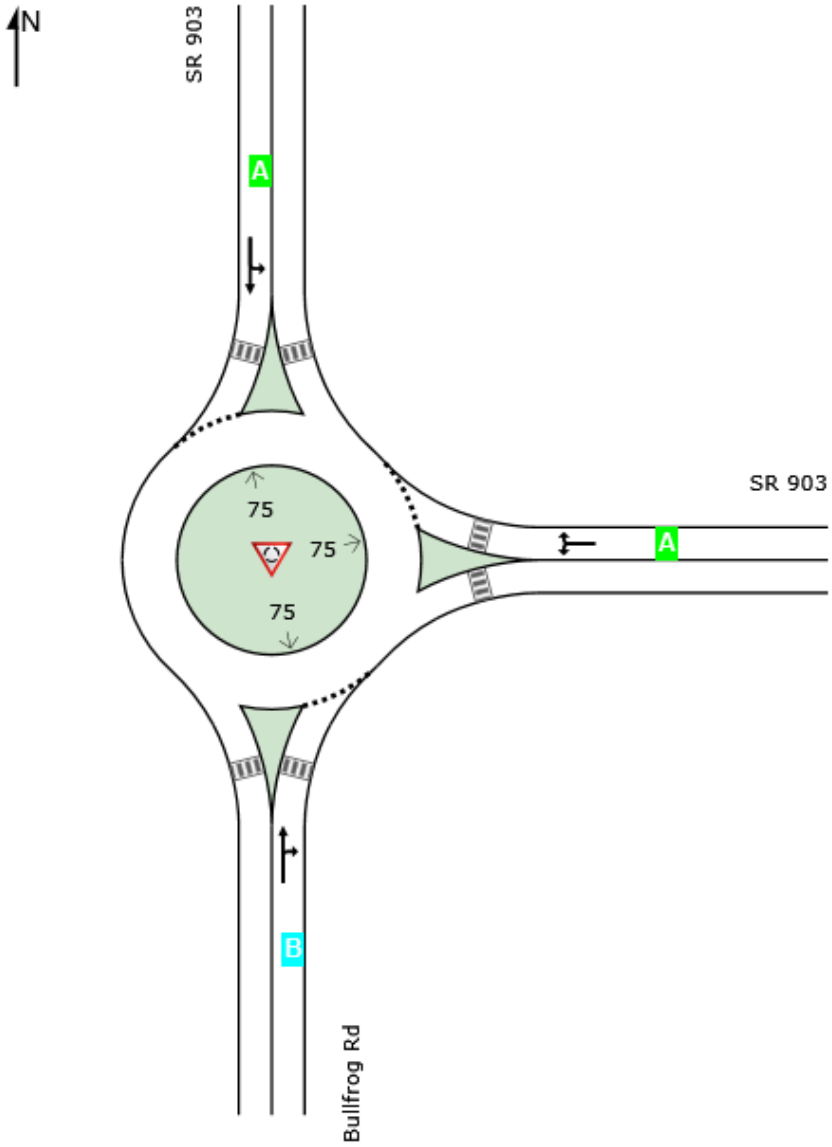
Lane Level of Service

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	486	4.3	486	4.3	942	0.516	100	10.3	LOS B	3.8	99.5	Full	1600	0.0	0.0
Approach	486	4.3	486	4.3		0.516		10.3	LOS B	3.8	99.5				
East: SR 903															
Lane 1[d]	561	2.8	561	2.8	1058	0.530	100	9.7	LOS A	3.6	91.7	Full	1600	0.0	0.0
Approach	561	2.8	561	2.8		0.530		9.7	LOS A	3.6	91.7				
North: SR 903															
Lane 1[d]	488	2.3	488	2.3	1132	0.431	100	7.6	LOS A	2.7	68.7	Full	1600	0.0	0.0
Approach	488	2.3	488	2.3		0.431		7.6	LOS A	2.7	68.7				
All Vehicles	1535	3.1	1535	3.1		0.530		9.2	LOS A	3.8	99.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	220	266	486	4.3	942	0.516	100	NA	NA
Approach	220	266	486	4.3		0.516			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	165	396	561	2.8	1058	0.530	100	NA	NA
Approach	165	396	561	2.8		0.530			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	315	173	488	2.3	1132	0.431	100	NA	NA
Approach	315	173	488	2.3		0.431			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1535	3.1	0.530

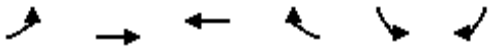
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	14	713	732	20	20	15
Future Volume (vph)	14	713	732	20	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

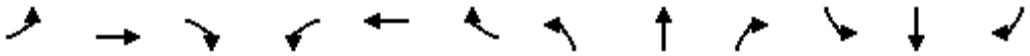
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	713	732	20	20	15
Future Vol, veh/h	14	713	732	20	20	15
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	14	713	732	20	20	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	752	0	-	0	1483	745
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	741	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	840	-	-	-	139	417
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	475	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	840	-	-	-	135	416
Mov Cap-2 Maneuver	-	-	-	-	135	-
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	475	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	28.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	840	-	-	-	190
HCM Lane V/C Ratio	0.017	-	-	-	0.184
HCM Control Delay (s)	9.4	0	-	-	28.2
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	613	116	30	613	10	134	0	70	10	0	5
Future Volume (vph)	14	613	116	30	613	10	134	0	70	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	30.5

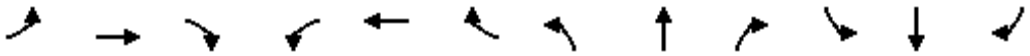
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	613	116	30	613	10	134	0	70	10	0	5
Future Vol, veh/h	14	613	116	30	613	10	134	0	70	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	14	613	116	30	613	10	134	0	70	10	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	623	0	0	729	0	0	1381	1382	671	1412	1435	619
Stage 1	-	-	-	-	-	-	699	699	-	678	678	-
Stage 2	-	-	-	-	-	-	682	683	-	734	757	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	944	-	-	870	-	-	~ 123	145	460	117	135	492
Stage 1	-	-	-	-	-	-	434	445	-	445	455	-
Stage 2	-	-	-	-	-	-	443	452	-	415	419	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	944	-	-	870	-	-	~ 115	134	460	93	125	492
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 115	134	-	93	125	-
Stage 1	-	-	-	-	-	-	423	434	-	434	431	-
Stage 2	-	-	-	-	-	-	415	428	-	343	409	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	236.5	37.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	155	944	-	-	870	-	-	127
HCM Lane V/C Ratio	1.316	0.015	-	-	0.034	-	-	0.118
HCM Control Delay (s)	236.5	8.9	0	-	9.3	0	-	37.1
HCM Lane LOS	F	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	12.3	0	-	-	0.1	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	650	39	10	596	10	52	0	20	10	0	15
Future Volume (vph)	14	650	39	10	596	10	52	0	20	10	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	650	39	10	596	10	52	0	20	10	0	15
Future Vol, veh/h	14	650	39	10	596	10	52	0	20	10	0	15
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	14	650	39	10	596	10	52	0	20	10	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	606	0	0	693	0	0	1331	1328	674	1329	1342	601
Stage 1	-	-	-	-	-	-	702	702	-	621	621	-
Stage 2	-	-	-	-	-	-	629	626	-	708	721	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	958	-	-	902	-	-	122	145	430	133	154	504
Stage 1	-	-	-	-	-	-	406	419	-	478	482	-
Stage 2	-	-	-	-	-	-	446	454	-	429	435	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	958	-	-	899	-	-	114	139	428	123	147	504
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	139	-	123	147	-
Stage 1	-	-	-	-	-	-	395	407	-	467	474	-
Stage 2	-	-	-	-	-	-	425	446	-	399	423	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	53.3	23
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	143	958	-	-	899	-	-	225
HCM Lane V/C Ratio	0.503	0.015	-	-	0.011	-	-	0.111
HCM Control Delay (s)	53.3	8.8	0	-	9	0	-	23
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.4	0	-	-	0	-	-	0.4

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	126	20	10	184
Future Volume (vph)	20	10	126	20	10	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

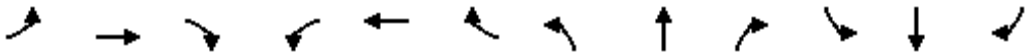
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	126	20	10	184
Future Vol, veh/h	20	10	126	20	10	184
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	126	20	10	184
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	8.5	7.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	5%	0%	86%
Vol Thru, %	0%	67%	14%
Vol Right, %	95%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	194	30	146
LT Vol	10	0	126
Through Vol	0	20	20
RT Vol	184	10	0
Lane Flow Rate	194	30	146
Geometry Grp	1	1	1
Degree of Util (X)	0.205	0.035	0.181
Departure Headway (Hd)	3.808	4.257	4.454
Convergence, Y/N	Yes	Yes	Yes
Cap	949	844	797
Service Time	1.808	2.27	2.527
HCM Lane V/C Ratio	0.204	0.036	0.183
HCM Control Delay	7.8	7.4	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.1	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	250	130	50	180	80	70	82	115	80	69	37
Future Volume (vph)	112	250	130	50	180	80	70	82	115	80	69	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

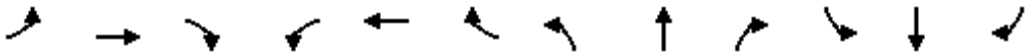
Intersection	
Int Delay, s/veh	16

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	250	130	50	180	80	70	82	115	80	69	37
Future Vol, veh/h	112	250	130	50	180	80	70	82	115	80	69	37
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	112	250	130	50	180	80	70	82	115	80	69	37

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	261	0	0	383	0	0	916	903	319	960	928	222
Stage 1	-	-	-	-	-	-	542	542	-	321	321	-
Stage 2	-	-	-	-	-	-	374	361	-	639	607	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1280	-	-	1165	-	-	252	276	719	237	269	820
Stage 1	-	-	-	-	-	-	523	519	-	693	653	-
Stage 2	-	-	-	-	-	-	645	624	-	466	488	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1279	-	-	1162	-	-	168	240	716	132	234	818
Mov Cap-2 Maneuver	-	-	-	-	-	-	168	240	-	132	234	-
Stage 1	-	-	-	-	-	-	476	472	-	632	624	-
Stage 2	-	-	-	-	-	-	524	597	-	295	444	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1.3	41.3	41.7
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	200	716	1279	-	-	1162	-	-	132	312
HCM Lane V/C Ratio	0.76	0.161	0.088	-	-	0.043	-	-	0.606	0.34
HCM Control Delay (s)	64.2	11	8.1	-	-	8.2	-	-	67.3	22.4
HCM Lane LOS	F	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	5.1	0.6	0.3	-	-	0.1	-	-	3.1	1.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	440	10	80	360	10	20	42	90	10	29	20
Future Volume (vph)	25	440	10	80	360	10	20	42	90	10	29	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

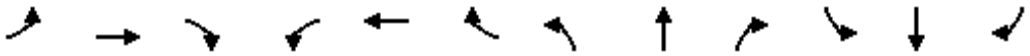
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	440	10	80	360	10	20	42	90	10	29	20
Future Vol, veh/h	25	440	10	80	360	10	20	42	90	10	29	20
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	25	440	10	80	360	10	20	42	90	10	29	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	375	0	0	452	0	0	1050	1032	447	1091	1032	373
Stage 1	-	-	-	-	-	-	497	497	-	530	530	-
Stage 2	-	-	-	-	-	-	553	535	-	561	502	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1162	-	-	1093	-	-	202	230	605	189	229	664
Stage 1	-	-	-	-	-	-	549	540	-	525	520	-
Stage 2	-	-	-	-	-	-	512	519	-	505	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1156	-	-	1091	-	-	162	207	604	126	206	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	207	-	126	206	-
Stage 1	-	-	-	-	-	-	536	527	-	511	479	-
Stage 2	-	-	-	-	-	-	431	479	-	387	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.5	20.5	25.3
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	190	604	1156	-	-	1091	-	-	236
HCM Lane V/C Ratio	0.326	0.149	0.022	-	-	0.073	-	-	0.25
HCM Control Delay (s)	32.9	12	8.2	-	-	8.6	-	-	25.3
HCM Lane LOS	D	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.3	0.5	0.1	-	-	0.2	-	-	1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	511	123	50	389	30	179	20	20	20	20	28
Future Volume (vph)	56	511	123	50	389	30	179	20	20	20	20	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	42.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	511	123	50	389	30	179	20	20	20	20	28
Future Vol, veh/h	56	511	123	50	389	30	179	20	20	20	20	28
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	56	511	123	50	389	30	179	20	20	20	20	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	419	0	0	635	0	0	1216	1205	574	1209	1251	406
Stage 1	-	-	-	-	-	-	686	686	-	504	504	-
Stage 2	-	-	-	-	-	-	530	519	-	705	747	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1119	-	-	948	-	-	~ 158	184	518	161	174	649
Stage 1	-	-	-	-	-	-	438	448	-	554	544	-
Stage 2	-	-	-	-	-	-	533	533	-	430	423	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1119	-	-	947	-	-	~ 121	158	518	125	149	648
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 121	158	-	125	149	-
Stage 1	-	-	-	-	-	-	403	412	-	510	506	-
Stage 2	-	-	-	-	-	-	455	496	-	362	389	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1	265.6	31.6
HCM LOS			F	D

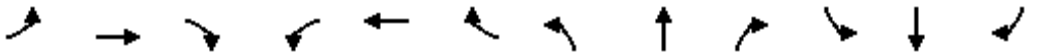
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	242	1119	-	-	947	-	-	202
HCM Lane V/C Ratio	1.479	0.165	0.05	-	-	0.053	-	-	0.337
HCM Control Delay (s)	$ 319.9	22.8	8.4	0	-	9	0	-	31.6
HCM Lane LOS	F	C	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	12.6	0.6	0.2	-	-	0.2	-	-	1.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	420	90	80	340	116	80	83	70	54	99	60
Future Volume (vph)	20	420	90	80	340	116	80	83	70	54	99	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 69.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



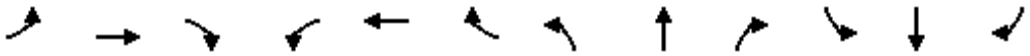
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	420	90	80	340	116	80	83	70	54	99	60
Future Volume (veh/h)	20	420	90	80	340	116	80	83	70	54	99	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	420	90	80	340	116	80	83	70	54	99	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	605	966	207	568	870	297	245	182	154	248	210	128
Arrive On Green	0.67	0.67	0.67	0.67	0.67	0.67	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	905	1445	310	868	1302	444	1216	929	783	1213	1072	650
Grp Volume(v), veh/h	20	0	510	80	0	456	80	0	153	54	0	159
Grp Sat Flow(s),veh/h/ln	905	0	1755	868	0	1746	1216	0	1712	1213	0	1722
Q Serve(g_s), s	0.7	0.0	9.2	3.2	0.0	8.0	4.2	0.0	5.4	2.8	0.0	5.6
Cycle Q Clear(g_c), s	8.7	0.0	9.2	12.5	0.0	8.0	9.8	0.0	5.4	8.2	0.0	5.6
Prop In Lane	1.00		0.18	1.00		0.25	1.00		0.46	1.00		0.38
Lane Grp Cap(c), veh/h	605	0	1173	568	0	1167	245	0	336	248	0	338
V/C Ratio(X)	0.03	0.00	0.43	0.14	0.00	0.39	0.33	0.00	0.46	0.22	0.00	0.47
Avail Cap(c_a), veh/h	605	0	1173	568	0	1167	461	0	640	464	0	644
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.0	0.0	5.3	8.2	0.0	5.1	28.5	0.0	24.1	27.7	0.0	24.2
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.5	0.0	1.0	1.1	0.0	1.4	0.6	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	3.0	0.6	0.0	2.5	1.3	0.0	2.2	0.8	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.1	0.0	6.4	8.7	0.0	6.0	29.6	0.0	25.5	28.3	0.0	25.6
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		530			536			233			213	
Approach Delay, s/veh		6.5			6.4			26.9			26.3	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	17.9	50.0	17.9
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	45.4	25.4	45.4	25.4
Max Q Clear Time (g_c+I1), s	11.2	10.2	14.5	11.8
Green Ext Time (p_c), s	4.1	1.3	4.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	337	173	10	267	20	169	20	10	20	10	33
Future Volume (vph)	41	337	173	10	267	20	169	20	10	20	10	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	8.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	337	173	10	267	20	169	20	10	20	10	33
Future Vol, veh/h	41	337	173	10	267	20	169	20	10	20	10	33
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	41	337	173	10	267	20	169	20	10	20	10	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	287	0	0	513	0	0	829	816	432	823	892	278
Stage 1	-	-	-	-	-	-	509	509	-	297	297	-
Stage 2	-	-	-	-	-	-	320	307	-	526	595	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1247	-	-	1042	-	-	291	313	626	288	277	751
Stage 1	-	-	-	-	-	-	549	540	-	703	660	-
Stage 2	-	-	-	-	-	-	694	663	-	528	486	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	1039	-	-	257	294	621	256	260	750
Mov Cap-2 Maneuver	-	-	-	-	-	-	257	294	-	256	260	-
Stage 1	-	-	-	-	-	-	522	513	-	670	653	-
Stage 2	-	-	-	-	-	-	646	656	-	474	462	-

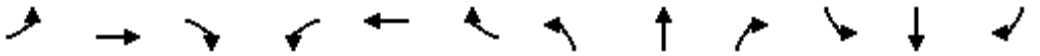
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	38.4	15.9
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	257	357	1247	-	-	1039	-	-	392
HCM Lane V/C Ratio	0.658	0.084	0.033	-	-	0.01	-	-	0.161
HCM Control Delay (s)	42.4	16	8	0	-	8.5	0	-	15.9
HCM Lane LOS	E	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	4.2	0.3	0.1	-	-	0	-	-	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	385	139	40	335	65	171	124	40	65	118	10
Future Volume (vph)	10	385	139	40	335	65	171	124	40	65	118	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



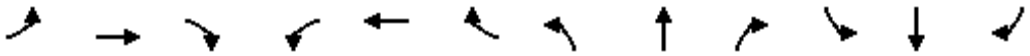
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	385	139	40	335	65	171	124	40	65	118	10
Future Volume (veh/h)	10	385	139	40	335	65	171	124	40	65	118	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	385	139	40	335	65	171	124	40	65	118	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	698	694	250	480	832	161	326	275	89	294	354	30
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	943	1132	409	870	1358	263	1199	1160	374	1190	1493	127
Grp Volume(v), veh/h	10	0	524	40	0	400	171	0	164	65	0	128
Grp Sat Flow(s),veh/h/ln	943	0	1541	870	0	1621	1199	0	1534	1190	0	1620
Q Serve(g_s), s	0.2	0.0	12.0	1.0	0.0	0.0	8.3	0.0	5.5	3.0	0.0	3.9
Cycle Q Clear(g_c), s	0.2	0.0	12.0	12.9	0.0	0.0	12.2	0.0	5.5	8.4	0.0	3.9
Prop In Lane	1.00		0.27	1.00		0.16	1.00		0.24	1.00		0.08
Lane Grp Cap(c), veh/h	698	0	944	480	0	993	326	0	364	294	0	384
V/C Ratio(X)	0.01	0.00	0.55	0.08	0.00	0.40	0.52	0.00	0.45	0.22	0.00	0.33
Avail Cap(c_a), veh/h	698	0	944	480	0	993	331	0	371	299	0	391
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	0.94	0.00	0.94	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.5	0.0	6.8	2.1	0.0	0.0	24.0	0.0	19.5	23.1	0.0	18.9
Incr Delay (d2), s/veh	0.0	0.0	2.2	0.3	0.0	1.1	0.7	0.0	0.3	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.6	0.1	0.0	0.3	2.3	0.0	1.9	0.8	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.6	0.0	9.0	2.4	0.0	1.1	24.7	0.0	19.9	23.3	0.0	19.1
LnGrp LOS	A	A	A	A	A	A	C	A	B	C	A	B
Approach Vol, veh/h		534			440			335			193	
Approach Delay, s/veh		8.9			1.3			22.3			20.5	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	41.3	18.7	41.3	18.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	36.5	14.5	36.5	14.5
Max Q Clear Time (g_c+I1), s	14.0	10.4	14.9	14.2
Green Ext Time (p_c), s	3.9	0.2	2.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	11.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	247	93	10	183	10	86	10	30	10	10	18
Future Volume (vph)	17	247	93	10	183	10	86	10	30	10	10	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	247	93	10	183	10	86	10	30	10	10	18
Future Vol, veh/h	17	247	93	10	183	10	86	10	30	10	10	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	17	247	93	10	183	10	86	10	30	10	10	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.3	9.6	9.6	8.5
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	68%	5%	5%	26%
Vol Thru, %	8%	69%	90%	26%
Vol Right, %	24%	26%	5%	47%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	357	203	38
LT Vol	86	17	10	10
Through Vol	10	247	183	10
RT Vol	30	93	10	18
Lane Flow Rate	126	357	203	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.185	0.452	0.269	0.054
Departure Headway (Hd)	5.289	4.559	4.766	5.144
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	674	785	749	689
Service Time	3.36	2.605	2.821	3.228
HCM Lane V/C Ratio	0.187	0.455	0.271	0.055
HCM Control Delay	9.6	11.3	9.6	8.5
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.7	2.4	1.1	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	430	20	20	380	81	20	15	20	89	24	30
Future Volume (vph)	30	430	20	20	380	81	20	15	20	89	24	30
Satd. Flow (prot)	1719	1615	0	1736	1594	0	0	1759	1384	0	1757	1398
Flt Permitted	0.477			0.484				0.798			0.748	
Satd. Flow (perm)	861	1615	0	880	1594	0	0	1436	1354	0	1365	1353
Satd. Flow (RTOR)		7			33				27			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	450	0	20	461	0	0	35	20	0	113	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	43.7	43.7		43.7	43.7			10.7	43.7		10.7	43.7
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.18	0.73		0.18	0.73
v/c Ratio	0.05	0.38		0.03	0.39			0.14	0.02		0.47	0.03
Control Delay	3.9	4.6		4.8	5.9			20.2	2.0		27.6	2.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.9	4.6		4.8	5.9			20.2	2.0		27.6	2.3
LOS	A	A		A	A			C	A		C	A
Approach Delay		4.6			5.9			13.6			22.3	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 7.7	Intersection LOS: A
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	285	10	0	0	267
Future Volume (vph)	10	285	10	0	0	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	285	10	0	0	267
Future Vol, veh/h	10	285	10	0	0	267
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	10	285	10	0	0	267

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	277	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	696	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	760	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	696	1048	-	-	-	-
Mov Cap-2 Maneuver	696	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1030	-
HCM Lane V/C Ratio	-	0.286	-
HCM Control Delay (s)	-	9.9	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	1.2	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	247	20
Future Volume (vph)	0	0	10	0	247	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

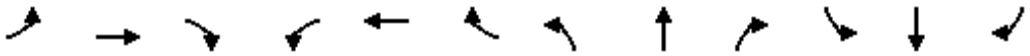
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	247	20
Future Vol, veh/h	0	0	10	0	247	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	247	20

Major/Minor	Minor2		Major2	
Conflicting Flow All	514	20	0	0
Stage 1	514	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	439	1008	-	-
Stage 1	507	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1008	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	10	74	14	10	10	96	346	16	10	345	20
Future Volume (vph)	20	10	74	14	10	10	96	346	16	10	345	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

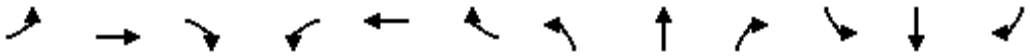
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	10	74	14	10	10	96	346	16	10	345	20
Future Vol, veh/h	20	10	74	14	10	10	96	346	16	10	345	20
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	20	10	74	14	10	10	96	346	16	10	345	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	955	953	378	988	955	380	376	0	0	375	0	0
Stage 1	386	386	-	559	559	-	-	-	-	-	-	-
Stage 2	569	567	-	429	396	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	240	261	673	228	260	671	1188	-	-	1178	-	-
Stage 1	641	614	-	517	514	-	-	-	-	-	-	-
Stage 2	511	510	-	608	607	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	204	227	658	175	226	654	1176	-	-	1163	-	-
Mov Cap-2 Maneuver	204	227	-	175	226	-	-	-	-	-	-	-
Stage 1	570	601	-	459	456	-	-	-	-	-	-	-
Stage 2	436	452	-	519	594	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.8	22.1	1.7	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	409	244	1163	-	-
HCM Lane V/C Ratio	0.082	-	-	0.254	0.139	0.009	-	-
HCM Control Delay (s)	8.3	0	-	16.8	22.1	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	24	14	0	10	41	244	11	0	207	10
Future Volume (vph)	0	0	24	14	0	10	41	244	11	0	207	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

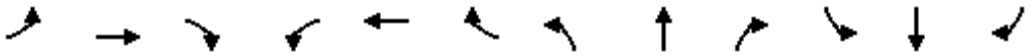
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	24	14	0	10	41	244	11	0	207	10
Future Vol, veh/h	0	0	24	14	0	10	41	244	11	0	207	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	0	0	24	14	0	10	41	244	11	0	207	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	549	549	212	556	549	250	217	0	0	255	0	0
Stage 1	212	212	-	332	332	-	-	-	-	-	-	-
Stage 2	337	337	-	224	217	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	450	446	833	408	413	736	1353	-	-	1310	-	-
Stage 1	795	731	-	636	605	-	-	-	-	-	-	-
Stage 2	681	645	-	729	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	432	430	833	386	399	736	1353	-	-	1310	-	-
Mov Cap-2 Maneuver	432	430	-	386	399	-	-	-	-	-	-	-
Stage 1	767	731	-	614	584	-	-	-	-	-	-	-
Stage 2	648	622	-	708	682	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	12.9	1.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1353	-	-	833	481	1310	-	-
HCM Lane V/C Ratio	0.03	-	-	0.029	0.05	-	-	-
HCM Control Delay (s)	7.7	0	-	9.5	12.9	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	119	10	31	130	13	10	10	35	13	10	10
Future Volume (vph)	10	119	10	31	130	13	10	10	35	13	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	119	10	31	130	13	10	10	35	13	10	10
Future Vol, veh/h	10	119	10	31	130	13	10	10	35	13	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	119	10	31	130	13	10	10	35	13	10	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	143	0	0	129	0	0	353	349	124	366	348	137
Stage 1	-	-	-	-	-	-	144	144	-	199	199	-
Stage 2	-	-	-	-	-	-	209	205	-	167	149	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1451	-	-	606	578	932	594	579	917
Stage 1	-	-	-	-	-	-	864	782	-	807	740	-
Stage 2	-	-	-	-	-	-	798	736	-	840	778	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1451	-	-	578	561	932	551	562	917
Mov Cap-2 Maneuver	-	-	-	-	-	-	578	561	-	551	562	-
Stage 1	-	-	-	-	-	-	858	777	-	801	723	-
Stage 2	-	-	-	-	-	-	760	719	-	792	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.3	10.1	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	757	1440	-	-	1451	-	-	631
HCM Lane V/C Ratio	0.073	0.007	-	-	0.021	-	-	0.052
HCM Control Delay (s)	10.1	7.5	0	-	7.5	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	14	483	31	26	313
Future Volume (vph)	17	14	483	31	26	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1004		2032			1241
Travel Time (s)	27.4		39.6			24.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	14	483	31	26	313
Future Vol, veh/h	17	14	483	31	26	313
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	18	15	525	34	28	340

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	938	542	0	0	559	0
Stage 1	542	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	242	458	-	-	811	-
Stage 1	497	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	232	458	-	-	811	-
Mov Cap-2 Maneuver	232	-	-	-	-	-
Stage 1	497	-	-	-	-	-
Stage 2	562	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.6	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	299	811	-
HCM Lane V/C Ratio	-	-	0.113	0.035	-
HCM Control Delay (s)	-	-	18.6	9.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	23	464	67	27	292
Future Volume (vph)	22	23	464	67	27	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	817		1236			172
Travel Time (s)	22.3		24.1			3.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

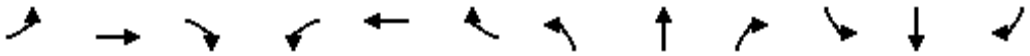
Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	23	464	67	27	292
Future Vol, veh/h	22	23	464	67	27	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	24	25	504	73	29	317

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	916	541	0	0	577	0
Stage 1	541	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	301	539	-	-	992	-
Stage 1	581	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	290	539	-	-	992	-
Mov Cap-2 Maneuver	290	-	-	-	-	-
Stage 1	581	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.2	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	290	539	992	-
HCM Lane V/C Ratio	-	-	0.082	0.046	0.03	-
HCM Control Delay (s)	-	-	18.5	12	8.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	430	80	295	412	40	84	0	274	25	0	32
Future Volume (vph)	42	430	80	295	412	40	84	0	274	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			1176			385	
Travel Time (s)		32.9			12.3			32.1			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	63.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	42	430	80	295	412	40	84	0	274	25	0	32
Future Vol, veh/h	42	430	80	295	412	40	84	0	274	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	467	87	321	448	43	91	0	298	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	491	0	0	554	0	0	1732	1736	511	1864	1758	470
Stage 1	-	-	-	-	-	-	603	603	-	1112	1112	-
Stage 2	-	-	-	-	-	-	1129	1133	-	752	646	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1067	-	-	1011	-	-	~ 69	87	561	55	84	591
Stage 1	-	-	-	-	-	-	484	487	-	252	283	-
Stage 2	-	-	-	-	-	-	247	277	-	401	465	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1067	-	-	1011	-	-	~ 41	46	561	~ 16	44	591
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 41	46	-	~ 16	44	-
Stage 1	-	-	-	-	-	-	454	456	-	236	158	-
Stage 2	-	-	-	-	-	-	130	155	-	176	436	-

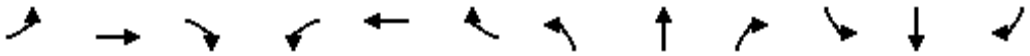
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	4	195.7	$ 615.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	41	561	1067	-	-	1011	-	-	35
HCM Lane V/C Ratio	2.227	0.531	0.043	-	-	0.317	-	-	1.77
HCM Control Delay (s)	$ 774.1	18.4	8.5	0	-	10.2	0	-	$ 615.8
HCM Lane LOS	F	C	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	9.8	3.1	0.1	-	-	1.4	-	-	6.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Weekday LOS Calculations

(2031 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	10	30	0	0	0	0	20	30	230	30	0
Future Volume (vph)	240	10	30	0	0	0	0	20	30	230	30	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

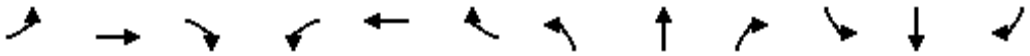
Intersection	
Int Delay, s/veh	14.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	240	10	30	0	0	0	0	20	30	230	30	0
Future Vol, veh/h	240	10	30	0	0	0	0	20	30	230	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	240	10	30	0	0	0	0	20	30	230	30	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	525	540	30	-	0	0	50	0	0
Stage 1	490	490	-	-	-	-	-	-	-
Stage 2	35	50	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	509	446	1039	0	-	-	1544	-	0
Stage 1	612	545	-	0	-	-	-	-	0
Stage 2	982	849	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	432	0	1039	-	-	-	1544	-	-
Mov Cap-2 Maneuver	432	0	-	-	-	-	-	-	-
Stage 1	612	0	-	-	-	-	-	-	-
Stage 2	834	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.1	0	6.8
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	462	1544	-
HCM Lane V/C Ratio	-	-	0.606	0.149	-
HCM Control Delay (s)	-	-	24.1	7.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.9	0.5	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	30	10	360	10	240	0	0	230	170
Future Volume (vph)	0	0	0	30	10	360	10	240	0	0	230	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

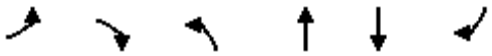
Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	10	360	10	240	0	0	230	170
Future Vol, veh/h	0	0	0	30	10	360	10	240	0	0	230	170
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	30	10	360	10	240	0	0	230	170

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	575	660	240	400	0	-	-	-	0	
Stage 1	260	260	-	-	-	-	-	-	-	
Stage 2	315	400	-	-	-	-	-	-	-	
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-	
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-	
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-	
Pot Cap-1 Maneuver	476	381	794	1148	-	0	0	-	-	
Stage 1	779	689	-	-	-	0	0	-	-	
Stage 2	735	598	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	471	0	794	1148	-	-	-	-	-	
Mov Cap-2 Maneuver	471	0	-	-	-	-	-	-	-	
Stage 1	771	0	-	-	-	-	-	-	-	
Stage 2	735	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	15	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1148	-	754	-	-
HCM Lane V/C Ratio	0.009	-	0.531	-	-
HCM Control Delay (s)	8.2	0	15	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	3.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	80	130	470	310	40
Future Volume (vph)	50	80	130	470	310	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	80	130	470	310	40
Future Vol, veh/h	50	80	130	470	310	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	50	80	130	470	310	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1060	330	350	0	-	0
Stage 1	330	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	234	683	1198	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	208	683	1198	-	-	-
Mov Cap-2 Maneuver	208	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	454	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.3	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1198	-	364	-	-
HCM Lane V/C Ratio	0.109	-	0.357	-	-
HCM Control Delay (s)	8.4	-	20.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.4	-	1.6	-	-

LANE LEVEL OF SERVICE

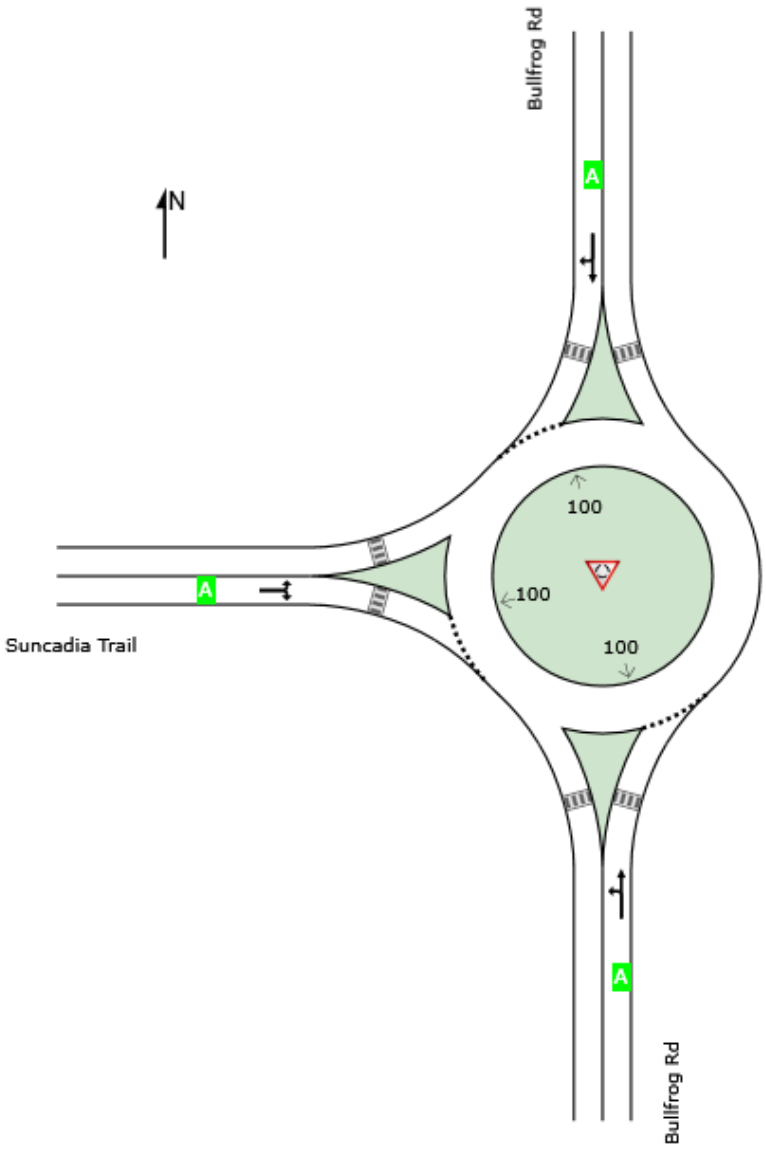
Lane Level of Service

Site: 4 [2031 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	520	4.3	520	4.3	1099	0.473	100	8.4	LOS A	3.1	78.9	Full	1600	0.0	0.0
Approach	520	4.3	520	4.3		0.473		8.4	LOS A	3.1	78.9				
North: Bullfrog Rd															
Lane 1[d]	230	2.1	230	2.1	1010	0.228	100	5.7	LOS A	1.1	27.4	Full	1600	0.0	0.0
Approach	230	2.1	230	2.1		0.228		5.7	LOS A	1.1	27.4				
West: Suncadia Trail															
Lane 1[d]	380	4.7	380	4.7	1111	0.342	100	6.5	LOS A	1.9	48.6	Full	1600	0.0	0.0
Approach	380	4.7	380	4.7		0.342		6.5	LOS A	1.9	48.6				
All Vehicles	1130	4.0	1130	4.0		0.473		7.2	LOS A	3.1	78.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	270	250	520	4.3	1099	0.473	100	NA	NA
Approach	270	250	520	4.3		0.473			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	160	70	230	2.1	1010	0.228	100	NA	NA
Approach	160	70	230	2.1		0.228			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	170	210	380	4.7	1111	0.342	100	NA	NA
Approach	170	210	380	4.7		0.342			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1130	4.0	0.473

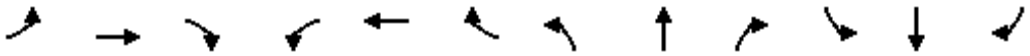
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	10	0	0	0	10	410	0	0	230	20
Future Volume (vph)	30	0	10	0	0	0	10	410	0	0	230	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	0	10	0	0	0	10	410	0	0	230	20
Future Vol, veh/h	30	0	10	0	0	0	10	410	0	0	230	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	30	0	10	0	0	0	10	410	0	0	230	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	671	671	241	675	681	410	251	0	0	410	0	0
Stage 1	241	241	-	430	430	-	-	-	-	-	-	-
Stage 2	430	430	-	245	251	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	363	371	786	371	375	646	1303	-	-	1149	-	-
Stage 1	751	697	-	607	587	-	-	-	-	-	-	-
Stage 2	594	575	-	763	703	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	360	367	785	364	371	646	1302	-	-	1149	-	-
Mov Cap-2 Maneuver	360	367	-	364	371	-	-	-	-	-	-	-
Stage 1	743	696	-	601	581	-	-	-	-	-	-	-
Stage 2	588	569	-	753	702	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	0	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1302	-	-	416	-	1149	-	-
HCM Lane V/C Ratio	0.008	-	-	0.096	-	-	-	-
HCM Control Delay (s)	7.8	0	-	14.6	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	-	-

LANE LEVEL OF SERVICE

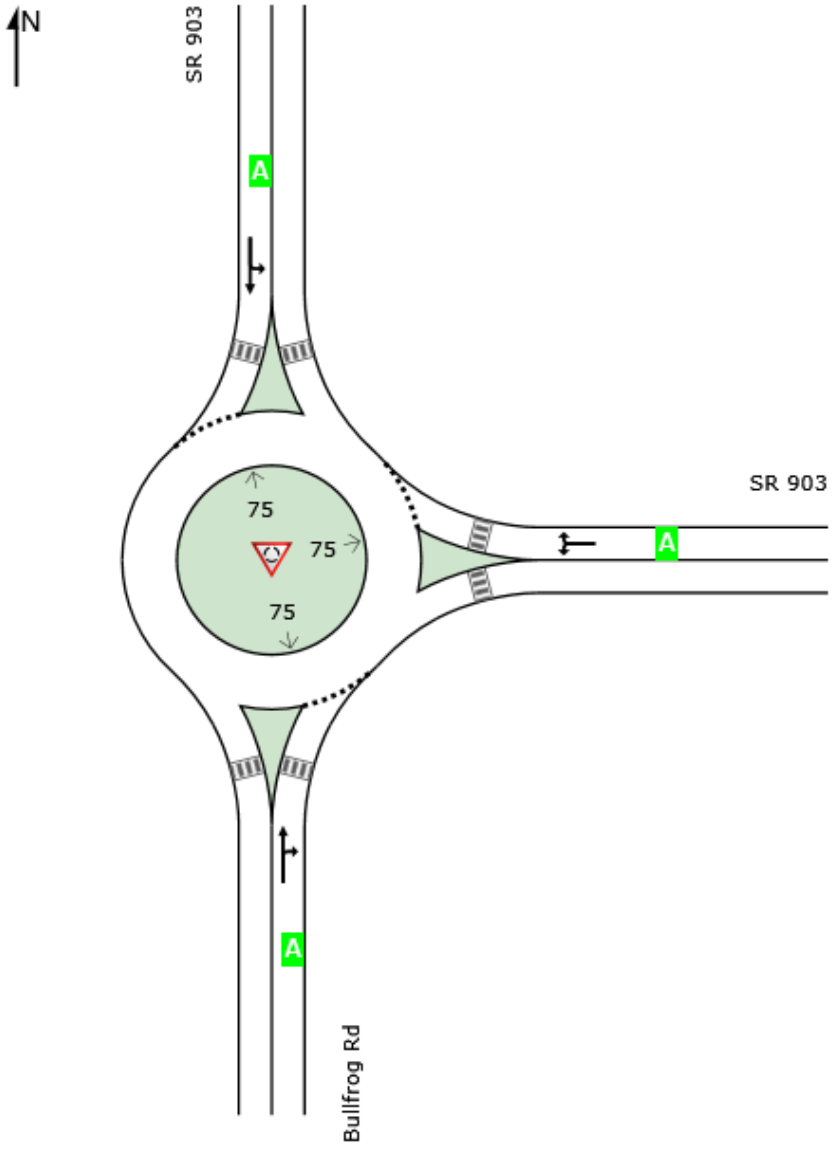
Lane Level of Service

Site: 6 [2031 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	440	4.3	440	4.3	907	0.485	100	10.0	LOS A	3.3	85.2	Full	1600	0.0	0.0
Approach	440	4.3	440	4.3		0.485		10.0	LOS A	3.3	85.2				
East: SR 903															
Lane 1[d]	570	2.8	570	2.8	1081	0.527	100	9.4	LOS A	3.6	92.6	Full	1600	0.0	0.0
Approach	570	2.8	570	2.8		0.527		9.4	LOS A	3.6	92.6				
North: SR 903															
Lane 1[d]	500	2.3	500	2.3	1188	0.421	100	7.2	LOS A	2.7	68.5	Full	1600	0.0	0.0
Approach	500	2.3	500	2.3		0.421		7.2	LOS A	2.7	68.5				
All Vehicles	1510	3.1	1510	3.1		0.527		8.8	LOS A	3.6	92.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd									
Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	200	240	440	4.3	907	0.485	100	NA	NA
Approach	200	240	440	4.3		0.485			
East: SR 903									
Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	120	450	570	2.8	1081	0.527	100	NA	NA
Approach	120	450	570	2.8		0.527			
North: SR 903									
Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	350	150	500	2.3	1188	0.421	100	NA	NA
Approach	350	150	500	2.3		0.421			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1510	3.1	0.527

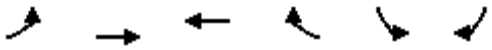
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	560	560	30	20	10
Future Volume (vph)	10	560	560	30	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

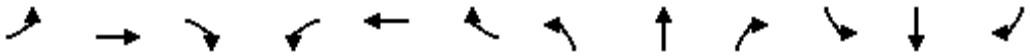
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	560	560	30	20	10
Future Vol, veh/h	10	560	560	30	20	10
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	10	560	560	30	20	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	590	0	-	0	1155	578
Stage 1	-	-	-	-	575	-
Stage 2	-	-	-	-	580	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	966	-	-	-	220	519
Stage 1	-	-	-	-	567	-
Stage 2	-	-	-	-	564	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	966	-	-	-	217	518
Mov Cap-2 Maneuver	-	-	-	-	217	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	564	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	20.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	966	-	-	-	269
HCM Lane V/C Ratio	0.01	-	-	-	0.112
HCM Control Delay (s)	8.8	0	-	-	20.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	490	90	30	480	10	100	0	110	10	0	0
Future Volume (vph)	10	490	90	30	480	10	100	0	110	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

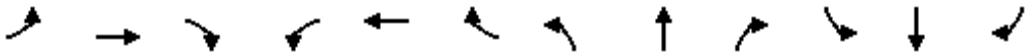
Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	490	90	30	480	10	100	0	110	10	0	0
Future Vol, veh/h	10	490	90	30	480	10	100	0	110	10	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	490	90	30	480	10	100	0	110	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	490	0	0	580	0	0	1101	1105	535	1155	1145	486
Stage 1	-	-	-	-	-	-	555	555	-	545	545	-
Stage 2	-	-	-	-	-	-	546	550	-	610	600	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1058	-	-	989	-	-	191	213	549	175	201	585
Stage 1	-	-	-	-	-	-	520	516	-	526	522	-
Stage 2	-	-	-	-	-	-	526	519	-	485	493	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1058	-	-	989	-	-	183	201	549	134	190	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	183	201	-	134	190	-
Stage 1	-	-	-	-	-	-	513	509	-	519	500	-
Stage 2	-	-	-	-	-	-	503	497	-	382	486	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	47.8	34
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	281	1058	-	-	989	-	-	134
HCM Lane V/C Ratio	0.747	0.009	-	-	0.03	-	-	0.075
HCM Control Delay (s)	47.8	8.4	0	-	8.8	0	-	34
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	5.5	0	-	-	0.1	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	590	20	10	500	10	20	0	20	10	0	10
Future Volume (vph)	10	590	20	10	500	10	20	0	20	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	590	20	10	500	10	20	0	20	10	0	10
Future Vol, veh/h	10	590	20	10	500	10	20	0	20	10	0	10
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	10	590	20	10	500	10	20	0	20	10	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	510	0	0	614	0	0	1154	1154	604	1155	1159	505
Stage 1	-	-	-	-	-	-	624	624	-	525	525	-
Stage 2	-	-	-	-	-	-	530	530	-	630	634	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	1040	-	-	965	-	-	163	185	472	175	197	571
Stage 1	-	-	-	-	-	-	449	455	-	540	533	-
Stage 2	-	-	-	-	-	-	506	503	-	473	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1040	-	-	961	-	-	156	179	470	164	190	571
Mov Cap-2 Maneuver	-	-	-	-	-	-	156	179	-	164	190	-
Stage 1	-	-	-	-	-	-	440	446	-	532	525	-
Stage 2	-	-	-	-	-	-	490	495	-	446	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	23.5	20.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	234	1040	-	-	961	-	-	255
HCM Lane V/C Ratio	0.171	0.01	-	-	0.01	-	-	0.078
HCM Control Delay (s)	23.5	8.5	0	-	8.8	0	-	20.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	100	20	10	190
Future Volume (vph)	20	10	100	20	10	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

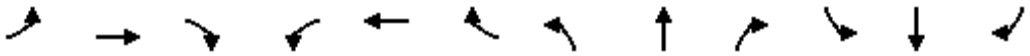
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	100	20	10	190
Future Vol, veh/h	20	10	100	20	10	190
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	100	20	10	190
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	8.3	7.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	5%	0%	83%
Vol Thru, %	0%	67%	17%
Vol Right, %	95%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	200	30	120
LT Vol	10	0	100
Through Vol	0	20	20
RT Vol	190	10	0
Lane Flow Rate	200	30	120
Geometry Grp	1	1	1
Degree of Util (X)	0.203	0.035	0.149
Departure Headway (Hd)	3.65	4.147	4.46
Convergence, Y/N	Yes	Yes	Yes
Cap	964	850	799
Service Time	1.745	2.236	2.517
HCM Lane V/C Ratio	0.207	0.035	0.15
HCM Control Delay	7.7	7.4	8.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.1	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	280	130	60	220	90	70	60	110	70	50	30
Future Volume (vph)	120	280	130	60	220	90	70	60	110	70	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

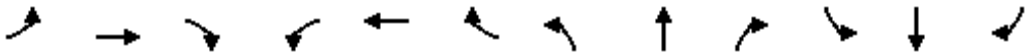
Intersection	
Int Delay, s/veh	15.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	120	280	130	60	220	90	70	60	110	70	50	30
Future Vol, veh/h	120	280	130	60	220	90	70	60	110	70	50	30
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	120	280	130	60	220	90	70	60	110	70	50	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	413	0	0	1014	1019	349	1057	1039	267
Stage 1	-	-	-	-	-	-	588	588	-	386	386	-
Stage 2	-	-	-	-	-	-	426	431	-	671	653	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1227	-	-	1135	-	-	216	236	692	204	232	774
Stage 1	-	-	-	-	-	-	493	494	-	639	612	-
Stage 2	-	-	-	-	-	-	604	581	-	448	465	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1226	-	-	1132	-	-	149	201	689	118	197	773
Mov Cap-2 Maneuver	-	-	-	-	-	-	149	201	-	118	197	-
Stage 1	-	-	-	-	-	-	444	444	-	576	579	-
Stage 2	-	-	-	-	-	-	502	550	-	293	418	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	1.4	45.6	46.4
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	169	689	1226	-	-	1132	-	-	118	273
HCM Lane V/C Ratio	0.769	0.16	0.098	-	-	0.053	-	-	0.593	0.293
HCM Control Delay (s)	74.7	11.2	8.3	-	-	8.4	-	-	72.5	23.6
HCM Lane LOS	F	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	5	0.6	0.3	-	-	0.2	-	-	2.9	1.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	440	10	80	360	10	20	10	100	10	10	20
Future Volume (vph)	25	440	10	80	360	10	20	10	100	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

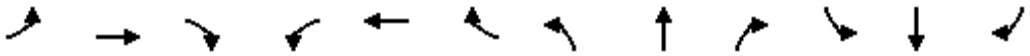
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	440	10	80	360	10	20	10	100	10	10	20
Future Vol, veh/h	25	440	10	80	360	10	20	10	100	10	10	20
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	25	440	10	80	360	10	20	10	100	10	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	375	0	0	452	0	0	1040	1032	447	1080	1032	373
Stage 1	-	-	-	-	-	-	497	497	-	530	530	-
Stage 2	-	-	-	-	-	-	543	535	-	550	502	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1162	-	-	1093	-	-	206	230	605	192	229	664
Stage 1	-	-	-	-	-	-	549	540	-	525	520	-
Stage 2	-	-	-	-	-	-	519	519	-	512	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1156	-	-	1091	-	-	178	207	604	143	206	659
Mov Cap-2 Maneuver	-	-	-	-	-	-	178	207	-	143	206	-
Stage 1	-	-	-	-	-	-	536	527	-	511	479	-
Stage 2	-	-	-	-	-	-	455	479	-	410	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.5	15.7	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	187	604	1156	-	-	1091	-	-	269
HCM Lane V/C Ratio	0.16	0.166	0.022	-	-	0.073	-	-	0.149
HCM Control Delay (s)	27.9	12.1	8.2	-	-	8.6	-	-	20.7
HCM Lane LOS	D	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.6	0.1	-	-	0.2	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	500	70	80	340	50	150	20	30	40	30	20
Future Volume (vph)	50	500	70	80	340	50	150	20	30	40	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	30.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	50	500	70	80	340	50	150	20	30	40	30	20
Future Vol, veh/h	50	500	70	80	340	50	150	20	30	40	30	20
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	50	500	70	80	340	50	150	20	30	40	30	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	571	0	0	1188	1186	536	1185	1196	367
Stage 1	-	-	-	-	-	-	636	636	-	525	525	-
Stage 2	-	-	-	-	-	-	552	550	-	660	671	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1147	-	-	1002	-	-	165	189	545	167	188	683
Stage 1	-	-	-	-	-	-	466	472	-	540	533	-
Stage 2	-	-	-	-	-	-	518	516	-	455	458	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1147	-	-	1001	-	-	~ 120	158	544	125	158	682
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 120	158	-	125	158	-
Stage 1	-	-	-	-	-	-	435	441	-	505	478	-
Stage 2	-	-	-	-	-	-	422	463	-	384	428	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.5	179.9	49.3
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	120	275	1147	-	-	1001	-	-	167
HCM Lane V/C Ratio	1.25	0.182	0.044	-	-	0.08	-	-	0.539
HCM Control Delay (s)	232.8	21	8.3	0	-	8.9	0	-	49.3
HCM Lane LOS	F	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	9.6	0.7	0.1	-	-	0.3	-	-	2.7

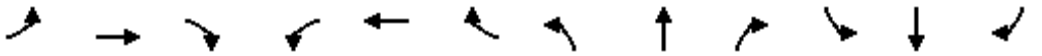
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	420	100	80	340	100	80	90	80	20	100	80
Future Volume (vph)	20	420	100	80	340	100	80	90	80	20	100	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 69.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



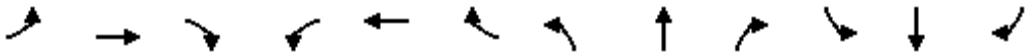
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	420	100	80	340	100	80	90	80	20	100	80
Future Volume (veh/h)	20	420	100	80	340	100	80	90	80	20	100	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	420	100	80	340	100	80	90	80	20	100	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	603	930	221	546	891	262	242	189	168	250	198	158
Arrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	919	1414	337	860	1355	399	1193	905	804	1194	946	757
Grp Volume(v), veh/h	20	0	520	80	0	440	80	0	170	20	0	180
Grp Sat Flow(s),veh/h/ln	919	0	1750	860	0	1754	1193	0	1709	1194	0	1702
Q Serve(g_s), s	0.7	0.0	10.0	3.4	0.0	7.9	4.4	0.0	6.0	1.0	0.0	6.5
Cycle Q Clear(g_c), s	8.6	0.0	10.0	13.4	0.0	7.9	10.8	0.0	6.0	7.1	0.0	6.5
Prop In Lane	1.00		0.19	1.00		0.23	1.00		0.47	1.00		0.44
Lane Grp Cap(c), veh/h	603	0	1151	546	0	1153	242	0	357	250	0	356
V/C Ratio(X)	0.03	0.00	0.45	0.15	0.00	0.38	0.33	0.00	0.48	0.08	0.00	0.51
Avail Cap(c_a), veh/h	603	0	1151	546	0	1153	432	0	629	439	0	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	0.0	5.8	9.0	0.0	5.4	28.9	0.0	24.0	27.1	0.0	24.1
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.6	0.0	1.0	1.1	0.0	1.4	0.2	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	3.3	0.7	0.0	2.6	1.3	0.0	2.5	0.3	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.5	0.0	7.0	9.6	0.0	6.4	30.1	0.0	25.4	27.3	0.0	25.7
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		540			520			250			200	
Approach Delay, s/veh		7.1			6.9			26.9			25.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		19.0		50.0		19.0				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		45.4		25.4		45.4		25.4				
Max Q Clear Time (g_c+I1), s		12.0		9.1		15.4		12.8				
Green Ext Time (p_c), s		4.2		1.4		3.8		1.4				

Intersection Summary												
HCM 6th Ctrl Delay			12.8									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	380	150	10	300	30	140	30	10	30	20	30
Future Volume (vph)	40	380	150	10	300	30	140	30	10	30	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	380	150	10	300	30	140	30	10	30	20	30
Future Vol, veh/h	40	380	150	10	300	30	140	30	10	30	20	30
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	40	380	150	10	300	30	140	30	10	30	20	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	330	0	0	533	0	0	899	888	463	895	948	316
Stage 1	-	-	-	-	-	-	538	538	-	335	335	-
Stage 2	-	-	-	-	-	-	361	350	-	560	613	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1202	-	-	1025	-	-	261	284	601	257	257	715
Stage 1	-	-	-	-	-	-	529	524	-	671	635	-
Stage 2	-	-	-	-	-	-	659	635	-	506	477	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1202	-	-	1022	-	-	223	266	596	219	241	714
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	266	-	219	241	-
Stage 1	-	-	-	-	-	-	502	497	-	639	627	-
Stage 2	-	-	-	-	-	-	603	627	-	443	453	-

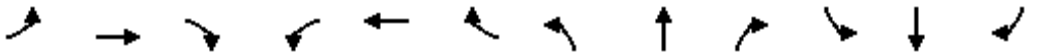
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	39.1	20.9
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	223	309	1202	-	-	1022	-	-	305
HCM Lane V/C Ratio	0.628	0.129	0.033	-	-	0.01	-	-	0.262
HCM Control Delay (s)	45	18.4	8.1	0	-	8.6	0	-	20.9
HCM Lane LOS	E	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.7	0.4	0.1	-	-	0	-	-	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	360	130	40	320	30	190	140	40	30	130	10
Future Volume (vph)	10	360	130	40	320	30	190	140	40	30	130	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



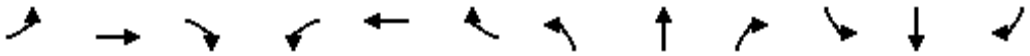
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	360	130	40	320	30	190	140	40	30	130	10
Future Volume (veh/h)	10	360	130	40	320	30	190	140	40	30	130	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	360	130	40	320	30	190	140	40	30	130	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	721	689	249	502	914	86	322	289	83	286	364	28
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	988	1132	409	898	1503	141	1186	1198	342	1173	1506	116
Grp Volume(v), veh/h	10	0	490	40	0	350	190	0	180	30	0	140
Grp Sat Flow(s),veh/h/ln	988	0	1541	898	0	1644	1186	0	1540	1173	0	1622
Q Serve(g_s), s	0.2	0.0	11.0	0.9	0.0	0.0	9.5	0.0	6.0	1.4	0.0	4.3
Cycle Q Clear(g_c), s	0.2	0.0	11.0	11.8	0.0	0.0	13.8	0.0	6.0	7.4	0.0	4.3
Prop In Lane	1.00		0.27	1.00		0.09	1.00		0.22	1.00		0.07
Lane Grp Cap(c), veh/h	721	0	937	502	0	1000	322	0	372	286	0	392
V/C Ratio(X)	0.01	0.00	0.52	0.08	0.00	0.35	0.59	0.00	0.48	0.11	0.00	0.36
Avail Cap(c_a), veh/h	721	0	937	502	0	1000	322	0	372	286	0	392
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.00	0.91	0.96	0.00	0.96	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.6	0.0	6.7	1.8	0.0	0.0	24.6	0.0	19.5	22.7	0.0	18.9
Incr Delay (d2), s/veh	0.0	0.0	1.9	0.3	0.0	0.9	2.0	0.0	0.4	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.3	0.1	0.0	0.3	2.7	0.0	2.1	0.4	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	0.0	8.6	2.1	0.0	0.9	26.6	0.0	19.9	22.8	0.0	19.1
LnGrp LOS	A	A	A	A	A	A	C	A	B	C	A	B
Approach Vol, veh/h		500			390			370			170	
Approach Delay, s/veh		8.6			1.0			23.3			19.7	
Approach LOS		A			A			C			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		41.0		19.0		41.0		19.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		36.5		14.5		36.5		14.5				
Max Q Clear Time (g_c+I1), s		13.0		9.4		13.8		15.8				
Green Ext Time (p_c), s		3.6		0.2		2.5		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			11.7									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	300	90	10	290	20	50	20	30	10	20	10
Future Volume (vph)	20	300	90	10	290	20	50	20	30	10	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	300	90	10	290	20	50	20	30	10	20	10
Future Vol, veh/h	20	300	90	10	290	20	50	20	30	10	20	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	20	300	90	10	290	20	50	20	30	10	20	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13	11.4	9.8	9.1
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	5%	3%	25%
Vol Thru, %	20%	73%	91%	50%
Vol Right, %	30%	22%	6%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	410	320	40
LT Vol	50	20	10	10
Through Vol	20	300	290	20
RT Vol	30	90	20	10
Lane Flow Rate	100	410	320	40
Geometry Grp	1	1	1	1
Degree of Util (X)	0.158	0.532	0.424	0.064
Departure Headway (Hd)	5.698	4.671	4.772	5.743
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	633	767	749	627
Service Time	3.7	2.74	2.848	3.748
HCM Lane V/C Ratio	0.158	0.535	0.427	0.064
HCM Control Delay	9.8	13	11.4	9.1
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.6	3.2	2.1	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	370	20	20	330	50	20	10	30	90	20	30
Future Volume (vph)	40	370	20	20	330	50	20	10	30	90	20	30
Satd. Flow (prot)	1719	1613	0	1736	1606	0	0	1752	1384	0	1756	1398
Flt Permitted	0.529			0.522				0.784			0.744	
Satd. Flow (perm)	954	1613	0	949	1606	0	0	1409	1354	0	1357	1353
Satd. Flow (RTOR)		8			23				30			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	390	0	20	380	0	0	30	30	0	110	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	43.0	43.0		43.0	43.0			11.4	43.0		11.4	43.0
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.19	0.72		0.19	0.72
v/c Ratio	0.06	0.34		0.03	0.33			0.11	0.03		0.43	0.03
Control Delay	5.3	5.4		5.8	6.2			18.4	2.9		25.0	2.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.3	5.4		5.8	6.2			18.4	2.9		25.0	2.9
LOS	A	A		A	A			B	A		C	A
Approach Delay		5.4			6.2			10.6			20.3	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	330	10	0	0	270
Future Volume (vph)	10	330	10	0	0	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	330	10	0	0	270
Future Vol, veh/h	10	330	10	0	0	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	10	330	10	0	0	270

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	280	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	270	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	693	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	757	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	693	1048	-	-	-	-
Mov Cap-2 Maneuver	693	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	757	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1032	-
HCM Lane V/C Ratio	-	0.329	-
HCM Control Delay (s)	-	10.2	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	240	40
Future Volume (vph)	0	0	10	0	240	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

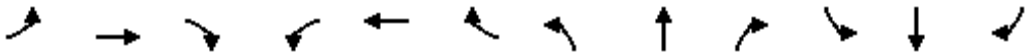
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	240	40
Future Vol, veh/h	0	0	10	0	240	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	240	40

Major/Minor	Minor2		Major2	
Conflicting Flow All	520	40	0	0
Stage 1	520	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	436	982	-	-
Stage 1	504	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	982	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	10	100	10	10	10	90	350	10	10	380	20
Future Volume (vph)	30	10	100	10	10	10	90	350	10	10	380	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

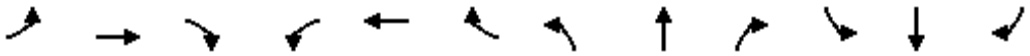
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	10	100	10	10	10	90	350	10	10	380	20
Future Vol, veh/h	30	10	100	10	10	10	90	350	10	10	380	20
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	30	10	100	10	10	10	90	350	10	10	380	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	979	974	413	1025	979	381	411	0	0	373	0	0
Stage 1	421	421	-	548	548	-	-	-	-	-	-	-
Stage 2	558	553	-	477	431	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	231	254	643	215	252	671	1153	-	-	1180	-	-
Stage 1	614	592	-	524	520	-	-	-	-	-	-	-
Stage 2	518	518	-	573	586	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	221	629	156	220	654	1141	-	-	1165	-	-
Mov Cap-2 Maneuver	197	221	-	156	220	-	-	-	-	-	-	-
Stage 1	548	580	-	466	463	-	-	-	-	-	-	-
Stage 2	444	461	-	463	574	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.1	22.1	1.7	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1141	-	-	393	240	1165	-	-
HCM Lane V/C Ratio	0.079	-	-	0.356	0.125	0.009	-	-
HCM Control Delay (s)	8.4	0	-	19.1	22.1	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.6	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	30	20	0	10	50	270	20	0	230	10
Future Volume (vph)	10	0	30	20	0	10	50	270	20	0	230	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

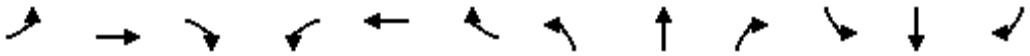
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	30	20	0	10	50	270	20	0	230	10
Future Vol, veh/h	10	0	30	20	0	10	50	270	20	0	230	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	10	0	30	20	0	10	50	270	20	0	230	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	620	625	235	630	620	280	240	0	0	290	0	0
Stage 1	235	235	-	380	380	-	-	-	-	-	-	-
Stage 2	385	390	-	250	240	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	403	404	809	363	375	707	1327	-	-	1272	-	-
Stage 1	773	714	-	598	576	-	-	-	-	-	-	-
Stage 2	642	611	-	706	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	384	386	809	338	358	707	1327	-	-	1272	-	-
Mov Cap-2 Maneuver	384	386	-	338	358	-	-	-	-	-	-	-
Stage 1	738	714	-	571	550	-	-	-	-	-	-	-
Stage 2	604	584	-	680	666	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	14.5	1.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1327	-	-	634	409	1272	-	-
HCM Lane V/C Ratio	0.038	-	-	0.063	0.073	-	-	-
HCM Control Delay (s)	7.8	0	-	11.1	14.5	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	140	10	30	150	10	10	10	40	10	10	10
Future Volume (vph)	10	140	10	30	150	10	10	10	40	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	140	10	30	150	10	10	10	40	10	10	10
Future Vol, veh/h	10	140	10	30	150	10	10	10	40	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	140	10	30	150	10	10	10	40	10	10	10

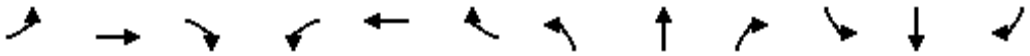
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	160	0	0	150	0	0	390	385	145	405	385	155
Stage 1	-	-	-	-	-	-	165	165	-	215	215	-
Stage 2	-	-	-	-	-	-	225	220	-	190	170	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1419	-	-	1425	-	-	573	552	908	560	552	896
Stage 1	-	-	-	-	-	-	842	766	-	792	729	-
Stage 2	-	-	-	-	-	-	782	725	-	816	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1419	-	-	1425	-	-	545	535	908	515	535	896
Mov Cap-2 Maneuver	-	-	-	-	-	-	545	535	-	515	535	-
Stage 1	-	-	-	-	-	-	835	760	-	786	712	-
Stage 2	-	-	-	-	-	-	745	708	-	764	756	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.2	10.3	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	740	1419	-	-	1425	-	-	609
HCM Lane V/C Ratio	0.081	0.007	-	-	0.021	-	-	0.049
HCM Control Delay (s)	10.3	7.6	0	-	7.6	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Weekday LOS Calculations

(2031 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	381	10	30	0	0	0	0	20	30	263	30	0
Future Volume (vph)	381	10	30	0	0	0	0	20	30	263	30	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

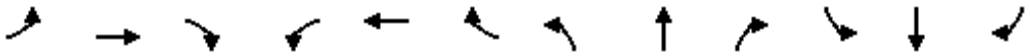
Intersection	
Int Delay, s/veh	51.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	381	10	30	0	0	0	0	20	30	263	30	0
Future Vol, veh/h	381	10	30	0	0	0	0	20	30	263	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	381	10	30	0	0	0	0	20	30	263	30	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	591	606	30	-	0	0	50	0	0
Stage 1	556	556	-	-	-	-	-	-	-
Stage 2	35	50	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	466	409	1039	0	-	-	1544	-	0
Stage 1	570	509	-	0	-	-	-	-	0
Stage 2	982	849	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	385	0	1039	-	-	-	1544	-	-
Mov Cap-2 Maneuver	385	0	-	-	-	-	-	-	-
Stage 1	570	0	-	-	-	-	-	-	-
Stage 2	812	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	88.7	0	7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	404	1544	-
HCM Lane V/C Ratio	-	-	1.042	0.17	-
HCM Control Delay (s)	-	-	88.7	7.8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	13.7	0.6	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	30	10	419	10	381	0	0	263	215
Future Volume (vph)	0	0	0	30	10	419	10	381	0	0	263	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

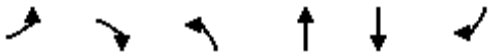
Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	30	10	419	10	381	0	0	263	215
Future Vol, veh/h	0	0	0	30	10	419	10	381	0	0	263	215
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	30	10	419	10	381	0	0	263	215

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	772	879	381	478	0	-	-	-	0
Stage 1	401	401	-	-	-	-	-	-	-
Stage 2	371	478	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	365	284	662	1074	-	0	0	-	-
Stage 1	672	597	-	-	-	0	0	-	-
Stage 2	693	552	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	361	0	662	1074	-	-	-	-	-
Mov Cap-2 Maneuver	361	0	-	-	-	-	-	-	-
Stage 1	664	0	-	-	-	-	-	-	-
Stage 2	693	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.8	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1074	-	627	-	-
HCM Lane V/C Ratio	0.009	-	0.732	-	-
HCM Control Delay (s)	8.4	0	24.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	6.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	65	80	130	670	388	51
Future Volume (vph)	65	80	130	670	388	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	80	130	670	388	51
Future Vol, veh/h	65	80	130	670	388	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	65	80	130	670	388	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1344	414	439	0	-	0
Stage 1	414	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	157	611	1110	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	139	611	1110	-	-	-
Mov Cap-2 Maneuver	139	-	-	-	-	-
Stage 1	565	-	-	-	-	-
Stage 2	364	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	39.9	1.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1110	-	242	-	-
HCM Lane V/C Ratio	0.117	-	0.599	-	-
HCM Control Delay (s)	8.7	-	39.9	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0.4	-	3.5	-	-

LANE LEVEL OF SERVICE

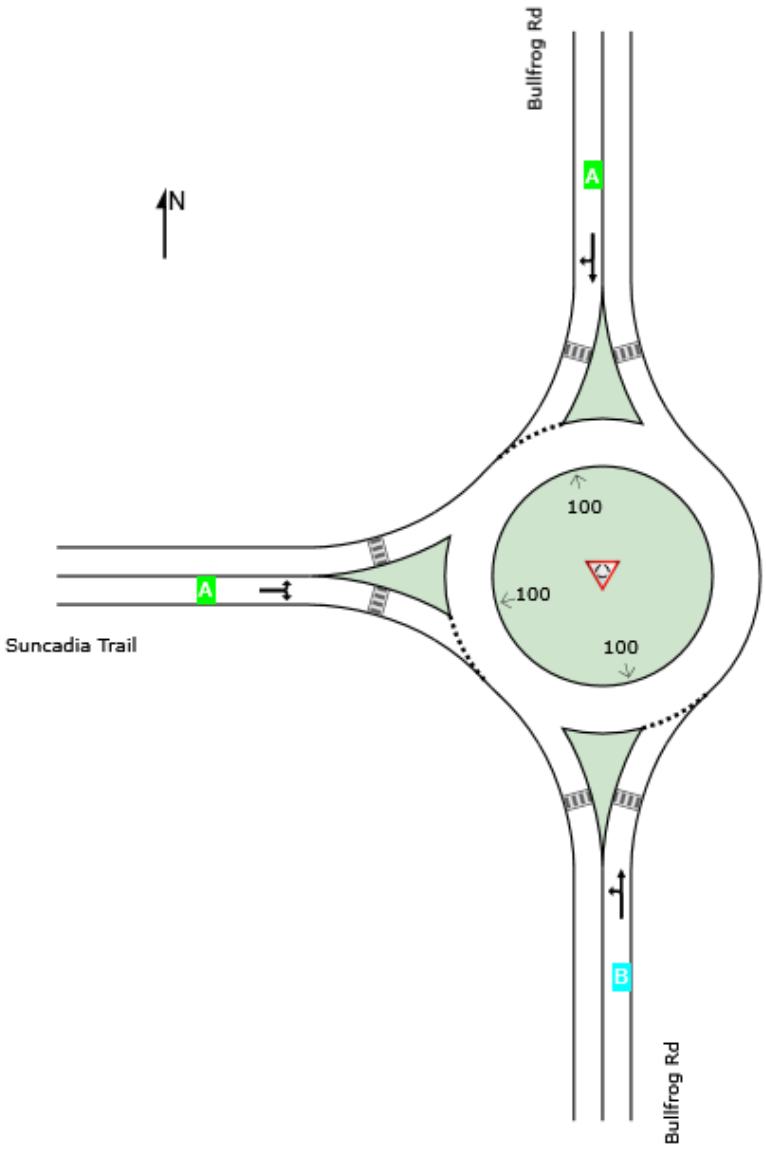
Lane Level of Service

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	702	4.3	702	4.3	1076	0.653	100	12.3	LOS B	7.5	193.3	Full	1600	0.0	0.0
Approach	702	4.3	702	4.3		0.653		12.3	LOS B	7.5	193.3				
North: Bullfrog Rd															
Lane 1[d]	358	2.1	358	2.1	1003	0.357	100	7.3	LOS A	1.9	48.4	Full	1600	0.0	0.0
Approach	358	2.1	358	2.1		0.357		7.3	LOS A	1.9	48.4				
West: Suncadia Trail															
Lane 1[d]	404	4.7	404	4.7	994	0.406	100	8.0	LOS A	2.2	58.2	Full	1600	0.0	0.0
Approach	404	4.7	404	4.7		0.406		8.0	LOS A	2.2	58.2				
All Vehicles	1464	3.9	1464	3.9		0.653		9.9	LOS A	7.5	193.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	276	426	702	4.3	1076	0.653	100	NA	NA
Approach	276	426	702	4.3		0.653			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	262	96	358	2.1	1003	0.357	100	NA	NA
Approach	262	96	358	2.1		0.357			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	189	215	404	4.7	994	0.406	100	NA	NA
Approach	189	215	404	4.7		0.406			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1464	3.9		0.653					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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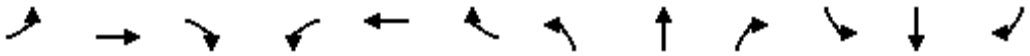


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	12	0	0	0	11	479	0	0	355	20
Future Volume (vph)	30	0	12	0	0	0	11	479	0	0	355	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	0	12	0	0	0	11	479	0	0	355	20
Future Vol, veh/h	30	0	12	0	0	0	11	479	0	0	355	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	30	0	12	0	0	0	11	479	0	0	355	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	867	867	366	872	877	479	376	0	0	479	0	0
Stage 1	366	366	-	501	501	-	-	-	-	-	-	-
Stage 2	501	501	-	371	376	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	268	285	668	273	289	591	1172	-	-	1083	-	-
Stage 1	643	614	-	556	546	-	-	-	-	-	-	-
Stage 2	543	534	-	653	620	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	265	281	667	265	285	591	1171	-	-	1083	-	-
Mov Cap-2 Maneuver	265	281	-	265	285	-	-	-	-	-	-	-
Stage 1	634	613	-	549	539	-	-	-	-	-	-	-
Stage 2	536	527	-	641	619	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.9	0	0.2	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1171	-	-	320	-	1083	-	-
HCM Lane V/C Ratio	0.009	-	-	0.131	-	-	-	-
HCM Control Delay (s)	8.1	0	-	17.9	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	0	-	-

LANE LEVEL OF SERVICE

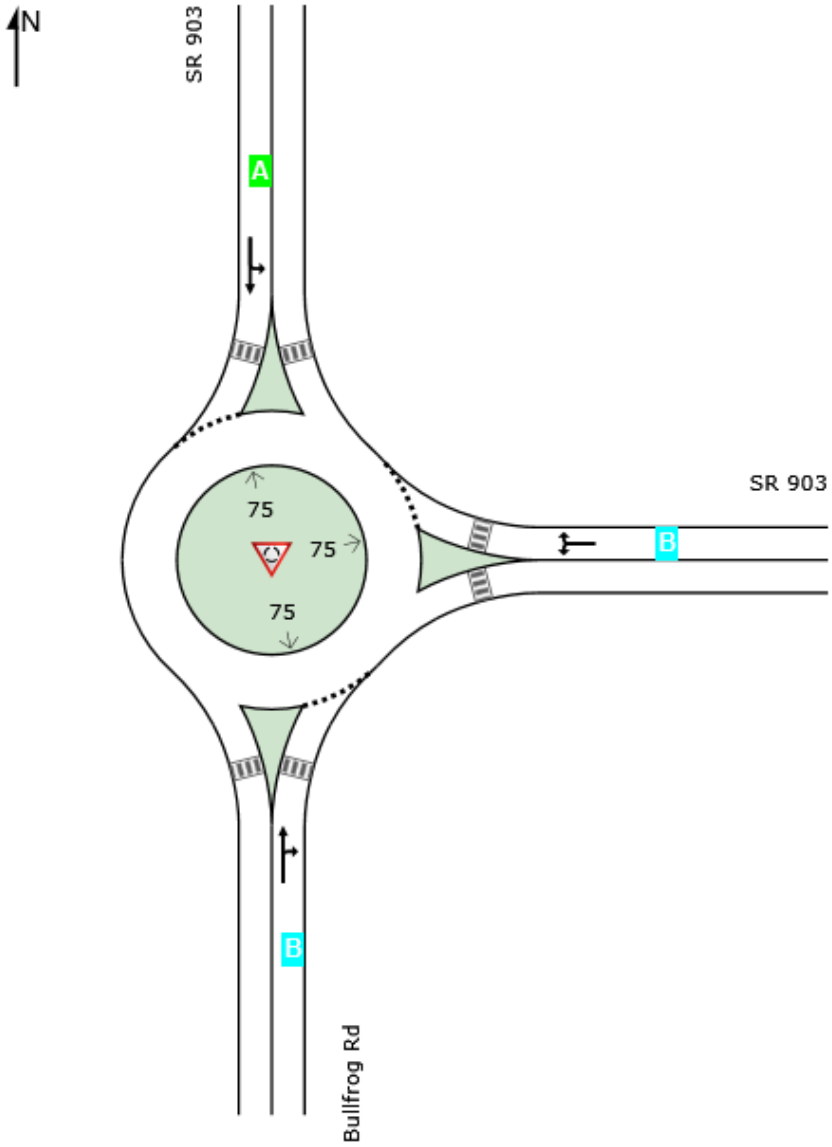
Lane Level of Service

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	509	4.3	509	4.3	858	0.593	100	12.9	LOS B	5.5	141.8	Full	1600	0.0	0.0
Approach	509	4.3	509	4.3		0.593		12.9	LOS B	5.5	141.8				
East: SR 903															
Lane 1[d]	650	2.8	650	2.8	1034	0.629	100	12.1	LOS B	7.1	181.4	Full	1600	0.0	0.0
Approach	650	2.8	650	2.8		0.629		12.1	LOS B	7.1	181.4				
North: SR 903															
Lane 1[d]	647	2.3	647	2.3	1152	0.562	100	9.6	LOS A	4.3	110.2	Full	1600	0.0	0.0
Approach	647	2.3	647	2.3		0.562		9.6	LOS A	4.3	110.2				
All Vehicles	1806	3.0	1806	3.0		0.629		11.4	LOS B	7.1	181.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	241	268	509	4.3	858	0.593	100	NA	NA
Approach	241	268	509	4.3		0.593			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	149	501	650	2.8	1034	0.629	100	NA	NA
Approach	149	501	650	2.8		0.629			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	401	246	647	2.3	1152	0.562	100	NA	NA
Approach	401	246	647	2.3		0.562			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1806	3.0	0.629

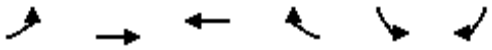
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	883	875	30	20	18
Future Volume (vph)	12	883	875	30	20	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

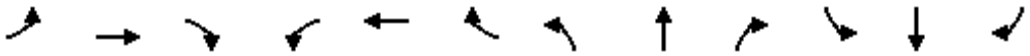
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	883	875	30	20	18
Future Vol, veh/h	12	883	875	30	20	18
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	12	883	875	30	20	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	905	0	-	0	1797	893
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	907	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	735	-	-	-	89	343
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	735	-	-	-	86	342
Mov Cap-2 Maneuver	-	-	-	-	86	-
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	397	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	42.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	735	-	-	-	133
HCM Lane V/C Ratio	0.016	-	-	-	0.286
HCM Control Delay (s)	10	0	-	-	42.6
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	776	122	30	728	10	159	0	110	10	0	8
Future Volume (vph)	15	776	122	30	728	10	159	0	110	10	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	107.9

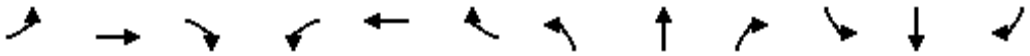
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	776	122	30	728	10	159	0	110	10	0	8
Future Vol, veh/h	15	776	122	30	728	10	159	0	110	10	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	15	776	122	30	728	10	159	0	110	10	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	898	0	0	1665	1665	837	1715	1721	734
Stage 1	-	-	-	-	-	-	867	867	-	793	793	-
Stage 2	-	-	-	-	-	-	798	798	-	922	928	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	855	-	-	752	-	-	~ 78	98	370	72	90	423
Stage 1	-	-	-	-	-	-	350	373	-	385	403	-
Stage 2	-	-	-	-	-	-	382	401	-	327	349	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	855	-	-	752	-	-	~ 71	88	370	47	81	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 71	88	-	47	81	-
Stage 1	-	-	-	-	-	-	337	360	-	371	376	-
Stage 2	-	-	-	-	-	-	349	374	-	222	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	$ 783.1	64.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	106	855	-	-	752	-	-	78
HCM Lane V/C Ratio	2.538	0.018	-	-	0.04	-	-	0.231
HCM Control Delay (s)	$ 783.1	9.3	0	-	10	0	-	64.5
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	24.5	0.1	-	-	0.1	-	-	0.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	771	120	10	667	10	93	0	20	10	0	18
Future Volume (vph)	15	771	120	10	667	10	93	0	20	10	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	18.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	771	120	10	667	10	93	0	20	10	0	18
Future Vol, veh/h	15	771	120	10	667	10	93	0	20	10	0	18
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	15	771	120	10	667	10	93	0	20	10	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	677	0	0	895	0	0	1566	1562	835	1563	1617	672
Stage 1	-	-	-	-	-	-	865	865	-	692	692	-
Stage 2	-	-	-	-	-	-	701	697	-	871	925	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	901	-	-	758	-	-	~ 83	104	346	92	105	459
Stage 1	-	-	-	-	-	-	328	351	-	437	448	-
Stage 2	-	-	-	-	-	-	406	421	-	349	351	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	901	-	-	755	-	-	~ 76	98	345	83	99	459
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 76	98	-	83	99	-
Stage 1	-	-	-	-	-	-	316	338	-	422	439	-
Stage 2	-	-	-	-	-	-	382	412	-	318	338	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	276.3	29.5
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	88	901	-	-	755	-	-	175
HCM Lane V/C Ratio	1.284	0.017	-	-	0.013	-	-	0.16
HCM Control Delay (s)	276.3	9.1	0	-	9.8	0	-	29.5
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	8.3	0.1	-	-	0	-	-	0.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	132	20	10	249
Future Volume (vph)	20	10	132	20	10	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

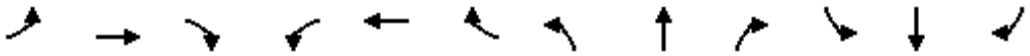
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	132	20	10	249
Future Vol, veh/h	20	10	132	20	10	249
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	132	20	10	249
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	8.8	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	4%	0%	87%
Vol Thru, %	0%	67%	13%
Vol Right, %	96%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	259	30	152
LT Vol	10	0	132
Through Vol	0	20	20
RT Vol	249	10	0
Lane Flow Rate	259	30	152
Geometry Grp	1	1	1
Degree of Util (X)	0.275	0.037	0.193
Departure Headway (Hd)	3.823	4.406	4.57
Convergence, Y/N	Yes	Yes	Yes
Cap	945	814	774
Service Time	1.824	2.424	2.669
HCM Lane V/C Ratio	0.274	0.037	0.196
HCM Control Delay	8.3	7.6	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	0.1	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	280	130	112	220	90	70	104	110	70	71	41
Future Volume (vph)	135	280	130	112	220	90	70	104	110	70	71	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	59.7

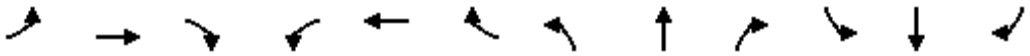
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	135	280	130	112	220	90	70	104	110	70	71	41
Future Vol, veh/h	135	280	130	112	220	90	70	104	110	70	71	41
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	135	280	130	112	220	90	70	104	110	70	71	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	413	0	0	1164	1153	349	1213	1173	267
Stage 1	-	-	-	-	-	-	618	618	-	490	490	-
Stage 2	-	-	-	-	-	-	546	535	-	723	683	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1227	-	-	1135	-	-	171	197	692	159	193	774
Stage 1	-	-	-	-	-	-	475	479	-	562	550	-
Stage 2	-	-	-	-	-	-	520	522	-	419	451	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1226	-	-	1132	-	-	89	157	689	~ 54	154	773
Mov Cap-2 Maneuver	-	-	-	-	-	-	89	157	-	~ 54	154	-
Stage 1	-	-	-	-	-	-	421	425	-	500	495	-
Stage 2	-	-	-	-	-	-	380	470	-	236	400	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	2.3	193.7	156.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	120	689	1226	-	-	1132	-	-	54	218
HCM Lane V/C Ratio	1.45	0.16	0.11	-	-	0.099	-	-	1.296	0.514
HCM Control Delay (s)	$ 309	11.2	8.3	-	-	8.5	-	-	$ 346.5	37.8
HCM Lane LOS	F	B	A	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	12.1	0.6	0.4	-	-	0.3	-	-	6.2	2.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	440	10	80	360	53	20	40	100	26	42	72
Future Volume (vph)	25	440	10	80	360	53	20	40	100	26	42	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

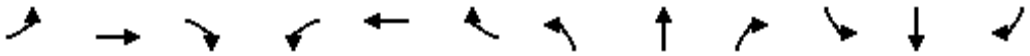
Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	440	10	80	360	53	20	40	100	26	42	72
Future Vol, veh/h	25	440	10	80	360	53	20	40	100	26	42	72
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	25	440	10	80	360	53	20	40	100	26	42	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	418	0	0	452	0	0	1104	1075	447	1117	1054	395
Stage 1	-	-	-	-	-	-	497	497	-	552	552	-
Stage 2	-	-	-	-	-	-	607	578	-	565	502	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1120	-	-	1093	-	-	186	217	605	181	222	646
Stage 1	-	-	-	-	-	-	549	540	-	511	508	-
Stage 2	-	-	-	-	-	-	478	496	-	503	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1115	-	-	1091	-	-	128	195	604	118	200	641
Mov Cap-2 Maneuver	-	-	-	-	-	-	128	195	-	118	200	-
Stage 1	-	-	-	-	-	-	536	527	-	497	468	-
Stage 2	-	-	-	-	-	-	357	457	-	379	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.4	22	34.4
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	166	604	1115	-	-	1091	-	-	258
HCM Lane V/C Ratio	0.361	0.166	0.022	-	-	0.073	-	-	0.543
HCM Control Delay (s)	38.5	12.1	8.3	-	-	8.6	-	-	34.4
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.5	0.6	0.1	-	-	0.2	-	-	3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	625	114	80	421	50	217	20	30	40	30	39
Future Volume (vph)	62	625	114	80	421	50	217	20	30	40	30	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	155.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	62	625	114	80	421	50	217	20	30	40	30	39
Future Vol, veh/h	62	625	114	80	421	50	217	20	30	40	30	39
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	62	625	114	80	421	50	217	20	30	40	30	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	471	0	0	740	0	0	1450	1438	683	1437	1470	448
Stage 1	-	-	-	-	-	-	807	807	-	606	606	-
Stage 2	-	-	-	-	-	-	643	631	-	831	864	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1070	-	-	867	-	-	~ 109	133	449	112	129	615
Stage 1	-	-	-	-	-	-	375	394	-	487	490	-
Stage 2	-	-	-	-	-	-	462	474	-	367	374	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1070	-	-	866	-	-	~ 66	105	449	75	101	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 66	105	-	75	101	-
Stage 1	-	-	-	-	-	-	337	354	-	438	428	-
Stage 2	-	-	-	-	-	-	351	414	-	291	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.4	$ 950.2	122.1
HCM LOS			F	F

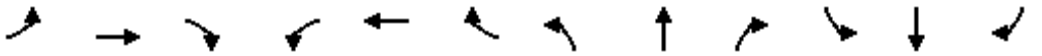
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	66	194	1070	-	-	866	-	-	122
HCM Lane V/C Ratio	3.288	0.258	0.058	-	-	0.092	-	-	0.893
HCM Control Delay (s)	$ 1162.3	29.9	8.6	0	-	9.6	0	-	122.1
HCM Lane LOS	F	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	22.5	1	0.2	-	-	0.3	-	-	5.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	425	110	80	383	144	80	113	80	46	118	80
Future Volume (vph)	20	425	110	80	383	144	80	113	80	46	118	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 69.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



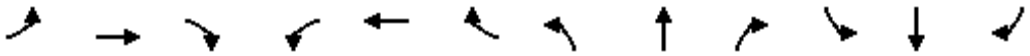
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	425	110	80	383	144	80	113	80	46	118	80
Future Volume (veh/h)	20	425	110	80	383	144	80	113	80	46	118	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	425	110	80	383	144	80	113	80	46	118	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	524	900	233	522	821	309	241	222	157	245	224	152
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	848	1387	359	849	1264	475	1174	1010	715	1170	1022	693
Grp Volume(v), veh/h	20	0	535	80	0	527	80	0	193	46	0	198
Grp Sat Flow(s),veh/h/ln	848	0	1746	849	0	1740	1174	0	1725	1170	0	1714
Q Serve(g_s), s	0.9	0.0	10.8	3.7	0.0	10.7	4.5	0.0	6.9	2.5	0.0	7.1
Cycle Q Clear(g_c), s	11.5	0.0	10.8	14.5	0.0	10.7	11.6	0.0	6.9	9.4	0.0	7.1
Prop In Lane	1.00		0.21	1.00		0.27	1.00		0.41	1.00		0.40
Lane Grp Cap(c), veh/h	524	0	1133	522	0	1129	241	0	378	245	0	376
V/C Ratio(X)	0.04	0.00	0.47	0.15	0.00	0.47	0.33	0.00	0.51	0.19	0.00	0.53
Avail Cap(c_a), veh/h	524	0	1133	522	0	1129	409	0	626	413	0	622
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.1	0.0	6.2	9.9	0.0	6.2	29.2	0.0	24.0	28.1	0.0	24.1
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.6	0.0	1.4	1.1	0.0	1.5	0.5	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.7	0.7	0.0	3.6	1.3	0.0	2.9	0.7	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	0.0	7.6	10.5	0.0	7.6	30.4	0.0	25.5	28.6	0.0	25.7
LnGrp LOS	A	A	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		555			607			273			244	
Approach Delay, s/veh		7.7			8.0			26.9			26.3	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		19.9		50.0		19.9				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		45.4		25.4		45.4		25.4				
Max Q Clear Time (g_c+I1), s		13.5		11.4		16.5		13.6				
Green Ext Time (p_c), s		4.4		1.5		4.7		1.5				

Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	448	197	10	330	30	183	30	10	30	20	38
Future Volume (vph)	50	448	197	10	330	30	183	30	10	30	20	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	22.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	448	197	10	330	30	183	30	10	30	20	38
Future Vol, veh/h	50	448	197	10	330	30	183	30	10	30	20	38
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	50	448	197	10	330	30	183	30	10	30	20	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	360	0	0	648	0	0	1045	1030	555	1037	1113	346
Stage 1	-	-	-	-	-	-	650	650	-	365	365	-
Stage 2	-	-	-	-	-	-	395	380	-	672	748	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1171	-	-	928	-	-	208	234	533	206	205	688
Stage 1	-	-	-	-	-	-	460	467	-	646	616	-
Stage 2	-	-	-	-	-	-	632	616	-	439	414	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1171	-	-	925	-	-	~ 169	214	529	169	188	687
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 169	214	-	169	188	-
Stage 1	-	-	-	-	-	-	427	433	-	601	607	-
Stage 2	-	-	-	-	-	-	569	607	-	371	384	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	125.8	25.9
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	169	251	1171	-	-	925	-	-	259
HCM Lane V/C Ratio	1.083	0.159	0.043	-	-	0.011	-	-	0.34
HCM Control Delay (s)	148.5	22	8.2	0	-	8.9	0	-	25.9
HCM Lane LOS	F	C	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	9.2	0.6	0.1	-	-	0	-	-	1.4

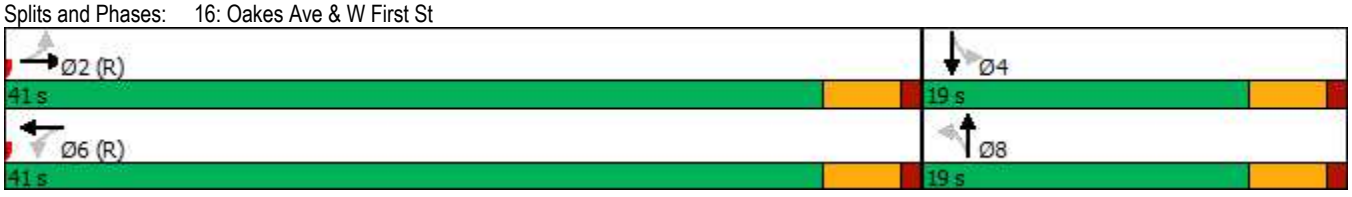
Notes

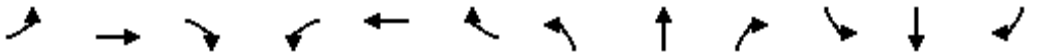
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	376	146	40	385	44	213	169	40	51	156	10
Future Volume (vph)	10	376	146	40	385	44	213	169	40	51	156	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





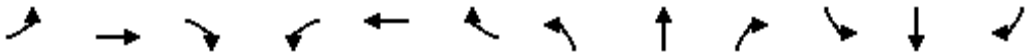
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	376	146	40	385	44	213	169	40	51	156	10
Future Volume (veh/h)	10	376	146	40	385	44	213	169	40	51	156	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	376	146	40	385	44	213	169	40	51	156	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	679	674	262	475	895	102	300	303	72	261	369	24
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	919	1107	430	872	1471	168	1158	1252	296	1142	1527	98
Grp Volume(v), veh/h	10	0	522	40	0	429	213	0	209	51	0	166
Grp Sat Flow(s),veh/h/ln	919	0	1537	872	0	1639	1158	0	1548	1142	0	1625
Q Serve(g_s), s	0.3	0.0	12.1	1.0	0.0	0.0	9.3	0.0	7.1	2.5	0.0	5.2
Cycle Q Clear(g_c), s	0.3	0.0	12.1	13.1	0.0	0.0	14.5	0.0	7.1	9.6	0.0	5.2
Prop In Lane	1.00		0.28	1.00		0.10	1.00		0.19	1.00		0.06
Lane Grp Cap(c), veh/h	679	0	935	475	0	997	300	0	374	261	0	393
V/C Ratio(X)	0.01	0.00	0.56	0.08	0.00	0.43	0.71	0.00	0.56	0.20	0.00	0.42
Avail Cap(c_a), veh/h	679	0	935	475	0	997	300	0	374	261	0	393
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.00	0.90	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.7	0.0	7.0	2.2	0.0	0.0	26.1	0.0	19.9	24.1	0.0	19.2
Incr Delay (d2), s/veh	0.0	0.0	2.2	0.3	0.0	1.3	6.5	0.0	1.1	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.6	0.1	0.0	0.3	3.5	0.0	2.5	0.6	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	0.0	9.1	2.5	0.0	1.3	32.6	0.0	21.1	24.3	0.0	19.5
LnGrp LOS	A	A	A	A	A	A	C	A	C	C	A	B
Approach Vol, veh/h		532			469			422			217	
Approach Delay, s/veh		9.1			1.4			26.9			20.6	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	41.0	19.0	41.0	19.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	36.5	14.5	36.5	14.5
Max Q Clear Time (g_c+I1), s	14.1	11.6	15.1	16.5
Green Ext Time (p_c), s	3.9	0.2	3.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	321	132	10	301	20	61	20	30	10	20	18
Future Volume (vph)	25	321	132	10	301	20	61	20	30	10	20	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	321	132	10	301	20	61	20	30	10	20	18
Future Vol, veh/h	25	321	132	10	301	20	61	20	30	10	20	18
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	25	321	132	10	301	20	61	20	30	10	20	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.6	12.3	10.3	9.4
HCM LOS	C	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	5%	3%	21%
Vol Thru, %	18%	67%	91%	42%
Vol Right, %	27%	28%	6%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	111	478	331	48
LT Vol	61	25	10	10
Through Vol	20	321	301	20
RT Vol	30	132	20	18
Lane Flow Rate	111	478	331	48
Geometry Grp	1	1	1	1
Degree of Util (X)	0.184	0.627	0.462	0.079
Departure Headway (Hd)	5.958	4.83	5.029	5.917
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	604	750	722	607
Service Time	3.976	2.83	3.029	3.939
HCM Lane V/C Ratio	0.184	0.637	0.458	0.079
HCM Control Delay	10.3	15.6	12.3	9.4
HCM Lane LOS	B	C	B	A
HCM 95th-tile Q	0.7	4.5	2.5	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	406	20	20	409	57	20	14	30	130	22	30
Future Volume (vph)	40	406	20	20	409	57	20	14	30	130	22	30
Satd. Flow (prot)	1719	1615	0	1736	1610	0	0	1757	1384	0	1752	1398
Flt Permitted	0.470			0.497				0.787			0.733	
Satd. Flow (perm)	848	1615	0	904	1610	0	0	1416	1354	0	1337	1353
Satd. Flow (RTOR)		8			21				30			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	426	0	20	466	0	0	34	30	0	152	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	42.8	42.8		42.8	42.8			11.6	42.8		11.6	42.8
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.19	0.71		0.19	0.71
v/c Ratio	0.07	0.37		0.03	0.40			0.12	0.03		0.59	0.03
Control Delay	4.8	5.5		5.0	6.5			19.3	2.3		31.0	2.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.8	5.5		5.0	6.5			19.3	2.3		31.0	2.3
LOS	A	A		A	A			B	A		C	A
Approach Delay		5.4			6.4			11.3			26.3	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	382	10	0	0	312
Future Volume (vph)	10	382	10	0	0	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	382	10	0	0	312
Future Vol, veh/h	10	382	10	0	0	312
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	10	382	10	0	0	312

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	322	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	312	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	656	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	724	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	656	1048	-	-	-	-
Mov Cap-2 Maneuver	656	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1032	-
HCM Lane V/C Ratio	-	0.38	-
HCM Control Delay (s)	-	10.6	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.8	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	280	42
Future Volume (vph)	0	0	10	0	280	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

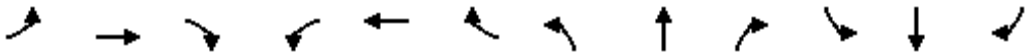
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	280	42
Future Vol, veh/h	0	0	10	0	280	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	280	42

Major/Minor	Minor2		Major2	
Conflicting Flow All	602	42	0	0
Stage 1	602	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	390	980	-	-
Stage 1	461	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	980	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	10	123	18	10	10	113	378	21	10	470	20
Future Volume (vph)	30	10	123	18	10	10	113	378	21	10	470	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

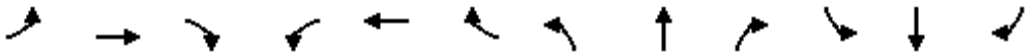
Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	10	123	18	10	10	113	378	21	10	470	20
Future Vol, veh/h	30	10	123	18	10	10	113	378	21	10	470	20
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	30	10	123	18	10	10	113	378	21	10	470	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1149	1149	503	1207	1149	415	501	0	0	412	0	0
Stage 1	511	511	-	628	628	-	-	-	-	-	-	-
Stage 2	638	638	-	579	521	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	177	200	573	162	200	642	1068	-	-	1142	-	-
Stage 1	549	540	-	474	479	-	-	-	-	-	-	-
Stage 2	468	474	-	504	535	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	144	167	561	104	167	626	1057	-	-	1128	-	-
Mov Cap-2 Maneuver	144	167	-	104	167	-	-	-	-	-	-	-
Stage 1	468	528	-	403	408	-	-	-	-	-	-	-
Stage 2	382	404	-	377	523	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.6	36.1	1.9	0.2
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1057	-	-	334	153	1128	-	-
HCM Lane V/C Ratio	0.107	-	-	0.488	0.248	0.009	-	-
HCM Control Delay (s)	8.8	0	-	25.6	36.1	8.2	0	-
HCM Lane LOS	A	A	-	D	E	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	2.6	0.9	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	53	35	0	10	52	293	23	0	282	10
Future Volume (vph)	10	0	53	35	0	10	52	293	23	0	282	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

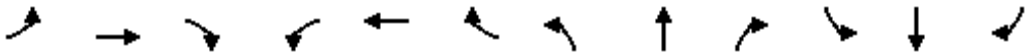
Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	53	35	0	10	52	293	23	0	282	10
Future Vol, veh/h	10	0	53	35	0	10	52	293	23	0	282	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	10	0	53	35	0	10	52	293	23	0	282	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	701	707	287	723	701	305	292	0	0	316	0	0
Stage 1	287	287	-	409	409	-	-	-	-	-	-	-
Stage 2	414	420	-	314	292	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	356	363	757	314	336	684	1270	-	-	1244	-	-
Stage 1	725	678	-	576	558	-	-	-	-	-	-	-
Stage 2	620	593	-	651	631	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	337	345	757	281	319	684	1270	-	-	1244	-	-
Mov Cap-2 Maneuver	337	345	-	281	319	-	-	-	-	-	-	-
Stage 1	689	678	-	547	530	-	-	-	-	-	-	-
Stage 2	580	563	-	605	631	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	17.9	1.1	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1270	-	-	632	323	1244	-	-
HCM Lane V/C Ratio	0.041	-	-	0.1	0.139	-	-	-
HCM Control Delay (s)	8	0	-	11.3	17.9	0	-	-
HCM Lane LOS	A	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	176	10	33	167	13	10	10	48	18	10	10
Future Volume (vph)	10	176	10	33	167	13	10	10	48	18	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	176	10	33	167	13	10	10	48	18	10	10
Future Vol, veh/h	10	176	10	33	167	13	10	10	48	18	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	176	10	33	167	13	10	10	48	18	10	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	180	0	0	186	0	0	451	447	181	470	446	174
Stage 1	-	-	-	-	-	-	201	201	-	240	240	-
Stage 2	-	-	-	-	-	-	250	246	-	230	206	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1396	-	-	1382	-	-	522	509	867	507	510	875
Stage 1	-	-	-	-	-	-	805	739	-	768	711	-
Stage 2	-	-	-	-	-	-	759	706	-	777	735	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1396	-	-	1382	-	-	494	491	867	459	492	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	494	491	-	459	492	-
Stage 1	-	-	-	-	-	-	799	733	-	762	692	-
Stage 2	-	-	-	-	-	-	720	687	-	718	729	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.2	10.6	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	709	1396	-	-	1382	-	-	535
HCM Lane V/C Ratio	0.096	0.007	-	-	0.024	-	-	0.071
HCM Control Delay (s)	10.6	7.6	0	-	7.7	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	33	26	676	59	51	426
Future Volume (vph)	33	26	676	59	51	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	903		1497			1776
Travel Time (s)	24.6		29.2			34.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	26	676	59	51	426
Future Vol, veh/h	33	26	676	59	51	426
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	36	28	735	64	55	463

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1340	767	0	0	799	0
Stage 1	767	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	133	334	-	-	647	-
Stage 1	384	-	-	-	-	-
Stage 2	480	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	118	334	-	-	647	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	425	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	40.1	0	1.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	165	647	-
HCM Lane V/C Ratio	-	-	0.389	0.086	-
HCM Control Delay (s)	-	-	40.1	11.1	0
HCM Lane LOS	-	-	E	B	A
HCM 95th %tile Q(veh)	-	-	1.7	0.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	55	435	180	87	270
Future Volume (vph)	88	55	435	180	87	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	755		1238			171
Travel Time (s)	20.6		24.1			3.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

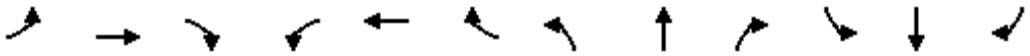
Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	55	435	180	87	270
Future Vol, veh/h	88	55	435	180	87	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	96	60	473	196	95	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1054	571	0	0	669	0
Stage 1	571	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	249	518	-	-	916	-
Stage 1	563	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	218	518	-	-	916	-
Mov Cap-2 Maneuver	218	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	541	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.8	0	2.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	218	518	916	-
HCM Lane V/C Ratio	-	-	0.439	0.115	0.103	-
HCM Control Delay (s)	-	-	33.8	12.9	9.4	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	2.1	0.4	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	466	173	394	459	40	156	0	405	25	0	32
Future Volume (vph)	42	466	173	394	459	40	156	0	405	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			803			368	
Travel Time (s)		32.9			12.3			21.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	816.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	466	173	394	459	40	156	0	405	25	0	32
Future Vol, veh/h	42	466	173	394	459	40	156	0	405	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	507	188	428	499	43	170	0	440	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	542	0	0	695	0	0	2087	2091	601	2290	2164	521
Stage 1	-	-	-	-	-	-	693	693	-	1377	1377	-
Stage 2	-	-	-	-	-	-	1394	1398	-	913	787	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1022	-	-	896	-	-	~ 38	52	498	~ 27	47	553
Stage 1	-	-	-	-	-	-	432	443	-	178	211	-
Stage 2	-	-	-	-	-	-	174	206	-	326	401	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1022	-	-	896	-	-	~ 15	15	498	~ 1	14	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 15	15	-	~ 1	14	-
Stage 1	-	-	-	-	-	-	399	409	-	164	66	-
Stage 2	-	-	-	-	-	-	~ 51	64	-	35	371	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	5.6	$ 1460.1	$ 16951.8
HCM LOS			F	F

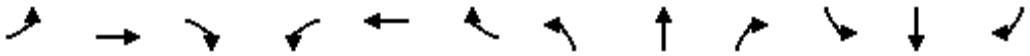
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	15	498	1022	-	-	896	-	-	2
HCM Lane V/C Ratio	11.304	0.884	0.045	-	-	0.478	-	-	30.978
HCM Control Delay (s)	$ 5131.8	45.8	8.7	0	-	12.6	0	-	$-16951.8
HCM Lane LOS	F	E	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	22.2	9.7	0.1	-	-	2.6	-	-	9.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Weekday LOS Calculations

(2037 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	10	30	0	0	0	0	30	40	310	40	0
Future Volume (vph)	250	10	30	0	0	0	0	30	40	310	40	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

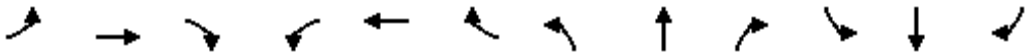
Intersection	
Int Delay, s/veh	25.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	250	10	30	0	0	0	0	30	40	310	40	0
Future Vol, veh/h	250	10	30	0	0	0	0	30	40	310	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	250	10	30	0	0	0	0	30	40	310	40	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	710	730	40	-	0	0	70	0	0
Stage 1	660	660	-	-	-	-	-	-	-
Stage 2	50	70	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	397	347	1026	0	-	-	1518	-	0
Stage 1	510	457	-	0	-	-	-	-	0
Stage 2	967	833	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	314	0	1026	-	-	-	1518	-	-
Mov Cap-2 Maneuver	314	0	-	-	-	-	-	-	-
Stage 1	510	0	-	-	-	-	-	-	-
Stage 2	765	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	54.8	0	7.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	339	1518	-
HCM Lane V/C Ratio	-	-	0.855	0.204	-
HCM Control Delay (s)	-	-	54.8	8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	7.8	0.8	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	40	10	550	10	260	0	0	310	170
Future Volume (vph)	0	0	0	40	10	550	10	260	0	0	310	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

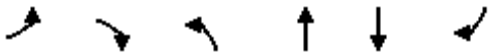
Intersection	
Int Delay, s/veh	12.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	10	550	10	260	0	0	310	170
Future Vol, veh/h	0	0	0	40	10	550	10	260	0	0	310	170
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	40	10	550	10	260	0	0	310	170

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	675	760	260	480	0	-	-	-	0
Stage 1	280	280	-	-	-	-	-	-	-
Stage 2	395	480	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	416	333	774	1072	-	0	0	-	-
Stage 1	763	675	-	-	-	0	0	-	-
Stage 2	676	551	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	411	0	774	1072	-	-	-	-	-
Mov Cap-2 Maneuver	411	0	-	-	-	-	-	-	-
Stage 1	755	0	-	-	-	-	-	-	-
Stage 2	676	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.4	0.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1072	-	730	-	-
HCM Lane V/C Ratio	0.009	-	0.822	-	-
HCM Control Delay (s)	8.4	0	28.4	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	8.9	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	120	190	620	350	50
Future Volume (vph)	50	120	190	620	350	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	120	190	620	350	50
Future Vol, veh/h	50	120	190	620	350	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	50	120	190	620	350	50

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1375	375	400	0	-	0
Stage 1	375	-	-	-	-	-
Stage 2	1000	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	150	643	1148	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	125	643	1148	-	-	-
Mov Cap-2 Maneuver	125	-	-	-	-	-
Stage 1	556	-	-	-	-	-
Stage 2	337	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.6	2.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1148	-	290	-	-
HCM Lane V/C Ratio	0.166	-	0.586	-	-
HCM Control Delay (s)	8.8	-	33.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.6	-	3.5	-	-

LANE LEVEL OF SERVICE

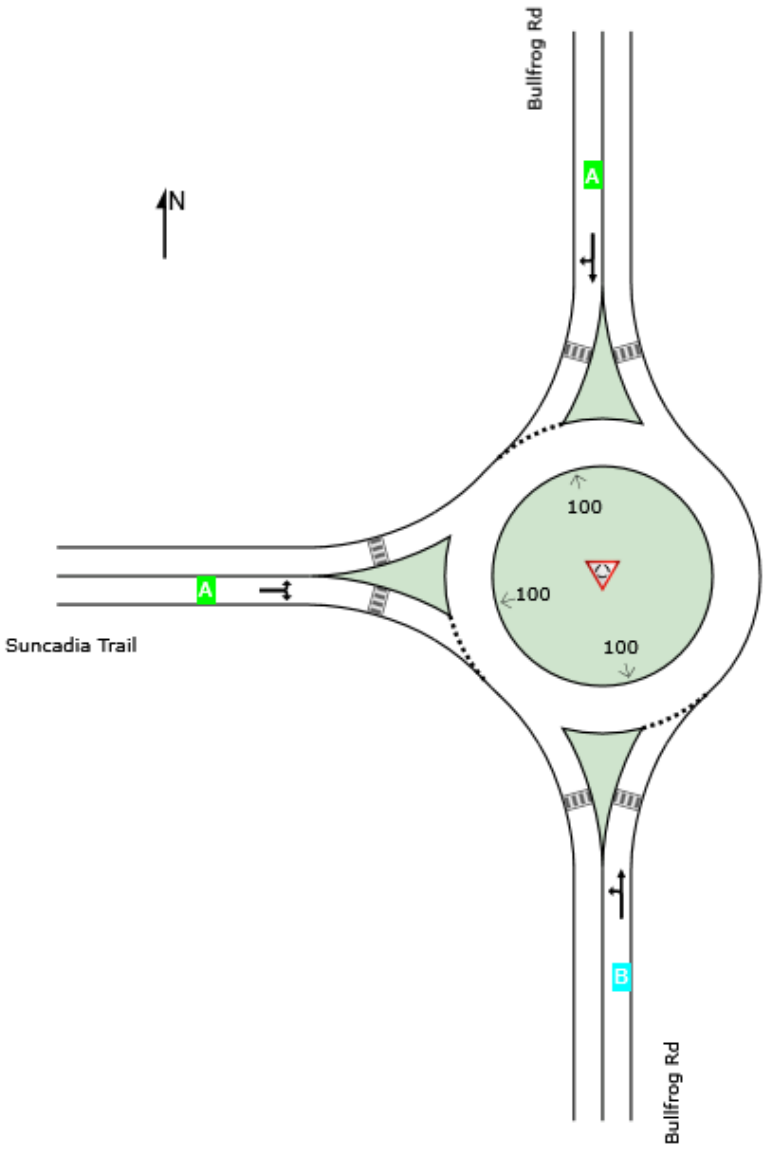
Lane Level of Service

Site: 4 [2037 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 Baseline - Weekday PM Peak Hour (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	670	4.3	670	4.3	1111	0.603	100	10.7	LOS B	4.8	124.0	Full	1600	0.0	0.0
Approach	670	4.3	670	4.3		0.603		10.7	LOS B	4.8	124.0				
North: Bullfrog Rd															
Lane 1[d]	230	2.1	230	2.1	858	0.268	100	7.0	LOS A	1.2	31.4	Full	1600	0.0	0.0
Approach	230	2.1	230	2.1		0.268		7.0	LOS A	1.2	31.4				
West: Suncadia Trail															
Lane 1[d]	410	4.7	410	4.7	1111	0.369	100	6.9	LOS A	2.1	54.2	Full	1600	0.0	0.0
Approach	410	4.7	410	4.7		0.369		6.9	LOS A	2.1	54.2				
All Vehicles	1310	4.0	1310	4.0		0.603		8.9	LOS A	4.8	124.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	420	250	670	4.3	1111	0.603	100	NA	NA
Approach	420	250	670	4.3		0.603			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	160	70	230	2.1	858	0.268	100	NA	NA
Approach	160	70	230	2.1		0.268			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	160	250	410	4.7	1111	0.369	100	NA	NA
Approach	160	250	410	4.7		0.369			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1310	4.0	0.603

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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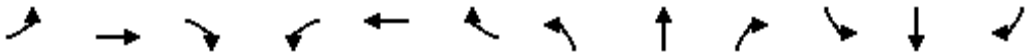


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	10	0	0	0	10	420	0	0	240	20
Future Volume (vph)	30	0	10	0	0	0	10	420	0	0	240	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	0	10	0	0	0	10	420	0	0	240	20
Future Vol, veh/h	30	0	10	0	0	0	10	420	0	0	240	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	30	0	10	0	0	0	10	420	0	0	240	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	691	691	251	695	701	420	261	0	0	420	0	0
Stage 1	251	251	-	440	440	-	-	-	-	-	-	-
Stage 2	440	440	-	255	261	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	352	362	776	359	365	638	1292	-	-	1139	-	-
Stage 1	742	690	-	600	581	-	-	-	-	-	-	-
Stage 2	586	569	-	754	696	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	349	358	775	352	361	638	1291	-	-	1139	-	-
Mov Cap-2 Maneuver	349	358	-	352	361	-	-	-	-	-	-	-
Stage 1	734	689	-	594	575	-	-	-	-	-	-	-
Stage 2	580	563	-	744	695	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.9	0	0.2	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	405	-	1139	-	-
HCM Lane V/C Ratio	0.008	-	-	0.099	-	-	-	-
HCM Control Delay (s)	7.8	0	-	14.9	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	-	-

LANE LEVEL OF SERVICE

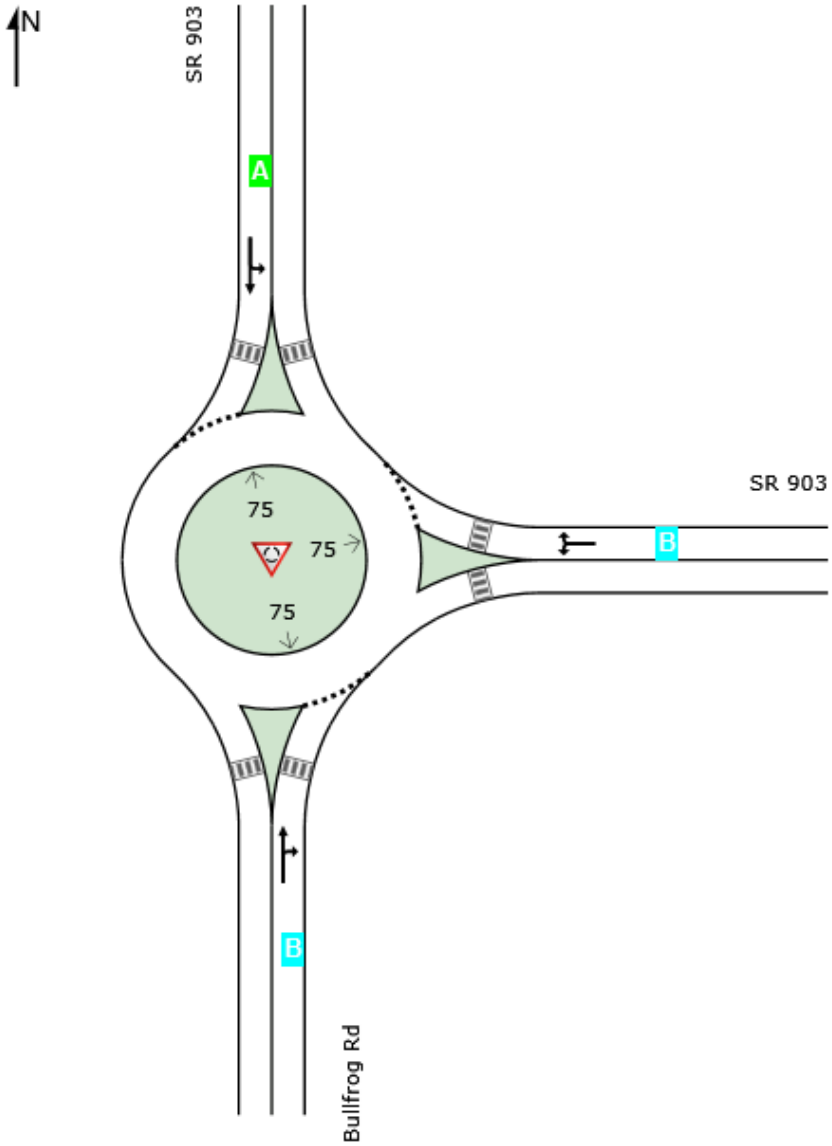
Lane Level of Service

Site: 6 [2037 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2037 Baseline (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	450	4.3	450	4.3	859	0.524	100	11.2	LOS B	4.0	103.4	Full	1600	0.0	0.0
Approach	450	4.3	450	4.3		0.524		11.2	LOS B	4.0	103.4				
East: SR 903															
Lane 1[d]	650	2.8	650	2.8	1069	0.608	100	11.2	LOS B	5.8	149.0	Full	1600	0.0	0.0
Approach	650	2.8	650	2.8		0.608		11.2	LOS B	5.8	149.0				
North: SR 903															
Lane 1[d]	560	2.3	560	2.3	1188	0.471	100	7.9	LOS A	3.2	82.6	Full	1600	0.0	0.0
Approach	560	2.3	560	2.3		0.471		7.9	LOS A	3.2	82.6				
All Vehicles	1660	3.0	1660	3.0		0.608		10.1	LOS B	5.8	149.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	210	240	450	4.3	859	0.524	100	NA	NA
Approach	210	240	450	4.3		0.524			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	120	530	650	2.8	1069	0.608	100	NA	NA
Approach	120	530	650	2.8		0.608			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	400	160	560	2.3	1188	0.471	100	NA	NA
Approach	400	160	560	2.3		0.471			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1660	3.0	0.608

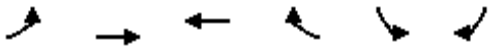
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	630	620	30	30	10
Future Volume (vph)	10	630	620	30	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

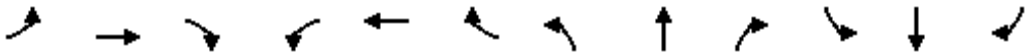
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	630	620	30	30	10
Future Vol, veh/h	10	630	620	30	30	10
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	10	630	620	30	30	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	650	0	-	0	1285	638
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	650	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	917	-	-	-	183	480
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	523	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	917	-	-	-	180	479
Mov Cap-2 Maneuver	-	-	-	-	180	-
Stage 1	-	-	-	-	523	-
Stage 2	-	-	-	-	523	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	25.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	917	-	-	-	213
HCM Lane V/C Ratio	0.011	-	-	-	0.188
HCM Control Delay (s)	9	0	-	-	25.8
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	560	90	40	480	10	170	10	140	10	0	0
Future Volume (vph)	10	560	90	40	480	10	170	10	140	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	54.2

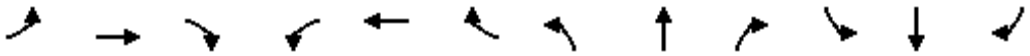
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	560	90	40	480	10	170	10	140	10	0	0
Future Vol, veh/h	10	560	90	40	480	10	170	10	140	10	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	560	90	40	480	10	170	10	140	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	490	0	0	650	0	0	1191	1195	605	1265	1235	486
Stage 1	-	-	-	-	-	-	625	625	-	565	565	-
Stage 2	-	-	-	-	-	-	566	570	-	700	670	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1058	-	-	931	-	-	~ 166	188	501	147	178	585
Stage 1	-	-	-	-	-	-	476	480	-	513	511	-
Stage 2	-	-	-	-	-	-	513	509	-	433	459	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1058	-	-	931	-	-	~ 157	174	501	96	165	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 157	174	-	96	165	-
Stage 1	-	-	-	-	-	-	469	473	-	505	481	-
Stage 2	-	-	-	-	-	-	482	479	-	301	452	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	254.8	46.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	1058	-	-	931	-	-	96
HCM Lane V/C Ratio	1.422	0.009	-	-	0.043	-	-	0.104
HCM Control Delay (s)	254.8	8.4	0	-	9	0	-	46.8
HCM Lane LOS	F	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	18.4	0	-	-	0.1	-	-	0.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	690	20	10	500	10	20	0	20	10	0	10
Future Volume (vph)	10	690	20	10	500	10	20	0	20	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	690	20	10	500	10	20	0	20	10	0	10
Future Vol, veh/h	10	690	20	10	500	10	20	0	20	10	0	10
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	10	690	20	10	500	10	20	0	20	10	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	510	0	0	714	0	0	1254	1254	704	1255	1259	505
Stage 1	-	-	-	-	-	-	724	724	-	525	525	-
Stage 2	-	-	-	-	-	-	530	530	-	730	734	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	1040	-	-	886	-	-	138	161	413	150	172	571
Stage 1	-	-	-	-	-	-	394	409	-	540	533	-
Stage 2	-	-	-	-	-	-	506	503	-	417	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1040	-	-	883	-	-	132	155	411	139	166	571
Mov Cap-2 Maneuver	-	-	-	-	-	-	132	155	-	139	166	-
Stage 1	-	-	-	-	-	-	386	401	-	531	524	-
Stage 2	-	-	-	-	-	-	489	495	-	390	420	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	27.4	22.6
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	200	1040	-	-	883	-	-	224
HCM Lane V/C Ratio	0.2	0.01	-	-	0.011	-	-	0.089
HCM Control Delay (s)	27.4	8.5	0	-	9.1	0	-	22.6
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	100	20	10	280
Future Volume (vph)	20	10	100	20	10	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

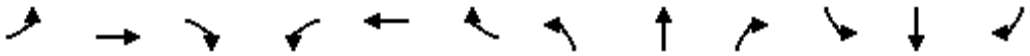
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	100	20	10	280
Future Vol, veh/h	20	10	100	20	10	280
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	100	20	10	280
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	8.6	8.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	3%	0%	83%
Vol Thru, %	0%	67%	17%
Vol Right, %	97%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	290	30	120
LT Vol	10	0	100
Through Vol	0	20	20
RT Vol	280	10	0
Lane Flow Rate	290	30	120
Geometry Grp	1	1	1
Degree of Util (X)	0.302	0.037	0.154
Departure Headway (Hd)	3.744	4.424	4.619
Convergence, Y/N	Yes	Yes	Yes
Cap	966	811	766
Service Time	1.746	2.442	2.716
HCM Lane V/C Ratio	0.3	0.037	0.157
HCM Control Delay	8.4	7.6	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.3	0.1	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	310	130	60	250	160	70	70	110	70	50	40
Future Volume (vph)	150	310	130	60	250	160	70	70	110	70	50	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

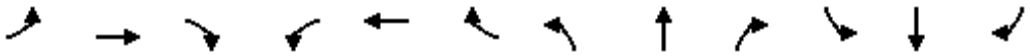
Intersection	
Int Delay, s/veh	32

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	150	310	130	60	250	160	70	70	110	70	50	40
Future Vol, veh/h	150	310	130	60	250	160	70	70	110	70	50	40
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	150	310	130	60	250	160	70	70	110	70	50	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	411	0	0	443	0	0	1174	1209	379	1217	1194	332
Stage 1	-	-	-	-	-	-	678	678	-	451	451	-
Stage 2	-	-	-	-	-	-	496	531	-	766	743	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1127	-	-	1107	-	-	168	182	666	158	187	712
Stage 1	-	-	-	-	-	-	440	450	-	590	573	-
Stage 2	-	-	-	-	-	-	554	524	-	397	423	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1126	-	-	1104	-	-	102	149	663	73	153	711
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	149	-	73	153	-
Stage 1	-	-	-	-	-	-	380	389	-	511	541	-
Stage 2	-	-	-	-	-	-	448	495	-	235	365	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	1.1	116.8	100.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	121	663	1126	-	-	1104	-	-	73	235
HCM Lane V/C Ratio	1.157	0.166	0.133	-	-	0.054	-	-	0.959	0.383
HCM Control Delay (s)	199.5	11.5	8.7	-	-	8.4	-	-	191.2	29.5
HCM Lane LOS	F	B	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	8.5	0.6	0.5	-	-	0.2	-	-	4.9	1.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	450	10	80	480	10	20	10	100	10	10	20
Future Volume (vph)	30	450	10	80	480	10	20	10	100	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

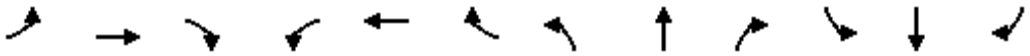
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	450	10	80	480	10	20	10	100	10	10	20
Future Vol, veh/h	30	450	10	80	480	10	20	10	100	10	10	20
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	30	450	10	80	480	10	20	10	100	10	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	495	0	0	462	0	0	1180	1172	457	1220	1172	493
Stage 1	-	-	-	-	-	-	517	517	-	650	650	-
Stage 2	-	-	-	-	-	-	663	655	-	570	522	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1048	-	-	1084	-	-	165	190	597	154	189	568
Stage 1	-	-	-	-	-	-	536	529	-	451	459	-
Stage 2	-	-	-	-	-	-	446	458	-	499	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1043	-	-	1082	-	-	140	170	596	113	169	564
Mov Cap-2 Maneuver	-	-	-	-	-	-	140	170	-	113	169	-
Stage 1	-	-	-	-	-	-	519	513	-	436	423	-
Stage 2	-	-	-	-	-	-	388	422	-	395	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.2	17.6	25.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	149	596	1043	-	-	1082	-	-	218
HCM Lane V/C Ratio	0.201	0.168	0.029	-	-	0.074	-	-	0.183
HCM Control Delay (s)	35.2	12.3	8.6	-	-	8.6	-	-	25.2
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.7	0.6	0.1	-	-	0.2	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	600	80	90	390	90	160	20	50	50	40	20
Future Volume (vph)	60	600	80	90	390	90	160	20	50	50	40	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	86.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	600	80	90	390	90	160	20	50	50	40	20
Future Vol, veh/h	60	600	80	90	390	90	160	20	50	50	40	20
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	60	600	80	90	390	90	160	20	50	50	40	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	480	0	0	681	0	0	1408	1421	641	1410	1416	437
Stage 1	-	-	-	-	-	-	761	761	-	615	615	-
Stage 2	-	-	-	-	-	-	647	660	-	795	801	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1062	-	-	912	-	-	~ 116	136	475	117	139	624
Stage 1	-	-	-	-	-	-	398	414	-	482	485	-
Stage 2	-	-	-	-	-	-	460	460	-	384	400	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1062	-	-	911	-	-	~ 68	106	475	75	109	623
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 68	106	-	75	109	-
Stage 1	-	-	-	-	-	-	361	375	-	438	419	-
Stage 2	-	-	-	-	-	-	347	397	-	295	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.5	$ 528.4	185.7
HCM LOS			F	F

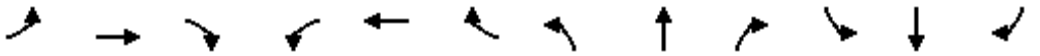
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	68	238	1062	-	-	911	-	-	103
HCM Lane V/C Ratio	2.353	0.294	0.056	-	-	0.099	-	-	1.068
HCM Control Delay (s)	$ 748	26.3	8.6	0	-	9.4	0	-	185.7
HCM Lane LOS	F	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	15.4	1.2	0.2	-	-	0.3	-	-	6.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	420	110	110	340	110	90	110	90	20	110	90
Future Volume (vph)	20	420	110	110	340	110	90	110	90	20	110	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 69.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



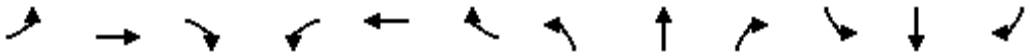
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	420	110	110	340	110	90	110	90	20	110	90
Future Volume (veh/h)	20	420	110	110	340	110	90	110	90	20	110	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	420	110	110	340	110	90	110	90	20	110	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	573	888	232	516	848	274	249	215	176	249	214	175
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	910	1383	362	853	1321	427	1172	943	772	1162	936	765
Grp Volume(v), veh/h	20	0	530	110	0	450	90	0	200	20	0	200
Grp Sat Flow(s),veh/h/ln	910	0	1746	853	0	1749	1172	0	1715	1162	0	1701
Q Serve(g_s), s	0.8	0.0	11.1	5.4	0.0	8.8	5.1	0.0	7.2	1.1	0.0	7.3
Cycle Q Clear(g_c), s	9.6	0.0	11.1	16.4	0.0	8.8	12.4	0.0	7.2	8.3	0.0	7.3
Prop In Lane	1.00		0.21	1.00		0.24	1.00		0.45	1.00		0.45
Lane Grp Cap(c), veh/h	573	0	1120	516	0	1122	249	0	391	249	0	388
V/C Ratio(X)	0.03	0.00	0.47	0.21	0.00	0.40	0.36	0.00	0.51	0.08	0.00	0.52
Avail Cap(c_a), veh/h	573	0	1120	516	0	1122	402	0	616	401	0	611
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	6.5	10.8	0.0	6.1	29.3	0.0	23.8	27.5	0.0	23.9
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.9	0.0	1.1	1.3	0.0	1.5	0.2	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.8	1.1	0.0	3.0	1.5	0.0	3.0	0.3	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	0.0	8.0	11.7	0.0	7.2	30.6	0.0	25.3	27.7	0.0	25.4
LnGrp LOS	A	A	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		550			560			290			220	
Approach Delay, s/veh		8.0			8.1			26.9			25.6	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		20.8		50.0		20.8				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		45.4		25.4		45.4		25.4				
Max Q Clear Time (g_c+I1), s		13.1		10.3		18.4		14.4				
Green Ext Time (p_c), s		4.3		1.5		4.1		1.6				

Intersection Summary												
HCM 6th Ctrl Delay			13.8									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	470	180	20	420	50	150	30	10	40	20	40
Future Volume (vph)	60	470	180	20	420	50	150	30	10	40	20	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	25.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	470	180	20	420	50	150	30	10	40	20	40
Future Vol, veh/h	60	470	180	20	420	50	150	30	10	40	20	40
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	60	470	180	20	420	50	150	30	10	40	20	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	470	0	0	653	0	0	1199	1193	568	1190	1258	446
Stage 1	-	-	-	-	-	-	683	683	-	485	485	-
Stage 2	-	-	-	-	-	-	516	510	-	705	773	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1066	-	-	924	-	-	163	188	524	161	168	604
Stage 1	-	-	-	-	-	-	441	451	-	556	545	-
Stage 2	-	-	-	-	-	-	544	539	-	421	403	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1066	-	-	921	-	-	~ 124	165	520	123	148	603
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 124	165	-	123	148	-
Stage 1	-	-	-	-	-	-	400	409	-	505	529	-
Stage 2	-	-	-	-	-	-	474	523	-	346	365	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	175.9	43.3
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	124	199	1066	-	-	921	-	-	190
HCM Lane V/C Ratio	1.21	0.201	0.056	-	-	0.022	-	-	0.526
HCM Control Delay (s)	215.5	27.6	8.6	0	-	9	0	-	43.3
HCM Lane LOS	F	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	9.3	0.7	0.2	-	-	0.1	-	-	2.7

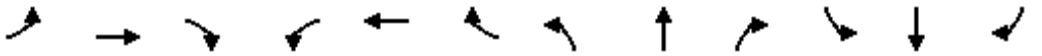
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	360	130	40	320	30	230	150	90	30	170	20
Future Volume (vph)	10	360	130	40	320	30	230	150	90	30	170	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



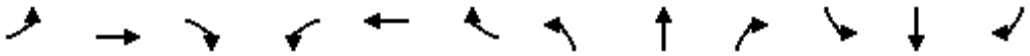
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	360	130	40	320	30	230	150	90	30	170	20
Future Volume (veh/h)	10	360	130	40	320	30	230	150	90	30	170	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	360	130	40	320	30	230	150	90	30	170	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	721	689	249	502	914	86	279	226	136	228	349	41
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	988	1132	409	898	1503	141	1134	937	562	1111	1442	170
Grp Volume(v), veh/h	10	0	490	40	0	350	230	0	240	30	0	190
Grp Sat Flow(s),veh/h/ln	988	0	1541	898	0	1644	1134	0	1499	1111	0	1612
Q Serve(g_s), s	0.2	0.0	11.0	0.9	0.0	0.0	8.4	0.0	8.7	1.5	0.0	6.1
Cycle Q Clear(g_c), s	0.2	0.0	11.0	11.8	0.0	0.0	14.5	0.0	8.7	10.2	0.0	6.1
Prop In Lane	1.00		0.27	1.00		0.09	1.00		0.38	1.00		0.11
Lane Grp Cap(c), veh/h	721	0	937	502	0	1000	279	0	362	228	0	390
V/C Ratio(X)	0.01	0.00	0.52	0.08	0.00	0.35	0.82	0.00	0.66	0.13	0.00	0.49
Avail Cap(c_a), veh/h	721	0	937	502	0	1000	279	0	362	228	0	390
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.00	0.90	0.96	0.00	0.96	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.6	0.0	6.7	1.8	0.0	0.0	27.1	0.0	20.5	25.1	0.0	19.6
Incr Delay (d2), s/veh	0.0	0.0	1.9	0.3	0.0	0.9	16.9	0.0	3.6	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.3	0.1	0.0	0.3	4.5	0.0	3.2	0.4	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	0.0	8.6	2.1	0.0	0.9	43.9	0.0	24.1	25.2	0.0	19.9
LnGrp LOS	A	A	A	A	A	A	D	A	C	C	A	B
Approach Vol, veh/h		500			390			470			220	
Approach Delay, s/veh		8.5			1.0			33.8			20.6	
Approach LOS		A			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	41.0	19.0	41.0	19.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	36.5	14.5	36.5	14.5
Max Q Clear Time (g_c+I1), s	13.0	12.2	13.8	16.5
Green Ext Time (p_c), s	3.6	0.2	2.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	360	110	20	400	40	60	20	30	10	20	20
Future Volume (vph)	20	360	110	20	400	40	60	20	30	10	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	360	110	20	400	40	60	20	30	10	20	20
Future Vol, veh/h	20	360	110	20	400	40	60	20	30	10	20	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	20	360	110	20	400	40	60	20	30	10	20	20
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.5	17.1	10.9	10
HCM LOS	C	C	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	4%	4%	20%
Vol Thru, %	18%	73%	87%	40%
Vol Right, %	27%	22%	9%	40%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	490	460	50
LT Vol	60	20	20	10
Through Vol	20	360	400	20
RT Vol	30	110	40	20
Lane Flow Rate	110	490	460	50
Geometry Grp	1	1	1	1
Degree of Util (X)	0.193	0.687	0.649	0.087
Departure Headway (Hd)	6.332	5.047	5.081	6.299
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	565	715	713	567
Service Time	4.385	3.077	3.112	4.361
HCM Lane V/C Ratio	0.195	0.685	0.645	0.088
HCM Control Delay	10.9	18.5	17.1	10
HCM Lane LOS	B	C	C	A
HCM 95th-tile Q	0.7	5.5	4.8	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	370	20	20	330	50	20	10	40	100	40	30
Future Volume (vph)	70	370	20	20	330	50	20	10	40	100	40	30
Satd. Flow (prot)	1719	1613	0	1736	1606	0	0	1752	1384	0	1765	1398
Flt Permitted	0.527			0.520				0.778			0.769	
Satd. Flow (perm)	951	1613	0	945	1606	0	0	1399	1354	0	1403	1353
Satd. Flow (RTOR)		8			23				40			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	390	0	20	380	0	0	30	40	0	140	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	42.4	42.4		42.4	42.4			12.0	42.4		12.0	42.4
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.20	0.71		0.20	0.71
v/c Ratio	0.10	0.34		0.03	0.33			0.11	0.04		0.50	0.03
Control Delay	6.4	6.6		6.0	6.5			17.8	2.8		26.3	3.0
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	6.4	6.6		6.0	6.5			17.8	2.8		26.3	3.0
LOS	A	A		A	A			B	A		C	A
Approach Delay		6.6			6.5			9.2			22.2	
Approach LOS		A			A			A			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	380	10	0	0	310
Future Volume (vph)	20	380	10	0	0	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	380	10	0	0	310
Future Vol, veh/h	20	380	10	0	0	310
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	20	380	10	0	0	310

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	320	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	657	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	726	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	657	1048	-	-	-	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	726	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1018	-
HCM Lane V/C Ratio	-	0.393	-
HCM Control Delay (s)	-	10.8	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.9	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	280	50
Future Volume (vph)	0	0	10	0	280	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

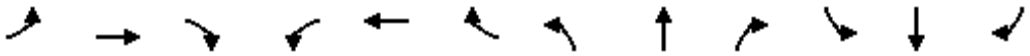
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	280	50
Future Vol, veh/h	0	0	10	0	280	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	280	50

Major/Minor	Minor2		Major2	
Conflicting Flow All	610	50	0	0
Stage 1	610	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	386	970	-	-
Stage 1	458	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	970	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	10	110	10	10	10	100	370	10	10	420	30
Future Volume (vph)	30	10	110	10	10	10	100	370	10	10	420	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

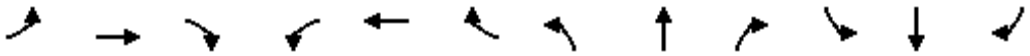
Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	10	110	10	10	10	100	370	10	10	420	30
Future Vol, veh/h	30	10	110	10	10	10	100	370	10	10	420	30
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	30	10	110	10	10	10	100	370	10	10	420	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1064	1059	458	1115	1069	401	461	0	0	393	0	0
Stage 1	466	466	-	588	588	-	-	-	-	-	-	-
Stage 2	598	593	-	527	481	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	202	226	607	187	223	653	1105	-	-	1160	-	-
Stage 1	581	566	-	499	499	-	-	-	-	-	-	-
Stage 2	492	497	-	538	557	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	168	193	594	129	190	637	1093	-	-	1146	-	-
Mov Cap-2 Maneuver	168	193	-	129	190	-	-	-	-	-	-	-
Stage 1	508	554	-	436	436	-	-	-	-	-	-	-
Stage 2	413	434	-	420	545	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.9	25.4	1.8	0.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1093	-	-	361	206	1146	-	-
HCM Lane V/C Ratio	0.091	-	-	0.416	0.146	0.009	-	-
HCM Control Delay (s)	8.6	0	-	21.9	25.4	8.2	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	2	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	40	20	0	10	70	310	30	10	260	20
Future Volume (vph)	10	0	40	20	0	10	70	310	30	10	260	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

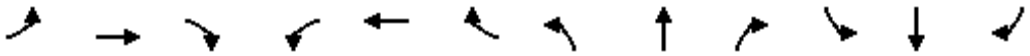
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	40	20	0	10	70	310	30	10	260	20
Future Vol, veh/h	10	0	40	20	0	10	70	310	30	10	260	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	10	0	40	20	0	10	70	310	30	10	260	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	760	770	270	775	765	325	280	0	0	340	0	0
Stage 1	290	290	-	465	465	-	-	-	-	-	-	-
Stage 2	470	480	-	310	300	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	325	333	774	289	308	666	1283	-	-	1219	-	-
Stage 1	722	676	-	536	526	-	-	-	-	-	-	-
Stage 2	578	558	-	654	626	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	301	307	774	258	284	666	1283	-	-	1219	-	-
Mov Cap-2 Maneuver	301	307	-	258	284	-	-	-	-	-	-	-
Stage 1	673	669	-	500	490	-	-	-	-	-	-	-
Stage 2	531	520	-	614	620	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	17.2	1.4	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1283	-	-	589	324	1219	-	-
HCM Lane V/C Ratio	0.055	-	-	0.085	0.093	0.008	-	-
HCM Control Delay (s)	8	0	-	11.7	17.2	8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	160	10	30	180	10	10	10	40	20	10	10
Future Volume (vph)	10	160	10	30	180	10	10	10	40	20	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	160	10	30	180	10	10	10	40	20	10	10
Future Vol, veh/h	10	160	10	30	180	10	10	10	40	20	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	160	10	30	180	10	10	10	40	20	10	10

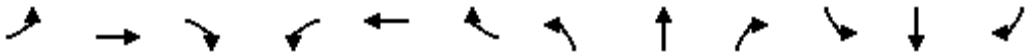
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	190	0	0	170	0	0	440	435	165	455	435	185
Stage 1	-	-	-	-	-	-	185	185	-	245	245	-
Stage 2	-	-	-	-	-	-	255	250	-	210	190	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1384	-	-	1401	-	-	531	517	885	519	517	862
Stage 1	-	-	-	-	-	-	821	751	-	763	707	-
Stage 2	-	-	-	-	-	-	754	704	-	797	747	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1384	-	-	1401	-	-	504	500	885	476	500	862
Mov Cap-2 Maneuver	-	-	-	-	-	-	504	500	-	476	500	-
Stage 1	-	-	-	-	-	-	814	745	-	757	690	-
Stage 2	-	-	-	-	-	-	717	687	-	745	741	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1	10.6	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	706	1384	-	-	1401	-	-	543
HCM Lane V/C Ratio	0.085	0.007	-	-	0.021	-	-	0.074
HCM Control Delay (s)	10.6	7.6	0	-	7.6	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Weekday LOS Calculations

(2037 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	391	10	30	0	0	0	0	30	40	343	40	0
Future Volume (vph)	391	10	30	0	0	0	0	30	40	343	40	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	0%	0%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	130

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	391	10	30	0	0	0	0	30	40	343	40	0
Future Vol, veh/h	391	10	30	0	0	0	0	30	40	343	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	0	0	0	0	0	0	4	4	4
Mvmt Flow	391	10	30	0	0	0	0	30	40	343	40	0

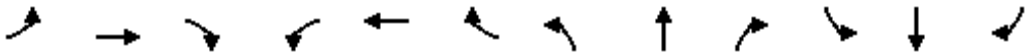
Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	776	796	40	-	0	0	70	0	0
Stage 1	726	726	-	-	-	-	-	-	-
Stage 2	50	70	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	-	-	-	4.14	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	-	-	-	2.236	-	-
Pot Cap-1 Maneuver	~ 363	318	1026	0	-	-	1518	-	0
Stage 1	475	427	-	0	-	-	-	-	0
Stage 2	967	833	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 279	0	1026	-	-	-	1518	-	-
Mov Cap-2 Maneuver	~ 279	0	-	-	-	-	-	-	-
Stage 1	475	0	-	-	-	-	-	-	-
Stage 2	744	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	260.2	0	7.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	294	1518	-
HCM Lane V/C Ratio	-	-	1.466	0.226	-
HCM Control Delay (s)	-	-	260.2	8.1	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	23.9	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	40	10	609	10	401	0	0	343	215
Future Volume (vph)	0	0	0	40	10	609	10	401	0	0	343	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

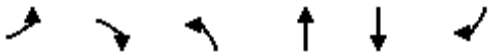
Intersection	
Int Delay, s/veh	35.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	10	609	10	401	0	0	343	215
Future Vol, veh/h	0	0	0	40	10	609	10	401	0	0	343	215
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	4	4	4	4	4	3	3	3
Mvmt Flow	0	0	0	40	10	609	10	401	0	0	343	215

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	872	979	401	558	0	-	-	-	0
Stage 1	421	421	-	-	-	-	-	-	-
Stage 2	451	558	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	6.24	4.14	-	-	-	-	-
Critical Hdwy Stg 1	5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	2.236	-	-	-	-	-
Pot Cap-1 Maneuver	319	248	645	1003	-	0	0	-	-
Stage 1	658	585	-	-	-	0	0	-	-
Stage 2	637	508	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	315	0	645	1003	-	-	-	-	-
Mov Cap-2 Maneuver	315	0	-	-	-	-	-	-	-
Stage 1	649	0	-	-	-	-	-	-	-
Stage 2	637	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	88	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1003	-	606	-	-
HCM Lane V/C Ratio	0.01	-	1.087	-	-
HCM Control Delay (s)	8.6	0	88	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	19.4	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	65	120	190	820	428	61
Future Volume (vph)	65	120	190	820	428	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	14

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	120	190	820	428	61
Future Vol, veh/h	65	120	190	820	428	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	65	120	190	820	428	61

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1659	459	489	0	-	0
Stage 1	459	-	-	-	-	-
Stage 2	1200	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	100	576	1064	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	82	576	1064	-	-	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	501	-	-	-	-	-
Stage 2	269	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	118	1.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1064	-	185	-	-
HCM Lane V/C Ratio	0.179	-	1	-	-
HCM Control Delay (s)	9.1	-	118	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.6	-	8.3	-	-

LANE LEVEL OF SERVICE

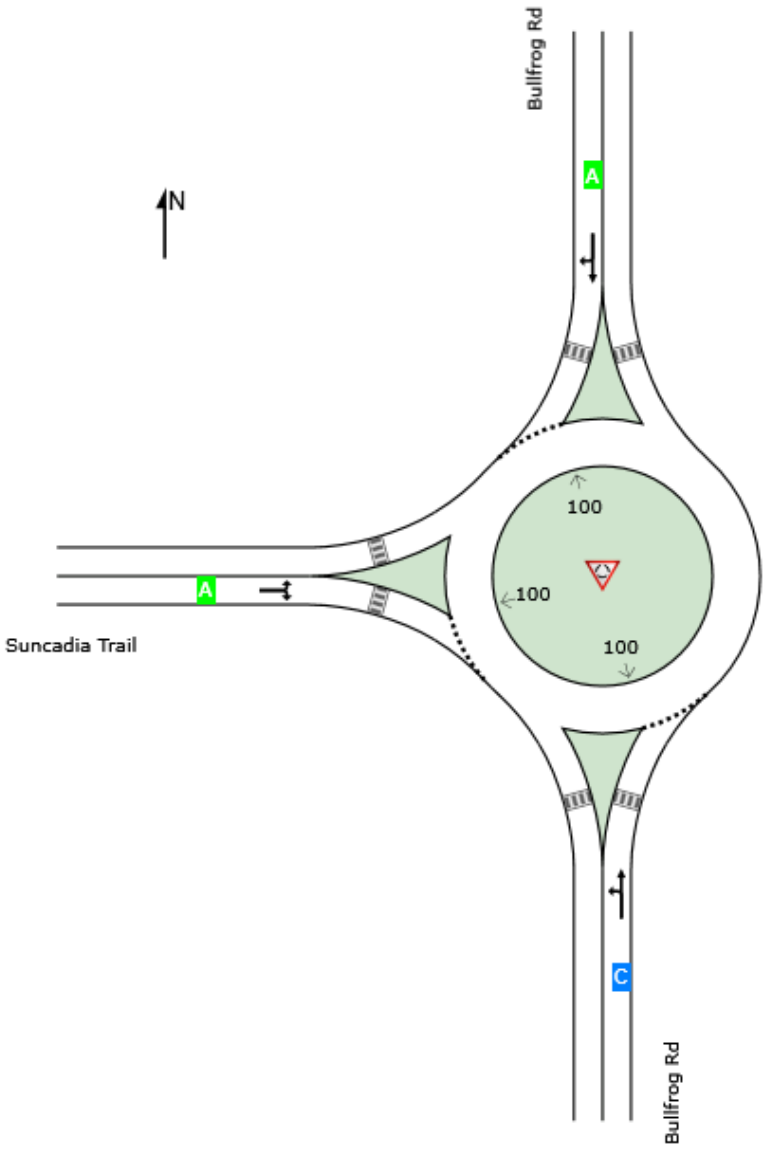
Lane Level of Service

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	C	A	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	852	4.3	852	4.3	1088	0.783	100	17.1	LOS C	17.3	447.9	Full	1600	0.0	0.0
Approach	852	4.3	852	4.3		0.783		17.1	LOS C	17.3	447.9				
North: Bullfrog Rd															
Lane 1[d]	358	2.1	358	2.1	852	0.420	100	9.3	LOS A	2.4	60.5	Full	1600	0.0	0.0
Approach	358	2.1	358	2.1		0.420		9.3	LOS A	2.4	60.5				
West: Suncadia Trail															
Lane 1[d]	434	4.7	434	4.7	994	0.436	100	8.5	LOS A	2.5	64.7	Full	1600	0.0	0.0
Approach	434	4.7	434	4.7		0.436		8.5	LOS A	2.5	64.7				
All Vehicles	1644	3.9	1644	3.9		0.783		13.1	LOS B	17.3	447.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	426	426	852	4.3	1088	0.783	100	NA	NA
Approach	426	426	852	4.3		0.783			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	262	96	358	2.1	852	0.420	100	NA	NA
Approach	262	96	358	2.1		0.420			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	179	255	434	4.7	994	0.436	100	NA	NA
Approach	179	255	434	4.7		0.436			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1644	3.9		0.783					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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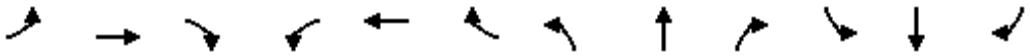


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	12	0	0	0	11	489	0	0	365	20
Future Volume (vph)	30	0	12	0	0	0	11	489	0	0	365	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	4%	4%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	0	12	0	0	0	11	489	0	0	365	20
Future Vol, veh/h	30	0	12	0	0	0	11	489	0	0	365	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	4	4	4	2	2	2
Mvmt Flow	30	0	12	0	0	0	11	489	0	0	365	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	887	887	376	892	897	489	386	0	0	489	0	0
Stage 1	376	376	-	511	511	-	-	-	-	-	-	-
Stage 2	511	511	-	381	386	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	259	278	659	265	281	583	1162	-	-	1074	-	-
Stage 1	635	608	-	549	540	-	-	-	-	-	-	-
Stage 2	536	529	-	645	614	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	256	274	658	258	277	583	1161	-	-	1074	-	-
Mov Cap-2 Maneuver	256	274	-	258	277	-	-	-	-	-	-	-
Stage 1	626	607	-	542	533	-	-	-	-	-	-	-
Stage 2	529	522	-	633	613	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	0	0.2	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1161	-	-	310	-	1074	-	-
HCM Lane V/C Ratio	0.009	-	-	0.135	-	-	-	-
HCM Control Delay (s)	8.1	0	-	18.4	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

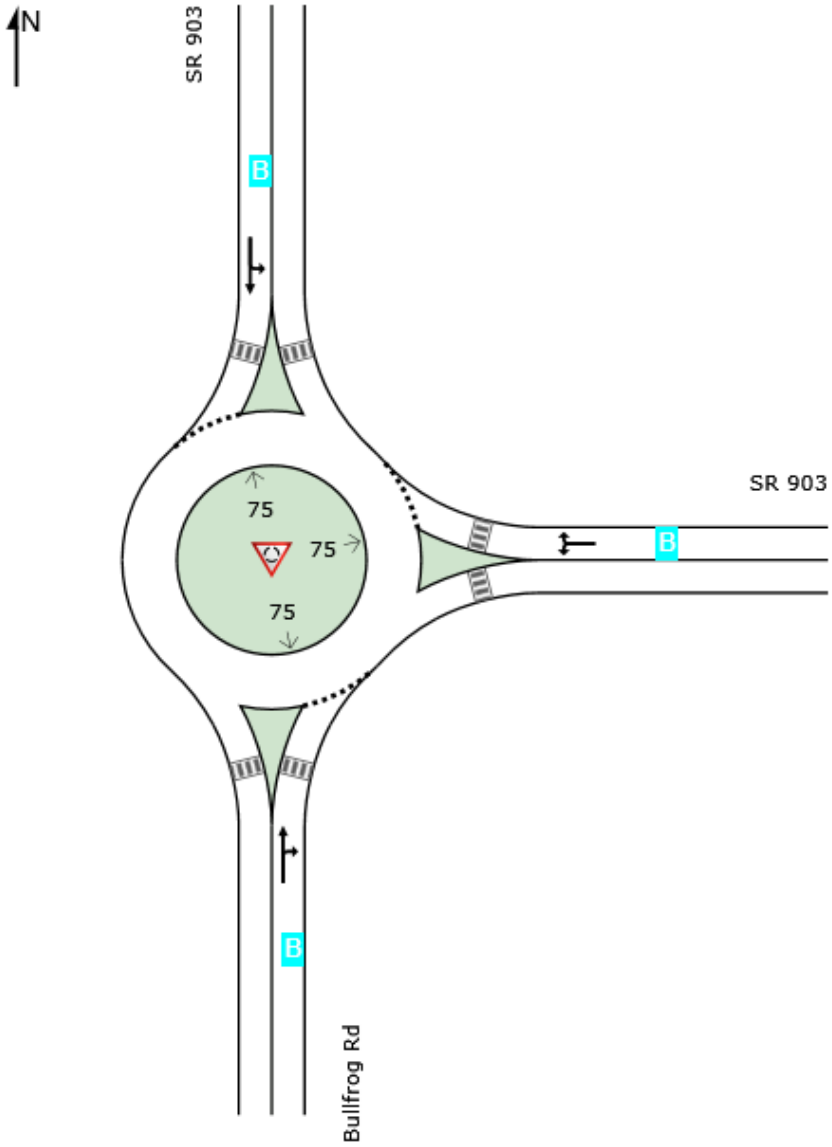
Lane Level of Service

Site: 6 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Weekday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	519	4.3	519	4.3	812	0.639	100	14.9	LOS B	6.3	163.1	Full	1600	0.0	0.0
Approach	519	4.3	519	4.3		0.639		14.9	LOS B	6.3	163.1				
East: SR 903															
Lane 1[d]	730	2.8	730	2.8	1022	0.714	100	14.9	LOS B	11.4	290.7	Full	1600	0.0	0.0
Approach	730	2.8	730	2.8		0.714		14.9	LOS B	11.4	290.7				
North: SR 903															
Lane 1[d]	707	2.3	707	2.3	1152	0.614	100	10.7	LOS B	5.2	131.7	Full	1600	0.0	0.0
Approach	707	2.3	707	2.3		0.614		10.7	LOS B	5.2	131.7				
All Vehicles	1956	3.0	1956	3.0		0.714		13.4	LOS B	11.4	290.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	251	268	519	4.3	812	0.639	100	NA	NA
Approach	251	268	519	4.3		0.639			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	149	581	730	2.8	1022	0.714	100	NA	NA
Approach	149	581	730	2.8		0.714			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	451	256	707	2.3	1152	0.614	100	NA	NA
Approach	451	256	707	2.3		0.614			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1956	3.0	0.714

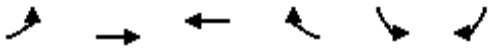
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	953	935	30	30	18
Future Volume (vph)	12	953	935	30	30	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

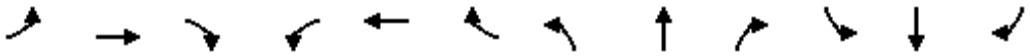
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	953	935	30	30	18
Future Vol, veh/h	12	953	935	30	30	18
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	12	953	935	30	30	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	965	0	-	0	1927	953
Stage 1	-	-	-	-	950	-
Stage 2	-	-	-	-	977	-
Critical Hdwy	4.16	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.254	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	698	-	-	-	74	317
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	368	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	698	-	-	-	71	316
Mov Cap-2 Maneuver	-	-	-	-	71	-
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	368	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	70.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	698	-	-	-	100
HCM Lane V/C Ratio	0.017	-	-	-	0.48
HCM Control Delay (s)	10.2	0	-	-	70.5
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	846	122	40	728	10	229	10	140	10	0	8
Future Volume (vph)	15	846	122	40	728	10	229	10	140	10	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	287.9

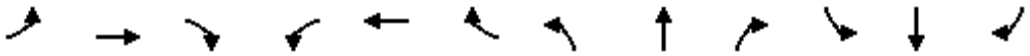
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	846	122	40	728	10	229	10	140	10	0	8
Future Vol, veh/h	15	846	122	40	728	10	229	10	140	10	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	15	846	122	40	728	10	229	10	140	10	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	968	0	0	1755	1755	907	1825	1811	734
Stage 1	-	-	-	-	-	-	937	937	-	813	813	-
Stage 2	-	-	-	-	-	-	818	818	-	1012	998	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	855	-	-	708	-	-	~ 67	86	337	60	79	423
Stage 1	-	-	-	-	-	-	320	346	-	375	395	-
Stage 2	-	-	-	-	-	-	373	393	-	291	324	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	855	-	-	708	-	-	~ 59	75	337	28	69	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 59	75	-	28	69	-
Stage 1	-	-	-	-	-	-	308	333	-	360	357	-
Stage 2	-	-	-	-	-	-	330	355	-	159	311	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	$ 1632.4	119.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	86	855	-	-	708	-	-	48
HCM Lane V/C Ratio	4.407	0.018	-	-	0.056	-	-	0.375
HCM Control Delay (s)	$ 1632.4	9.3	0	-	10.4	0	-	119.5
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	40.2	0.1	-	-	0.2	-	-	1.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	871	120	10	667	10	93	0	20	10	0	18
Future Volume (vph)	15	871	120	10	667	10	93	0	20	10	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	17%	17%	17%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	24

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	871	120	10	667	10	93	0	20	10	0	18
Future Vol, veh/h	15	871	120	10	667	10	93	0	20	10	0	18
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	17	17	17	0	0	0
Mvmt Flow	15	871	120	10	667	10	93	0	20	10	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	677	0	0	995	0	0	1666	1662	935	1663	1717	672
Stage 1	-	-	-	-	-	-	965	965	-	692	692	-
Stage 2	-	-	-	-	-	-	701	697	-	971	1025	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.27	6.67	6.37	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.67	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.653	4.153	3.453	3.5	4	3.3
Pot Cap-1 Maneuver	901	-	-	695	-	-	~ 71	90	302	78	91	459
Stage 1	-	-	-	-	-	-	288	314	-	437	448	-
Stage 2	-	-	-	-	-	-	406	421	-	307	315	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	901	-	-	692	-	-	~ 65	84	301	69	85	459
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 65	84	-	69	85	-
Stage 1	-	-	-	-	-	-	276	301	-	420	438	-
Stage 2	-	-	-	-	-	-	381	411	-	276	302	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 380.4	34
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	75	901	-	-	692	-	-	152
HCM Lane V/C Ratio	1.507	0.017	-	-	0.014	-	-	0.184
HCM Control Delay (s)	$ 380.4	9.1	0	-	10.3	0	-	34
HCM Lane LOS	F	A	A	-	B	A	-	D
HCM 95th %tile Q(veh)	9.3	0.1	-	-	0	-	-	0.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	10	132	20	10	339
Future Volume (vph)	20	10	132	20	10	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)		1	1			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	1%	1%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

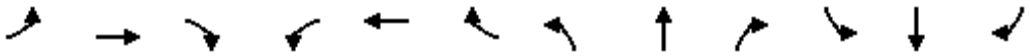
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	10	132	20	10	339
Future Vol, veh/h	20	10	132	20	10	339
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	1	1	3	3
Mvmt Flow	20	10	132	20	10	339
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.8	9.1	9.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	3%	0%	87%
Vol Thru, %	0%	67%	13%
Vol Right, %	97%	33%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	349	30	152
LT Vol	10	0	132
Through Vol	0	20	20
RT Vol	339	10	0
Lane Flow Rate	349	30	152
Geometry Grp	1	1	1
Degree of Util (X)	0.371	0.038	0.204
Departure Headway (Hd)	3.83	4.599	4.833
Convergence, Y/N	Yes	Yes	Yes
Cap	942	778	743
Service Time	1.839	2.632	2.861
HCM Lane V/C Ratio	0.37	0.039	0.205
HCM Control Delay	9.1	7.8	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.7	0.1	0.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	310	130	112	250	160	70	114	110	70	71	51
Future Volume (vph)	165	310	130	112	250	160	70	114	110	70	71	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	402.6

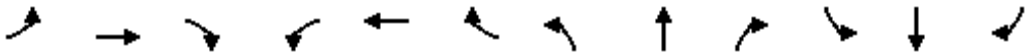
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	165	310	130	112	250	160	70	114	110	70	71	51
Future Vol, veh/h	165	310	130	112	250	160	70	114	110	70	71	51
Conflicting Peds, #/hr	1	0	3	3	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	1	1	1
Mvmt Flow	165	310	130	112	250	160	70	114	110	70	71	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	411	0	0	443	0	0	1324	1343	379	1373	1328	332
Stage 1	-	-	-	-	-	-	708	708	-	555	555	-
Stage 2	-	-	-	-	-	-	616	635	-	818	773	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.11	5.51	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.509	4.009	3.309
Pot Cap-1 Maneuver	1127	-	-	1107	-	-	132	151	666	124	156	712
Stage 1	-	-	-	-	-	-	424	436	-	518	515	-
Stage 2	-	-	-	-	-	-	476	471	-	371	410	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1126	-	-	1104	-	-	~ 54	115	663	~ 5	119	711
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 54	115	-	~ 5	119	-
Stage 1	-	-	-	-	-	-	361	371	-	442	462	-
Stage 2	-	-	-	-	-	-	336	423	-	183	349	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	1.9	$ 446.2	$ 2686.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	80	663	1126	-	-	1104	-	-	5	183
HCM Lane V/C Ratio	2.3	0.166	0.147	-	-	0.101	-	-	14	0.667
HCM Control Delay (s)	$ 706	11.5	8.7	-	-	8.6	-	-	$ 7268.2	57
HCM Lane LOS	F	B	A	-	-	A	-	-	F	F
HCM 95th %tile Q(veh)	17	0.6	0.5	-	-	0.3	-	-	10.6	4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	450	10	80	480	53	20	40	100	26	42	72
Future Volume (vph)	30	450	10	80	480	53	20	40	100	26	42	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	5		2	2		5	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	5%	5%	6%	6%	6%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

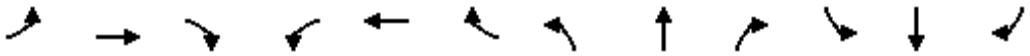
Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	450	10	80	480	53	20	40	100	26	42	72
Future Vol, veh/h	30	450	10	80	480	53	20	40	100	26	42	72
Conflicting Peds, #/hr	5	0	2	2	0	5	3	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	5	5	5	5	5	5	6	6	6
Mvmt Flow	30	450	10	80	480	53	20	40	100	26	42	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	538	0	0	462	0	0	1244	1215	457	1257	1194	515
Stage 1	-	-	-	-	-	-	517	517	-	672	672	-
Stage 2	-	-	-	-	-	-	727	698	-	585	522	-
Critical Hdwy	4.16	-	-	4.15	-	-	7.15	6.55	6.25	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.245	-	-	3.545	4.045	3.345	3.554	4.054	3.354
Pot Cap-1 Maneuver	1010	-	-	1084	-	-	149	179	597	145	183	552
Stage 1	-	-	-	-	-	-	536	529	-	439	448	-
Stage 2	-	-	-	-	-	-	411	438	-	490	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1005	-	-	1082	-	-	96	160	596	90	163	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	160	-	90	163	-
Stage 1	-	-	-	-	-	-	519	512	-	424	413	-
Stage 2	-	-	-	-	-	-	296	403	-	365	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.1	27.9	52.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	131	596	1005	-	-	1082	-	-	207
HCM Lane V/C Ratio	0.458	0.168	0.03	-	-	0.074	-	-	0.676
HCM Control Delay (s)	53.8	12.3	8.7	-	-	8.6	-	-	52.5
HCM Lane LOS	F	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	2.1	0.6	0.1	-	-	0.2	-	-	4.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	725	124	90	471	90	227	20	50	50	40	39
Future Volume (vph)	72	725	124	90	471	90	227	20	50	50	40	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	402.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	72	725	124	90	471	90	227	20	50	50	40	39
Future Vol, veh/h	72	725	124	90	471	90	227	20	50	50	40	39
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	2	2	2	2	2	2	0	0	0
Mvmt Flow	72	725	124	90	471	90	227	20	50	50	40	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	561	0	0	850	0	0	1670	1673	788	1662	1690	518
Stage 1	-	-	-	-	-	-	932	932	-	696	696	-
Stage 2	-	-	-	-	-	-	738	741	-	966	994	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	990	-	-	788	-	-	~ 76	96	391	78	94	562
Stage 1	-	-	-	-	-	-	320	345	-	435	446	-
Stage 2	-	-	-	-	-	-	410	423	-	309	326	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	990	-	-	787	-	-	~ 30	68	391	~ 41	67	561
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 30	68	-	~ 41	67	-
Stage 1	-	-	-	-	-	-	275	296	-	374	371	-
Stage 2	-	-	-	-	-	-	282	352	-	216	280	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.4	$ 2465	$ 552.9
HCM LOS			F	F

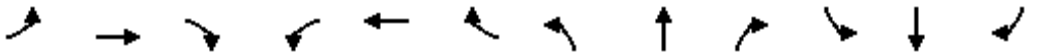
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	30	166	990	-	-	787	-	-	68
HCM Lane V/C Ratio	7.567	0.422	0.073	-	-	0.114	-	-	1.897
HCM Control Delay (s)	$ 3212.3	41.6	8.9	0	-	10.2	0	-	$ 552.9
HCM Lane LOS	F	E	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	27.7	1.9	0.2	-	-	0.4	-	-	11.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	425	120	110	383	154	90	133	90	46	128	90
Future Volume (vph)	20	425	120	110	383	154	90	133	90	46	128	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)	1		1	1		1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		28.6	28.6		31.6	31.6	
Total Split (s)	50.0	50.0		50.0	50.0		30.0	30.0		30.0	30.0	
Total Split (%)	62.5%	62.5%		62.5%	62.5%		37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 69.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



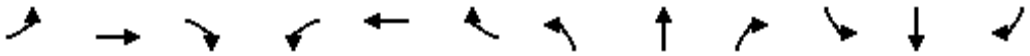
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	425	120	110	383	154	90	133	90	46	128	90
Future Volume (veh/h)	20	425	120	110	383	154	90	133	90	46	128	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1826	1826	1826	1856	1856	1856	1841	1841	1841
Adj Flow Rate, veh/h	20	425	120	110	383	154	90	133	90	46	128	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	6	6	6	5	5	5	3	3	3	4	4	4
Cap, veh/h	495	860	243	493	784	315	247	245	166	243	239	168
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	840	1358	383	841	1238	498	1153	1031	698	1138	1005	707
Grp Volume(v), veh/h	20	0	545	110	0	537	90	0	223	46	0	218
Grp Sat Flow(s),veh/h/ln	840	0	1742	841	0	1736	1153	0	1728	1138	0	1712
Q Serve(g_s), s	0.9	0.0	12.0	5.8	0.0	11.8	5.3	0.0	8.1	2.6	0.0	8.0
Cycle Q Clear(g_c), s	12.7	0.0	12.0	17.7	0.0	11.8	13.3	0.0	8.1	10.7	0.0	8.0
Prop In Lane	1.00		0.22	1.00		0.29	1.00		0.40	1.00		0.41
Lane Grp Cap(c), veh/h	495	0	1103	493	0	1100	247	0	411	243	0	408
V/C Ratio(X)	0.04	0.00	0.49	0.22	0.00	0.49	0.36	0.00	0.54	0.19	0.00	0.53
Avail Cap(c_a), veh/h	495	0	1103	493	0	1100	381	0	613	375	0	607
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.3	0.0	7.0	11.7	0.0	7.0	29.6	0.0	23.9	28.6	0.0	23.8
Incr Delay (d2), s/veh	0.2	0.0	1.6	1.0	0.0	1.6	1.3	0.0	1.6	0.5	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	4.2	1.2	0.0	4.1	1.5	0.0	3.4	0.7	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.5	0.0	8.6	12.8	0.0	8.5	30.9	0.0	25.5	29.1	0.0	25.4
LnGrp LOS	B	A	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h		565			647			313			264	
Approach Delay, s/veh		8.7			9.2			27.0			26.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		21.7		50.0		21.7				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		45.4		25.4		45.4		25.4				
Max Q Clear Time (g_c+I1), s		14.7		12.7		19.7		15.3				
Green Ext Time (p_c), s		4.5		1.6		4.9		1.7				

Intersection Summary												
HCM 6th Ctrl Delay			14.6									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	538	227	20	450	50	193	30	10	40	20	48
Future Volume (vph)	70	538	227	20	450	50	193	30	10	40	20	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			3	3			1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	4%	4%	4%	1%	1%	1%	6%	6%	6%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	76.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	538	227	20	450	50	193	30	10	40	20	48
Future Vol, veh/h	70	538	227	20	450	50	193	30	10	40	20	48
Conflicting Peds, #/hr	0	0	3	3	0	0	1	0	5	5	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	4	4	4	1	1	1	6	6	6
Mvmt Flow	70	538	227	20	450	50	193	30	10	40	20	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	500	0	0	768	0	0	1345	1335	660	1332	1423	476
Stage 1	-	-	-	-	-	-	795	795	-	515	515	-
Stage 2	-	-	-	-	-	-	550	540	-	817	908	-
Critical Hdwy	4.17	-	-	4.14	-	-	7.11	6.51	6.21	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.16	5.56	-
Follow-up Hdwy	2.263	-	-	2.236	-	-	3.509	4.009	3.309	3.554	4.054	3.354
Pot Cap-1 Maneuver	1039	-	-	837	-	-	~ 129	154	465	129	133	581
Stage 1	-	-	-	-	-	-	382	401	-	535	528	-
Stage 2	-	-	-	-	-	-	521	523	-	365	349	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1039	-	-	835	-	-	~ 90	130	461	92	113	580
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 90	130	-	92	113	-
Stage 1	-	-	-	-	-	-	334	350	-	469	511	-
Stage 2	-	-	-	-	-	-	444	506	-	285	305	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.4	$ 524.9	68.3
HCM LOS			F	F

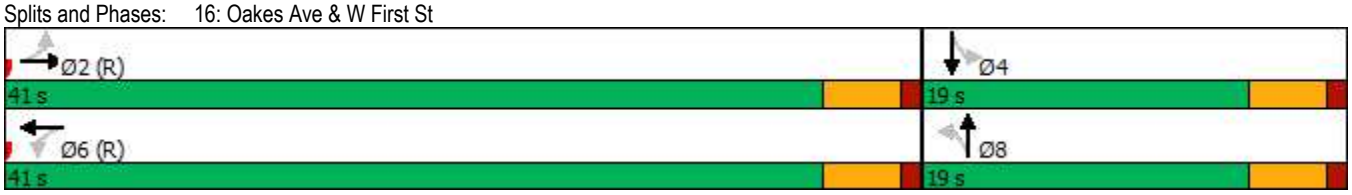
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	90	158	1039	-	-	835	-	-	156
HCM Lane V/C Ratio	2.144	0.253	0.067	-	-	0.024	-	-	0.692
HCM Control Delay (s)	$ 626.4	35.3	8.7	0	-	9.4	0	-	68.3
HCM Lane LOS	F	E	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	17.1	1	0.2	-	-	0.1	-	-	4

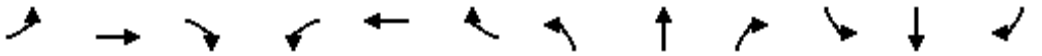
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	376	146	40	385	44	253	179	90	51	196	20
Future Volume (vph)	10	376	146	40	385	44	253	179	90	51	196	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	4		5	5		4	2		1	1		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	3%	3%	3%	8%	8%	8%	5%	5%	5%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0		19.0	19.0	
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%		31.7%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





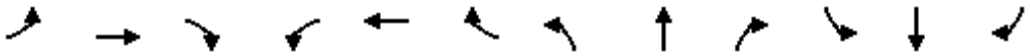
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	376	146	40	385	44	253	179	90	51	196	20
Future Volume (veh/h)	10	376	146	40	385	44	253	179	90	51	196	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1856	1856	1856	1781	1781	1781	1826	1826	1826
Adj Flow Rate, veh/h	10	376	146	40	385	44	253	179	90	51	196	20
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	7	7	7	3	3	3	8	8	8	5	5	5
Cap, veh/h	679	674	262	475	895	102	258	243	122	204	354	36
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	919	1107	430	872	1471	168	1107	1005	505	1082	1466	150
Grp Volume(v), veh/h	10	0	522	40	0	429	253	0	269	51	0	216
Grp Sat Flow(s),veh/h/ln	919	0	1537	872	0	1639	1107	0	1510	1082	0	1616
Q Serve(g_s), s	0.3	0.0	12.1	1.0	0.0	0.0	7.5	0.0	9.9	2.7	0.0	7.0
Cycle Q Clear(g_c), s	0.3	0.0	12.1	13.1	0.0	0.0	14.5	0.0	9.9	12.6	0.0	7.0
Prop In Lane	1.00		0.28	1.00		0.10	1.00		0.33	1.00		0.09
Lane Grp Cap(c), veh/h	679	0	935	475	0	997	258	0	365	204	0	390
V/C Ratio(X)	0.01	0.00	0.56	0.08	0.00	0.43	0.98	0.00	0.74	0.25	0.00	0.55
Avail Cap(c_a), veh/h	679	0	935	475	0	997	258	0	365	204	0	390
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.00	0.89	0.91	0.00	0.91	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.7	0.0	7.0	2.2	0.0	0.0	28.0	0.0	21.0	26.8	0.0	19.9
Incr Delay (d2), s/veh	0.0	0.0	2.1	0.3	0.0	1.2	50.3	0.0	6.8	0.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.6	0.1	0.0	0.3	7.1	0.0	3.9	0.7	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	0.0	9.1	2.5	0.0	1.2	78.2	0.0	27.8	27.0	0.0	20.9
LnGrp LOS	A	A	A	A	A	A	E	A	C	C	A	C
Approach Vol, veh/h		532			469			522			267	
Approach Delay, s/veh		9.0			1.3			52.2			22.1	
Approach LOS		A			A			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		41.0		19.0		41.0		19.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		36.5		14.5		36.5		14.5				
Max Q Clear Time (g_c+I1), s		14.1		14.6		15.1		16.5				
Green Ext Time (p_c), s		3.9		0.0		3.1		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			21.6									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	381	152	20	411	40	71	20	30	10	20	28
Future Volume (vph)	25	381	152	20	411	40	71	20	30	10	20	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		2	2		1	1		5	5		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	8%	8%	3%	3%	3%	4%	4%	4%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	21
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	381	152	20	411	40	71	20	30	10	20	28
Future Vol, veh/h	25	381	152	20	411	40	71	20	30	10	20	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	8	8	3	3	3	4	4	4	0	0	0
Mvmt Flow	25	381	152	20	411	40	71	20	30	10	20	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	25.4	19.4	11.6	10.4
HCM LOS	D	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	59%	4%	4%	17%
Vol Thru, %	17%	68%	87%	34%
Vol Right, %	25%	27%	8%	48%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	558	471	58
LT Vol	71	25	20	10
Through Vol	20	381	411	20
RT Vol	30	152	40	28
Lane Flow Rate	121	558	471	58
Geometry Grp	1	1	1	1
Degree of Util (X)	0.222	0.798	0.691	0.105
Departure Headway (Hd)	6.613	5.151	5.282	6.537
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	540	703	683	545
Service Time	4.687	3.196	3.33	4.622
HCM Lane V/C Ratio	0.224	0.794	0.69	0.106
HCM Control Delay	11.6	25.4	19.4	10.4
HCM Lane LOS	B	D	C	B
HCM 95th-tile Q	0.8	8.1	5.5	0.3

Lanes, Volumes, Timings
18: Pennsylvania Ave & W First St/First St

01/25/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	406	20	20	409	57	20	14	40	140	42	30
Future Volume (vph)	70	406	20	20	409	57	20	14	40	140	42	30
Satd. Flow (prot)	1719	1615	0	1736	1610	0	0	1757	1384	0	1759	1398
Flt Permitted	0.458			0.487				0.797			0.753	
Satd. Flow (perm)	827	1615	0	885	1610	0	0	1434	1354	0	1374	1353
Satd. Flow (RTOR)		8			21				40			30
Confl. Peds. (#/hr)	5		9	9		5	12		2	2		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	4%	4%	4%	5%	5%	5%	4%	4%	4%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	426	0	20	466	0	0	34	40	0	182	30
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	41.0	41.0		41.0	41.0		19.0	19.0	41.0	19.0	19.0	41.0
Total Split (%)	68.3%	68.3%		68.3%	68.3%		31.7%	31.7%	68.3%	31.7%	31.7%	68.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	38.8	38.8		38.8	38.8			12.2	38.8		12.2	38.8
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.20	0.65		0.20	0.65
v/c Ratio	0.13	0.41		0.03	0.45			0.12	0.04		0.65	0.03
Control Delay	5.8	6.9		5.2	7.4			18.6	2.2		32.6	2.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.8	6.9		5.2	7.4			18.6	2.2		32.6	2.4
LOS	A	A		A	A			B	A		C	A
Approach Delay		6.8			7.3			9.8			28.3	
Approach LOS		A			A			A			C	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 72.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	432	10	0	0	352
Future Volume (vph)	20	432	10	0	0	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	10%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	432	10	0	0	352
Future Vol, veh/h	20	432	10	0	0	352
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	10	20	20	9	9
Mvmt Flow	20	432	10	0	0	352

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	362	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	352	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	-	-
Pot Cap-1 Maneuver	621	1048	-	0	0	-
Stage 1	993	-	-	0	0	-
Stage 2	694	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	621	1048	-	-	-	-
Mov Cap-2 Maneuver	621	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	694	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1017	-
HCM Lane V/C Ratio	-	0.444	-
HCM Control Delay (s)	-	11.3	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	2.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	320	52
Future Volume (vph)	0	0	10	0	320	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	20%	20%	9%	9%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

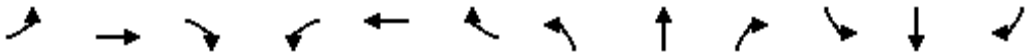
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	320	52
Future Vol, veh/h	0	0	10	0	320	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	20	20	9	9
Mvmt Flow	0	0	10	0	320	52

Major/Minor	Minor2		Major2	
Conflicting Flow All	692	52	0	0
Stage 1	692	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.7	6.4	4.19	-
Critical Hdwy Stg 1	5.7	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.18	3.48	2.281	-
Pot Cap-1 Maneuver	346	967	-	-
Stage 1	419	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	967	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	10	133	18	10	10	123	398	21	10	510	30
Future Volume (vph)	30	10	133	18	10	10	123	398	21	10	510	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	13		12	12		13	11		13	13		11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

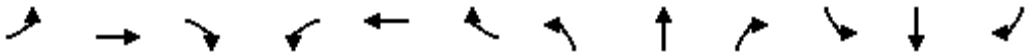
Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	10	133	18	10	10	123	398	21	10	510	30
Future Vol, veh/h	30	10	133	18	10	10	123	398	21	10	510	30
Conflicting Peds, #/hr	13	0	12	12	0	13	11	0	13	13	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	1	1	1	3	3	3
Mvmt Flow	30	10	133	18	10	10	123	398	21	10	510	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1234	1234	548	1297	1239	435	551	0	0	432	0	0
Stage 1	556	556	-	668	668	-	-	-	-	-	-	-
Stage 2	678	678	-	629	571	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.11	-	-	4.13	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.209	-	-	2.227	-	-
Pot Cap-1 Maneuver	155	178	540	140	177	625	1024	-	-	1122	-	-
Stage 1	519	516	-	451	459	-	-	-	-	-	-	-
Stage 2	445	455	-	474	508	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	145	528	84	144	610	1013	-	-	1108	-	-
Mov Cap-2 Maneuver	123	145	-	84	144	-	-	-	-	-	-	-
Stage 1	432	504	-	375	381	-	-	-	-	-	-	-
Stage 2	354	378	-	339	496	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31	45	2.1	0.2
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1013	-	-	306	127	1108	-	-
HCM Lane V/C Ratio	0.121	-	-	0.565	0.299	0.009	-	-
HCM Control Delay (s)	9	0	-	31	45	8.3	0	-
HCM Lane LOS	A	A	-	D	E	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	3.3	1.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	63	35	0	10	72	333	33	10	312	20
Future Volume (vph)	10	0	63	35	0	10	72	333	33	10	312	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	25%	25%	25%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

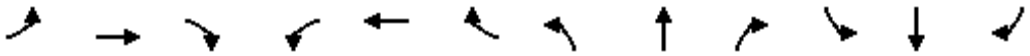
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	63	35	0	10	72	333	33	10	312	20
Future Vol, veh/h	10	0	63	35	0	10	72	333	33	10	312	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	25	25	25	2	2	2	2	2	2
Mvmt Flow	10	0	63	35	0	10	72	333	33	10	312	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	841	852	322	868	846	350	332	0	0	366	0	0
Stage 1	342	342	-	494	494	-	-	-	-	-	-	-
Stage 2	499	510	-	374	352	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.35	6.75	6.45	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.75	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.725	4.225	3.525	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	287	299	724	249	275	644	1227	-	-	1193	-	-
Stage 1	677	642	-	516	510	-	-	-	-	-	-	-
Stage 2	557	541	-	603	593	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	265	274	724	213	252	644	1227	-	-	1193	-	-
Mov Cap-2 Maneuver	265	274	-	213	252	-	-	-	-	-	-	-
Stage 1	627	636	-	478	472	-	-	-	-	-	-	-
Stage 2	508	501	-	545	587	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	22.5	1.3	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1227	-	-	585	250	1193	-	-
HCM Lane V/C Ratio	0.059	-	-	0.125	0.18	0.008	-	-
HCM Control Delay (s)	8.1	0	-	12	22.5	8	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.6	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	196	10	33	197	13	10	10	48	28	10	10
Future Volume (vph)	10	196	10	33	197	13	10	10	48	28	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	196	10	33	197	13	10	10	48	28	10	10
Future Vol, veh/h	10	196	10	33	197	13	10	10	48	28	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	3	3	0	0	0	0	0	0
Mvmt Flow	10	196	10	33	197	13	10	10	48	28	10	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	210	0	0	206	0	0	501	497	201	520	496	204
Stage 1	-	-	-	-	-	-	221	221	-	270	270	-
Stage 2	-	-	-	-	-	-	280	276	-	250	226	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1361	-	-	1359	-	-	484	477	845	470	478	842
Stage 1	-	-	-	-	-	-	786	724	-	740	690	-
Stage 2	-	-	-	-	-	-	731	685	-	759	721	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1361	-	-	1359	-	-	457	460	845	424	461	842
Mov Cap-2 Maneuver	-	-	-	-	-	-	457	460	-	424	461	-
Stage 1	-	-	-	-	-	-	780	718	-	734	671	-
Stage 2	-	-	-	-	-	-	692	666	-	700	715	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1	10.9	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	677	1361	-	-	1359	-	-	482
HCM Lane V/C Ratio	0.1	0.007	-	-	0.024	-	-	0.1
HCM Control Delay (s)	10.9	7.7	0	-	7.7	0	-	13.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	33	26	826	59	51	466
Future Volume (vph)	33	26	826	59	51	466
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	789		1497			1776
Travel Time (s)	21.5		29.2			34.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	26	826	59	51	466
Future Vol, veh/h	33	26	826	59	51	466
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	36	28	898	64	55	507

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1547	930	0	0	962	0
Stage 1	930	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	98	266	-	-	555	-
Stage 1	317	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	84	266	-	-	555	-
Mov Cap-2 Maneuver	84	-	-	-	-	-
Stage 1	317	-	-	-	-	-
Stage 2	393	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	65.1	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	120	555	-
HCM Lane V/C Ratio	-	-	0.534	0.1	-
HCM Control Delay (s)	-	-	65.1	12.2	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	2.5	0.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	55	425	180	87	270
Future Volume (vph)	88	55	425	180	87	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1092		1238			171
Travel Time (s)	29.8		24.1			3.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

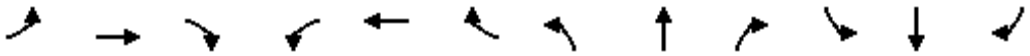
Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	55	425	180	87	270
Future Vol, veh/h	88	55	425	180	87	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	96	60	462	196	95	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1043	560	0	0	658	0
Stage 1	560	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	253	526	-	-	925	-
Stage 1	570	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	222	526	-	-	925	-
Mov Cap-2 Maneuver	222	-	-	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	542	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.2	0	2.3
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	222	526	925	-
HCM Lane V/C Ratio	-	-	0.431	0.114	0.102	-
HCM Control Delay (s)	-	-	33	12.7	9.3	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.4	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	536	173	394	519	40	156	0	405	25	0	32
Future Volume (vph)	42	536	173	394	519	40	156	0	405	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			1259			347	
Travel Time (s)		32.9			12.3			34.3			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	545.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	536	173	394	519	40	156	0	405	25	0	32
Future Vol, veh/h	42	536	173	394	519	40	156	0	405	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	583	188	428	564	43	170	0	440	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	607	0	0	771	0	0	2228	2232	677	2431	2305	586
Stage 1	-	-	-	-	-	-	769	769	-	1442	1442	-
Stage 2	-	-	-	-	-	-	1459	1463	-	989	863	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	966	-	-	839	-	-	~ 30	42	451	~ 22	38	508
Stage 1	-	-	-	-	-	-	392	409	-	164	197	-
Stage 2	-	-	-	-	-	-	~ 160	192	-	296	370	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	966	-	-	839	-	-	~ 10	9	451	0	8	508
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 10	9	-	0	8	-
Stage 1	-	-	-	-	-	-	358	374	-	150	44	-
Stage 2	-	-	-	-	-	-	~ 33	43	-	~ 6	338	-

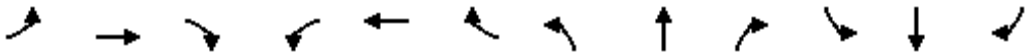
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	5.7	$ 2247.9	13.1
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	10	451	966	-	-	839	-	-	508
HCM Lane V/C Ratio	16.957	0.976	0.047	-	-	0.51	-	-	0.122
HCM Control Delay (s)	$ 7909.5	67.1	8.9	0	-	13.7	0	-	13.1
HCM Lane LOS	F	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	22.7	12.2	0.1	-	-	3	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Friday LOS Calculations

(2025 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	5	10	0	0	0	0	10	35	155	20	0
Future Volume (vph)	380	5	10	0	0	0	0	10	35	155	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

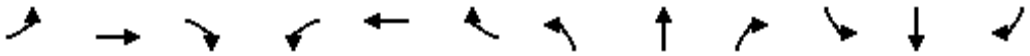
Intersection	
Int Delay, s/veh	17.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	380	5	10	0	0	0	0	10	35	155	20	0
Future Vol, veh/h	380	5	10	0	0	0	0	10	35	155	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	380	5	10	0	0	0	0	10	35	155	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	358	375	20	-	0	0	45	0	0
Stage 1	330	330	-	-	-	-	-	-	-
Stage 2	28	45	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	642	558	1061	0	-	-	1444	-	0
Stage 1	731	648	-	0	-	-	-	-	0
Stage 2	997	859	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	572	0	1061	-	-	-	1444	-	-
Mov Cap-2 Maneuver	572	0	-	-	-	-	-	-	-
Stage 1	731	0	-	-	-	-	-	-	-
Stage 2	888	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.5	0	6.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	579	1444	-
HCM Lane V/C Ratio	-	-	0.682	0.107	-
HCM Control Delay (s)	-	-	23.5	7.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	5.2	0.4	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	40	5	225	5	385	0	0	135	100
Future Volume (vph)	0	0	0	40	5	225	5	385	0	0	135	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

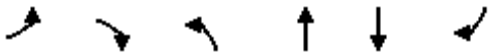
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	5	225	5	385	0	0	135	100
Future Vol, veh/h	0	0	0	40	5	225	5	385	0	0	135	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	40	5	225	5	385	0	0	135	100

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	580	630	385	235	0	-	-	-	0
Stage 1	395	395	-	-	-	-	-	-	-
Stage 2	185	235	-	-	-	-	-	-	-
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-
Pot Cap-1 Maneuver	454	381	633	1338	-	0	0	-	-
Stage 1	651	581	-	-	-	0	0	-	-
Stage 2	814	685	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	452	0	633	1338	-	-	-	-	-
Mov Cap-2 Maneuver	452	0	-	-	-	-	-	-	-
Stage 1	648	0	-	-	-	-	-	-	-
Stage 2	814	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.9	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1338	-	597	-	-
HCM Lane V/C Ratio	0.004	-	0.452	-	-
HCM Control Delay (s)	7.7	0	15.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	2.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	25	65	50	560	170	20
Future Volume (vph)	25	65	50	560	170	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	65	50	560	170	20
Future Vol, veh/h	25	65	50	560	170	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	25	65	50	560	170	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	840	180	190	0	-	0
Stage 1	180	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	321	835	1384	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	835	1384	-	-	-
Mov Cap-2 Maneuver	309	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	494	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1384	-	567	-	-
HCM Lane V/C Ratio	0.036	-	0.159	-	-
HCM Control Delay (s)	7.7	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

LANE LEVEL OF SERVICE

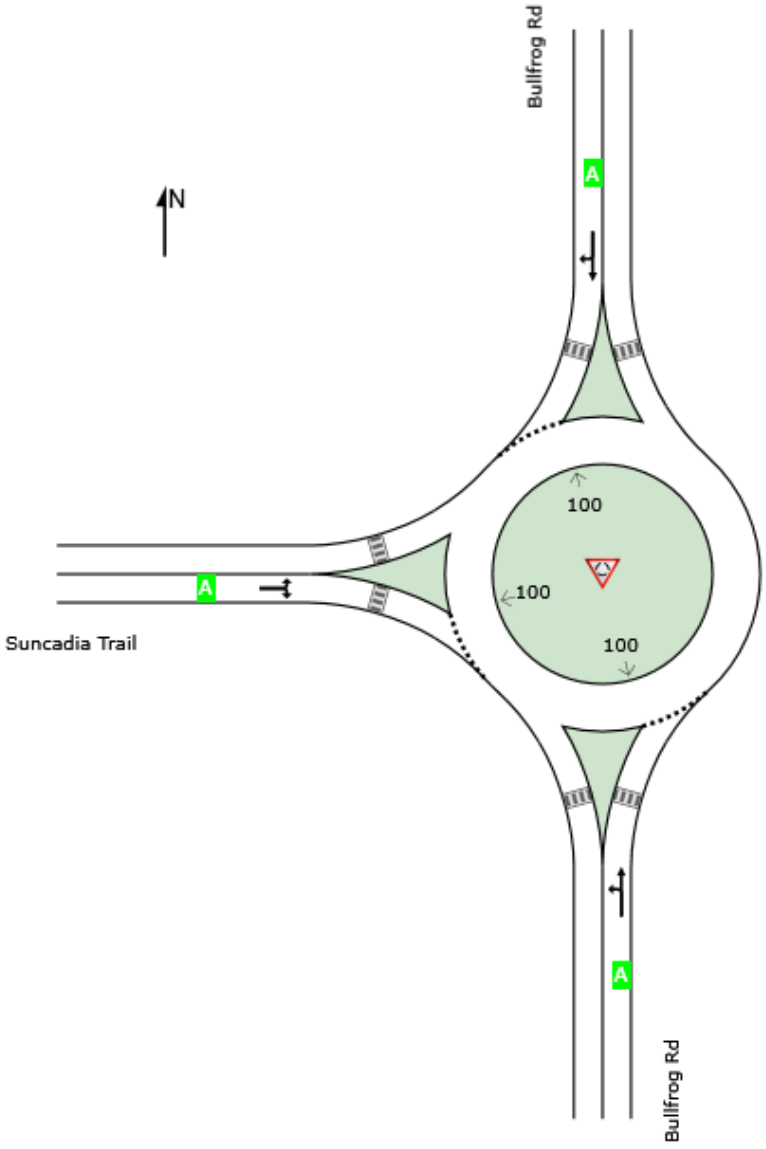
Lane Level of Service

Site: 4 [2025 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	585	1.4	585	1.4	1172	0.499	100	8.4	LOS A	3.5	89.6	Full	1600	0.0	0.0
Approach	585	1.4	585	1.4		0.499		8.4	LOS A	3.5	89.6				
North: Bullfrog Rd															
Lane 1[d]	210	3.5	210	3.5	939	0.224	100	6.0	LOS A	1.0	26.1	Full	1600	0.0	0.0
Approach	210	3.5	210	3.5		0.224		6.0	LOS A	1.0	26.1				
West: Suncadia Trail															
Lane 1[d]	245	4.2	245	4.2	1210	0.202	100	4.7	LOS A	1.0	25.5	Full	1600	0.0	0.0
Approach	245	4.2	245	4.2		0.202		4.7	LOS A	1.0	25.5				
All Vehicles	1040	2.5	1040	2.5		0.499		7.0	LOS A	3.5	89.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	330	255	585	1.4	1172	0.499	100	NA	NA
Approach	330	255	585	1.4		0.499			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	125	210	3.5	939	0.224	100	NA	NA
Approach	85	125	210	3.5		0.224			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	140	105	245	4.2	1210	0.202	100	NA	NA
Approach	140	105	245	4.2		0.202			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1040	2.5	0.499

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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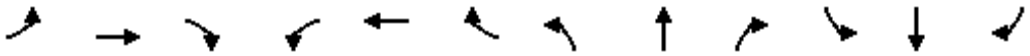


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	30	0	0	0	15	380	0	0	180	40
Future Volume (vph)	25	0	30	0	0	0	15	380	0	0	180	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	30	0	0	0	15	380	0	0	180	40
Future Vol, veh/h	25	0	30	0	0	0	15	380	0	0	180	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	30	0	0	0	15	380	0	0	180	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	610	610	200	625	630	380	220	0	0	380	0	0
Stage 1	200	200	-	410	410	-	-	-	-	-	-	-
Stage 2	410	410	-	215	220	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	399	403	828	400	401	671	1349	-	-	1173	-	-
Stage 1	790	726	-	623	599	-	-	-	-	-	-	-
Stage 2	609	587	-	792	725	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	395	397	828	381	395	671	1349	-	-	1173	-	-
Mov Cap-2 Maneuver	395	397	-	381	395	-	-	-	-	-	-	-
Stage 1	779	726	-	614	591	-	-	-	-	-	-	-
Stage 2	600	579	-	763	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	0	0.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1349	-	-	553	-	1173	-	-
HCM Lane V/C Ratio	0.011	-	-	0.099	-	-	-	-
HCM Control Delay (s)	7.7	0	-	12.2	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	-	-

LANE LEVEL OF SERVICE

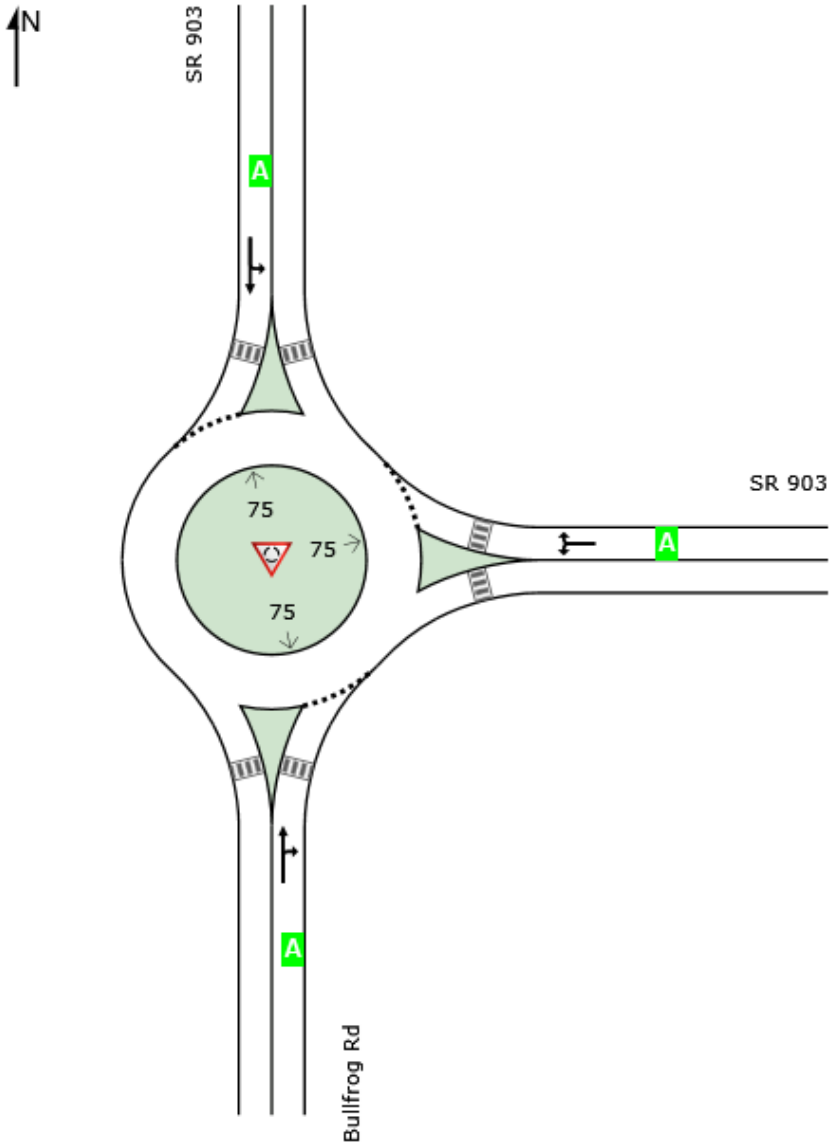
Lane Level of Service

Site: 6 [2025 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	405	3.3	405	3.3	947	0.428	100	8.7	LOS A	2.4	60.6	Full	1600	0.0	0.0
Approach	405	3.3	405	3.3		0.428		8.7	LOS A	2.4	60.6				
East: SR 903															
Lane 1[d]	505	2.8	505	2.8	1032	0.489	100	9.1	LOS A	3.1	78.6	Full	1600	0.0	0.0
Approach	505	2.8	505	2.8		0.489		9.1	LOS A	3.1	78.6				
North: SR 903															
Lane 1[d]	425	4.4	425	4.4	1176	0.361	100	6.5	LOS A	2.1	54.5	Full	1600	0.0	0.0
Approach	425	4.4	425	4.4		0.361		6.5	LOS A	2.1	54.5				
All Vehicles	1335	3.5	1335	3.5		0.489		8.1	LOS A	3.1	78.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd									
Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	245	160	405	3.3	947	0.428	100	NA	NA
Approach	245	160	405	3.3		0.428			
East: SR 903									
Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	110	395	505	2.8	1032	0.489	100	NA	NA
Approach	110	395	505	2.8		0.489			
North: SR 903									
Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	315	110	425	4.4	1176	0.361	100	NA	NA
Approach	315	110	425	4.4		0.361			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1335	3.5	0.489

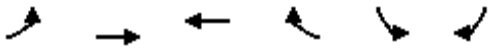
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	530	575	30	20	10
Future Volume (vph)	5	530	575	30	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

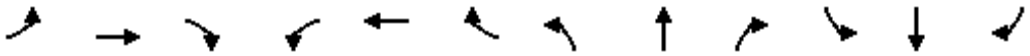
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	530	575	30	20	10
Future Vol, veh/h	5	530	575	30	20	10
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	5	530	575	30	20	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	605	0	-	0	1130	597
Stage 1	-	-	-	-	590	-
Stage 2	-	-	-	-	540	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	963	-	-	-	227	507
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	963	-	-	-	225	504
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	963	-	-	-	276
HCM Lane V/C Ratio	0.005	-	-	-	0.109
HCM Control Delay (s)	8.8	0	-	-	19.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	450	115	40	455	5	135	0	85	0	0	0
Future Volume (vph)	0	450	115	40	455	5	135	0	85	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

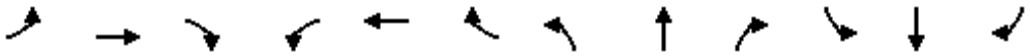
Intersection	
Int Delay, s/veh	11

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	450	115	40	455	5	135	0	85	0	0	0
Future Vol, veh/h	0	450	115	40	455	5	135	0	85	0	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	0	450	115	40	455	5	135	0	85	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	460	0	0	569	0	0	1050	1052	513	1089	1107	458
Stage 1	-	-	-	-	-	-	512	512	-	538	538	-
Stage 2	-	-	-	-	-	-	538	540	-	551	569	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	1091	-	-	998	-	-	206	227	563	195	212	607
Stage 1	-	-	-	-	-	-	547	538	-	531	526	-
Stage 2	-	-	-	-	-	-	529	523	-	522	509	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1091	-	-	994	-	-	197	214	560	158	200	607
Mov Cap-2 Maneuver	-	-	-	-	-	-	197	214	-	158	200	-
Stage 1	-	-	-	-	-	-	545	536	-	531	498	-
Stage 2	-	-	-	-	-	-	500	495	-	442	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	62.6	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	263	1091	-	-	994	-	-	-
HCM Lane V/C Ratio	0.837	-	-	-	0.04	-	-	-
HCM Control Delay (s)	62.6	0	-	-	8.8	0	-	0
HCM Lane LOS	F	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	6.8	0	-	-	0.1	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	545	0	5	510	10	5	5	5	20	0	25
Future Volume (vph)	20	545	0	5	510	10	5	5	5	20	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	545	0	5	510	10	5	5	5	20	0	25
Future Vol, veh/h	20	545	0	5	510	10	5	5	5	20	0	25
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	20	545	0	5	510	10	5	5	5	20	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	521	0	0	550	0	0	1128	1121	552	1118	1116	516
Stage 1	-	-	-	-	-	-	590	590	-	526	526	-
Stage 2	-	-	-	-	-	-	538	531	-	592	590	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1025	-	-	1010	-	-	181	205	531	186	209	563
Stage 1	-	-	-	-	-	-	492	493	-	539	532	-
Stage 2	-	-	-	-	-	-	525	524	-	496	498	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1024	-	-	1005	-	-	168	197	527	175	200	562
Mov Cap-2 Maneuver	-	-	-	-	-	-	168	197	-	175	200	-
Stage 1	-	-	-	-	-	-	476	477	-	523	528	-
Stage 2	-	-	-	-	-	-	498	520	-	472	482	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	21.6	20.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	232	1024	-	-	1005	-	-	283
HCM Lane V/C Ratio	0.065	0.02	-	-	0.005	-	-	0.159
HCM Control Delay (s)	21.6	8.6	0	-	8.6	0	-	20.1
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.6

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	135	10	30	180
Future Volume (vph)	25	10	135	10	30	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

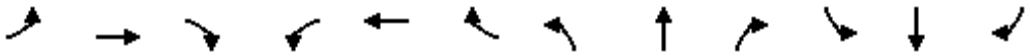
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	135	10	30	180
Future Vol, veh/h	25	10	135	10	30	180
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	135	10	30	180
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.5	8.6	8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	14%	0%	93%
Vol Thru, %	0%	71%	7%
Vol Right, %	86%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	210	35	145
LT Vol	30	0	135
Through Vol	0	25	10
RT Vol	180	10	0
Lane Flow Rate	210	35	145
Geometry Grp	1	1	1
Degree of Util (X)	0.227	0.042	0.182
Departure Headway (Hd)	3.894	4.33	4.518
Convergence, Y/N	Yes	Yes	Yes
Cap	928	829	783
Service Time	1.896	2.344	2.608
HCM Lane V/C Ratio	0.226	0.042	0.185
HCM Control Delay	8	7.5	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.1	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	350	200	55	195	100	75	70	155	80	70	40
Future Volume (vph)	125	350	200	55	195	100	75	70	155	80	70	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	31.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	125	350	200	55	195	100	75	70	155	80	70	40
Future Vol, veh/h	125	350	200	55	195	100	75	70	155	80	70	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	125	350	200	55	195	100	75	70	155	80	70	40

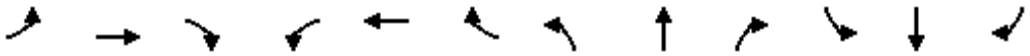
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	295	0	0	550	0	0	1110	1105	450	1168	1155	245
Stage 1	-	-	-	-	-	-	700	700	-	355	355	-
Stage 2	-	-	-	-	-	-	410	405	-	813	800	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1255	-	-	1005	-	-	187	211	609	169	195	789
Stage 1	-	-	-	-	-	-	430	441	-	658	626	-
Stage 2	-	-	-	-	-	-	619	598	-	369	394	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1255	-	-	1005	-	-	107	179	609	~ 78	166	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	179	-	~ 78	166	-
Stage 1	-	-	-	-	-	-	387	397	-	592	592	-
Stage 2	-	-	-	-	-	-	490	565	-	204	355	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	1.4	88.5	104.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	133	609	1255	-	-	1005	-	-	78	233
HCM Lane V/C Ratio	1.09	0.255	0.1	-	-	0.055	-	-	1.026	0.472
HCM Control Delay (s)	169.4	12.9	8.2	-	-	8.8	-	-	203	33.5
HCM Lane LOS	F	B	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	8.2	1	0.3	-	-	0.2	-	-	5.6	2.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	545	25	70	370	0	40	0	140	0	20	5
Future Volume (vph)	15	545	25	70	370	0	40	0	140	0	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

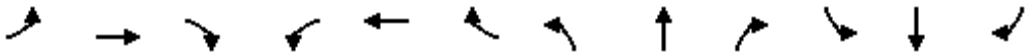
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	545	25	70	370	0	40	0	140	0	20	5
Future Vol, veh/h	15	545	25	70	370	0	40	0	140	0	20	5
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	15	545	25	70	370	0	40	0	140	0	20	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	371	0	0	574	0	0	1123	1103	562	1169	1115	379
Stage 1	-	-	-	-	-	-	592	592	-	511	511	-
Stage 2	-	-	-	-	-	-	531	511	-	658	604	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1177	-	-	989	-	-	180	209	521	127	159	546
Stage 1	-	-	-	-	-	-	487	489	-	443	444	-
Stage 2	-	-	-	-	-	-	526	532	-	362	399	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1176	-	-	985	-	-	148	191	519	87	145	541
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	191	-	87	145	-
Stage 1	-	-	-	-	-	-	479	481	-	437	412	-
Stage 2	-	-	-	-	-	-	457	494	-	261	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.4	19.7	29.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	148	519	1176	-	-	985	-	-	170
HCM Lane V/C Ratio	0.27	0.27	0.013	-	-	0.071	-	-	0.147
HCM Control Delay (s)	38.1	14.5	8.1	-	-	8.9	-	-	29.8
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1	1.1	0	-	-	0.2	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	405	100	60	300	20	210	40	20	15	15	15
Future Volume (vph)	30	405	100	60	300	20	210	40	20	15	15	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	24.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	405	100	60	300	20	210	40	20	15	15	15
Future Vol, veh/h	30	405	100	60	300	20	210	40	20	15	15	15
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	30	405	100	60	300	20	210	40	20	15	15	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	321	0	0	507	0	0	963	958	458	977	998	312
Stage 1	-	-	-	-	-	-	517	517	-	431	431	-
Stage 2	-	-	-	-	-	-	446	441	-	546	567	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1222	-	-	1058	-	-	232	254	597	232	246	733
Stage 1	-	-	-	-	-	-	536	529	-	607	586	-
Stage 2	-	-	-	-	-	-	586	572	-	526	510	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1221	-	-	1056	-	-	~ 198	228	595	179	220	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 198	228	-	179	220	-
Stage 1	-	-	-	-	-	-	516	509	-	585	545	-
Stage 2	-	-	-	-	-	-	519	532	-	452	491	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1.4	106.5	21.6
HCM LOS			F	C

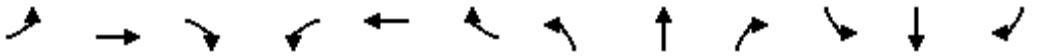
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	198	287	1221	-	-	1056	-	-	261
HCM Lane V/C Ratio	1.061	0.209	0.025	-	-	0.057	-	-	0.172
HCM Control Delay (s)	131	20.8	8	0	-	8.6	0	-	21.6
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	9.7	0.8	0.1	-	-	0.2	-	-	0.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	515	110	70	340	130	85	65	105	25	135	60
Future Volume (vph)	60	515	110	70	340	130	85	65	105	25	135	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 84.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

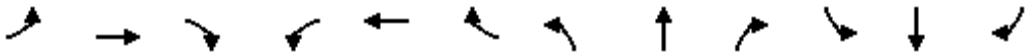
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	515	110	70	340	130	85	65	105	25	135	60
Future Volume (veh/h)	60	515	110	70	340	130	85	65	105	25	135	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	60	515	110	70	340	130	85	65	105	25	135	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	583	988	211	474	859	328	222	139	224	235	265	118
Arrive On Green	0.67	0.67	0.67	0.67	0.67	0.67	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	907	1469	314	793	1277	488	1140	617	996	1165	1182	525
Grp Volume(v), veh/h	60	0	625	70	0	470	85	0	170	25	0	195
Grp Sat Flow(s),veh/h/ln	907	0	1782	793	0	1765	1140	0	1613	1165	0	1707
Q Serve(g_s), s	2.8	0.0	15.9	4.4	0.0	10.7	6.3	0.0	8.2	1.7	0.0	9.0
Cycle Q Clear(g_c), s	13.5	0.0	15.9	20.2	0.0	10.7	15.3	0.0	8.2	9.9	0.0	9.0
Prop In Lane	1.00		0.18	1.00		0.28	1.00		0.62	1.00		0.31
Lane Grp Cap(c), veh/h	583	0	1199	474	0	1187	222	0	362	235	0	383
V/C Ratio(X)	0.10	0.00	0.52	0.15	0.00	0.40	0.38	0.00	0.47	0.11	0.00	0.51
Avail Cap(c_a), veh/h	583	0	1199	474	0	1187	352	0	546	368	0	578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	7.4	12.5	0.0	6.5	37.2	0.0	30.2	34.5	0.0	30.5
Incr Delay (d2), s/veh	0.4	0.0	1.6	0.7	0.0	1.0	1.5	0.0	1.3	0.2	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	5.8	0.8	0.0	3.8	1.9	0.0	3.3	0.5	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.0	9.0	13.2	0.0	7.5	38.7	0.0	31.5	34.7	0.0	31.5
LnGrp LOS	A	A	A	B	A	A	D	A	C	C	A	C
Approach Vol, veh/h		685			540			255			220	
Approach Delay, s/veh		9.1			8.3			33.9			31.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		24.8		65.0		24.8				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		60.4		30.4		60.4		30.4				
Max Q Clear Time (g_c+I1), s		17.9		17.3		22.2		11.9				
Green Ext Time (p_c), s		5.9		1.5		4.3		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			15.5									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	265	150	20	230	30	155	20	5	15	10	25
Future Volume (vph)	15	265	150	20	230	30	155	20	5	15	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	265	150	20	230	30	155	20	5	15	10	25
Future Vol, veh/h	15	265	150	20	230	30	155	20	5	15	10	25
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	15	265	150	20	230	30	155	20	5	15	10	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	262	0	0	417	0	0	677	674	344	672	734	249
Stage 1	-	-	-	-	-	-	372	372	-	287	287	-
Stage 2	-	-	-	-	-	-	305	302	-	385	447	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1291	-	-	1142	-	-	365	375	696	372	350	795
Stage 1	-	-	-	-	-	-	646	617	-	725	678	-
Stage 2	-	-	-	-	-	-	702	662	-	642	577	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1289	-	-	1140	-	-	335	360	693	343	336	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	335	360	-	343	336	-
Stage 1	-	-	-	-	-	-	635	607	-	713	662	-
Stage 2	-	-	-	-	-	-	654	647	-	606	567	-

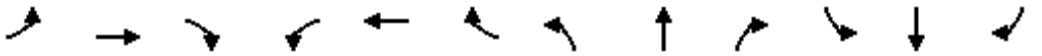
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.6	23.3	13.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	335	398	1289	-	-	1140	-	-	476
HCM Lane V/C Ratio	0.463	0.063	0.012	-	-	0.018	-	-	0.105
HCM Control Delay (s)	24.7	14.7	7.8	0	-	8.2	0	-	13.4
HCM Lane LOS	C	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	2.3	0.2	0	-	-	0.1	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	480	200	40	315	50	170	85	35	45	120	10
Future Volume (vph)	10	480	200	40	315	50	170	85	35	45	120	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



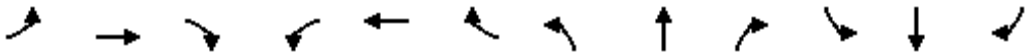
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	480	200	40	315	50	170	85	35	45	120	10
Future Volume (veh/h)	10	480	200	40	315	50	170	85	35	45	120	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	480	200	40	315	50	170	85	35	45	120	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	742	720	300	381	907	144	298	258	106	300	338	28
Arrive On Green	0.65	0.65	0.65	1.00	1.00	1.00	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	998	1113	464	753	1403	223	1230	1106	455	1201	1448	121
Grp Volume(v), veh/h	10	0	680	40	0	365	170	0	120	45	0	130
Grp Sat Flow(s),veh/h/ln	998	0	1577	753	0	1625	1230	0	1561	1201	0	1568
Q Serve(g_s), s	0.3	0.0	20.1	1.8	0.0	0.0	10.1	0.0	4.8	2.4	0.0	5.2
Cycle Q Clear(g_c), s	0.3	0.0	20.1	21.9	0.0	0.0	15.2	0.0	4.8	7.2	0.0	5.2
Prop In Lane	1.00		0.29	1.00		0.14	1.00		0.29	1.00		0.08
Lane Grp Cap(c), veh/h	742	0	1020	381	0	1051	298	0	365	300	0	366
V/C Ratio(X)	0.01	0.00	0.67	0.10	0.00	0.35	0.57	0.00	0.33	0.15	0.00	0.36
Avail Cap(c_a), veh/h	742	0	1020	381	0	1051	347	0	427	348	0	429
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.00	0.88	0.97	0.00	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.7	0.0	8.2	4.5	0.0	0.0	30.4	0.0	23.9	26.9	0.0	24.0
Incr Delay (d2), s/veh	0.0	0.0	3.0	0.5	0.0	0.9	0.6	0.0	0.2	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	6.5	0.3	0.0	0.3	3.0	0.0	1.7	0.7	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.8	0.0	11.3	5.1	0.0	0.9	31.0	0.0	24.1	26.9	0.0	24.2
LnGrp LOS	A	A	B	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		690			405			290			175	
Approach Delay, s/veh		11.2			1.3			28.2			24.9	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	53.0	22.0	53.0	22.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	22.1	9.2	23.9	17.2
Green Ext Time (p_c), s	5.6	0.4	2.7	0.3

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	185	85	15	195	10	55	20	25	5	10	35
Future Volume (vph)	20	185	85	15	195	10	55	20	25	5	10	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	185	85	15	195	10	55	20	25	5	10	35
Future Vol, veh/h	20	185	85	15	195	10	55	20	25	5	10	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	20	185	85	15	195	10	55	20	25	5	10	35
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	9.5	9.1	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	55%	7%	7%	10%
Vol Thru, %	20%	64%	89%	20%
Vol Right, %	25%	29%	5%	70%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	290	220	50
LT Vol	55	20	15	5
Through Vol	20	185	195	10
RT Vol	25	85	10	35
Lane Flow Rate	100	290	220	50
Geometry Grp	1	1	1	1
Degree of Util (X)	0.143	0.355	0.282	0.066
Departure Headway (Hd)	5.148	4.401	4.615	4.784
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	693	815	777	744
Service Time	3.205	2.437	2.655	2.847
HCM Lane V/C Ratio	0.144	0.356	0.283	0.067
HCM Control Delay	9.1	9.9	9.5	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1.6	1.2	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	480	30	30	335	55	15	10	20	75	20	45
Future Volume (vph)	35	480	30	30	335	55	15	10	20	75	20	45
Satd. Flow (prot)	1736	1626	0	1770	1635	0	0	1791	1411	0	1810	1439
Flt Permitted	0.524			0.449				0.814			0.754	
Satd. Flow (perm)	953	1626	0	831	1635	0	0	1498	1367	0	1407	1403
Satd. Flow (RTOR)		8			20				22			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	510	0	30	390	0	0	25	20	0	95	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	57.6	57.6		57.6	57.6			11.8	57.6		11.8	57.6
Actuated g/C Ratio	0.77	0.77		0.77	0.77			0.16	0.77		0.16	0.77
v/c Ratio	0.05	0.41		0.05	0.31			0.11	0.02		0.43	0.04
Control Delay	4.9	5.2		4.9	5.2			25.1	2.5		33.0	2.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.9	5.2		4.9	5.2			25.1	2.5		33.0	2.1
LOS	A	A		A	A			C	A		C	A
Approach Delay		5.2			5.1			15.0			23.0	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 7.7	Intersection LOS: A
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	225	15	0	0	305
Future Volume (vph)	20	225	15	0	0	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	225	15	0	0	305
Future Vol, veh/h	20	225	15	0	0	305
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	20	225	15	0	0	305

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	320	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	305	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	663	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	736	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	663	1050	-	-	-	-
Mov Cap-2 Maneuver	663	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	736	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1002	-
HCM Lane V/C Ratio	-	0.245	-
HCM Control Delay (s)	-	9.8	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	290	35
Future Volume (vph)	0	0	10	0	290	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

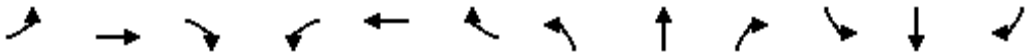
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	290	35
Future Vol, veh/h	0	0	10	0	290	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	290	35

Major/Minor	Minor2		Major2	
Conflicting Flow All	615	35	0	0
Stage 1	615	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	409	1044	-	-
Stage 1	485	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1044	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	45	70	10	10	10	70	385	15	10	275	25
Future Volume (vph)	20	45	70	10	10	10	70	385	15	10	275	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

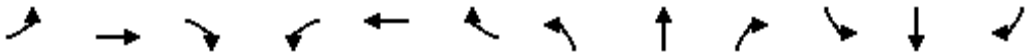
Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	45	70	10	10	10	70	385	15	10	275	25
Future Vol, veh/h	20	45	70	10	10	10	70	385	15	10	275	25
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	20	45	70	10	10	10	70	385	15	10	275	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	894	874	316	926	879	436	313	0	0	413	0	0
Stage 1	321	321	-	546	546	-	-	-	-	-	-	-
Stage 2	573	553	-	380	333	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	264	290	729	251	288	625	1247	-	-	1135	-	-
Stage 1	695	655	-	526	521	-	-	-	-	-	-	-
Stage 2	508	518	-	646	647	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	227	260	710	179	258	600	1232	-	-	1121	-	-
Mov Cap-2 Maneuver	227	260	-	179	258	-	-	-	-	-	-	-
Stage 1	637	640	-	482	477	-	-	-	-	-	-	-
Stage 2	440	474	-	528	632	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.9	20	1.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1232	-	-	375	270	1121	-	-
HCM Lane V/C Ratio	0.057	-	-	0.36	0.111	0.009	-	-
HCM Control Delay (s)	8.1	0	-	19.9	20	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.6	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	10	10	0	10	45	250	10	0	175	5
Future Volume (vph)	0	0	10	10	0	10	45	250	10	0	175	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

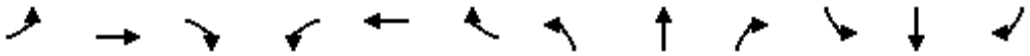
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	10	10	0	10	45	250	10	0	175	5
Future Vol, veh/h	0	0	10	10	0	10	45	250	10	0	175	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	0	0	10	10	0	10	45	250	10	0	175	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	528	528	178	528	525	255	180	0	0	260	0	0
Stage 1	178	178	-	345	345	-	-	-	-	-	-	-
Stage 2	350	350	-	183	180	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	437	434	825	464	460	789	1389	-	-	1293	-	-
Stage 1	788	723	-	675	640	-	-	-	-	-	-	-
Stage 2	635	605	-	823	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	419	418	825	445	443	789	1389	-	-	1293	-	-
Mov Cap-2 Maneuver	419	418	-	445	443	-	-	-	-	-	-	-
Stage 1	758	723	-	649	616	-	-	-	-	-	-	-
Stage 2	603	582	-	813	754	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	11.6	1.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	825	569	1293	-	-
HCM Lane V/C Ratio	0.032	-	-	0.012	0.035	-	-	-
HCM Control Delay (s)	7.7	0	-	9.4	11.6	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	85	5	30	135	35	0	25	25	20	0	25
Future Volume (vph)	20	85	5	30	135	35	0	25	25	20	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	85	5	30	135	35	0	25	25	20	0	25
Future Vol, veh/h	20	85	5	30	135	35	0	25	25	20	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	85	5	30	135	35	0	25	25	20	0	25

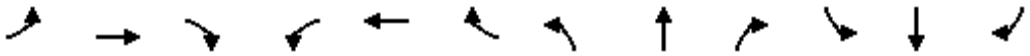
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	170	0	0	90	0	0	353	358	88	366	343	153
Stage 1	-	-	-	-	-	-	128	128	-	213	213	-
Stage 2	-	-	-	-	-	-	225	230	-	153	130	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1389	-	-	1518	-	-	585	554	946	594	583	898
Stage 1	-	-	-	-	-	-	855	773	-	794	730	-
Stage 2	-	-	-	-	-	-	758	698	-	854	792	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1389	-	-	1518	-	-	553	534	946	542	561	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	553	534	-	542	561	-
Stage 1	-	-	-	-	-	-	842	761	-	782	714	-
Stage 2	-	-	-	-	-	-	721	683	-	792	780	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.1	10.7	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	683	1389	-	-	1518	-	-	695
HCM Lane V/C Ratio	0.073	0.014	-	-	0.02	-	-	0.065
HCM Control Delay (s)	10.7	7.6	0	-	7.4	0	-	10.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

Friday LOS Calculations

(2025 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	458	5	10	0	0	0	0	10	35	174	20	0
Future Volume (vph)	458	5	10	0	0	0	0	10	35	174	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

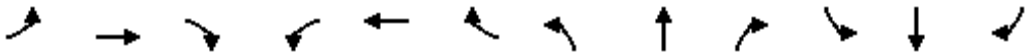
Intersection	
Int Delay, s/veh	29.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	458	5	10	0	0	0	0	10	35	174	20	0
Future Vol, veh/h	458	5	10	0	0	0	0	10	35	174	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	458	5	10	0	0	0	0	10	35	174	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	396	413	20	-	0	0	45	0	0
Stage 1	368	368	-	-	-	-	-	-	-
Stage 2	28	45	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	611	531	1061	0	-	-	1444	-	0
Stage 1	702	623	-	0	-	-	-	-	0
Stage 2	997	859	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	536	0	1061	-	-	-	1444	-	-
Mov Cap-2 Maneuver	536	0	-	-	-	-	-	-	-
Stage 1	702	0	-	-	-	-	-	-	-
Stage 2	875	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	41.6	0	7
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	542	1444	-
HCM Lane V/C Ratio	-	-	0.873	0.12	-
HCM Control Delay (s)	-	-	41.6	7.8	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	9.7	0.4	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	40	5	257	5	463	0	0	154	125
Future Volume (vph)	0	0	0	40	5	257	5	463	0	0	154	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

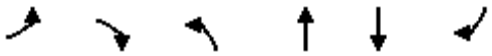
Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	5	257	5	463	0	0	154	125
Future Vol, veh/h	0	0	0	40	5	257	5	463	0	0	154	125
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	40	5	257	5	463	0	0	154	125

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	690	752	463	279	0	-	-	-	0
Stage 1	473	473	-	-	-	-	-	-	-
Stage 2	217	279	-	-	-	-	-	-	-
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-
Pot Cap-1 Maneuver	390	323	571	1289	-	0	0	-	-
Stage 1	599	536	-	-	-	0	0	-	-
Stage 2	787	655	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	388	0	571	1289	-	-	-	-	-
Mov Cap-2 Maneuver	388	0	-	-	-	-	-	-	-
Stage 1	596	0	-	-	-	-	-	-	-
Stage 2	787	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1289	-	537	-	-
HCM Lane V/C Ratio	0.004	-	0.562	-	-
HCM Control Delay (s)	7.8	0	20	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	3.5	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	29	65	50	670	214	26
Future Volume (vph)	29	65	50	670	214	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	65	50	670	214	26
Future Vol, veh/h	29	65	50	670	214	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	29	65	50	670	214	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	997	227	240	0	-	0
Stage 1	227	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	258	786	1327	-	-	-
Stage 1	785	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	786	1327	-	-	-
Mov Cap-2 Maneuver	248	-	-	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	471	-	-
HCM Lane V/C Ratio	0.038	-	0.2	-	-
HCM Control Delay (s)	7.8	-	14.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

LANE LEVEL OF SERVICE

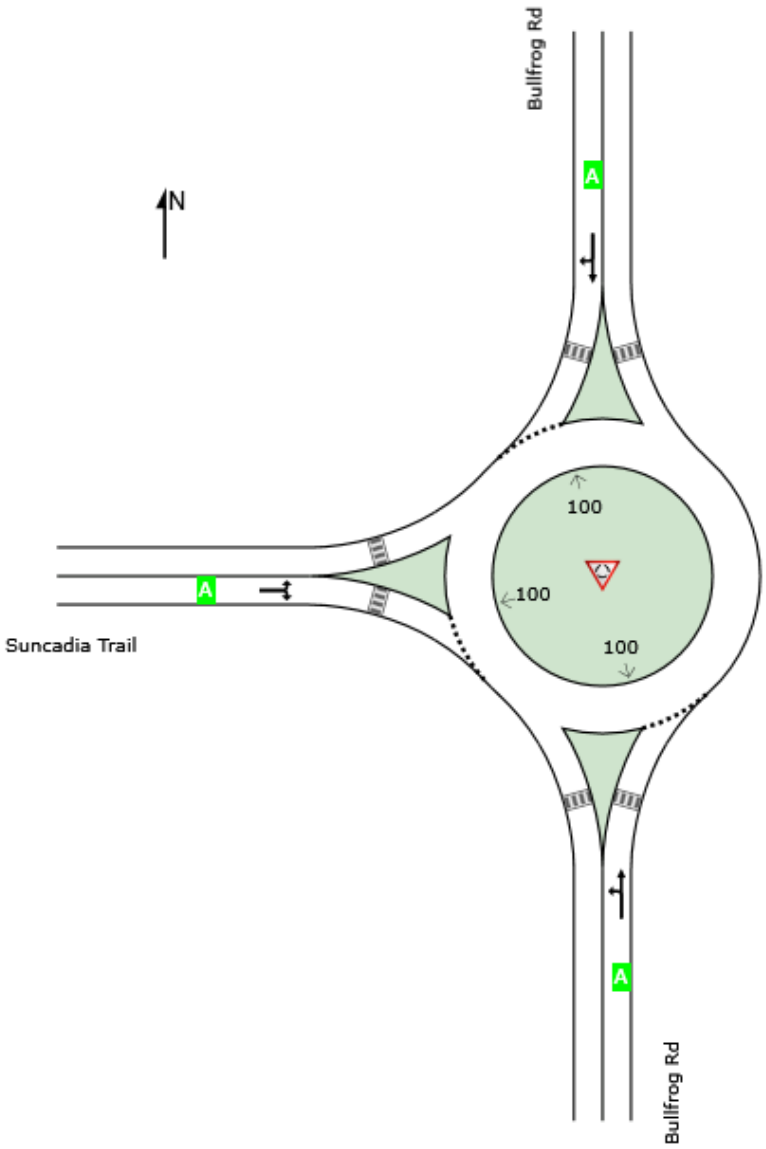
Lane Level of Service

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	682	1.4	682	1.4	1165	0.585	100	10.0	LOS A	4.7	120.0	Full	1600	0.0	0.0
Approach	682	1.4	682	1.4		0.585		10.0	LOS A	4.7	120.0				
North: Bullfrog Rd															
Lane 1[d]	284	3.5	284	3.5	938	0.303	100	7.0	LOS A	1.5	37.8	Full	1600	0.0	0.0
Approach	284	3.5	284	3.5		0.303		7.0	LOS A	1.5	37.8				
West: Suncadia Trail															
Lane 1[d]	251	4.2	251	4.2	1136	0.221	100	5.1	LOS A	1.1	27.7	Full	1600	0.0	0.0
Approach	251	4.2	251	4.2		0.221		5.1	LOS A	1.1	27.7				
All Vehicles	1217	2.5	1217	2.5		0.585		8.3	LOS A	4.7	120.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	331	351	682	1.4	1165	0.585	100	NA	NA
Approach	331	351	682	1.4		0.585			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	143	141	284	3.5	938	0.303	100	NA	NA
Approach	143	141	284	3.5		0.303			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	145	106	251	4.2	1136	0.221	100	NA	NA
Approach	145	106	251	4.2		0.221			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1217	2.5		0.585					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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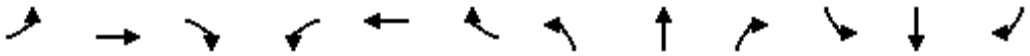


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	31	0	0	0	16	436	0	0	258	40
Future Volume (vph)	25	0	31	0	0	0	16	436	0	0	258	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	31	0	0	0	16	436	0	0	258	40
Future Vol, veh/h	25	0	31	0	0	0	16	436	0	0	258	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	31	0	0	0	16	436	0	0	258	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	746	746	278	762	766	436	298	0	0	436	0	0
Stage 1	278	278	-	468	468	-	-	-	-	-	-	-
Stage 2	468	468	-	294	298	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	323	336	749	324	335	625	1263	-	-	1118	-	-
Stage 1	718	671	-	579	565	-	-	-	-	-	-	-
Stage 2	566	553	-	719	671	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	319	330	749	307	329	625	1263	-	-	1118	-	-
Mov Cap-2 Maneuver	319	330	-	307	329	-	-	-	-	-	-	-
Stage 1	706	671	-	569	555	-	-	-	-	-	-	-
Stage 2	556	544	-	689	671	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	0	0.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1263	-	-	468	-	1118	-	-
HCM Lane V/C Ratio	0.013	-	-	0.12	-	-	-	-
HCM Control Delay (s)	7.9	0	-	13.7	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	0	-	-

LANE LEVEL OF SERVICE

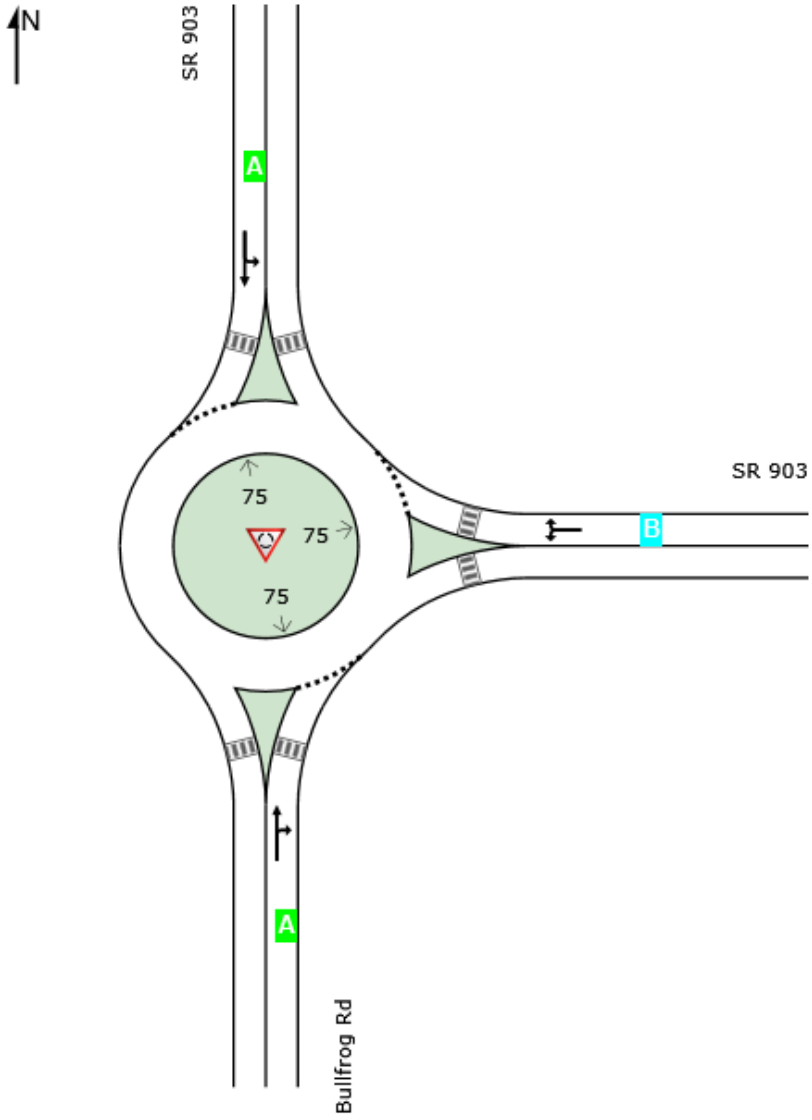
Lane Level of Service

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	461	3.3	461	3.3	932	0.495	100	9.9	LOS A	3.5	89.1	Full	1600	0.0	0.0
Approach	461	3.3	461	3.3		0.495		9.9	LOS A	3.5	89.1				
East: SR 903															
Lane 1[d]	566	2.8	566	2.8	999	0.567	100	10.9	LOS B	5.1	129.2	Full	1600	0.0	0.0
Approach	566	2.8	566	2.8		0.567		10.9	LOS B	5.1	129.2				
North: SR 903															
Lane 1[d]	473	4.4	473	4.4	1120	0.422	100	7.5	LOS A	2.6	66.7	Full	1600	0.0	0.0
Approach	473	4.4	473	4.4		0.422		7.5	LOS A	2.6	66.7				
All Vehicles	1500	3.5	1500	3.5		0.567		9.5	LOS A	5.1	129.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	275	186	461	3.3	932	0.495	100	NA	NA
Approach	275	186	461	3.3		0.495			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	155	411	566	2.8	999	0.567	100	NA	NA
Approach	155	411	566	2.8		0.567			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	330	143	473	4.4	1120	0.422	100	NA	NA
Approach	330	143	473	4.4		0.422			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1500	3.5	0.567

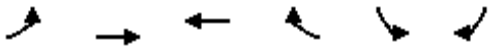
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	763	847	30	20	15
Future Volume (vph)	9	763	847	30	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

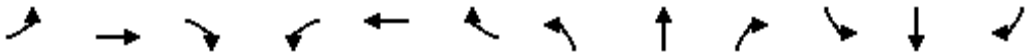
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	763	847	30	20	15
Future Vol, veh/h	9	763	847	30	20	15
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	9	763	847	30	20	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	877	0	-	0	1643	869
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	781	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	762	-	-	-	111	354
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	455	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	762	-	-	-	109	352
Mov Cap-2 Maneuver	-	-	-	-	109	-
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	455	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	34.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	762	-	-	-	155
HCM Lane V/C Ratio	0.012	-	-	-	0.226
HCM Control Delay (s)	9.8	0	-	-	34.9
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	653	141	40	678	5	179	0	85	0	0	5
Future Volume (vph)	4	653	141	40	678	5	179	0	85	0	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	87.6

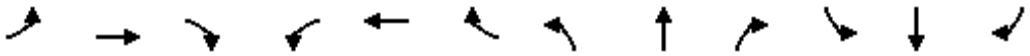
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	653	141	40	678	5	179	0	85	0	0	5
Future Vol, veh/h	4	653	141	40	678	5	179	0	85	0	0	5
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	4	653	141	40	678	5	179	0	85	0	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	683	0	0	798	0	0	1499	1499	729	1536	1567	681
Stage 1	-	-	-	-	-	-	736	736	-	761	761	-
Stage 2	-	-	-	-	-	-	763	763	-	775	806	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	901	-	-	820	-	-	~ 101	123	425	96	112	454
Stage 1	-	-	-	-	-	-	412	427	-	401	417	-
Stage 2	-	-	-	-	-	-	398	415	-	394	398	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	901	-	-	817	-	-	~ 93	112	423	72	102	454
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 93	112	-	72	102	-
Stage 1	-	-	-	-	-	-	407	422	-	398	384	-
Stage 2	-	-	-	-	-	-	363	382	-	312	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	$ 592	13
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	124	901	-	-	817	-	-	454
HCM Lane V/C Ratio	2.129	0.004	-	-	0.049	-	-	0.011
HCM Control Delay (s)	$ 592	9	0	-	9.6	0	-	13
HCM Lane LOS	F	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	22	0	-	-	0.2	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	725	19	5	696	10	37	5	5	20	0	30
Future Volume (vph)	24	725	19	5	696	10	37	5	5	20	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	725	19	5	696	10	37	5	5	20	0	30
Future Vol, veh/h	24	725	19	5	696	10	37	5	5	20	0	30
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	24	725	19	5	696	10	37	5	5	20	0	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	707	0	0	749	0	0	1514	1505	742	1502	1509	702
Stage 1	-	-	-	-	-	-	788	788	-	712	712	-
Stage 2	-	-	-	-	-	-	726	717	-	790	797	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	873	-	-	851	-	-	98	121	414	101	122	442
Stage 1	-	-	-	-	-	-	383	401	-	427	439	-
Stage 2	-	-	-	-	-	-	414	432	-	386	401	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	872	-	-	847	-	-	87	113	411	92	114	442
Mov Cap-2 Maneuver	-	-	-	-	-	-	87	113	-	92	114	-
Stage 1	-	-	-	-	-	-	363	380	-	407	434	-
Stage 2	-	-	-	-	-	-	382	427	-	358	380	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	71.7	33.6
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	98	872	-	-	847	-	-	175
HCM Lane V/C Ratio	0.48	0.028	-	-	0.006	-	-	0.286
HCM Control Delay (s)	71.7	9.2	0	-	9.3	0	-	33.6
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	2.1	0.1	-	-	0	-	-	1.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	161	10	30	224
Future Volume (vph)	25	10	161	10	30	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

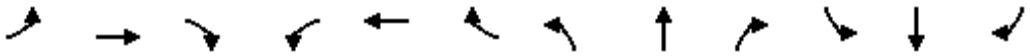
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	161	10	30	224
Future Vol, veh/h	25	10	161	10	30	224
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	161	10	30	224
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.7	9.1	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	12%	0%	94%
Vol Thru, %	0%	71%	6%
Vol Right, %	88%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	254	35	171
LT Vol	30	0	161
Through Vol	0	25	10
RT Vol	224	10	0
Lane Flow Rate	254	35	171
Geometry Grp	1	1	1
Degree of Util (X)	0.278	0.043	0.224
Departure Headway (Hd)	3.945	4.462	4.713
Convergence, Y/N	Yes	Yes	Yes
Cap	914	803	766
Service Time	1.958	2.489	2.713
HCM Lane V/C Ratio	0.278	0.044	0.223
HCM Control Delay	8.5	7.7	9.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.1	0.1	0.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	350	200	55	195	100	75	102	155	80	89	47
Future Volume (vph)	137	350	200	55	195	100	75	102	155	80	89	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	64

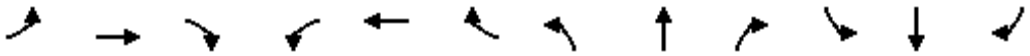
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	137	350	200	55	195	100	75	102	155	80	89	47
Future Vol, veh/h	137	350	200	55	195	100	75	102	155	80	89	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	137	350	200	55	195	100	75	102	155	80	89	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	295	0	0	550	0	0	1147	1129	450	1208	1179	245
Stage 1	-	-	-	-	-	-	724	724	-	355	355	-
Stage 2	-	-	-	-	-	-	423	405	-	853	824	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1255	-	-	1005	-	-	176	204	609	158	189	789
Stage 1	-	-	-	-	-	-	417	430	-	658	626	-
Stage 2	-	-	-	-	-	-	609	598	-	351	385	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1255	-	-	1005	-	-	82	172	609	~ 55	159	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	82	172	-	~ 55	159	-
Stage 1	-	-	-	-	-	-	372	383	-	586	592	-
Stage 2	-	-	-	-	-	-	460	565	-	171	343	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	1.4	185.3	177.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	117	609	1255	-	-	1005	-	-	55	220
HCM Lane V/C Ratio	1.513	0.255	0.109	-	-	0.055	-	-	1.455	0.618
HCM Control Delay (s)	$ 336.2	12.9	8.2	-	-	8.8	-	-	$ 403.6	44.7
HCM Lane LOS	F	B	A	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	12.7	1	0.4	-	-	0.2	-	-	7.3	3.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	545	25	70	370	0	40	32	140	0	39	5
Future Volume (vph)	15	545	25	70	370	0	40	32	140	0	39	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

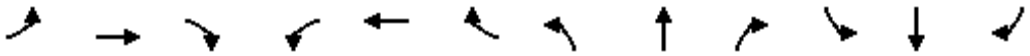
Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	545	25	70	370	0	40	32	140	0	39	5
Future Vol, veh/h	15	545	25	70	370	0	40	32	140	0	39	5
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	15	545	25	70	370	0	40	32	140	0	39	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	371	0	0	574	0	0	1132	1103	562	1185	1115	379
Stage 1	-	-	-	-	-	-	592	592	-	511	511	-
Stage 2	-	-	-	-	-	-	540	511	-	674	604	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1177	-	-	989	-	-	178	209	521	124	159	546
Stage 1	-	-	-	-	-	-	487	489	-	443	444	-
Stage 2	-	-	-	-	-	-	520	532	-	354	399	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1176	-	-	985	-	-	130	191	519	74	145	541
Mov Cap-2 Maneuver	-	-	-	-	-	-	130	191	-	74	145	-
Stage 1	-	-	-	-	-	-	479	481	-	437	412	-
Stage 2	-	-	-	-	-	-	430	494	-	238	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.4	26	36.4
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	152	519	1176	-	-	985	-	-	158
HCM Lane V/C Ratio	0.474	0.27	0.013	-	-	0.071	-	-	0.278
HCM Control Delay (s)	48.4	14.5	8.1	-	-	8.9	-	-	36.4
HCM Lane LOS	E	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.2	1.1	0	-	-	0.2	-	-	1.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	516	153	60	429	20	249	40	20	15	15	33
Future Volume (vph)	46	516	153	60	429	20	249	40	20	15	15	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	106

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	516	153	60	429	20	249	40	20	15	15	33
Future Vol, veh/h	46	516	153	60	429	20	249	40	20	15	15	33
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	46	516	153	60	429	20	249	40	20	15	15	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	671	0	0	1271	1257	596	1276	1323	441
Stage 1	-	-	-	-	-	-	687	687	-	560	560	-
Stage 2	-	-	-	-	-	-	584	570	-	716	763	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1095	-	-	919	-	-	~ 143	169	498	145	158	621
Stage 1	-	-	-	-	-	-	432	443	-	516	514	-
Stage 2	-	-	-	-	-	-	492	501	-	424	416	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1094	-	-	917	-	-	~ 110	143	497	97	134	620
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 110	143	-	97	134	-
Stage 1	-	-	-	-	-	-	401	412	-	480	469	-
Stage 2	-	-	-	-	-	-	411	457	-	342	386	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.1	$ 538.2	31.6
HCM LOS			F	D

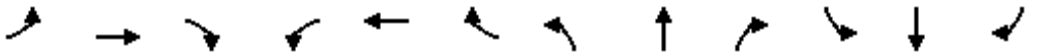
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	110	188	1094	-	-	917	-	-	197
HCM Lane V/C Ratio	2.264	0.319	0.042	-	-	0.065	-	-	0.32
HCM Control Delay (s)	$ 659.9	32.9	8.4	0	-	9.2	0	-	31.6
HCM Lane LOS	F	D	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	21.7	1.3	0.1	-	-	0.2	-	-	1.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	515	110	70	340	156	85	78	105	59	154	60
Future Volume (vph)	60	515	110	70	340	156	85	78	105	59	154	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 85.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

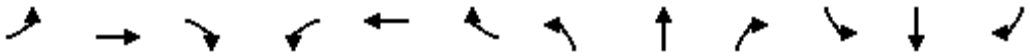
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	515	110	70	340	156	85	78	105	59	154	60
Future Volume (veh/h)	60	515	110	70	340	156	85	78	105	59	154	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	60	515	110	70	340	156	85	78	105	59	154	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	552	978	209	464	800	367	218	161	217	236	288	112
Arrive On Green	0.67	0.67	0.67	0.67	0.67	0.67	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	886	1469	314	793	1202	551	1121	693	933	1152	1235	481
Grp Volume(v), veh/h	60	0	625	70	0	496	85	0	183	59	0	214
Grp Sat Flow(s),veh/h/ln	886	0	1782	793	0	1753	1121	0	1626	1152	0	1716
Q Serve(g_s), s	3.1	0.0	16.4	4.5	0.0	12.0	6.5	0.0	8.8	4.2	0.0	9.9
Cycle Q Clear(g_c), s	15.0	0.0	16.4	20.9	0.0	12.0	16.4	0.0	8.8	13.1	0.0	9.9
Prop In Lane	1.00		0.18	1.00		0.31	1.00		0.57	1.00		0.28
Lane Grp Cap(c), veh/h	552	0	1186	464	0	1167	218	0	379	236	0	400
V/C Ratio(X)	0.11	0.00	0.53	0.15	0.00	0.43	0.39	0.00	0.48	0.25	0.00	0.54
Avail Cap(c_a), veh/h	552	0	1186	464	0	1167	332	0	545	353	0	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.6	0.0	7.8	13.2	0.0	7.1	37.7	0.0	30.1	35.7	0.0	30.5
Incr Delay (d2), s/veh	0.4	0.0	1.7	0.7	0.0	1.1	1.6	0.0	1.4	0.6	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	6.1	0.9	0.0	4.4	1.9	0.0	3.6	1.2	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	9.5	13.9	0.0	8.2	39.3	0.0	31.4	36.3	0.0	31.6
LnGrp LOS	B	A	A	B	A	A	D	A	C	D	A	C
Approach Vol, veh/h		685			566			268			273	
Approach Delay, s/veh		9.6			8.9			33.9			32.6	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		25.7		65.0		25.7				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		60.4		30.4		60.4		30.4				
Max Q Clear Time (g_c+I1), s		18.4		18.4		22.9		15.1				
Green Ext Time (p_c), s		5.9		1.5		4.6		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			16.5									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	312	203	20	287	30	214	20	5	15	10	38
Future Volume (vph)	26	312	203	20	287	30	214	20	5	15	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	312	203	20	287	30	214	20	5	15	10	38
Future Vol, veh/h	26	312	203	20	287	30	214	20	5	15	10	38
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	26	312	203	20	287	30	214	20	5	15	10	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	319	0	0	517	0	0	836	827	418	824	913	306
Stage 1	-	-	-	-	-	-	468	468	-	344	344	-
Stage 2	-	-	-	-	-	-	368	359	-	480	569	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1230	-	-	1049	-	-	285	306	633	294	276	739
Stage 1	-	-	-	-	-	-	574	560	-	676	640	-
Stage 2	-	-	-	-	-	-	650	625	-	571	509	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1228	-	-	1047	-	-	251	289	631	264	260	736
Mov Cap-2 Maneuver	-	-	-	-	-	-	251	289	-	264	260	-
Stage 1	-	-	-	-	-	-	555	542	-	654	624	-
Stage 2	-	-	-	-	-	-	591	609	-	528	492	-

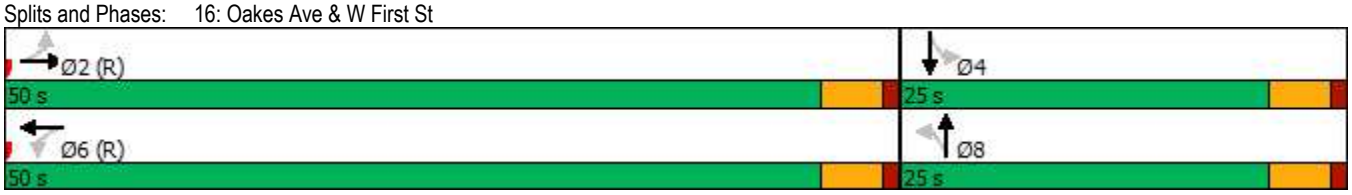
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.5	62.1	14.8
HCM LOS			F	B

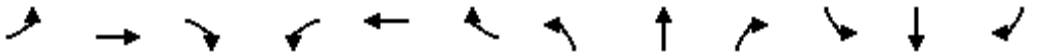
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	251	324	1228	-	-	1047	-	-	429
HCM Lane V/C Ratio	0.853	0.077	0.021	-	-	0.019	-	-	0.147
HCM Control Delay (s)	67.4	17	8	0	-	8.5	0	-	14.8
HCM Lane LOS	F	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	6.9	0.2	0.1	-	-	0.1	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	505	209	40	330	85	181	109	35	80	138	10
Future Volume (vph)	10	505	209	40	330	85	181	109	35	80	138	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





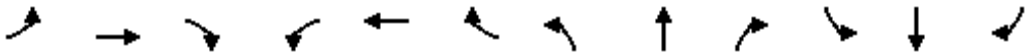
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	505	209	40	330	85	181	109	35	80	138	10
Future Volume (veh/h)	10	505	209	40	330	85	181	109	35	80	138	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	505	209	40	330	85	181	109	35	80	138	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	695	700	290	330	801	206	307	301	97	304	369	27
Arrive On Green	0.63	0.63	0.63	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	954	1116	462	730	1275	329	1210	1192	383	1175	1465	106
Grp Volume(v), veh/h	10	0	714	40	0	415	181	0	144	80	0	148
Grp Sat Flow(s),veh/h/ln	954	0	1577	730	0	1604	1210	0	1574	1175	0	1571
Q Serve(g_s), s	0.3	0.0	23.1	2.2	0.0	0.0	10.9	0.0	5.6	4.5	0.0	5.8
Cycle Q Clear(g_c), s	0.3	0.0	23.1	25.3	0.0	0.0	16.7	0.0	5.6	10.2	0.0	5.8
Prop In Lane	1.00		0.29	1.00		0.20	1.00		0.24	1.00		0.07
Lane Grp Cap(c), veh/h	695	0	990	330	0	1007	307	0	397	304	0	396
V/C Ratio(X)	0.01	0.00	0.72	0.12	0.00	0.41	0.59	0.00	0.36	0.26	0.00	0.37
Avail Cap(c_a), veh/h	695	0	990	330	0	1007	333	0	430	329	0	429
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.00	0.87	0.95	0.00	0.95	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.2	0.0	9.5	6.2	0.0	0.0	30.1	0.0	23.1	27.3	0.0	23.2
Incr Delay (d2), s/veh	0.0	0.0	4.0	0.7	0.0	1.2	1.3	0.0	0.2	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.8	0.3	0.0	0.3	3.2	0.0	2.1	1.3	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.3	0.0	13.5	6.9	0.0	1.2	31.4	0.0	23.3	27.4	0.0	23.4
LnGrp LOS	A	A	B	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		724			455			325			228	
Approach Delay, s/veh		13.3			1.7			27.8			24.8	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	51.6	23.4	51.6	23.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	25.1	12.2	27.3	18.7
Green Ext Time (p_c), s	5.7	0.5	2.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	202	108	15	208	10	91	20	25	5	10	43
Future Volume (vph)	27	202	108	15	208	10	91	20	25	5	10	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	202	108	15	208	10	91	20	25	5	10	43
Future Vol, veh/h	27	202	108	15	208	10	91	20	25	5	10	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	27	202	108	15	208	10	91	20	25	5	10	43
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11	10.1	9.9	8.5
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	8%	6%	9%
Vol Thru, %	15%	60%	89%	17%
Vol Right, %	18%	32%	4%	74%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	136	337	233	58
LT Vol	91	27	15	5
Through Vol	20	202	208	10
RT Vol	25	108	10	43
Lane Flow Rate	136	337	233	58
Geometry Grp	1	1	1	1
Degree of Util (X)	0.203	0.425	0.311	0.08
Departure Headway (Hd)	5.38	4.544	4.812	4.983
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	661	789	741	710
Service Time	3.464	2.602	2.878	3.077
HCM Lane V/C Ratio	0.206	0.427	0.314	0.082
HCM Control Delay	9.9	11	10.1	8.5
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.8	2.1	1.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	540	30	30	385	86	15	15	20	94	24	45
Future Volume (vph)	35	540	30	30	385	86	15	15	20	94	24	45
Satd. Flow (prot)	1736	1628	0	1770	1623	0	0	1800	1411	0	1810	1439
Flt Permitted	0.472			0.413				0.832			0.749	
Satd. Flow (perm)	859	1628	0	765	1623	0	0	1532	1367	0	1397	1403
Satd. Flow (RTOR)		7			27				22			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	570	0	30	471	0	0	30	20	0	118	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	57.3	57.3		57.3	57.3			12.1	57.3		12.1	57.3
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.16	0.76		0.16	0.76
v/c Ratio	0.05	0.46		0.05	0.38			0.12	0.02		0.52	0.04
Control Delay	5.1	5.9		4.8	5.6			25.3	2.4		35.9	1.9
Queue Delay	0.0	0.1		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.1	6.0		4.8	5.6			25.3	2.4		35.9	1.9
LOS	A	A		A	A			C	A		D	A
Approach Delay		6.0			5.6			16.1			26.5	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	260	15	0	0	332
Future Volume (vph)	20	260	15	0	0	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	260	15	0	0	332
Future Vol, veh/h	20	260	15	0	0	332
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	20	260	15	0	0	332

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	347	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	640	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	716	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	640	1050	-	-	-	-
Mov Cap-2 Maneuver	640	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1004	-
HCM Lane V/C Ratio	-	0.279	-
HCM Control Delay (s)	-	10	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	317	35
Future Volume (vph)	0	0	10	0	317	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

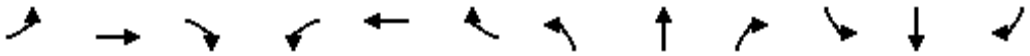
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	317	35
Future Vol, veh/h	0	0	10	0	317	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	317	35

Major/Minor	Minor2		Major2	
Conflicting Flow All	669	35	0	0
Stage 1	669	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	381	1044	-	-
Stage 1	459	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1044	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	45	74	14	10	10	76	401	21	10	300	25
Future Volume (vph)	20	45	74	14	10	10	76	401	21	10	300	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

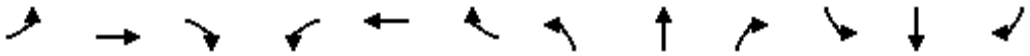
Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	45	74	14	10	10	76	401	21	10	300	25
Future Vol, veh/h	20	45	74	14	10	10	76	401	21	10	300	25
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	20	45	74	14	10	10	76	401	21	10	300	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	950	933	341	984	935	455	338	0	0	435	0	0
Stage 1	346	346	-	577	577	-	-	-	-	-	-	-
Stage 2	604	587	-	407	358	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	242	268	706	229	267	609	1221	-	-	1114	-	-
Stage 1	674	639	-	506	505	-	-	-	-	-	-	-
Stage 2	489	500	-	625	631	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	205	237	687	158	236	584	1206	-	-	1100	-	-
Mov Cap-2 Maneuver	205	237	-	158	236	-	-	-	-	-	-	-
Stage 1	611	624	-	458	458	-	-	-	-	-	-	-
Stage 2	419	453	-	504	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.7	23.3	1.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1206	-	-	352	230	1100	-	-
HCM Lane V/C Ratio	0.063	-	-	0.395	0.148	0.009	-	-
HCM Control Delay (s)	8.2	0	-	21.7	23.3	8.3	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.8	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	14	14	0	10	46	264	11	0	192	5
Future Volume (vph)	0	0	14	14	0	10	46	264	11	0	192	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

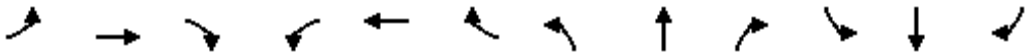
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	14	14	0	10	46	264	11	0	192	5
Future Vol, veh/h	0	0	14	14	0	10	46	264	11	0	192	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	0	0	14	14	0	10	46	264	11	0	192	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	562	562	195	564	559	270	197	0	0	275	0	0
Stage 1	195	195	-	362	362	-	-	-	-	-	-	-
Stage 2	367	367	-	202	197	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	414	415	807	439	440	774	1370	-	-	1277	-	-
Stage 1	771	710	-	661	629	-	-	-	-	-	-	-
Stage 2	621	595	-	805	742	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	396	398	807	418	422	774	1370	-	-	1277	-	-
Mov Cap-2 Maneuver	396	398	-	418	422	-	-	-	-	-	-	-
Stage 1	740	710	-	635	604	-	-	-	-	-	-	-
Stage 2	588	571	-	791	742	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	12.3	1.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1370	-	-	807	517	1277	-	-
HCM Lane V/C Ratio	0.034	-	-	0.017	0.046	-	-	-
HCM Control Delay (s)	7.7	0	-	9.5	12.3	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	94	5	31	145	38	0	25	30	23	0	25
Future Volume (vph)	20	94	5	31	145	38	0	25	30	23	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	94	5	31	145	38	0	25	30	23	0	25
Future Vol, veh/h	20	94	5	31	145	38	0	25	30	23	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	94	5	31	145	38	0	25	30	23	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	183	0	0	99	0	0	376	382	97	390	365	164
Stage 1	-	-	-	-	-	-	137	137	-	226	226	-
Stage 2	-	-	-	-	-	-	239	245	-	164	139	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1374	-	-	1507	-	-	565	537	935	573	566	886
Stage 1	-	-	-	-	-	-	845	766	-	781	721	-
Stage 2	-	-	-	-	-	-	745	687	-	843	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1374	-	-	1507	-	-	533	517	935	519	544	886
Mov Cap-2 Maneuver	-	-	-	-	-	-	533	517	-	519	544	-
Stage 1	-	-	-	-	-	-	832	755	-	769	704	-
Stage 2	-	-	-	-	-	-	707	671	-	777	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	1.1	10.7	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	684	1374	-	-	1507	-	-	662
HCM Lane V/C Ratio	0.08	0.015	-	-	0.021	-	-	0.073
HCM Control Delay (s)	10.7	7.7	0	-	7.4	0	-	10.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	14	668	31	26	223
Future Volume (vph)	17	14	668	31	26	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1141		1727			1546
Travel Time (s)	31.1		33.6			30.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	14	668	31	26	223
Future Vol, veh/h	17	14	668	31	26	223
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	18	15	726	34	28	242

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1041	743	0	0	760	0
Stage 1	743	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	208	346	-	-	672	-
Stage 1	394	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	198	346	-	-	672	-
Mov Cap-2 Maneuver	198	-	-	-	-	-
Stage 1	394	-	-	-	-	-
Stage 2	625	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	245	672	-
HCM Lane V/C Ratio	-	-	0.138	0.042	-
HCM Control Delay (s)	-	-	22	10.6	0
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	23	429	67	27	262
Future Volume (vph)	22	23	429	67	27	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1047		1154			255
Travel Time (s)	28.6		22.5			5.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

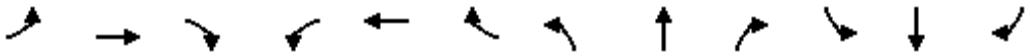
Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	23	429	67	27	262
Future Vol, veh/h	22	23	429	67	27	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	24	25	466	73	29	285

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	846	503	0	0	539	0
Stage 1	503	-	-	-	-	-
Stage 2	343	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	331	567	-	-	1024	-
Stage 1	605	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	320	567	-	-	1024	-
Mov Cap-2 Maneuver	320	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	692	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.3	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	320	567	1024	-
HCM Lane V/C Ratio	-	-	0.075	0.044	0.029	-
HCM Control Delay (s)	-	-	17.2	11.6	8.6	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	475	80	295	527	40	84	0	274	25	0	32
Future Volume (vph)	42	475	80	295	527	40	84	0	274	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			831			417	
Travel Time (s)		32.9			12.3			22.7			11.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	99.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	42	475	80	295	527	40	84	0	274	25	0	32
Future Vol, veh/h	42	475	80	295	527	40	84	0	274	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	516	87	321	573	43	91	0	298	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	616	0	0	603	0	0	1906	1910	560	2038	1932	595
Stage 1	-	-	-	-	-	-	652	652	-	1237	1237	-
Stage 2	-	-	-	-	-	-	1254	1258	-	801	695	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	959	-	-	970	-	-	~ 52	68	526	42	66	502
Stage 1	-	-	-	-	-	-	455	463	-	214	247	-
Stage 2	-	-	-	-	-	-	210	241	-	377	442	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	959	-	-	970	-	-	~ 28	31	526	~ 10	30	502
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 28	31	-	~ 10	30	-
Stage 1	-	-	-	-	-	-	422	429	-	198	122	-
Stage 2	-	-	-	-	-	-	96	119	-	152	410	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	3.6	$ 323.3	$ 1189.1
HCM LOS			F	F

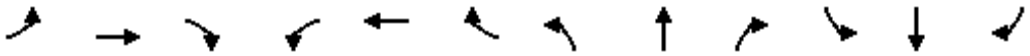
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	28	526	959	-	-	970	-	-	22
HCM Lane V/C Ratio	3.261	0.566	0.048	-	-	0.331	-	-	2.816
HCM Control Delay (s)	$ 1311.2	20.4	8.9	0	-	10.5	0		$ 1189.1
HCM Lane LOS	F	C	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	11	3.5	0.1	-	-	1.5	-	-	7.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Friday LOS Calculations

(2031 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	470	5	15	0	0	0	0	10	35	260	20	0
Future Volume (vph)	470	5	15	0	0	0	0	10	35	260	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	89.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	470	5	15	0	0	0	0	10	35	260	20	0
Future Vol, veh/h	470	5	15	0	0	0	0	10	35	260	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	470	5	15	0	0	0	0	10	35	260	20	0

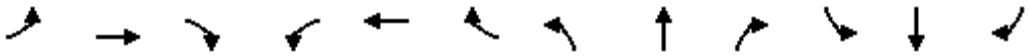
Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	568	585	20	-	0	0	45	0	0
Stage 1	540	540	-	-	-	-	-	-	-
Stage 2	28	45	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	486	424	1061	0	-	-	1444	-	0
Stage 1	586	523	-	0	-	-	-	-	0
Stage 2	997	859	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 398	0	1061	-	-	-	1444	-	-
Mov Cap-2 Maneuver	~ 398	0	-	-	-	-	-	-	-
Stage 1	586	0	-	-	-	-	-	-	-
Stage 2	816	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	144	0	7.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	406	1444	-
HCM Lane V/C Ratio	-	-	1.207	0.18	-
HCM Control Delay (s)	-	-	144	8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	19.8	0.7	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	5	385	5	475	0	0	220	105
Future Volume (vph)	0	0	0	60	5	385	5	475	0	0	220	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

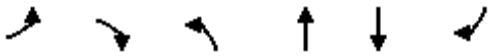
Intersection	
Int Delay, s/veh	14.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	60	5	385	5	475	0	0	220	105
Future Vol, veh/h	0	0	0	60	5	385	5	475	0	0	220	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	60	5	385	5	475	0	0	220	105

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	758	810	475	325	0	-	-	-	0
Stage 1	485	485	-	-	-	-	-	-	-
Stage 2	273	325	-	-	-	-	-	-	-
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-
Pot Cap-1 Maneuver	356	298	562	1240	-	0	0	-	-
Stage 1	591	529	-	-	-	0	0	-	-
Stage 2	742	625	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	354	0	562	1240	-	-	-	-	-
Mov Cap-2 Maneuver	354	0	-	-	-	-	-	-	-
Stage 1	588	0	-	-	-	-	-	-	-
Stage 2	742	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.5	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1240	-	521	-	-
HCM Lane V/C Ratio	0.004	-	0.864	-	-
HCM Control Delay (s)	7.9	0	41.5	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0	-	9.3	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	35	105	95	765	220	20
Future Volume (vph)	35	105	95	765	220	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	105	95	765	220	20
Future Vol, veh/h	35	105	95	765	220	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	35	105	95	765	220	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1185	230	240	0	-	0
Stage 1	230	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	198	783	1327	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	357	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	184	783	1327	-	-	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	357	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.3	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	432	-	-
HCM Lane V/C Ratio	0.072	-	0.324	-	-
HCM Control Delay (s)	7.9	-	17.3	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-

LANE LEVEL OF SERVICE

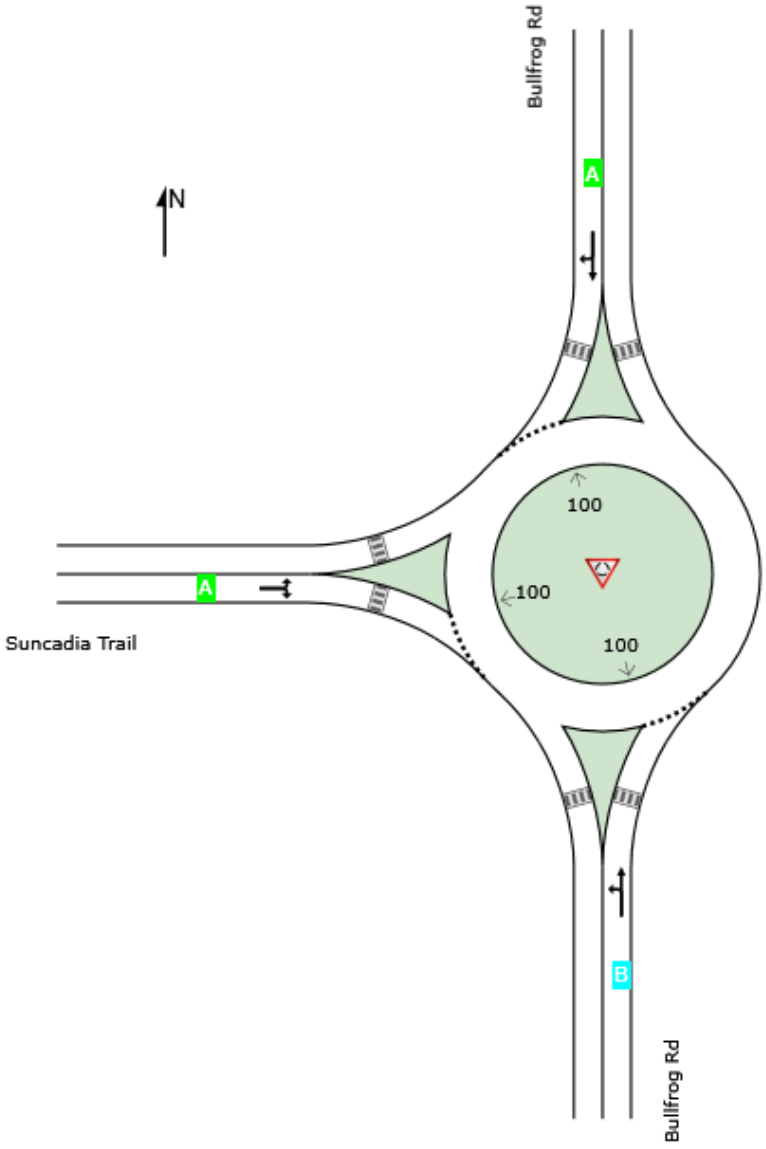
Lane Level of Service

Site: 4 [2031 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	800	1.4	800	1.4	1184	0.676	100	11.9	LOS B	6.7	168.1	Full	1600	0.0	0.0
Approach	800	1.4	800	1.4		0.676		11.9	LOS B	6.7	168.1				
North: Bullfrog Rd															
Lane 1[d]	220	3.5	220	3.5	770	0.286	100	7.9	LOS A	1.3	32.5	Full	1600	0.0	0.0
Approach	220	3.5	220	3.5		0.286		7.9	LOS A	1.3	32.5				
West: Suncadia Trail															
Lane 1[d]	275	4.2	275	4.2	1197	0.230	100	5.0	LOS A	1.2	29.7	Full	1600	0.0	0.0
Approach	275	4.2	275	4.2		0.230		5.0	LOS A	1.2	29.7				
All Vehicles	1295	2.4	1295	2.4		0.676		9.8	LOS A	6.7	168.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	515	285	800	1.4	1184	0.676	100	NA	NA
Approach	515	285	800	1.4		0.676			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	125	220	3.5	770	0.286	100	NA	NA
Approach	95	125	220	3.5		0.286			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	130	145	275	4.2	1197	0.230	100	NA	NA
Approach	130	145	275	4.2		0.230			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1295	2.4	0.676

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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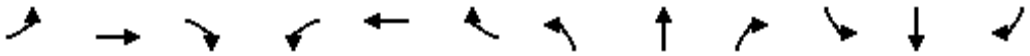


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	30	0	0	0	15	400	0	0	190	40
Future Volume (vph)	25	0	30	0	0	0	15	400	0	0	190	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	30	0	0	0	15	400	0	0	190	40
Future Vol, veh/h	25	0	30	0	0	0	15	400	0	0	190	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	30	0	0	0	15	400	0	0	190	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	640	640	210	655	660	400	230	0	0	400	0	0
Stage 1	210	210	-	430	430	-	-	-	-	-	-	-
Stage 2	430	430	-	225	230	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	381	387	818	382	386	654	1338	-	-	1153	-	-
Stage 1	781	719	-	607	587	-	-	-	-	-	-	-
Stage 2	594	575	-	782	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	377	382	818	364	381	654	1338	-	-	1153	-	-
Mov Cap-2 Maneuver	377	382	-	364	381	-	-	-	-	-	-	-
Stage 1	770	719	-	599	579	-	-	-	-	-	-	-
Stage 2	586	567	-	753	718	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	0	0.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	534	-	1153	-	-
HCM Lane V/C Ratio	0.011	-	-	0.103	-	-	-	-
HCM Control Delay (s)	7.7	0	-	12.5	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	-	-

LANE LEVEL OF SERVICE

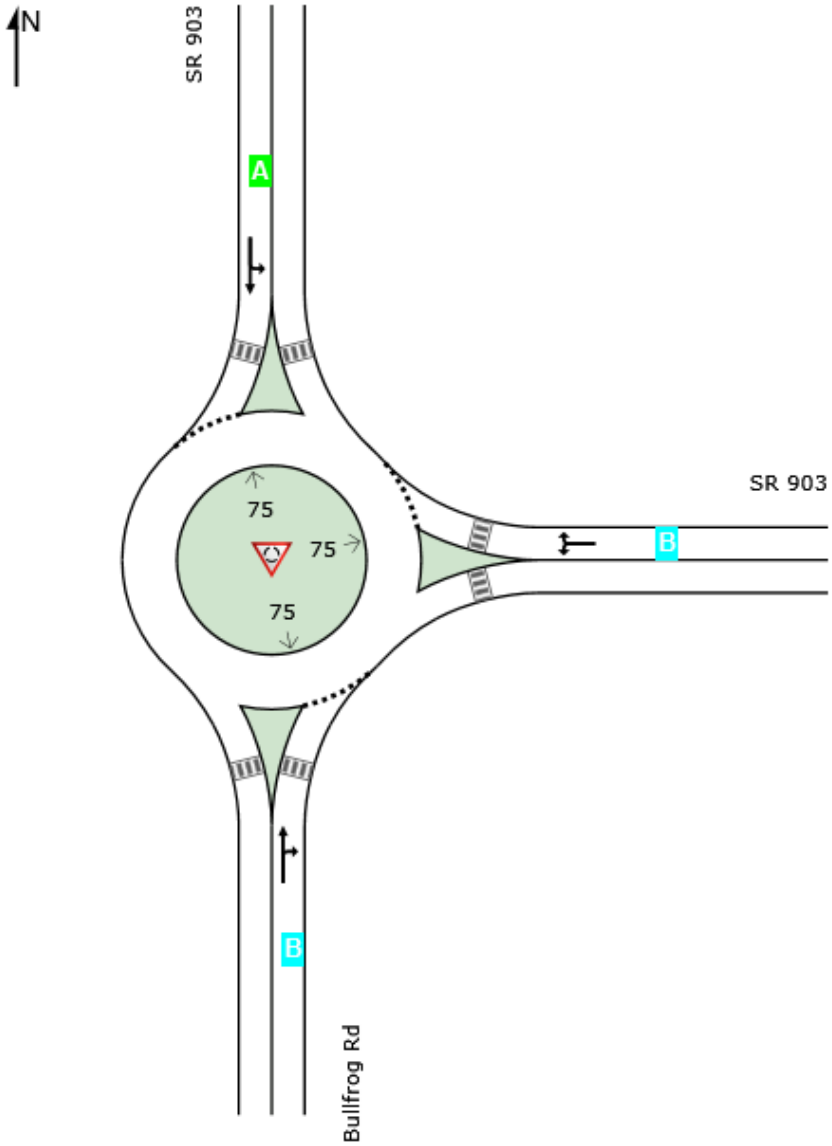
Lane Level of Service

Site: 6 [2031 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	425	3.3	425	3.3	886	0.479	100	10.0	LOS B	3.2	83.0	Full	1600	0.0	0.0
Approach	425	3.3	425	3.3		0.479		10.0	LOS B	3.2	83.0				
East: SR 903															
Lane 1[d]	585	2.8	585	2.8	1010	0.579	100	11.1	LOS B	5.4	138.0	Full	1600	0.0	0.0
Approach	585	2.8	585	2.8		0.579		11.1	LOS B	5.4	138.0				
North: SR 903															
Lane 1[d]	495	4.4	495	4.4	1176	0.421	100	7.2	LOS A	2.7	68.8	Full	1600	0.0	0.0
Approach	495	4.4	495	4.4		0.421		7.2	LOS A	2.7	68.8				
All Vehicles	1505	3.5	1505	3.5		0.579		9.5	LOS A	5.4	138.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	265	160	425	3.3	886	0.479	100	NA	NA
Approach	265	160	425	3.3		0.479			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	110	475	585	2.8	1010	0.579	100	NA	NA
Approach	110	475	585	2.8		0.579			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	375	120	495	4.4	1176	0.421	100	NA	NA
Approach	375	120	495	4.4		0.421			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1505	3.5	0.579

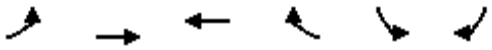
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	620	695	40	20	10
Future Volume (vph)	5	620	695	40	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

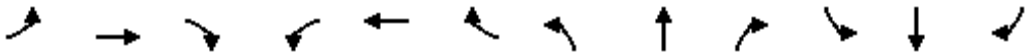
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	620	695	40	20	10
Future Vol, veh/h	5	620	695	40	20	10
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	5	620	695	40	20	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	735	0	-	0	1345	722
Stage 1	-	-	-	-	715	-
Stage 2	-	-	-	-	630	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	861	-	-	-	169	430
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	535	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	861	-	-	-	167	427
Mov Cap-2 Maneuver	-	-	-	-	167	-
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	535	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	25
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	861	-	-	-	210
HCM Lane V/C Ratio	0.006	-	-	-	0.143
HCM Control Delay (s)	9.2	0	-	-	25
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	540	115	40	585	5	150	0	130	0	0	0
Future Volume (vph)	0	540	115	40	585	5	150	0	130	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	41.2

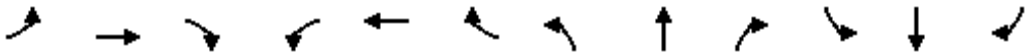
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	540	115	40	585	5	150	0	130	0	0	0
Future Vol, veh/h	0	540	115	40	585	5	150	0	130	0	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	0	540	115	40	585	5	150	0	130	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	590	0	0	659	0	0	1270	1272	603	1332	1327	588
Stage 1	-	-	-	-	-	-	602	602	-	668	668	-
Stage 2	-	-	-	-	-	-	668	670	-	664	659	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	976	-	-	924	-	-	~ 146	168	501	133	157	513
Stage 1	-	-	-	-	-	-	488	490	-	451	459	-
Stage 2	-	-	-	-	-	-	449	457	-	453	464	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	976	-	-	920	-	-	~ 138	156	499	93	146	513
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 138	156	-	93	146	-
Stage 1	-	-	-	-	-	-	486	488	-	451	429	-
Stage 2	-	-	-	-	-	-	420	427	-	335	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.6	228.8	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	976	-	-	920	-	-	-
HCM Lane V/C Ratio	1.346	-	-	-	0.043	-	-	-
HCM Control Delay (s)	228.8	0	-	-	9.1	0	-	0
HCM Lane LOS	F	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	15.7	0	-	-	0.1	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	680	0	15	625	10	15	10	5	20	15	25
Future Volume (vph)	20	680	0	15	625	10	15	10	5	20	15	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	680	0	15	625	10	15	10	5	20	15	25
Future Vol, veh/h	20	680	0	15	625	10	15	10	5	20	15	25
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	20	680	0	15	625	10	15	10	5	20	15	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	636	0	0	685	0	0	1405	1391	687	1391	1386	631
Stage 1	-	-	-	-	-	-	725	725	-	661	661	-
Stage 2	-	-	-	-	-	-	680	666	-	730	725	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	928	-	-	899	-	-	116	141	445	121	144	485
Stage 1	-	-	-	-	-	-	415	428	-	455	463	-
Stage 2	-	-	-	-	-	-	439	456	-	417	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	927	-	-	895	-	-	96	132	442	107	134	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	132	-	107	134	-
Stage 1	-	-	-	-	-	-	398	411	-	439	450	-
Stage 2	-	-	-	-	-	-	392	444	-	387	416	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	43.5	37
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	123	927	-	-	895	-	-	171
HCM Lane V/C Ratio	0.244	0.022	-	-	0.017	-	-	0.351
HCM Control Delay (s)	43.5	9	0	-	9.1	0	-	37
HCM Lane LOS	E	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	-	1.5

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	135	10	30	245
Future Volume (vph)	25	10	135	10	30	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

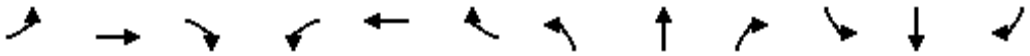
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	135	10	30	245
Future Vol, veh/h	25	10	135	10	30	245
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	135	10	30	245
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.7	8.9	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	11%	0%	93%
Vol Thru, %	0%	71%	7%
Vol Right, %	89%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	275	35	145
LT Vol	30	0	135
Through Vol	0	25	10
RT Vol	245	10	0
Lane Flow Rate	275	35	145
Geometry Grp	1	1	1
Degree of Util (X)	0.296	0.043	0.191
Departure Headway (Hd)	3.879	4.47	4.747
Convergence, Y/N	Yes	Yes	Yes
Cap	930	802	761
Service Time	1.888	2.494	2.747
HCM Lane V/C Ratio	0.296	0.044	0.191
HCM Control Delay	8.5	7.7	8.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.2	0.1	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	395	200	70	195	110	75	85	155	80	70	40
Future Volume (vph)	150	395	200	70	195	110	75	85	155	80	70	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	70.6

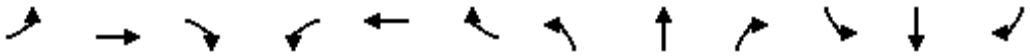
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	150	395	200	70	195	110	75	85	155	80	70	40
Future Vol, veh/h	150	395	200	70	195	110	75	85	155	80	70	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	150	395	200	70	195	110	75	85	155	80	70	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	305	0	0	595	0	0	1240	1240	495	1305	1285	250
Stage 1	-	-	-	-	-	-	795	795	-	390	390	-
Stage 2	-	-	-	-	-	-	445	445	-	915	895	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1244	-	-	967	-	-	152	175	575	136	163	784
Stage 1	-	-	-	-	-	-	381	399	-	630	604	-
Stage 2	-	-	-	-	-	-	592	575	-	324	356	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1244	-	-	967	-	-	~ 74	143	575	~ 46	133	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 74	143	-	~ 46	133	-
Stage 1	-	-	-	-	-	-	335	351	-	554	561	-
Stage 2	-	-	-	-	-	-	456	534	-	158	313	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	1.7	202.8	257.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	100	575	1244	-	-	967	-	-	46	191
HCM Lane V/C Ratio	1.6	0.27	0.121	-	-	0.072	-	-	1.739	0.576
HCM Control Delay (s)	$ 386.1	13.6	8.3	-	-	9	-	-	$ 547.7	46.7
HCM Lane LOS	F	B	A	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	12.4	1.1	0.4	-	-	0.2	-	-	8	3.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	570	35	70	370	0	40	0	155	0	20	5
Future Volume (vph)	25	570	35	70	370	0	40	0	155	0	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

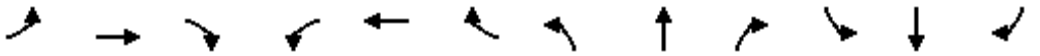
Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	570	35	70	370	0	40	0	155	0	20	5
Future Vol, veh/h	25	570	35	70	370	0	40	0	155	0	20	5
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	25	570	35	70	370	0	40	0	155	0	20	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	371	0	0	609	0	0	1173	1153	592	1226	1170	379
Stage 1	-	-	-	-	-	-	642	642	-	511	511	-
Stage 2	-	-	-	-	-	-	531	511	-	715	659	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1177	-	-	960	-	-	167	195	501	116	147	546
Stage 1	-	-	-	-	-	-	458	464	-	443	444	-
Stage 2	-	-	-	-	-	-	526	532	-	334	374	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1176	-	-	956	-	-	135	176	499	74	133	541
Mov Cap-2 Maneuver	-	-	-	-	-	-	135	176	-	74	133	-
Stage 1	-	-	-	-	-	-	447	452	-	433	411	-
Stage 2	-	-	-	-	-	-	456	493	-	225	365	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.4	21	32.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	135	499	1176	-	-	956	-	-	157
HCM Lane V/C Ratio	0.296	0.311	0.021	-	-	0.073	-	-	0.159
HCM Control Delay (s)	42.5	15.4	8.1	-	-	9.1	-	-	32.2
HCM Lane LOS	E	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.2	1.3	0.1	-	-	0.2	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	510	100	90	390	30	225	40	25	25	25	35
Future Volume (vph)	40	510	100	90	390	30	225	40	25	25	25	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	95.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	510	100	90	390	30	225	40	25	25	25	35
Future Vol, veh/h	40	510	100	90	390	30	225	40	25	25	25	35
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	40	510	100	90	390	30	225	40	25	25	25	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	421	0	0	612	0	0	1258	1243	563	1260	1278	407
Stage 1	-	-	-	-	-	-	642	642	-	586	586	-
Stage 2	-	-	-	-	-	-	616	601	-	674	692	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1122	-	-	967	-	-	~ 146	172	520	149	168	648
Stage 1	-	-	-	-	-	-	458	464	-	500	500	-
Stage 2	-	-	-	-	-	-	473	485	-	448	448	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1121	-	-	965	-	-	~ 104	142	519	97	139	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 104	142	-	97	139	-
Stage 1	-	-	-	-	-	-	432	438	-	472	439	-
Stage 2	-	-	-	-	-	-	370	425	-	366	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.6	$ 489.1	44.4
HCM LOS			F	E

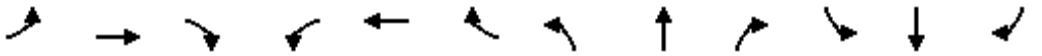
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	104	197	1121	-	-	965	-	-	173
HCM Lane V/C Ratio	2.163	0.33	0.036	-	-	0.093	-	-	0.491
HCM Control Delay (s)	$ 621.1	32	8.3	0	-	9.1	0	-	44.4
HCM Lane LOS	F	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	19.5	1.4	0.1	-	-	0.3	-	-	2.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	540	125	70	340	145	85	85	120	25	170	80
Future Volume (vph)	60	540	125	70	340	145	85	85	120	25	170	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 86.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

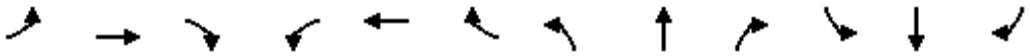
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	540	125	70	340	145	85	85	120	25	170	80
Future Volume (veh/h)	60	540	125	70	340	145	85	85	120	25	170	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	60	540	125	70	340	145	85	85	120	25	170	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	541	940	218	416	802	342	209	168	237	237	289	136
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	895	1444	334	764	1232	525	1086	673	951	1130	1159	545
Grp Volume(v), veh/h	60	0	665	70	0	485	85	0	205	25	0	250
Grp Sat Flow(s),veh/h/ln	895	0	1778	764	0	1758	1086	0	1624	1130	0	1704
Q Serve(g_s), s	3.2	0.0	19.3	5.2	0.0	12.3	6.9	0.0	10.1	1.8	0.0	12.0
Cycle Q Clear(g_c), s	15.5	0.0	19.3	24.5	0.0	12.3	18.9	0.0	10.1	11.9	0.0	12.0
Prop In Lane	1.00		0.19	1.00		0.30	1.00		0.59	1.00		0.32
Lane Grp Cap(c), veh/h	541	0	1158	416	0	1144	209	0	405	237	0	425
V/C Ratio(X)	0.11	0.00	0.57	0.17	0.00	0.42	0.41	0.00	0.51	0.11	0.00	0.59
Avail Cap(c_a), veh/h	541	0	1158	416	0	1144	293	0	532	326	0	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	0.0	9.0	15.9	0.0	7.8	38.9	0.0	29.9	35.0	0.0	30.6
Incr Delay (d2), s/veh	0.4	0.0	2.1	0.9	0.0	1.2	1.8	0.0	1.4	0.2	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	7.4	1.0	0.0	4.6	1.9	0.0	4.1	0.5	0.0	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	0.0	11.1	16.7	0.0	8.9	40.7	0.0	31.3	35.2	0.0	31.9
LnGrp LOS	B	A	B	B	A	A	D	A	C	D	A	C
Approach Vol, veh/h		725			555			290			275	
Approach Delay, s/veh		11.2			9.9			34.0			32.2	
Approach LOS		B			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		27.8		65.0		27.8				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		60.4		30.4		60.4		30.4				
Max Q Clear Time (g_c+I1), s		21.3		20.9		26.5		14.0				
Green Ext Time (p_c), s		6.4		1.5		4.4		1.5				

Intersection Summary												
HCM 6th Ctrl Delay			17.5									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	345	190	20	330	45	200	25	5	25	25	40
Future Volume (vph)	20	345	190	20	330	45	200	25	5	25	25	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	17.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	345	190	20	330	45	200	25	5	25	25	40
Future Vol, veh/h	20	345	190	20	330	45	200	25	5	25	25	40
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	20	345	190	20	330	45	200	25	5	25	25	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	377	0	0	537	0	0	909	899	444	892	972	357
Stage 1	-	-	-	-	-	-	482	482	-	395	395	-
Stage 2	-	-	-	-	-	-	427	417	-	497	577	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1171	-	-	1031	-	-	255	278	612	265	254	692
Stage 1	-	-	-	-	-	-	564	552	-	634	608	-
Stage 2	-	-	-	-	-	-	604	590	-	559	505	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1029	-	-	212	263	610	234	241	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	212	263	-	234	241	-
Stage 1	-	-	-	-	-	-	549	537	-	617	592	-
Stage 2	-	-	-	-	-	-	530	574	-	514	491	-

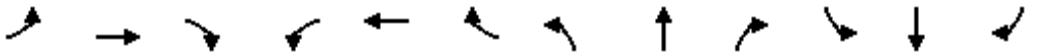
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.4	85.1	19.6
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	212	291	1169	-	-	1029	-	-	335
HCM Lane V/C Ratio	0.943	0.103	0.017	-	-	0.019	-	-	0.269
HCM Control Delay (s)	95.1	18.8	8.1	0	-	8.6	0	-	19.6
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	7.9	0.3	0.1	-	-	0.1	-	-	1.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	480	200	40	315	50	200	115	35	45	160	10
Future Volume (vph)	10	480	200	40	315	50	200	115	35	45	160	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St



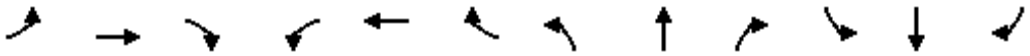
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	480	200	40	315	50	200	115	35	45	160	10
Future Volume (veh/h)	10	480	200	40	315	50	200	115	35	45	160	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	480	200	40	315	50	200	115	35	45	160	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	701	675	281	328	851	135	316	330	101	326	405	25
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	998	1113	464	754	1402	223	1186	1209	368	1169	1481	93
Grp Volume(v), veh/h	10	0	680	40	0	365	200	0	150	45	0	170
Grp Sat Flow(s),veh/h/ln	998	0	1576	754	0	1625	1186	0	1577	1169	0	1573
Q Serve(g_s), s	0.3	0.0	22.4	2.1	0.0	0.0	12.4	0.0	5.7	2.4	0.0	6.6
Cycle Q Clear(g_c), s	0.3	0.0	22.4	24.5	0.0	0.0	19.0	0.0	5.7	8.1	0.0	6.6
Prop In Lane	1.00		0.29	1.00		0.14	1.00		0.23	1.00		0.06
Lane Grp Cap(c), veh/h	701	0	956	328	0	986	316	0	431	326	0	430
V/C Ratio(X)	0.01	0.00	0.71	0.12	0.00	0.37	0.63	0.00	0.35	0.14	0.00	0.40
Avail Cap(c_a), veh/h	701	0	956	328	0	986	316	0	431	326	0	430
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.00	0.84	0.97	0.00	0.97	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	0.0	10.2	6.0	0.0	0.0	29.9	0.0	21.9	25.2	0.0	22.2
Incr Delay (d2), s/veh	0.0	0.0	3.8	0.7	0.0	1.0	3.1	0.0	0.2	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.6	0.3	0.0	0.3	3.7	0.0	2.1	0.7	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	14.0	6.8	0.0	1.0	33.1	0.0	22.1	25.2	0.0	22.4
LnGrp LOS	A	A	B	A	A	A	C	A	C	C	A	C
Approach Vol, veh/h		690			405			350			215	
Approach Delay, s/veh		13.9			1.6			28.4			23.0	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	25.0	50.0	25.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	24.4	10.1	26.5	21.0
Green Ext Time (p_c), s	5.4	0.5	2.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	245	110	15	335	20	55	35	25	5	15	35
Future Volume (vph)	40	245	110	15	335	20	55	35	25	5	15	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	245	110	15	335	20	55	35	25	5	15	35
Future Vol, veh/h	40	245	110	15	335	20	55	35	25	5	15	35
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	40	245	110	15	335	20	55	35	25	5	15	35
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.8	12.9	10.3	9.2
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	48%	10%	4%	9%
Vol Thru, %	30%	62%	91%	27%
Vol Right, %	22%	28%	5%	64%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	115	395	370	55
LT Vol	55	40	15	5
Through Vol	35	245	335	15
RT Vol	25	110	20	35
Lane Flow Rate	115	395	370	55
Geometry Grp	1	1	1	1
Degree of Util (X)	0.188	0.515	0.507	0.086
Departure Headway (Hd)	5.886	4.803	4.934	5.616
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	612	754	736	639
Service Time	3.906	2.803	2.934	3.64
HCM Lane V/C Ratio	0.188	0.524	0.503	0.086
HCM Control Delay	10.3	12.8	12.9	9.2
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	0.7	3	2.9	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	480	30	30	335	55	15	10	30	100	20	45
Future Volume (vph)	45	480	30	30	335	55	15	10	30	100	20	45
Satd. Flow (prot)	1736	1626	0	1770	1635	0	0	1791	1411	0	1806	1439
Flt Permitted	0.522			0.447				0.810			0.744	
Satd. Flow (perm)	949	1626	0	828	1635	0	0	1490	1367	0	1387	1403
Satd. Flow (RTOR)		8			20				30			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	510	0	30	390	0	0	25	30	0	120	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	56.9	56.9		56.9	56.9			12.5	56.9		12.5	56.9
Actuated g/C Ratio	0.76	0.76		0.76	0.76			0.17	0.76		0.17	0.76
v/c Ratio	0.06	0.41		0.05	0.31			0.10	0.03		0.52	0.04
Control Delay	5.6	6.2		5.1	5.4			24.2	2.4		35.0	2.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.6	6.2		5.1	5.4			24.2	2.4		35.0	2.1
LOS	A	A		A	A			C	A		D	A
Approach Delay		6.1			5.4			12.3			26.1	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 66.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	300	15	0	0	345
Future Volume (vph)	20	300	15	0	0	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	300	15	0	0	345
Future Vol, veh/h	20	300	15	0	0	345
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	20	300	15	0	0	345

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	360	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	629	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	706	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	629	1050	-	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1008	-
HCM Lane V/C Ratio	-	0.317	-
HCM Control Delay (s)	-	10.2	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	315	75
Future Volume (vph)	0	0	10	0	315	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

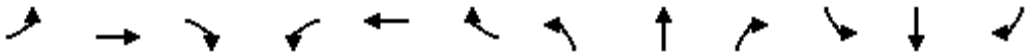
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	315	75
Future Vol, veh/h	0	0	10	0	315	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	315	75

Major/Minor	Minor2		Major2	
Conflicting Flow All	705	75	0	0
Stage 1	705	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	363	992	-	-
Stage 1	442	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	992	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	45	100	10	10	10	70	405	15	10	330	25
Future Volume (vph)	25	45	100	10	10	10	70	405	15	10	330	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

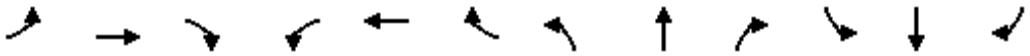
Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	45	100	10	10	10	70	405	15	10	330	25
Future Vol, veh/h	25	45	100	10	10	10	70	405	15	10	330	25
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	25	45	100	10	10	10	70	405	15	10	330	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	969	949	371	1016	954	456	368	0	0	433	0	0
Stage 1	376	376	-	566	566	-	-	-	-	-	-	-
Stage 2	593	573	-	450	388	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	235	262	679	218	261	609	1191	-	-	1116	-	-
Stage 1	649	620	-	513	511	-	-	-	-	-	-	-
Stage 2	496	507	-	592	612	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	200	233	661	143	232	584	1176	-	-	1102	-	-
Mov Cap-2 Maneuver	200	233	-	143	232	-	-	-	-	-	-	-
Stage 1	591	606	-	467	466	-	-	-	-	-	-	-
Stage 2	427	462	-	453	598	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.4	23	1.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1176	-	-	362	230	1102	-	-
HCM Lane V/C Ratio	0.06	-	-	0.47	0.13	0.009	-	-
HCM Control Delay (s)	8.3	0	-	23.4	23	8.3	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	2.4	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	15	20	0	10	60	295	20	0	215	5
Future Volume (vph)	5	0	15	20	0	10	60	295	20	0	215	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

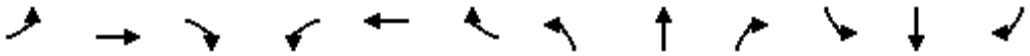
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	0	15	20	0	10	60	295	20	0	215	5
Future Vol, veh/h	5	0	15	20	0	10	60	295	20	0	215	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	5	0	15	20	0	10	60	295	20	0	215	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	648	653	218	650	645	305	220	0	0	315	0	0
Stage 1	218	218	-	425	425	-	-	-	-	-	-	-
Stage 2	430	435	-	225	220	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	362	367	783	385	393	740	1343	-	-	1234	-	-
Stage 1	749	694	-	611	590	-	-	-	-	-	-	-
Stage 2	573	554	-	782	725	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	342	347	783	362	372	740	1343	-	-	1234	-	-
Mov Cap-2 Maneuver	342	347	-	362	372	-	-	-	-	-	-	-
Stage 1	709	694	-	578	558	-	-	-	-	-	-	-
Stage 2	535	524	-	767	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	13.9	1.2	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1343	-	-	592	436	1234	-	-
HCM Lane V/C Ratio	0.045	-	-	0.034	0.069	-	-	-
HCM Control Delay (s)	7.8	0	-	11.3	13.9	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	105	5	30	170	35	0	25	30	20	0	25
Future Volume (vph)	20	105	5	30	170	35	0	25	30	20	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	105	5	30	170	35	0	25	30	20	0	25
Future Vol, veh/h	20	105	5	30	170	35	0	25	30	20	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	105	5	30	170	35	0	25	30	20	0	25

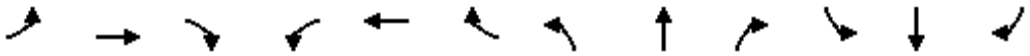
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	205	0	0	110	0	0	408	413	108	423	398	188
Stage 1	-	-	-	-	-	-	148	148	-	248	248	-
Stage 2	-	-	-	-	-	-	260	265	-	175	150	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1349	-	-	1493	-	-	538	516	922	545	543	859
Stage 1	-	-	-	-	-	-	834	758	-	760	705	-
Stage 2	-	-	-	-	-	-	725	673	-	832	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1493	-	-	507	496	922	492	522	859
Mov Cap-2 Maneuver	-	-	-	-	-	-	507	496	-	492	522	-
Stage 1	-	-	-	-	-	-	821	746	-	748	689	-
Stage 2	-	-	-	-	-	-	688	658	-	766	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1	10.9	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	663	1349	-	-	1493	-	-	645
HCM Lane V/C Ratio	0.083	0.015	-	-	0.02	-	-	0.07
HCM Control Delay (s)	10.9	7.7	0	-	7.5	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

Friday LOS Calculations

(2031 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	611	5	15	0	0	0	0	10	35	293	20	0
Future Volume (vph)	611	5	15	0	0	0	0	10	35	293	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	242

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	611	5	15	0	0	0	0	10	35	293	20	0
Future Vol, veh/h	611	5	15	0	0	0	0	10	35	293	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	611	5	15	0	0	0	0	10	35	293	20	0

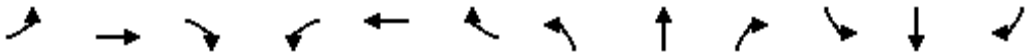
Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	634	651	20	-	0	0	45	0	0
Stage 1	606	606	-	-	-	-	-	-	-
Stage 2	28	45	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	~ 445	389	1061	0	-	-	1444	-	0
Stage 1	~ 546	488	-	0	-	-	-	-	0
Stage 2	997	859	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 354	0	1061	-	-	-	1444	-	-
Mov Cap-2 Maneuver	~ 354	0	-	-	-	-	-	-	-
Stage 1	~ 546	0	-	-	-	-	-	-	-
Stage 2	793	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 375.6	0	7.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	360	1444	-
HCM Lane V/C Ratio	-	-	1.753	0.203	-
HCM Control Delay (s)	-	-	$ 375.6	8.1	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	39.8	0.8	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	5	444	5	616	0	0	253	150
Future Volume (vph)	0	0	0	60	5	444	5	616	0	0	253	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

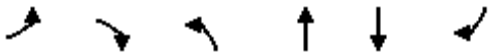
Intersection	
Int Delay, s/veh	44.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	60	5	444	5	616	0	0	253	150
Future Vol, veh/h	0	0	0	60	5	444	5	616	0	0	253	150
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	60	5	444	5	616	0	0	253	150

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	954	1029	616	403	0	-	-	-	0
Stage 1	626	626	-	-	-	-	-	-	-
Stage 2	328	403	-	-	-	-	-	-	-
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-
Pot Cap-1 Maneuver	271	221	466	1161	-	0	0	-	-
Stage 1	507	456	-	-	-	0	0	-	-
Stage 2	700	576	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	269	0	466	1161	-	-	-	-	-
Mov Cap-2 Maneuver	269	0	-	-	-	-	-	-	-
Stage 1	503	0	-	-	-	-	-	-	-
Stage 2	700	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	134.3	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1161	-	429	-	-
HCM Lane V/C Ratio	0.004	-	1.186	-	-
HCM Control Delay (s)	8.1	0	134.3	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	19.7	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	105	95	965	298	31
Future Volume (vph)	50	105	95	965	298	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	105	95	965	298	31
Future Vol, veh/h	50	105	95	965	298	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	50	105	95	965	298	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1469	314	329	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	1155	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	133	701	1231	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	123	701	1231	-	-	-
Mov Cap-2 Maneuver	123	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	285	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.9	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1231	-	279	-	-
HCM Lane V/C Ratio	0.077	-	0.556	-	-
HCM Control Delay (s)	8.2	-	32.9	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	3.1	-	-

LANE LEVEL OF SERVICE

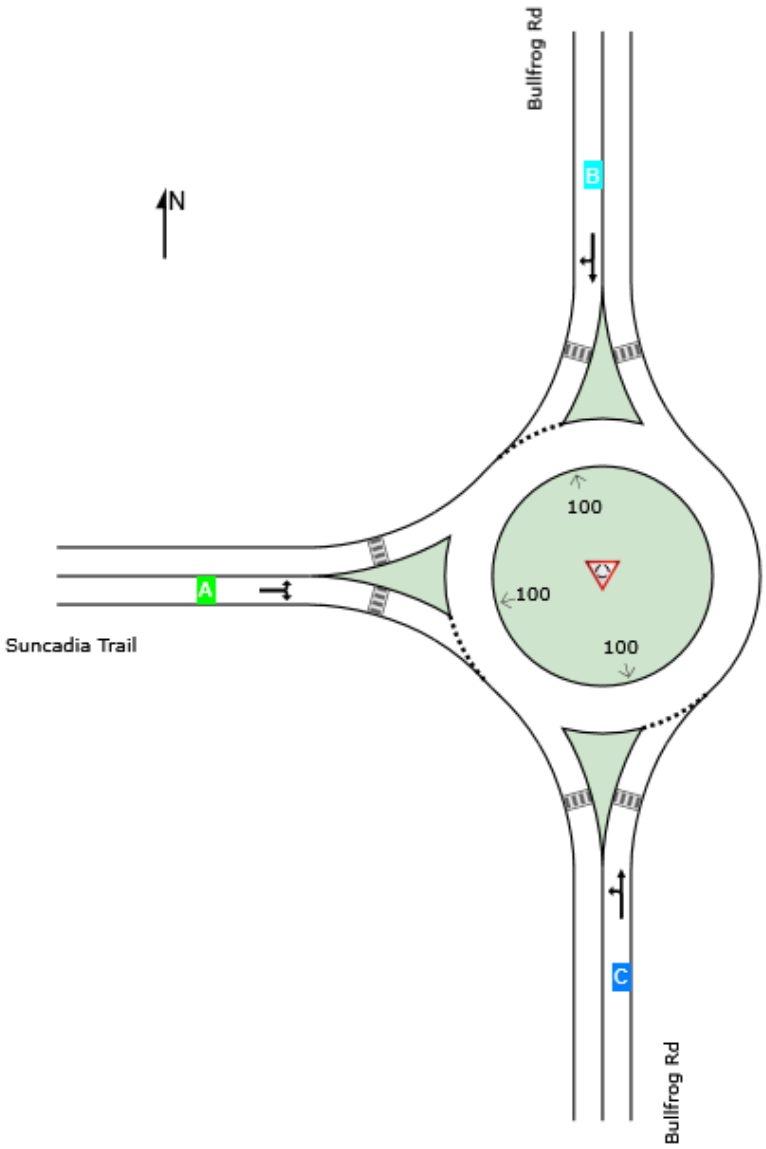
Lane Level of Service

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	C	B	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	982	1.4	982	1.4	1160	0.846	100	19.9	LOS C	25.2	637.8	Full	1600	0.0	0.0
Approach	982	1.4	982	1.4		0.846		19.9	LOS C	25.2	637.8				
North: Bullfrog Rd															
Lane 1[d]	348	3.5	348	3.5	765	0.455	100	10.8	LOS B	2.7	70.1	Full	1600	0.0	0.0
Approach	348	3.5	348	3.5		0.455		10.8	LOS B	2.7	70.1				
West: Suncadia Trail															
Lane 1[d]	299	4.2	299	4.2	1070	0.279	100	6.0	LOS A	1.4	36.3	Full	1600	0.0	0.0
Approach	299	4.2	299	4.2		0.279		6.0	LOS A	1.4	36.3				
All Vehicles	1629	2.4	1629	2.4		0.846		15.4	LOS C	25.2	637.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	521	461	982	1.4	1160	0.846	100	NA	NA
Approach	521	461	982	1.4		0.846			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	197	151	348	3.5	765	0.455	100	NA	NA
Approach	197	151	348	3.5		0.455			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	149	150	299	4.2	1070	0.279	100	NA	NA
Approach	149	150	299	4.2		0.279			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1629	2.4	0.846

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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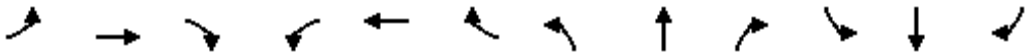
Project: T:\Active Projects\47 North - 5885\Planning - 5885\LOS\Revised Proposal 2022\Sidra\Bullfrog Rd & Suncadia Trail - Friday UPDATE.sip9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	32	0	0	0	16	469	0	0	315	40
Future Volume (vph)	25	0	32	0	0	0	16	469	0	0	315	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	32	0	0	0	16	469	0	0	315	40
Future Vol, veh/h	25	0	32	0	0	0	16	469	0	0	315	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	32	0	0	0	16	469	0	0	315	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	836	836	335	852	856	469	355	0	0	469	0	0
Stage 1	335	335	-	501	501	-	-	-	-	-	-	-
Stage 2	501	501	-	351	355	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	281	298	696	282	297	598	1204	-	-	1087	-	-
Stage 1	669	634	-	556	546	-	-	-	-	-	-	-
Stage 2	543	534	-	670	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	277	293	696	265	292	598	1204	-	-	1087	-	-
Mov Cap-2 Maneuver	277	293	-	265	292	-	-	-	-	-	-	-
Stage 1	657	634	-	546	536	-	-	-	-	-	-	-
Stage 2	533	524	-	639	633	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	0	0.3	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1204	-	-	418	-	1087	-	-
HCM Lane V/C Ratio	0.013	-	-	0.136	-	-	-	-
HCM Control Delay (s)	8	0	-	15	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

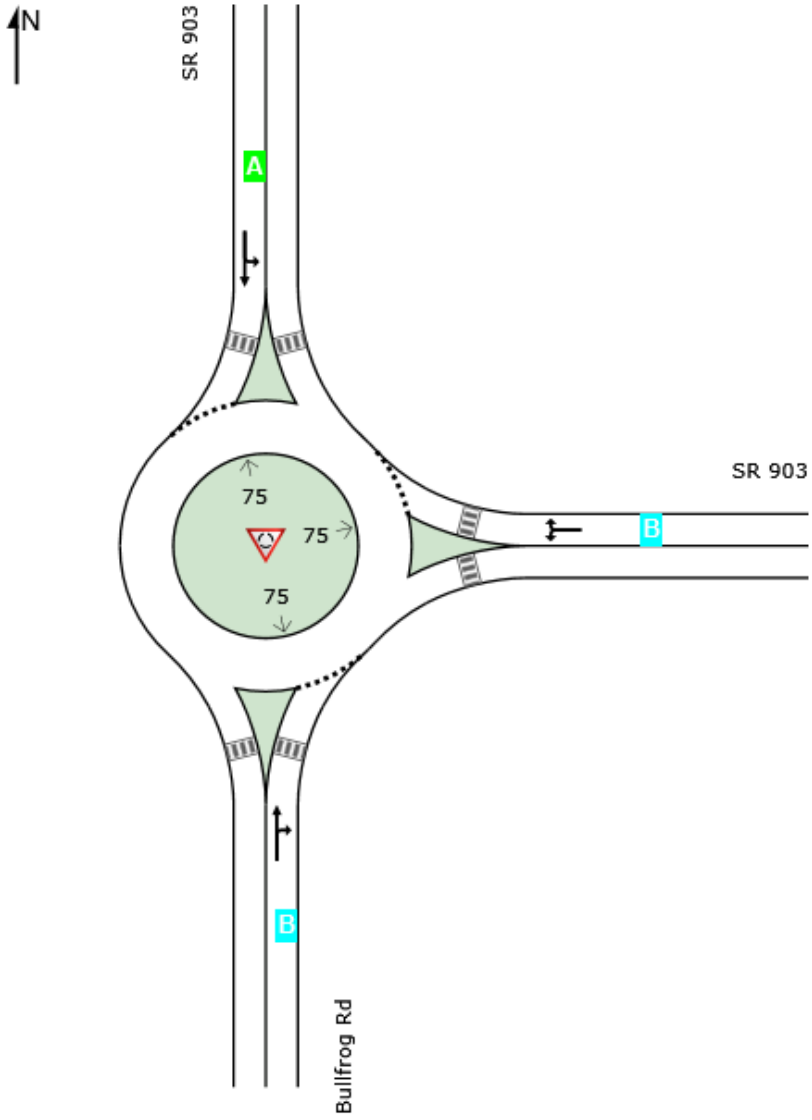
Lane Level of Service

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	494	3.3	494	3.3	838	0.590	100	13.0	LOS B	5.3	135.5	Full	1600	0.0	0.0
Approach	494	3.3	494	3.3		0.590		13.0	LOS B	5.3	135.5				
East: SR 903															
Lane 1[d]	665	2.8	665	2.8	966	0.689	100	14.6	LOS B	9.5	242.0	Full	1600	0.0	0.0
Approach	665	2.8	665	2.8		0.689		14.6	LOS B	9.5	242.0				
North: SR 903															
Lane 1[d]	642	4.4	642	4.4	1139	0.563	100	9.7	LOS A	4.3	111.6	Full	1600	0.0	0.0
Approach	642	4.4	642	4.4		0.563		9.7	LOS A	4.3	111.6				
All Vehicles	1801	3.5	1801	3.5		0.689		12.4	LOS B	9.5	242.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	306	188	494	3.3	838	0.590	100	NA	NA
Approach	306	188	494	3.3		0.590			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	139	526	665	2.8	966	0.689	100	NA	NA
Approach	139	526	665	2.8		0.689			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	426	216	642	4.4	1139	0.563	100	NA	NA
Approach	426	216	642	4.4		0.563			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1801	3.5	0.689

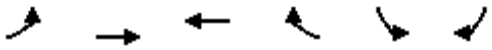
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	943	1010	40	20	18
Future Volume (vph)	7	943	1010	40	20	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

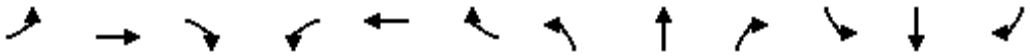
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	943	1010	40	20	18
Future Vol, veh/h	7	943	1010	40	20	18
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	7	943	1010	40	20	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1050	0	-	0	1987	1037
Stage 1	-	-	-	-	1030	-
Stage 2	-	-	-	-	957	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	655	-	-	-	68	283
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	376	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	655	-	-	-	67	281
Mov Cap-2 Maneuver	-	-	-	-	67	-
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	376	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	57.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	655	-	-	-	105
HCM Lane V/C Ratio	0.011	-	-	-	0.362
HCM Control Delay (s)	10.6	0	-	-	57.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	1.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	826	147	40	833	5	209	0	130	0	0	8
Future Volume (vph)	5	826	147	40	833	5	209	0	130	0	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	252.8

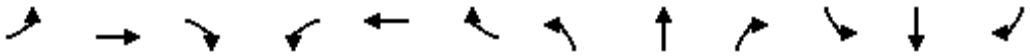
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	826	147	40	833	5	209	0	130	0	0	8
Future Vol, veh/h	5	826	147	40	833	5	209	0	130	0	0	8
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	5	826	147	40	833	5	209	0	130	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	838	0	0	977	0	0	1834	1832	905	1892	1903	836
Stage 1	-	-	-	-	-	-	914	914	-	916	916	-
Stage 2	-	-	-	-	-	-	920	918	-	976	987	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	788	-	-	702	-	-	~ 59	77	336	54	70	370
Stage 1	-	-	-	-	-	-	329	353	-	329	354	-
Stage 2	-	-	-	-	-	-	326	352	-	305	328	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	788	-	-	699	-	-	~ 52	68	334	30	61	370
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 52	68	-	30	61	-
Stage 1	-	-	-	-	-	-	323	347	-	324	316	-
Stage 2	-	-	-	-	-	-	285	314	-	184	322	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	$ 1641.2	14.9
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	77	788	-	-	699	-	-	370
HCM Lane V/C Ratio	4.403	0.006	-	-	0.057	-	-	0.022
HCM Control Delay (s)	$ 1641.2	9.6	0	-	10.5	0	-	14.9
HCM Lane LOS	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	36.3	0	-	-	0.2	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	861	100	15	792	10	88	10	5	20	15	33
Future Volume (vph)	25	861	100	15	792	10	88	10	5	20	15	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	43.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	861	100	15	792	10	88	10	5	20	15	33
Future Vol, veh/h	25	861	100	15	792	10	88	10	5	20	15	33
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	25	861	100	15	792	10	88	10	5	20	15	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	803	0	0	966	0	0	1817	1799	918	1799	1844	798
Stage 1	-	-	-	-	-	-	966	966	-	828	828	-
Stage 2	-	-	-	-	-	-	851	833	-	971	1016	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	803	-	-	705	-	-	~ 60	79	328	63	76	389
Stage 1	-	-	-	-	-	-	305	332	-	368	389	-
Stage 2	-	-	-	-	-	-	353	382	-	307	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	802	-	-	702	-	-	~ 42	70	326	51	68	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 42	70	-	51	68	-
Stage 1	-	-	-	-	-	-	283	307	-	342	373	-
Stage 2	-	-	-	-	-	-	298	367	-	272	294	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	$ 757.8	102.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	46	802	-	-	702	-	-	97
HCM Lane V/C Ratio	2.239	0.031	-	-	0.021	-	-	0.701
HCM Control Delay (s)	$ 757.8	9.6	0	-	10.2	0	-	102.3
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	10.7	0.1	-	-	0.1	-	-	3.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	167	10	30	304
Future Volume (vph)	25	10	167	10	30	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

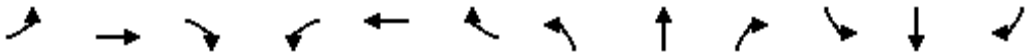
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	167	10	30	304
Future Vol, veh/h	25	10	167	10	30	304
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	167	10	30	304
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.9	9.4	9.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	9%	0%	94%
Vol Thru, %	0%	71%	6%
Vol Right, %	91%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	334	35	177
LT Vol	30	0	167
Through Vol	0	25	10
RT Vol	304	10	0
Lane Flow Rate	334	35	177
Geometry Grp	1	1	1
Degree of Util (X)	0.367	0.045	0.239
Departure Headway (Hd)	3.953	4.648	4.859
Convergence, Y/N	Yes	Yes	Yes
Cap	912	769	738
Service Time	1.968	2.687	2.893
HCM Lane V/C Ratio	0.366	0.046	0.24
HCM Control Delay	9.3	7.9	9.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.7	0.1	0.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	395	200	122	195	110	75	129	155	80	91	51
Future Volume (vph)	165	395	200	122	195	110	75	129	155	80	91	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	207

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	165	395	200	122	195	110	75	129	155	80	91	51
Future Vol, veh/h	165	395	200	122	195	110	75	129	155	80	91	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	165	395	200	122	195	110	75	129	155	80	91	51

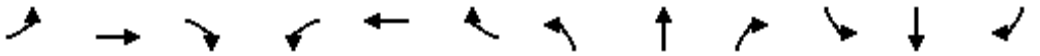
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	305	0	0	595	0	0	1390	1374	495	1461	1419	250
Stage 1	-	-	-	-	-	-	825	825	-	494	494	-
Stage 2	-	-	-	-	-	-	565	549	-	967	925	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1244	-	-	967	-	-	120	145	575	106	135	784
Stage 1	-	-	-	-	-	-	367	387	-	553	543	-
Stage 2	-	-	-	-	-	-	510	516	-	303	345	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1244	-	-	967	-	-	~ 22	~ 110	575	-	102	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 22	~ 110	-	-	102	-
Stage 1	-	-	-	-	-	-	318	336	-	479	475	-
Stage 2	-	-	-	-	-	-	337	451	-	118	299	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	2.6	$ 1012.7	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	45	575	1244	-	-	967	-	-	-	148
HCM Lane V/C Ratio	4.533	0.27	0.133	-	-	0.126	-	-	-	0.959
HCM Control Delay (s)	$ 1771.8	13.6	8.3	-	-	9.3	-	-	-	123.1
HCM Lane LOS	F	B	A	-	-	A	-	-	-	F
HCM 95th %tile Q(veh)	23.2	1.1	0.5	-	-	0.4	-	-	-	6.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	570	35	70	370	43	40	30	155	16	52	57
Future Volume (vph)	25	570	35	70	370	43	40	30	155	16	52	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

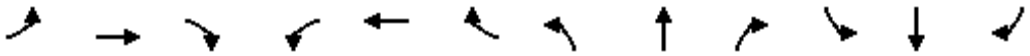
Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	570	35	70	370	43	40	30	155	16	52	57
Future Vol, veh/h	25	570	35	70	370	43	40	30	155	16	52	57
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	25	570	35	70	370	43	40	30	155	16	52	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	414	0	0	609	0	0	1236	1196	592	1263	1192	401
Stage 1	-	-	-	-	-	-	642	642	-	533	533	-
Stage 2	-	-	-	-	-	-	594	554	-	730	659	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1134	-	-	960	-	-	151	184	501	108	142	529
Stage 1	-	-	-	-	-	-	458	464	-	430	433	-
Stage 2	-	-	-	-	-	-	486	509	-	327	374	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1133	-	-	956	-	-	85	166	499	60	128	524
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	166	-	60	128	-
Stage 1	-	-	-	-	-	-	446	452	-	420	401	-
Stage 2	-	-	-	-	-	-	347	471	-	206	364	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.3	37.7	79.9
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	107	499	1133	-	-	956	-	-	160
HCM Lane V/C Ratio	0.654	0.311	0.022	-	-	0.073	-	-	0.781
HCM Control Delay (s)	87.2	15.4	8.2	-	-	9.1	-	-	79.9
HCM Lane LOS	F	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	3.3	1.3	0.1	-	-	0.2	-	-	5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	635	144	90	471	30	292	40	25	25	25	54
Future Volume (vph)	52	635	144	90	471	30	292	40	25	25	25	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	318.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	635	144	90	471	30	292	40	25	25	25	54
Future Vol, veh/h	52	635	144	90	471	30	292	40	25	25	25	54
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	52	635	144	90	471	30	292	40	25	25	25	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	502	0	0	781	0	0	1520	1495	710	1512	1552	488
Stage 1	-	-	-	-	-	-	813	813	-	667	667	-
Stage 2	-	-	-	-	-	-	707	682	-	845	885	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1047	-	-	837	-	-	~ 96	121	429	100	115	584
Stage 1	-	-	-	-	-	-	368	388	-	451	460	-
Stage 2	-	-	-	-	-	-	421	445	-	360	366	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1046	-	-	835	-	-	~ 57	93	428	52	89	583
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 57	93	-	52	89	-
Stage 1	-	-	-	-	-	-	334	352	-	410	391	-
Stage 2	-	-	-	-	-	-	304	378	-	273	332	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.5	$ 1645	112.8
HCM LOS			F	F

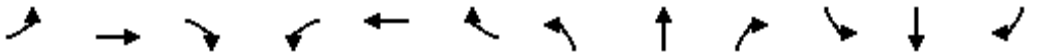
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	57	133	1046	-	-	835	-	-	122
HCM Lane V/C Ratio	5.123	0.489	0.05	-	-	0.108	-	-	0.852
HCM Control Delay (s)	$ 1998.8	55.5	8.6	0	-	9.8	0	-	112.8
HCM Lane LOS	F	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	32.7	2.3	0.2	-	-	0.4	-	-	5.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	545	135	70	383	189	85	108	120	51	188	80
Future Volume (vph)	60	545	135	70	383	189	85	108	120	51	188	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 88	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

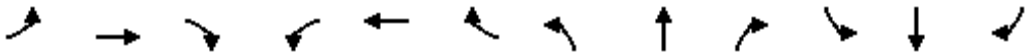
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	545	135	70	383	189	85	108	120	51	188	80
Future Volume (veh/h)	60	545	135	70	383	189	85	108	120	51	188	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	60	545	135	70	383	189	85	108	120	51	188	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	466	917	227	396	754	372	205	200	223	229	309	132
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	826	1423	352	754	1170	578	1069	778	864	1108	1200	511
Grp Volume(v), veh/h	60	0	680	70	0	572	85	0	228	51	0	268
Grp Sat Flow(s),veh/h/ln	826	0	1775	754	0	1748	1069	0	1642	1108	0	1711
Q Serve(g_s), s	3.9	0.0	20.7	5.5	0.0	16.2	7.1	0.0	11.2	3.9	0.0	12.9
Cycle Q Clear(g_c), s	20.1	0.0	20.7	26.2	0.0	16.2	20.1	0.0	11.2	15.1	0.0	12.9
Prop In Lane	1.00		0.20	1.00		0.33	1.00		0.53	1.00		0.30
Lane Grp Cap(c), veh/h	466	0	1144	396	0	1126	205	0	423	229	0	441
V/C Ratio(X)	0.13	0.00	0.59	0.18	0.00	0.51	0.42	0.00	0.54	0.22	0.00	0.61
Avail Cap(c_a), veh/h	466	0	1144	396	0	1126	276	0	532	303	0	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	0.0	9.6	17.2	0.0	8.8	39.5	0.0	30.0	36.5	0.0	30.6
Incr Delay (d2), s/veh	0.6	0.0	2.3	1.0	0.0	1.6	1.9	0.0	1.5	0.5	0.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	8.0	1.1	0.0	6.1	2.0	0.0	4.6	1.1	0.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	0.0	11.9	18.2	0.0	10.5	41.4	0.0	31.5	37.0	0.0	32.0
LnGrp LOS	B	A	B	B	A	B	D	A	C	D	A	C
Approach Vol, veh/h		740			642			313			319	
Approach Delay, s/veh		12.1			11.3			34.2			32.8	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		28.7		65.0		28.7				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		60.4		30.4		60.4		30.4				
Max Q Clear Time (g_c+I1), s		22.7		22.1		28.2		17.1				
Green Ext Time (p_c), s		6.6		1.5		5.4		1.5				

Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	413	237	20	360	45	243	25	5	25	25	48
Future Volume (vph)	30	413	237	20	360	45	243	25	5	25	25	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	54.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	413	237	20	360	45	243	25	5	25	25	48
Future Vol, veh/h	30	413	237	20	360	45	243	25	5	25	25	48
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	30	413	237	20	360	45	243	25	5	25	25	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	407	0	0	652	0	0	1055	1041	536	1034	1137	387
Stage 1	-	-	-	-	-	-	594	594	-	425	425	-
Stage 2	-	-	-	-	-	-	461	447	-	609	712	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1141	-	-	935	-	-	~ 203	229	543	212	203	665
Stage 1	-	-	-	-	-	-	490	491	-	611	590	-
Stage 2	-	-	-	-	-	-	579	572	-	486	439	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1139	-	-	933	-	-	~ 160	212	541	180	188	662
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 160	212	-	180	188	-
Stage 1	-	-	-	-	-	-	468	469	-	584	572	-
Stage 2	-	-	-	-	-	-	498	555	-	435	419	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	282.4	24.1
HCM LOS			F	C

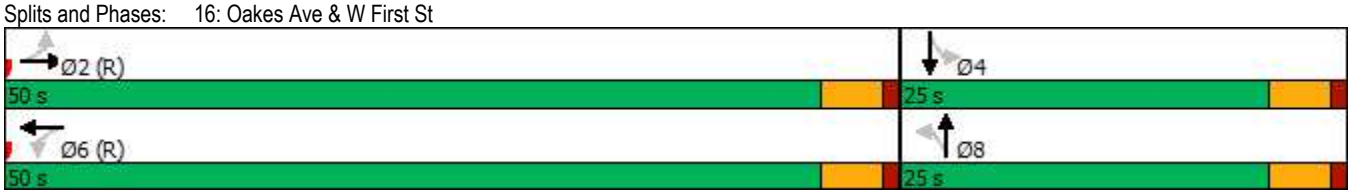
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	236	1139	-	-	933	-	-	285
HCM Lane V/C Ratio	1.519	0.127	0.026	-	-	0.021	-	-	0.344
HCM Control Delay (s)	$ 314.5	22.5	8.2	0	-	8.9	0	-	24.1
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	16.1	0.4	0.1	-	-	0.1	-	-	1.5

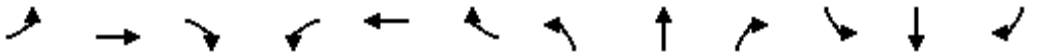
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	496	216	40	380	64	223	144	35	66	186	10
Future Volume (vph)	10	496	216	40	380	64	223	144	35	66	186	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





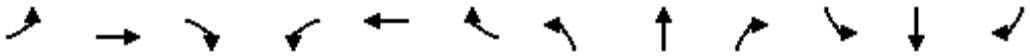
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	496	216	40	380	64	223	144	35	66	186	10
Future Volume (veh/h)	10	496	216	40	380	64	223	144	35	66	186	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	496	216	40	380	64	223	144	35	66	186	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	660	665	290	302	843	142	293	349	85	302	409	22
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	929	1096	477	732	1389	234	1159	1277	310	1138	1495	80
Grp Volume(v), veh/h	10	0	712	40	0	444	223	0	179	66	0	196
Grp Sat Flow(s),veh/h/ln	929	0	1574	732	0	1623	1159	0	1587	1138	0	1575
Q Serve(g_s), s	0.3	0.0	24.4	2.4	0.0	0.0	12.8	0.0	6.9	3.8	0.0	7.7
Cycle Q Clear(g_c), s	0.3	0.0	24.4	26.8	0.0	0.0	20.5	0.0	6.9	10.7	0.0	7.7
Prop In Lane	1.00		0.30	1.00		0.14	1.00		0.20	1.00		0.05
Lane Grp Cap(c), veh/h	660	0	955	302	0	984	293	0	434	302	0	431
V/C Ratio(X)	0.02	0.00	0.75	0.13	0.00	0.45	0.76	0.00	0.41	0.22	0.00	0.46
Avail Cap(c_a), veh/h	660	0	955	302	0	984	293	0	434	302	0	431
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.00	0.82	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	0.0	10.6	7.2	0.0	0.0	31.9	0.0	22.3	26.7	0.0	22.6
Incr Delay (d2), s/veh	0.0	0.0	4.4	0.8	0.0	1.4	10.0	0.0	0.2	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	8.3	0.4	0.0	0.4	4.9	0.0	2.5	1.0	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	15.0	8.0	0.0	1.4	41.9	0.0	22.6	26.8	0.0	22.9
LnGrp LOS	A	A	B	A	A	A	D	A	C	C	A	C
Approach Vol, veh/h		722			484			402			262	
Approach Delay, s/veh		14.8			1.9			33.3			23.9	
Approach LOS		B			A			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	25.0	50.0	25.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	26.4	12.7	28.8	22.5
Green Ext Time (p_c), s	5.5	0.6	3.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	266	152	15	346	20	66	35	25	5	15	43
Future Volume (vph)	45	266	152	15	346	20	66	35	25	5	15	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	14.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	266	152	15	346	20	66	35	25	5	15	43
Future Vol, veh/h	45	266	152	15	346	20	66	35	25	5	15	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	45	266	152	15	346	20	66	35	25	5	15	43
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.7	14	10.9	9.6
HCM LOS	C	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	52%	10%	4%	8%
Vol Thru, %	28%	57%	91%	24%
Vol Right, %	20%	33%	5%	68%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	463	381	63
LT Vol	66	45	15	5
Through Vol	35	266	346	15
RT Vol	25	152	20	43
Lane Flow Rate	126	463	381	63
Geometry Grp	1	1	1	1
Degree of Util (X)	0.215	0.626	0.54	0.102
Departure Headway (Hd)	6.146	4.865	5.104	5.852
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	583	741	705	610
Service Time	4.194	2.897	3.138	3.908
HCM Lane V/C Ratio	0.216	0.625	0.54	0.103
HCM Control Delay	10.9	15.7	14	9.6
HCM Lane LOS	B	C	B	A
HCM 95th-tile Q	0.8	4.4	3.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	516	30	30	414	62	15	14	30	140	22	45
Future Volume (vph)	45	516	30	30	414	62	15	14	30	140	22	45
Satd. Flow (prot)	1736	1628	0	1770	1637	0	0	1799	1411	0	1804	1439
Flt Permitted	0.456			0.412				0.836			0.734	
Satd. Flow (perm)	830	1628	0	763	1637	0	0	1539	1367	0	1368	1403
Satd. Flow (RTOR)		7			18				30			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	546	0	30	476	0	0	29	30	0	162	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	52.2	52.2		52.2	52.2			13.8	52.2		13.8	52.2
Actuated g/C Ratio	0.70	0.70		0.70	0.70			0.18	0.70		0.18	0.70
v/c Ratio	0.08	0.48		0.06	0.42			0.10	0.03		0.65	0.05
Control Delay	6.5	8.0		5.4	6.9			23.6	2.4		39.5	2.1
Queue Delay	0.0	0.2		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	6.5	8.2		5.4	6.9			23.6	2.4		39.5	2.1
LOS	A	A		A	A			C	A		D	A
Approach Delay		8.1			6.9			12.8			31.4	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	20	352	15	0	0	387
Future Volume (vph)	20	352	15	0	0	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	352	15	0	0	387
Future Vol, veh/h	20	352	15	0	0	387
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	20	352	15	0	0	387

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	402	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	595	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	676	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	595	1050	-	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	676	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1009	-
HCM Lane V/C Ratio	-	0.369	-
HCM Control Delay (s)	-	10.6	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.7	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	355	77
Future Volume (vph)	0	0	10	0	355	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

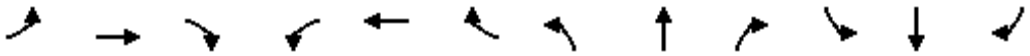
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	355	77
Future Vol, veh/h	0	0	10	0	355	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	355	77

Major/Minor	Minor2		Major2	
Conflicting Flow All	787	77	0	0
Stage 1	787	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	326	990	-	-
Stage 1	406	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	990	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	45	123	18	10	10	93	433	26	10	420	25
Future Volume (vph)	25	45	123	18	10	10	93	433	26	10	420	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

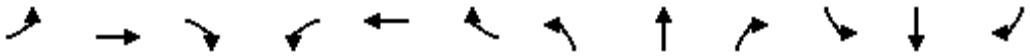
Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	45	123	18	10	10	93	433	26	10	420	25
Future Vol, veh/h	25	45	123	18	10	10	93	433	26	10	420	25
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	25	45	123	18	10	10	93	433	26	10	420	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1138	1124	461	1197	1123	489	458	0	0	472	0	0
Stage 1	466	466	-	645	645	-	-	-	-	-	-	-
Stage 2	672	658	-	552	478	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	180	207	605	164	207	583	1103	-	-	1079	-	-
Stage 1	581	566	-	464	471	-	-	-	-	-	-	-
Stage 2	449	464	-	522	559	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	147	177	589	92	177	559	1089	-	-	1066	-	-
Mov Cap-2 Maneuver	147	177	-	92	177	-	-	-	-	-	-	-
Stage 1	508	552	-	406	412	-	-	-	-	-	-	-
Stage 2	370	406	-	369	545	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.1	39.7	1.5	0.2
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1089	-	-	305	141	1066	-	-
HCM Lane V/C Ratio	0.085	-	-	0.633	0.27	0.009	-	-
HCM Control Delay (s)	8.6	0	-	35.1	39.7	8.4	0	-
HCM Lane LOS	A	A	-	E	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	4	1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	38	35	0	10	62	318	23	0	267	5
Future Volume (vph)	5	0	38	35	0	10	62	318	23	0	267	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

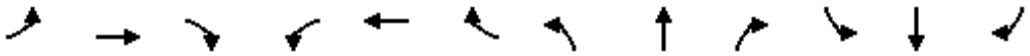
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	0	38	35	0	10	62	318	23	0	267	5
Future Vol, veh/h	5	0	38	35	0	10	62	318	23	0	267	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	5	0	38	35	0	10	62	318	23	0	267	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	729	735	270	743	726	330	272	0	0	341	0	0
Stage 1	270	270	-	454	454	-	-	-	-	-	-	-
Stage 2	459	465	-	289	272	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	319	328	732	334	354	716	1286	-	-	1207	-	-
Stage 1	702	658	-	589	573	-	-	-	-	-	-	-
Stage 2	552	537	-	723	688	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	300	308	732	302	333	716	1286	-	-	1207	-	-
Mov Cap-2 Maneuver	300	308	-	302	333	-	-	-	-	-	-	-
Stage 1	660	658	-	554	539	-	-	-	-	-	-	-
Stage 2	512	505	-	685	688	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	16.9	1.2	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1286	-	-	627	347	1207	-	-
HCM Lane V/C Ratio	0.048	-	-	0.069	0.13	-	-	-
HCM Control Delay (s)	7.9	0	-	11.2	16.9	0	-	-
HCM Lane LOS	A	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	141	5	33	187	38	0	25	38	28	0	25
Future Volume (vph)	20	141	5	33	187	38	0	25	38	28	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	141	5	33	187	38	0	25	38	28	0	25
Future Vol, veh/h	20	141	5	33	187	38	0	25	38	28	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	141	5	33	187	38	0	25	38	28	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	225	0	0	146	0	0	469	475	144	487	458	206
Stage 1	-	-	-	-	-	-	184	184	-	272	272	-
Stage 2	-	-	-	-	-	-	285	291	-	215	186	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1326	-	-	1448	-	-	490	475	880	494	502	840
Stage 1	-	-	-	-	-	-	797	731	-	738	688	-
Stage 2	-	-	-	-	-	-	703	656	-	792	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1448	-	-	460	455	880	439	481	840
Mov Cap-2 Maneuver	-	-	-	-	-	-	460	455	-	439	481	-
Stage 1	-	-	-	-	-	-	784	719	-	726	670	-
Stage 2	-	-	-	-	-	-	664	639	-	720	738	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	1	11.2	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	1326	-	-	1448	-	-	567
HCM Lane V/C Ratio	0.098	0.015	-	-	0.023	-	-	0.093
HCM Control Delay (s)	11.2	7.8	0	-	7.5	0	-	12
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	33	26	956	59	51	296
Future Volume (vph)	33	26	956	59	51	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	776		1544			1729
Travel Time (s)	21.2		30.1			33.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	26	956	59	51	296
Future Vol, veh/h	33	26	956	59	51	296
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	36	28	1039	64	55	322

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1503	1071	0	0	1103	0
Stage 1	1071	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	104	217	-	-	485	-
Stage 1	268	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	90	217	-	-	485	-
Mov Cap-2 Maneuver	90	-	-	-	-	-
Stage 1	268	-	-	-	-	-
Stage 2	486	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	64.2	0	2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	121	485	-
HCM Lane V/C Ratio	-	-	0.53	0.114	-
HCM Control Delay (s)	-	-	64.2	13.4	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	2.5	0.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	55	430	180	87	260
Future Volume (vph)	88	55	430	180	87	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1025		1194			214
Travel Time (s)	28.0		23.3			4.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

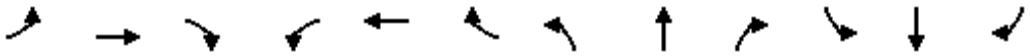
Intersection	
Int Delay, s/veh	4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	55	430	180	87	260
Future Vol, veh/h	88	55	430	180	87	260
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	96	60	467	196	95	283

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1038	565	0	0	663	0
Stage 1	565	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	255	522	-	-	921	-
Stage 1	567	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	224	522	-	-	921	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	567	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.9	0	2.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	224	522	921	-
HCM Lane V/C Ratio	-	-	0.427	0.115	0.103	-
HCM Control Delay (s)	-	-	32.5	12.8	9.4	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.4	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	521	173	394	594	40	156	0	405	25	0	32
Future Volume (vph)	42	521	173	394	594	40	156	0	405	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			1046			415	
Travel Time (s)		32.9			12.3			28.5			11.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	765.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	42	521	173	394	594	40	156	0	405	25	0	32
Future Vol, veh/h	42	521	173	394	594	40	156	0	405	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	566	188	428	646	43	170	0	440	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	689	0	0	754	0	0	2293	2297	660	2496	2370	668
Stage 1	-	-	-	-	-	-	752	752	-	1524	1524	-
Stage 2	-	-	-	-	-	-	1541	1545	-	972	846	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	901	-	-	852	-	-	~ 27	39	461	~ 19	35	456
Stage 1	-	-	-	-	-	-	401	416	-	147	179	-
Stage 2	-	-	-	-	-	-	~ 143	175	-	302	377	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	901	-	-	852	-	-	~ 7	6	461	0	6	456
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 7	6	-	0	6	-
Stage 1	-	-	-	-	-	-	365	378	-	134	32	-
Stage 2	-	-	-	-	-	-	~ 24	32	-	~ 12	343	-

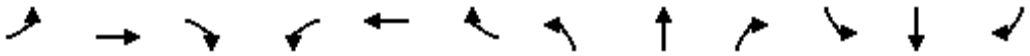
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	5.1	$ 3237.1	14.1
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	7	461	901	-	-	852	-	-	456
HCM Lane V/C Ratio	24.224	0.955	0.051	-	-	0.503	-	-	0.136
HCM Control Delay (s)	$ 11481.3	61.5	9.2	0	-	13.4	0	-	14.1
HCM Lane LOS	F	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	23.1	11.6	0.2	-	-	2.9	-	-	0.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Friday LOS Calculations

(2037 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	530	5	15	0	0	0	0	15	45	350	30	0
Future Volume (vph)	530	5	15	0	0	0	0	15	45	350	30	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	260.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	530	5	15	0	0	0	0	15	45	350	30	0
Future Vol, veh/h	530	5	15	0	0	0	0	15	45	350	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	530	5	15	0	0	0	0	15	45	350	30	0

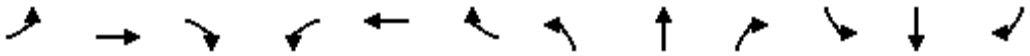
Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	768	790	30	-	0	0	60	0	0
Stage 1	730	730	-	-	-	-	-	-	-
Stage 2	38	60	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	~ 371	324	1047	0	-	-	1425	-	0
Stage 1	~ 479	429	-	0	-	-	-	-	0
Stage 2	987	847	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 278	0	1047	-	-	-	1425	-	-
Mov Cap-2 Maneuver	~ 278	0	-	-	-	-	-	-	-
Stage 1	~ 479	0	-	-	-	-	-	-	-
Stage 2	740	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 463.9	0	7.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	284	1425	-
HCM Lane V/C Ratio	-	-	1.937	0.246	-
HCM Control Delay (s)	-	-	$ 463.9	8.3	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	38.6	1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	80	5	535	5	540	0	0	300	115
Future Volume (vph)	0	0	0	80	5	535	5	540	0	0	300	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	73.3

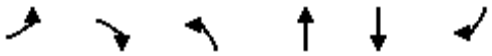
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	80	5	535	5	540	0	0	300	115
Future Vol, veh/h	0	0	0	80	5	535	5	540	0	0	300	115
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	80	5	535	5	540	0	0	300	115

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	908	965	540	415	0	-	-	-	0	
Stage 1	550	550	-	-	-	-	-	-	-	
Stage 2	358	415	-	-	-	-	-	-	-	
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-	
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-	
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-	
Pot Cap-1 Maneuver	289	241	~ 516	1149	-	0	0	-	-	
Stage 1	551	494	-	-	-	0	0	-	-	
Stage 2	678	569	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	287	0	~ 516	1149	-	-	-	-	-	
Mov Cap-2 Maneuver	287	0	-	-	-	-	-	-	-	
Stage 1	548	0	-	-	-	-	-	-	-	
Stage 2	678	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	186.6	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1149	-	467	-	-
HCM Lane V/C Ratio	0.004	-	1.328	-	-
HCM Control Delay (s)	8.1	0	186.6	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	27.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	35	155	140	935	260	25
Future Volume (vph)	35	155	140	935	260	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	155	140	935	260	25
Future Vol, veh/h	35	155	140	935	260	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	35	155	140	935	260	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1488	273	285	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	1215	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	129	740	1277	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	115	740	1277	-	-	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	666	-	-	-	-	-
Stage 2	267	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.6	1.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1277	-	370	-	-
HCM Lane V/C Ratio	0.11	-	0.514	-	-
HCM Control Delay (s)	8.2	-	24.6	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.4	-	2.8	-	-

LANE LEVEL OF SERVICE

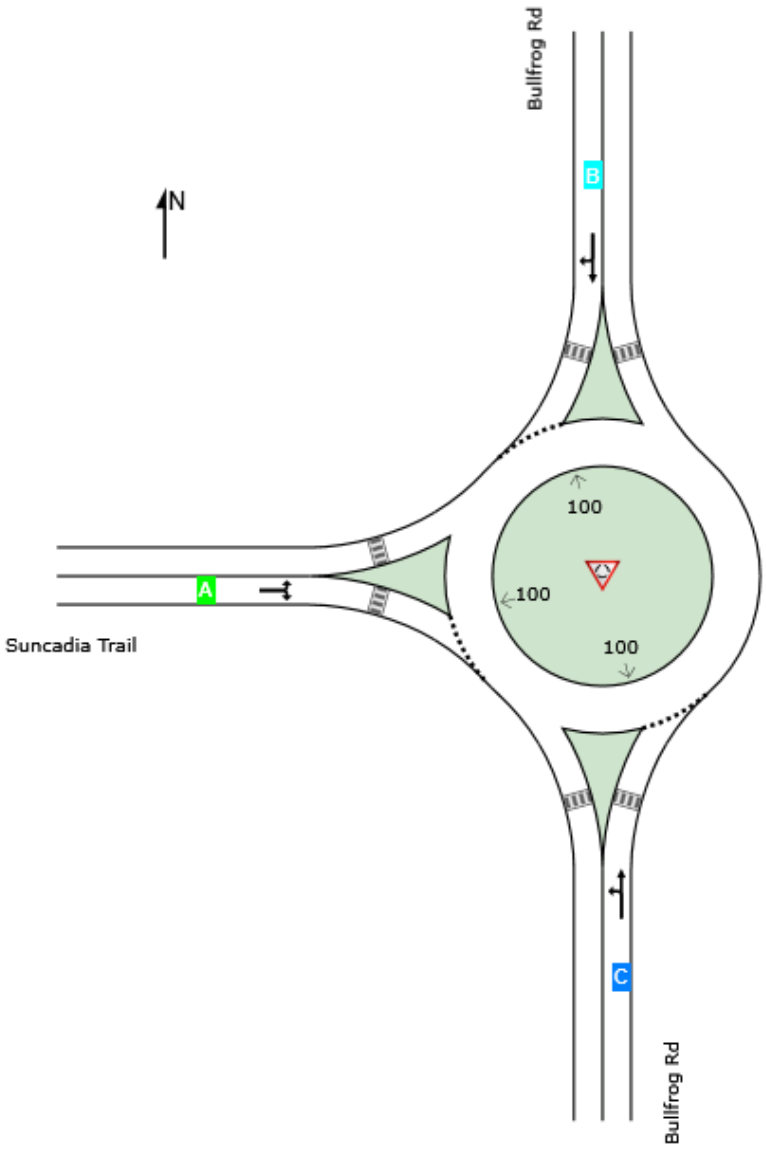
Lane Level of Service

Site: 4 [2037 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	C	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	970	1.4	970	1.4	1184	0.819	100	17.6	LOS C	18.6	470.8	Full	1600	0.0	0.0
Approach	970	1.4	970	1.4		0.819		17.6	LOS C	18.6	470.8				
North: Bullfrog Rd															
Lane 1[d]	220	3.5	220	3.5	630	0.349	100	10.4	LOS B	1.6	40.7	Full	1600	0.0	0.0
Approach	220	3.5	220	3.5		0.349		10.4	LOS B	1.6	40.7				
West: Suncadia Trail															
Lane 1[d]	320	4.2	320	4.2	1197	0.267	100	5.3	LOS A	1.4	36.1	Full	1600	0.0	0.0
Approach	320	4.2	320	4.2		0.267		5.3	LOS A	1.4	36.1				
All Vehicles	1510	2.3	1510	2.3		0.819		14.0	LOS B	18.6	470.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	700	270	970	1.4	1184	0.819	100	NA	NA
Approach	700	270	970	1.4		0.819			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	125	220	3.5	630	0.349	100	NA	NA
Approach	95	125	220	3.5		0.349			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	130	190	320	4.2	1197	0.267	100	NA	NA
Approach	130	190	320	4.2		0.267			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1510	2.3	0.819

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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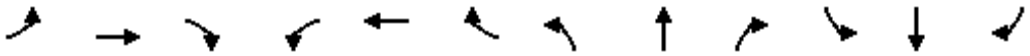

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	30	0	0	0	15	385	0	0	190	50
Future Volume (vph)	25	0	30	0	0	0	15	385	0	0	190	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	30	0	0	0	15	385	0	0	190	50
Future Vol, veh/h	25	0	30	0	0	0	15	385	0	0	190	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	30	0	0	0	15	385	0	0	190	50

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	630	630	215	645	655	385	240	0	0	385	0	0
Stage 1	215	215	-	415	415	-	-	-	-	-	-	-
Stage 2	415	415	-	230	240	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	387	392	813	388	388	667	1327	-	-	1168	-	-
Stage 1	776	716	-	619	596	-	-	-	-	-	-	-
Stage 2	605	584	-	777	711	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	383	387	813	370	383	667	1327	-	-	1168	-	-
Mov Cap-2 Maneuver	383	387	-	370	383	-	-	-	-	-	-	-
Stage 1	765	716	-	610	588	-	-	-	-	-	-	-
Stage 2	597	576	-	748	711	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	0	0.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1327	-	-	538	-	1168	-	-
HCM Lane V/C Ratio	0.011	-	-	0.102	-	-	-	-
HCM Control Delay (s)	7.7	0	-	12.5	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	-	-

LANE LEVEL OF SERVICE

Lane Level of Service

Site: 6 [2037 Baseline (Site Folder: Friday PM Peak Hour)]

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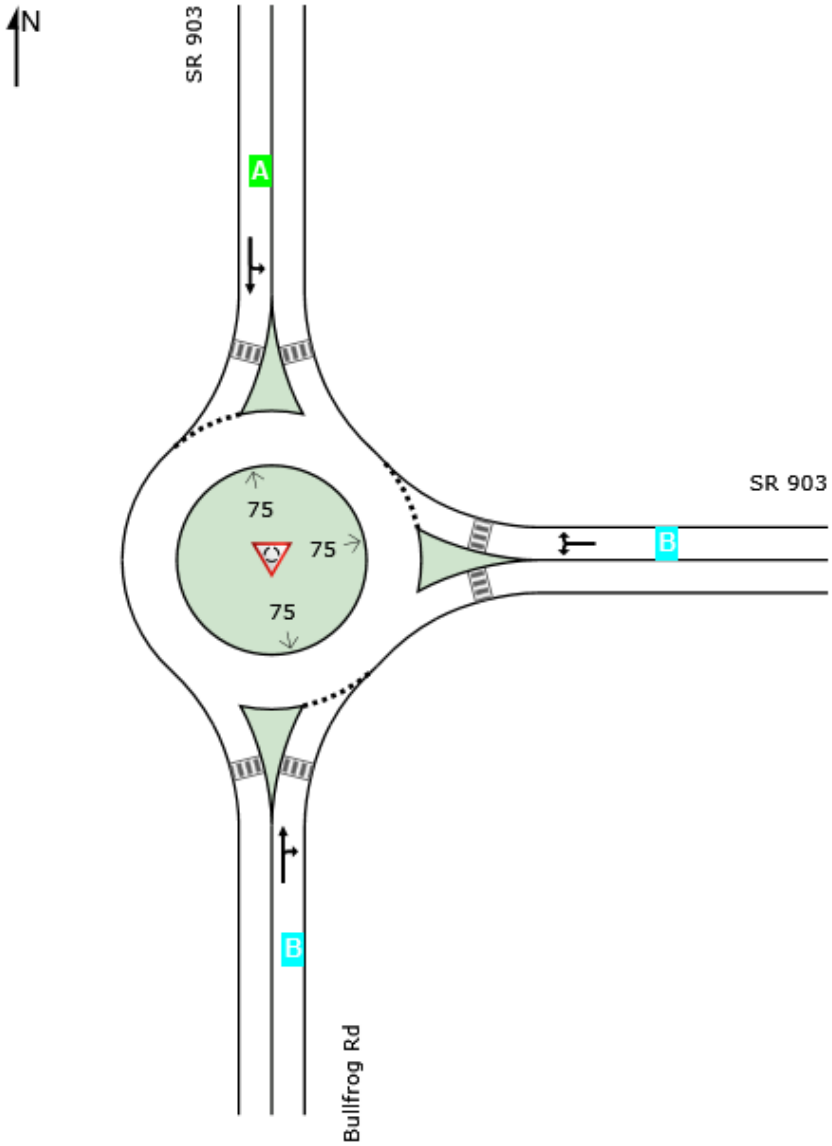
47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2037 Baseline (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	410	3.3	410	3.3	830	0.494	100	10.9	LOS B	3.4	88.1	Full	1600	0.0	0.0
Approach	410	3.3	410	3.3		0.494		10.9	LOS B	3.4	88.1				
East: SR 903															
Lane 1[d]	680	2.8	680	2.8	1021	0.666	100	13.3	LOS B	8.8	225.1	Full	1600	0.0	0.0
Approach	680	2.8	680	2.8		0.666		13.3	LOS B	8.8	225.1				
North: SR 903															
Lane 1[d]	565	4.4	565	4.4	1176	0.480	100	8.0	LOS A	3.3	85.8	Full	1600	0.0	0.0
Approach	565	4.4	565	4.4		0.480		8.0	LOS A	3.3	85.8				
All Vehicles	1655	3.5	1655	3.5		0.666		10.9	LOS B	8.8	225.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	255	155	410	3.3	830	0.494	100	NA	NA
Approach	255	155	410	3.3		0.494			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	110	570	680	2.8	1021	0.666	100	NA	NA
Approach	110	570	680	2.8		0.666			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	435	130	565	4.4	1176	0.480	100	NA	NA
Approach	435	130	565	4.4		0.480			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1655	3.5	0.666

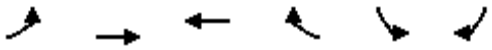
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	695	770	40	35	10
Future Volume (vph)	5	695	770	40	35	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

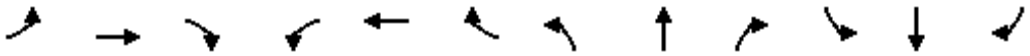
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	695	770	40	35	10
Future Vol, veh/h	5	695	770	40	35	10
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	5	695	770	40	35	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	810	0	-	0	1495	797
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	705	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	807	-	-	-	137	390
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	494	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	807	-	-	-	136	387
Mov Cap-2 Maneuver	-	-	-	-	136	-
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	494	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	36.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	807	-	-	-	159
HCM Lane V/C Ratio	0.006	-	-	-	0.283
HCM Control Delay (s)	9.5	0	-	-	36.3
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	615	115	55	565	5	260	0	165	0	0	0
Future Volume (vph)	0	615	115	55	565	5	260	0	165	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	185.8

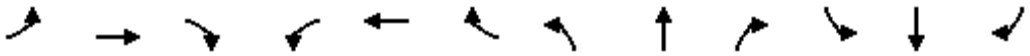
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	615	115	55	565	5	260	0	165	0	0	0
Future Vol, veh/h	0	615	115	55	565	5	260	0	165	0	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	0	615	115	55	565	5	260	0	165	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	570	0	0	734	0	0	1355	1357	678	1434	1412	568
Stage 1	-	-	-	-	-	-	677	677	-	678	678	-
Stage 2	-	-	-	-	-	-	678	680	-	756	734	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	993	-	-	866	-	-	~ 127	150	454	113	139	526
Stage 1	-	-	-	-	-	-	444	454	-	445	455	-
Stage 2	-	-	-	-	-	-	444	452	-	403	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	993	-	-	863	-	-	~ 117	135	452	67	126	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 117	135	-	67	126	-
Stage 1	-	-	-	-	-	-	442	452	-	445	413	-
Stage 2	-	-	-	-	-	-	403	410	-	256	427	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	$ 777.2	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	993	-	-	863	-	-	-
HCM Lane V/C Ratio	2.591	-	-	-	0.064	-	-	-
HCM Control Delay (s)	$ 777.2	0	-	-	9.5	0	-	0
HCM Lane LOS	F	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	36.9	0	-	-	0.2	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	795	0	15	625	45	15	10	5	20	15	25
Future Volume (vph)	20	795	0	15	625	45	15	10	5	20	15	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	795	0	15	625	45	15	10	5	20	15	25
Future Vol, veh/h	20	795	0	15	625	45	15	10	5	20	15	25
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	20	795	0	15	625	45	15	10	5	20	15	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	671	0	0	800	0	0	1538	1541	802	1524	1519	649
Stage 1	-	-	-	-	-	-	840	840	-	679	679	-
Stage 2	-	-	-	-	-	-	698	701	-	845	840	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	901	-	-	814	-	-	94	115	382	98	120	473
Stage 1	-	-	-	-	-	-	358	379	-	445	454	-
Stage 2	-	-	-	-	-	-	429	439	-	360	384	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	900	-	-	810	-	-	75	106	379	85	111	473
Mov Cap-2 Maneuver	-	-	-	-	-	-	75	106	-	85	111	-
Stage 1	-	-	-	-	-	-	342	362	-	427	440	-
Stage 2	-	-	-	-	-	-	381	425	-	331	367	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	57.2	47.7
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	98	900	-	-	810	-	-	142
HCM Lane V/C Ratio	0.306	0.022	-	-	0.019	-	-	0.423
HCM Control Delay (s)	57.2	9.1	0	-	9.5	0	-	47.7
HCM Lane LOS	F	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.1	-	-	1.9

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	135	10	30	365
Future Volume (vph)	25	10	135	10	30	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other

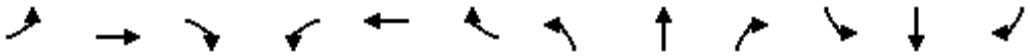
Control Type: Unsignalized

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	135	10	30	365
Future Vol, veh/h	25	10	135	10	30	365
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	135	10	30	365
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8	9.3	9.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	8%	0%	93%
Vol Thru, %	0%	71%	7%
Vol Right, %	92%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	395	35	145
LT Vol	30	0	135
Through Vol	0	25	10
RT Vol	365	10	0
Lane Flow Rate	395	35	145
Geometry Grp	1	1	1
Degree of Util (X)	0.425	0.046	0.2
Departure Headway (Hd)	3.871	4.728	4.971
Convergence, Y/N	Yes	Yes	Yes
Cap	932	756	721
Service Time	1.884	2.768	3.007
HCM Lane V/C Ratio	0.424	0.046	0.201
HCM Control Delay	9.7	8	9.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	2.1	0.1	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	395	200	70	195	200	75	95	155	80	70	55
Future Volume (vph)	185	395	200	70	195	200	75	95	155	80	70	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	172.5

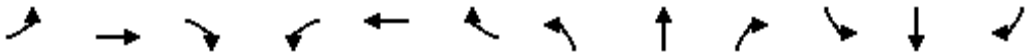
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	185	395	200	70	195	200	75	95	155	80	70	55
Future Vol, veh/h	185	395	200	70	195	200	75	95	155	80	70	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	185	395	200	70	195	200	75	95	155	80	70	55

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	595	0	0	1363	1400	495	1425	1400	295
Stage 1	-	-	-	-	-	-	865	865	-	435	435	-
Stage 2	-	-	-	-	-	-	498	535	-	990	965	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1153	-	-	967	-	-	125	140	575	112	139	740
Stage 1	-	-	-	-	-	-	348	371	-	596	577	-
Stage 2	-	-	-	-	-	-	554	524	-	294	331	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1153	-	-	967	-	-	~ 47	109	575	~ 18	108	740
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 47	109	-	~ 18	108	-
Stage 1	-	-	-	-	-	-	292	312	-	501	535	-
Stage 2	-	-	-	-	-	-	413	486	-	125	278	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	1.4	$ 422	$ 813.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	69	575	1153	-	-	967	-	-	18	173
HCM Lane V/C Ratio	2.464	0.27	0.16	-	-	0.072	-	-	4.444	0.723
HCM Control Delay (s)	$ 794.3	13.6	8.7	-	-	9	-	-	$ 1980.3	66.6
HCM Lane LOS	F	B	A	-	-	A	-	-	F	F
HCM 95th %tile Q(veh)	16.5	1.1	0.6	-	-	0.2	-	-	10.6	4.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	600	25	70	495	0	40	0	155	0	20	5
Future Volume (vph)	5	600	25	70	495	0	40	0	155	0	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

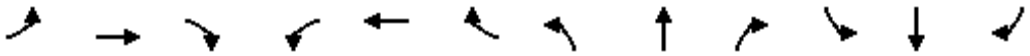
Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	600	25	70	495	0	40	0	155	0	20	5
Future Vol, veh/h	5	600	25	70	495	0	40	0	155	0	20	5
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	5	600	25	70	495	0	40	0	155	0	20	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	496	0	0	629	0	0	1283	1263	617	1336	1275	504
Stage 1	-	-	-	-	-	-	627	627	-	636	636	-
Stage 2	-	-	-	-	-	-	656	636	-	700	639	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1058	-	-	944	-	-	140	167	484	96	125	458
Stage 1	-	-	-	-	-	-	466	472	-	373	384	-
Stage 2	-	-	-	-	-	-	450	467	-	341	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1057	-	-	940	-	-	112	153	482	61	115	454
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	153	-	61	115	-
Stage 1	-	-	-	-	-	-	462	468	-	371	355	-
Stage 2	-	-	-	-	-	-	386	432	-	230	380	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	23.8	37.6
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	112	482	1057	-	-	940	-	-	135
HCM Lane V/C Ratio	0.357	0.322	0.005	-	-	0.074	-	-	0.185
HCM Control Delay (s)	54	16	8.4	-	-	9.1	-	-	37.6
HCM Lane LOS	F	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	1.4	1.4	0	-	-	0.2	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	610	115	105	445	100	245	40	45	35	35	35
Future Volume (vph)	45	610	115	105	445	100	245	40	45	35	35	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	246.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	45	610	115	105	445	100	245	40	45	35	35	35
Future Vol, veh/h	45	610	115	105	445	100	245	40	45	35	35	35
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	45	610	115	105	445	100	245	40	45	35	35	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	727	0	0	1501	1516	671	1507	1523	497
Stage 1	-	-	-	-	-	-	760	760	-	706	706	-
Stage 2	-	-	-	-	-	-	741	756	-	801	817	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1008	-	-	876	-	-	~ 99	118	451	100	119	577
Stage 1	-	-	-	-	-	-	394	410	-	430	442	-
Stage 2	-	-	-	-	-	-	403	412	-	381	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	874	-	-	~ 54	90	450	49	90	576
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 54	90	-	49	90	-
Stage 1	-	-	-	-	-	-	363	378	-	397	364	-
Stage 2	-	-	-	-	-	-	282	339	-	283	362	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.6	$ 1308.9	232.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	54	156	1007	-	-	874	-	-	90
HCM Lane V/C Ratio	4.537	0.545	0.045	-	-	0.12	-	-	1.167
HCM Control Delay (s)	$ 1744.7	52.7	8.7	0	-	9.7	0	-	232.2
HCM Lane LOS	F	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	27.2	2.7	0.1	-	-	0.4	-	-	7.3

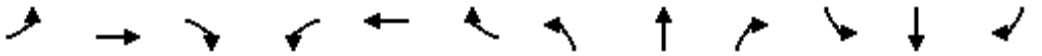
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	540	135	95	340	160	100	100	135	25	185	90
Future Volume (vph)	80	540	135	95	340	160	100	100	135	25	185	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 88.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

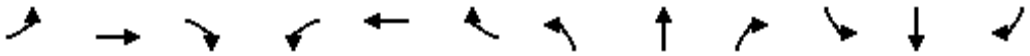
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	540	135	95	340	160	100	100	135	25	185	90
Future Volume (veh/h)	80	540	135	95	340	160	100	100	135	25	185	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	80	540	135	95	340	160	100	100	135	25	185	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	506	900	225	386	755	355	212	187	252	236	308	150
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	883	1420	355	757	1191	560	1063	693	935	1101	1145	557
Grp Volume(v), veh/h	80	0	675	95	0	500	100	0	235	25	0	275
Grp Sat Flow(s),veh/h/ln	883	0	1775	757	0	1751	1063	0	1628	1101	0	1702
Q Serve(g_s), s	4.9	0.0	21.4	8.1	0.0	13.9	8.6	0.0	11.7	1.9	0.0	13.4
Cycle Q Clear(g_c), s	18.8	0.0	21.4	29.5	0.0	13.9	22.0	0.0	11.7	13.6	0.0	13.4
Prop In Lane	1.00		0.20	1.00		0.32	1.00		0.57	1.00		0.33
Lane Grp Cap(c), veh/h	506	0	1125	386	0	1110	212	0	438	236	0	458
V/C Ratio(X)	0.16	0.00	0.60	0.25	0.00	0.45	0.47	0.00	0.54	0.11	0.00	0.60
Avail Cap(c_a), veh/h	506	0	1125	386	0	1110	265	0	520	291	0	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.7	0.0	10.3	19.0	0.0	8.9	39.9	0.0	29.7	35.5	0.0	30.3
Incr Delay (d2), s/veh	0.7	0.0	2.4	1.5	0.0	1.3	2.3	0.0	1.5	0.2	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	8.4	1.6	0.0	5.3	2.4	0.0	4.8	0.5	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	0.0	12.7	20.5	0.0	10.2	42.2	0.0	31.2	35.7	0.0	31.7
LnGrp LOS	B	A	B	C	A	B	D	A	C	D	A	C
Approach Vol, veh/h		755			595			335			300	
Approach Delay, s/veh		12.8			11.9			34.5			32.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	65.0	30.2	65.0	30.2
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	60.4	30.4	60.4	30.4
Max Q Clear Time (g_c+I1), s	23.4	24.0	31.5	15.6
Green Ext Time (p_c), s	6.6	1.3	4.7	1.6

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	425	230	40	465	75	215	25	5	30	25	50
Future Volume (vph)	25	425	230	40	465	75	215	25	5	30	25	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	67.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	425	230	40	465	75	215	25	5	30	25	50
Future Vol, veh/h	25	425	230	40	465	75	215	25	5	30	25	50
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	25	425	230	40	465	75	215	25	5	30	25	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	542	0	0	657	0	0	1214	1214	544	1192	1292	507
Stage 1	-	-	-	-	-	-	592	592	-	585	585	-
Stage 2	-	-	-	-	-	-	622	622	-	607	707	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1017	-	-	931	-	-	~ 158	181	537	166	165	570
Stage 1	-	-	-	-	-	-	491	492	-	501	501	-
Stage 2	-	-	-	-	-	-	473	477	-	487	441	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1015	-	-	929	-	-	~ 116	162	535	134	148	568
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 116	162	-	134	148	-
Stage 1	-	-	-	-	-	-	470	471	-	480	469	-
Stage 2	-	-	-	-	-	-	382	446	-	438	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.6	$ 423.5	36
HCM LOS			F	E

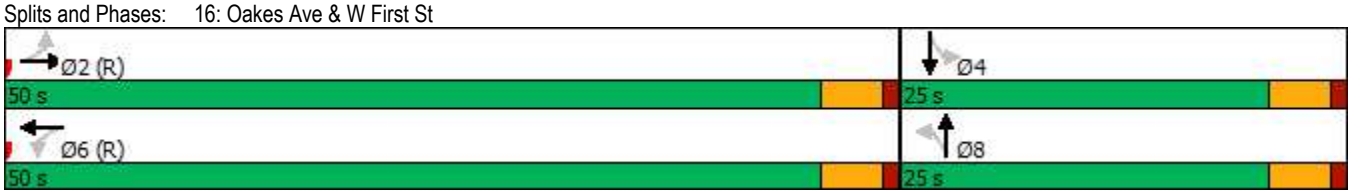
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	116	183	1015	-	-	929	-	-	218
HCM Lane V/C Ratio	1.853	0.164	0.025	-	-	0.043	-	-	0.482
HCM Control Delay (s)	$ 478.6	28.5	8.6	0	-	9	0	-	36
HCM Lane LOS	F	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	17.1	0.6	0.1	-	-	0.1	-	-	2.4

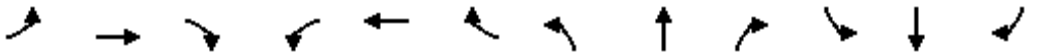
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	490	200	40	315	50	240	125	75	45	205	25
Future Volume (vph)	10	490	200	40	315	50	240	125	75	45	205	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





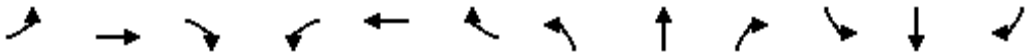
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	490	200	40	315	50	240	125	75	45	205	25
Future Volume (veh/h)	10	490	200	40	315	50	240	125	75	45	205	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	490	200	40	315	50	240	125	75	45	205	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	701	680	277	321	851	135	262	263	158	280	380	46
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	998	1120	457	747	1402	223	1123	962	577	1117	1390	170
Grp Volume(v), veh/h	10	0	690	40	0	365	240	0	200	45	0	230
Grp Sat Flow(s),veh/h/ln	998	0	1578	747	0	1625	1123	0	1539	1117	0	1559
Q Serve(g_s), s	0.3	0.0	22.9	2.2	0.0	0.0	11.1	0.0	8.1	2.6	0.0	9.4
Cycle Q Clear(g_c), s	0.3	0.0	22.9	25.2	0.0	0.0	20.5	0.0	8.1	10.8	0.0	9.4
Prop In Lane	1.00		0.29	1.00		0.14	1.00		0.38	1.00		0.11
Lane Grp Cap(c), veh/h	701	0	957	321	0	986	262	0	421	280	0	426
V/C Ratio(X)	0.01	0.00	0.72	0.12	0.00	0.37	0.92	0.00	0.48	0.16	0.00	0.54
Avail Cap(c_a), veh/h	701	0	957	321	0	986	262	0	421	280	0	426
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.00	0.82	0.96	0.00	0.96	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	0.0	10.3	6.3	0.0	0.0	33.7	0.0	22.8	27.3	0.0	23.2
Incr Delay (d2), s/veh	0.0	0.0	3.9	0.8	0.0	1.0	33.7	0.0	0.3	0.1	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.8	0.3	0.0	0.3	6.8	0.0	2.9	0.7	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	14.2	7.1	0.0	1.0	67.4	0.0	23.1	27.4	0.0	24.0
LnGrp LOS	A	A	B	A	A	A	E	A	C	C	A	C
Approach Vol, veh/h		700			405			440			275	
Approach Delay, s/veh		14.1			1.6			47.3			24.5	
Approach LOS		B			A			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	25.0	50.0	25.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	24.9	12.8	27.2	22.5
Green Ext Time (p_c), s	5.4	0.6	2.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	20.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	295	135	30	460	40	65	35	25	5	15	70
Future Volume (vph)	40	295	135	30	460	40	65	35	25	5	15	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	20.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	295	135	30	460	40	65	35	25	5	15	70
Future Vol, veh/h	40	295	135	30	460	40	65	35	25	5	15	70
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	40	295	135	30	460	40	65	35	25	5	15	70
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	19.2	24.6	11.8	10.6
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	52%	9%	6%	6%
Vol Thru, %	28%	63%	87%	17%
Vol Right, %	20%	29%	8%	78%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	470	530	90
LT Vol	65	40	30	5
Through Vol	35	295	460	15
RT Vol	25	135	40	70
Lane Flow Rate	125	470	530	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.232	0.687	0.779	0.157
Departure Headway (Hd)	6.694	5.26	5.29	6.297
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	533	682	678	564
Service Time	4.787	3.322	3.35	4.396
HCM Lane V/C Ratio	0.235	0.689	0.782	0.16
HCM Control Delay	11.8	19.2	24.6	10.6
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	0.9	5.5	7.5	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	480	30	30	335	55	15	10	40	110	35	45
Future Volume (vph)	80	480	30	30	335	55	15	10	40	110	35	45
Satd. Flow (prot)	1736	1626	0	1770	1635	0	0	1791	1411	0	1812	1439
Flt Permitted	0.515			0.437				0.819			0.762	
Satd. Flow (perm)	936	1626	0	809	1635	0	0	1507	1367	0	1422	1403
Satd. Flow (RTOR)		8			20				40			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	510	0	30	390	0	0	25	40	0	145	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	52.8	52.8		52.8	52.8			13.2	52.8		13.2	52.8
Actuated g/C Ratio	0.70	0.70		0.70	0.70			0.18	0.70		0.18	0.70
v/c Ratio	0.12	0.45		0.05	0.34			0.09	0.04		0.58	0.04
Control Delay	6.8	8.3		5.4	6.0			23.6	2.2		36.4	2.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	6.8	8.3		5.4	6.0			23.6	2.2		36.4	2.2
LOS	A	A		A	A			C	A		D	A
Approach Delay		8.1			6.0			10.5			28.3	
Approach LOS		A			A			B			C	

Intersection Summary		
Cycle Length: 75		
Actuated Cycle Length: 75		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.58		
Intersection Signal Delay: 10.5	Intersection LOS: B	
Intersection Capacity Utilization 71.0%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	345	15	0	0	395
Future Volume (vph)	40	345	15	0	0	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	345	15	0	0	395
Future Vol, veh/h	40	345	15	0	0	395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	40	345	15	0	0	395

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	410	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	588	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	670	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	588	1050	-	-	-	-
Mov Cap-2 Maneuver	588	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	971	-
HCM Lane V/C Ratio	-	0.396	-
HCM Control Delay (s)	-	11.1	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	1.9	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	370	90
Future Volume (vph)	0	0	10	0	370	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

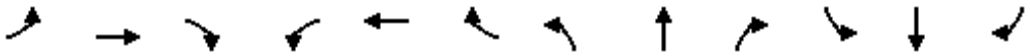
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	370	90
Future Vol, veh/h	0	0	10	0	370	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	370	90

Major/Minor	Minor2		Major2	
Conflicting Flow All	830	90	0	0
Stage 1	830	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	308	973	-	-
Stage 1	388	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	973	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	45	110	10	10	10	75	550	15	10	365	40
Future Volume (vph)	25	45	110	10	10	10	75	550	15	10	365	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

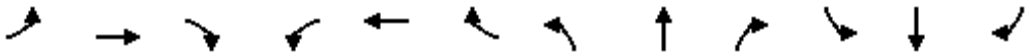
Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	45	110	10	10	10	75	550	15	10	365	40
Future Vol, veh/h	25	45	110	10	10	10	75	550	15	10	365	40
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	25	45	110	10	10	10	75	550	15	10	365	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1166	1146	413	1219	1159	601	418	0	0	578	0	0
Stage 1	418	418	-	721	721	-	-	-	-	-	-	-
Stage 2	748	728	-	498	438	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	172	201	643	159	197	504	1141	-	-	986	-	-
Stage 1	616	594	-	422	435	-	-	-	-	-	-	-
Stage 2	408	432	-	558	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	175	626	94	171	484	1127	-	-	974	-	-
Mov Cap-2 Maneuver	142	175	-	94	171	-	-	-	-	-	-	-
Stage 1	549	579	-	376	388	-	-	-	-	-	-	-
Stage 2	341	385	-	413	567	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34.4	32.2	1	0.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1127	-	-	296	162	974	-	-
HCM Lane V/C Ratio	0.067	-	-	0.608	0.185	0.01	-	-
HCM Control Delay (s)	8.4	0	-	34.4	32.2	8.7	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.7	0.7	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	20	20	0	10	80	340	30	5	240	10
Future Volume (vph)	5	0	20	20	0	10	80	340	30	5	240	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

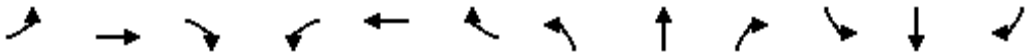
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	0	20	20	0	10	80	340	30	5	240	10
Future Vol, veh/h	5	0	20	20	0	10	80	340	30	5	240	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	5	0	20	20	0	10	80	340	30	5	240	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	775	785	245	780	775	355	250	0	0	370	0	0
Stage 1	255	255	-	515	515	-	-	-	-	-	-	-
Stage 2	520	530	-	265	260	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	296	307	756	315	331	693	1310	-	-	1178	-	-
Stage 1	715	668	-	546	538	-	-	-	-	-	-	-
Stage 2	511	501	-	745	697	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	274	282	756	288	304	693	1310	-	-	1178	-	-
Mov Cap-2 Maneuver	274	282	-	288	304	-	-	-	-	-	-	-
Stage 1	660	665	-	504	497	-	-	-	-	-	-	-
Stage 2	465	462	-	722	694	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	16	1.4	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1310	-	-	559	358	1178	-	-
HCM Lane V/C Ratio	0.061	-	-	0.045	0.084	0.004	-	-
HCM Control Delay (s)	7.9	0	-	11.7	16	8.1	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	120	5	30	205	35	0	25	30	40	0	25
Future Volume (vph)	20	120	5	30	205	35	0	25	30	40	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	120	5	30	205	35	0	25	30	40	0	25
Future Vol, veh/h	20	120	5	30	205	35	0	25	30	40	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	120	5	30	205	35	0	25	30	40	0	25

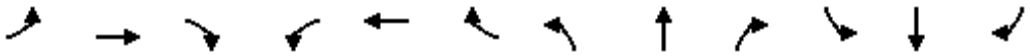
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	240	0	0	125	0	0	458	463	123	473	448	223
Stage 1	-	-	-	-	-	-	163	163	-	283	283	-
Stage 2	-	-	-	-	-	-	295	300	-	190	165	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1309	-	-	1474	-	-	498	483	904	505	509	822
Stage 1	-	-	-	-	-	-	818	746	-	728	681	-
Stage 2	-	-	-	-	-	-	694	650	-	816	766	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1309	-	-	1474	-	-	468	464	904	454	489	822
Mov Cap-2 Maneuver	-	-	-	-	-	-	468	464	-	454	489	-
Stage 1	-	-	-	-	-	-	805	734	-	716	665	-
Stage 2	-	-	-	-	-	-	657	634	-	750	754	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.8	11.2	12.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	632	1309	-	-	1474	-	-	548
HCM Lane V/C Ratio	0.087	0.015	-	-	0.02	-	-	0.119
HCM Control Delay (s)	11.2	7.8	0	-	7.5	0	-	12.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.4

Friday LOS Calculations

(2037 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	671	5	15	0	0	0	0	15	45	383	30	0
Future Volume (vph)	671	5	15	0	0	0	0	15	45	383	30	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	17%	17%	17%	22%	22%	22%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	498.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	671	5	15	0	0	0	0	15	45	383	30	0
Future Vol, veh/h	671	5	15	0	0	0	0	15	45	383	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	17	17	17	22	22	22
Mvmt Flow	671	5	15	0	0	0	0	15	45	383	30	0

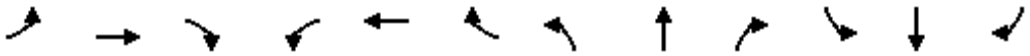
Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	834	856	30	-	0	0	60	0	0
Stage 1	796	796	-	-	-	-	-	-	-
Stage 2	38	60	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.32	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.398	-	-
Pot Cap-1 Maneuver	~ 339	296	1047	0	-	-	1425	-	0
Stage 1	~ 446	400	-	0	-	-	-	-	0
Stage 2	987	847	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	~ 246	0	1047	-	-	-	1425	-	-
Mov Cap-2 Maneuver	~ 246	0	-	-	-	-	-	-	-
Stage 1	~ 446	0	-	-	-	-	-	-	-
Stage 2	718	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 835.2	0	7.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	250	1425	-
HCM Lane V/C Ratio	-	-	2.764	0.269	-
HCM Control Delay (s)	-	-	$ 835.2	8.5	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	59.5	1.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	80	5	594	5	681	0	0	333	160
Future Volume (vph)	0	0	0	80	5	594	5	681	0	0	333	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	16%	16%	16%	1%	1%	1%	8%	8%	8%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	139.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	80	5	594	5	681	0	0	333	160
Future Vol, veh/h	0	0	0	80	5	594	5	681	0	0	333	160
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	16	16	16	1	1	1	8	8	8
Mvmt Flow	0	0	0	80	5	594	5	681	0	0	333	160

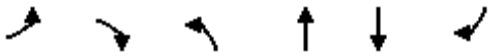
Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	1104	1184	681	493	0	-	-	-	0	
Stage 1	691	691	-	-	-	-	-	-	-	
Stage 2	413	493	-	-	-	-	-	-	-	
Critical Hdwy	6.56	6.66	6.36	4.11	-	-	-	-	-	
Critical Hdwy Stg 1	5.56	5.66	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	5.56	5.66	-	-	-	-	-	-	-	
Follow-up Hdwy	3.644	4.144	3.444	2.209	-	-	-	-	-	
Pot Cap-1 Maneuver	219	178	~ 427	1076	-	0	0	-	-	
Stage 1	472	425	-	-	-	0	0	-	-	
Stage 2	639	524	-	-	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	217	0	~ 427	1076	-	-	-	-	-	
Mov Cap-2 Maneuver	217	0	-	-	-	-	-	-	-	
Stage 1	469	0	-	-	-	-	-	-	-	
Stage 2	639	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	$ 382.5	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	1076	-	383	-	-
HCM Lane V/C Ratio	0.005	-	1.773	-	-
HCM Control Delay (s)	8.4	0	$ 382.5	-	-
HCM Lane LOS	A	A	F	-	-
HCM 95th %tile Q(veh)	0	-	42.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	155	140	1135	338	36
Future Volume (vph)	50	155	140	1135	338	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	155	140	1135	338	36
Future Vol, veh/h	50	155	140	1135	338	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	50	155	140	1135	338	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1771	356	374	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	1415	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	86	664	1184	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	76	664	1184	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	212	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	79.1	0.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1184	-	230	-	-
HCM Lane V/C Ratio	0.118	-	0.891	-	-
HCM Control Delay (s)	8.4	-	79.1	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	7.3	-	-

LANE LEVEL OF SERVICE

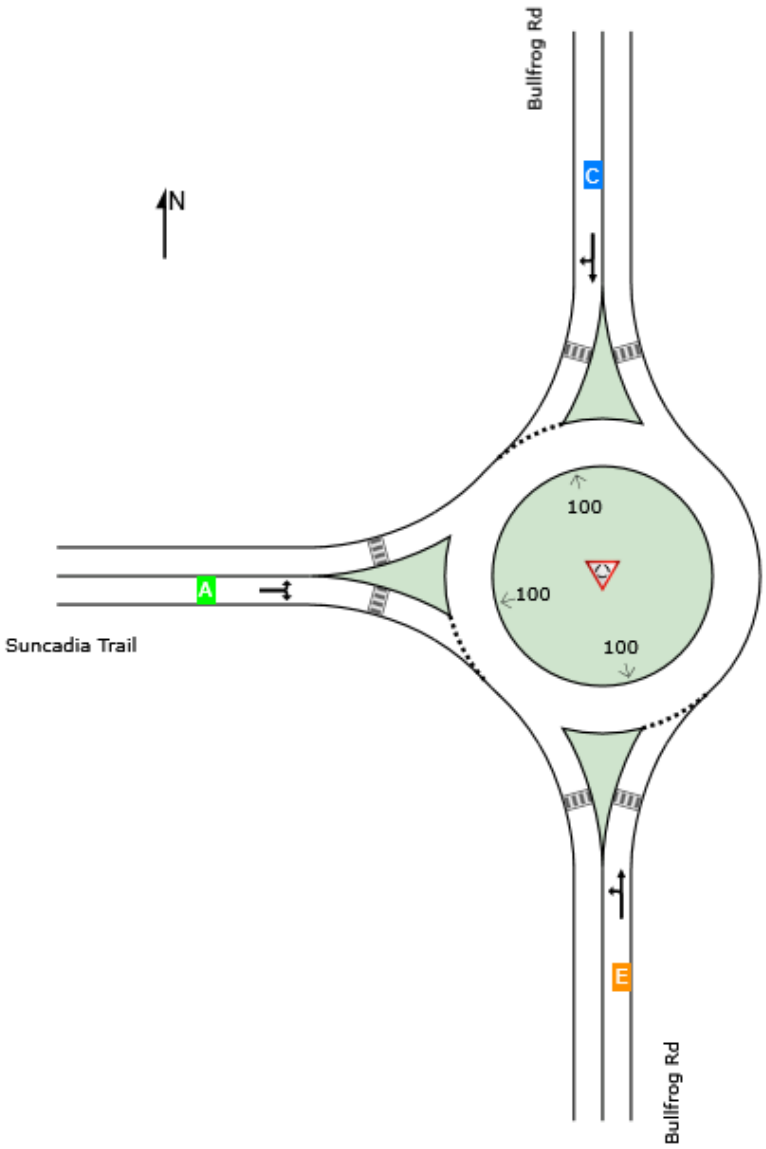
Lane Level of Service

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	E	C	A	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	1152	1.4	1152	1.4	1160	0.993	100	38.6	LOS E	64.0	1617.0	Full	1600	0.0	5.3
Approach	1152	1.4	1152	1.4		0.993		38.6	LOS E	64.0	1617.0				
North: Bullfrog Rd															
Lane 1[d]	348	3.5	348	3.5	626	0.556	100	15.3	LOS C	3.5	89.9	Full	1600	0.0	0.0
Approach	348	3.5	348	3.5		0.556		15.3	LOS C	3.5	89.9				
West: Suncadia Trail															
Lane 1[d]	344	4.2	344	4.2	1070	0.321	100	6.5	LOS A	1.7	43.7	Full	1600	0.0	0.0
Approach	344	4.2	344	4.2		0.321		6.5	LOS A	1.7	43.7				
All Vehicles	1844	2.3	1844	2.3		0.993		28.2	LOS D	64.0	1617.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	706	446	1152	1.4	1160	0.993	100	NA	NA
Approach	706	446	1152	1.4		0.993			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	197	151	348	3.5	626	0.556	100	NA	NA
Approach	197	151	348	3.5		0.556			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	149	195	344	4.2	1070	0.321	100	NA	NA
Approach	149	195	344	4.2		0.321			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1844	2.3		0.993					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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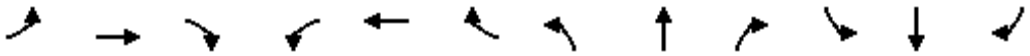


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	32	0	0	0	16	454	0	0	315	50
Future Volume (vph)	25	0	32	0	0	0	16	454	0	0	315	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	32	0	0	0	16	454	0	0	315	50
Future Vol, veh/h	25	0	32	0	0	0	16	454	0	0	315	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	2	2	2	3	3	3
Mvmt Flow	25	0	32	0	0	0	16	454	0	0	315	50

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	826	826	340	842	851	454	365	0	0	454	0	0
Stage 1	340	340	-	486	486	-	-	-	-	-	-	-
Stage 2	486	486	-	356	365	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.12	-	-	4.13	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.218	-	-	2.227	-	-
Pot Cap-1 Maneuver	285	302	691	286	299	610	1194	-	-	1101	-	-
Stage 1	664	630	-	566	554	-	-	-	-	-	-	-
Stage 2	553	543	-	666	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	281	297	691	269	294	610	1194	-	-	1101	-	-
Mov Cap-2 Maneuver	281	297	-	269	294	-	-	-	-	-	-	-
Stage 1	652	630	-	556	544	-	-	-	-	-	-	-
Stage 2	543	533	-	635	627	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.9	0	0.3	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	421	-	1101	-	-
HCM Lane V/C Ratio	0.013	-	-	0.135	-	-	-	-
HCM Control Delay (s)	8.1	0	-	14.9	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

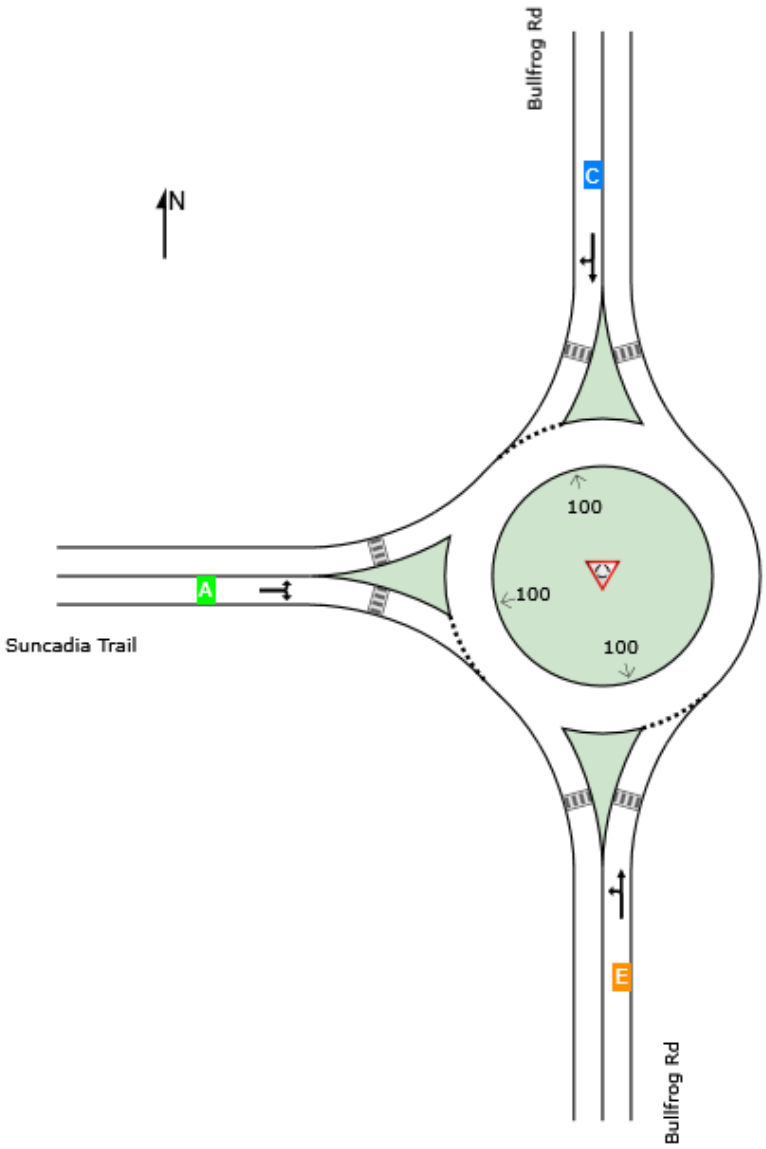
Lane Level of Service

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	E	C	A	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Friday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	1152	1.4	1152	1.4	1160	0.993	100	38.6	LOS E	64.0	1617.0	Full	1600	0.0	5.3
Approach	1152	1.4	1152	1.4		0.993		38.6	LOS E	64.0	1617.0				
North: Bullfrog Rd															
Lane 1[d]	348	3.5	348	3.5	626	0.556	100	15.3	LOS C	3.5	89.9	Full	1600	0.0	0.0
Approach	348	3.5	348	3.5		0.556		15.3	LOS C	3.5	89.9				
West: Suncadia Trail															
Lane 1[d]	344	4.2	344	4.2	1070	0.321	100	6.5	LOS A	1.7	43.7	Full	1600	0.0	0.0
Approach	344	4.2	344	4.2		0.321		6.5	LOS A	1.7	43.7				
All Vehicles	1844	2.3	1844	2.3		0.993		28.2	LOS D	64.0	1617.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	706	446	1152	1.4	1160	0.993	100	NA	NA
Approach	706	446	1152	1.4		0.993			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	197	151	348	3.5	626	0.556	100	NA	NA
Approach	197	151	348	3.5		0.556			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	149	195	344	4.2	1070	0.321	100	NA	NA
Approach	149	195	344	4.2		0.321			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1844	2.3		0.993					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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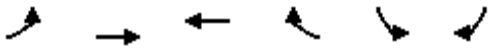


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	1018	1085	40	35	18
Future Volume (vph)	7	1018	1085	40	35	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

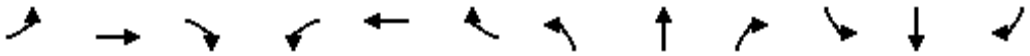
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	1018	1085	40	35	18
Future Vol, veh/h	7	1018	1085	40	35	18
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	7	1018	1085	40	35	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1125	0	-	0	2137	1112
Stage 1	-	-	-	-	1105	-
Stage 2	-	-	-	-	1032	-
Critical Hdwy	4.14	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.236	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	614	-	-	-	55	256
Stage 1	-	-	-	-	320	-
Stage 2	-	-	-	-	347	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	614	-	-	-	54	254
Mov Cap-2 Maneuver	-	-	-	-	54	-
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	347	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	130.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	614	-	-	-	74
HCM Lane V/C Ratio	0.011	-	-	-	0.716
HCM Control Delay (s)	10.9	0	-	-	130.4
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	3.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	901	147	55	813	5	319	0	165	0	0	8
Future Volume (vph)	5	901	147	55	813	5	319	0	165	0	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	651

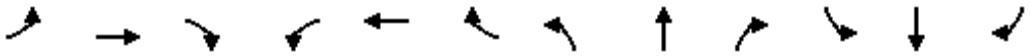
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	901	147	55	813	5	319	0	165	0	0	8
Future Vol, veh/h	5	901	147	55	813	5	319	0	165	0	0	8
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	5	901	147	55	813	5	319	0	165	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	818	0	0	1052	0	0	1919	1917	980	1994	1988	816
Stage 1	-	-	-	-	-	-	989	989	-	926	926	-
Stage 2	-	-	-	-	-	-	930	928	-	1068	1062	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	802	-	-	658	-	-	~ 51	68	304	46	62	380
Stage 1	-	-	-	-	-	-	~ 298	326	-	325	350	-
Stage 2	-	-	-	-	-	-	322	348	-	271	303	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	802	-	-	655	-	-	~ 43	56	303	18	51	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 43	56	-	18	51	-
Stage 1	-	-	-	-	-	-	~ 292	319	-	320	296	-
Stage 2	-	-	-	-	-	-	~ 267	294	-	121	297	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.7	$ 3250.6	14.7
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	61	802	-	-	655	-	-	380
HCM Lane V/C Ratio	7.934	0.006	-	-	0.084	-	-	0.021
HCM Control Delay (s)	$ 3250.6	9.5	0	-	11	0	-	14.7
HCM Lane LOS	F	A	A	-	B	A	-	B
HCM 95th %tile Q(veh)	56.1	0	-	-	0.3	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	976	100	15	792	45	88	10	5	20	15	33
Future Volume (vph)	25	976	100	15	792	45	88	10	5	20	15	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)	1		5	5		1			2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	61.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	976	100	15	792	45	88	10	5	20	15	33
Future Vol, veh/h	25	976	100	15	792	45	88	10	5	20	15	33
Conflicting Peds, #/hr	1	0	5	5	0	1	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	6	6	6	4	4	4	3	3	3	0	0	0
Mvmt Flow	25	976	100	15	792	45	88	10	5	20	15	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	838	0	0	1081	0	0	1950	1949	1033	1932	1977	816
Stage 1	-	-	-	-	-	-	1081	1081	-	846	846	-
Stage 2	-	-	-	-	-	-	869	868	-	1086	1131	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.236	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	779	-	-	638	-	-	~ 48	64	281	50	63	380
Stage 1	-	-	-	-	-	-	263	293	-	360	381	-
Stage 2	-	-	-	-	-	-	345	368	-	264	281	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	778	-	-	635	-	-	~ 31	56	279	38	55	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 31	56	-	38	55	-
Stage 1	-	-	-	-	-	-	240	268	-	330	363	-
Stage 2	-	-	-	-	-	-	288	351	-	229	257	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	$ 1161.5	164.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	34	778	-	-	635	-	-	77
HCM Lane V/C Ratio	3.029	0.032	-	-	0.024	-	-	0.883
HCM Control Delay (s)	$ 1161.5	9.8	0	-	10.8	0	-	164.3
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	11.9	0.1	-	-	0.1	-	-	4.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	10	167	10	30	424
Future Volume (vph)	25	10	167	10	30	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

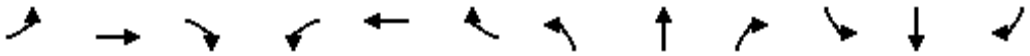
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	10	167	10	30	424
Future Vol, veh/h	25	10	167	10	30	424
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	25	10	167	10	30	424
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.2	9.9	10.9
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	94%
Vol Thru, %	0%	71%	6%
Vol Right, %	93%	29%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	454	35	177
LT Vol	30	0	167
Through Vol	0	25	10
RT Vol	424	10	0
Lane Flow Rate	454	35	177
Geometry Grp	1	1	1
Degree of Util (X)	0.499	0.048	0.251
Departure Headway (Hd)	3.958	4.915	5.109
Convergence, Y/N	Yes	Yes	Yes
Cap	913	725	701
Service Time	1.977	2.973	3.159
HCM Lane V/C Ratio	0.497	0.048	0.252
HCM Control Delay	10.9	8.2	9.9
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.8	0.2	1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	395	200	122	195	200	75	139	155	80	91	66
Future Volume (vph)	200	395	200	122	195	200	75	139	155	80	91	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	2%	2%	2%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	200	395	200	122	195	200	75	139	155	80	91	66
Future Vol, veh/h	200	395	200	122	195	200	75	139	155	80	91	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	5	5	5	2	2	2	4	4	4
Mvmt Flow	200	395	200	122	195	200	75	139	155	80	91	66

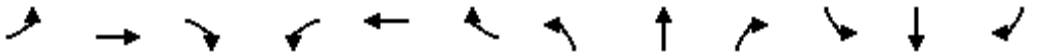
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	595	0	0	1513	1534	495	1581	1534	295
Stage 1	-	-	-	-	-	-	895	895	-	539	539	-
Stage 2	-	-	-	-	-	-	618	639	-	1042	995	-
Critical Hdwy	4.14	-	-	4.15	-	-	7.12	6.52	6.22	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.14	5.54	-
Follow-up Hdwy	2.236	-	-	2.245	-	-	3.518	4.018	3.318	3.536	4.036	3.336
Pot Cap-1 Maneuver	1153	-	-	967	-	-	98	~ 116	575	87	115	740
Stage 1	-	-	-	-	-	-	335	359	-	523	519	-
Stage 2	-	-	-	-	-	-	477	470	-	275	320	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1153	-	-	967	-	-	-	~ 84	575	-	~ 83	740
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 84	-	-	~ 83	-
Stage 1	-	-	-	-	-	-	277	297	-	433	454	-
Stage 2	-	-	-	-	-	-	304	411	-	88	265	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	2.2		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	-	575	1153	-	-	967	-	-	-	132
HCM Lane V/C Ratio	-	0.27	0.173	-	-	0.126	-	-	-	1.189
HCM Control Delay (s)	-	13.6	8.8	-	-	9.3	-	-	-	203
HCM Lane LOS	-	B	A	-	-	A	-	-	-	F
HCM 95th %tile Q(veh)	-	1.1	0.6	-	-	0.4	-	-	-	9.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	600	25	70	495	43	40	30	155	16	52	57
Future Volume (vph)	5	600	25	70	495	43	40	30	155	16	52	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	1		4	4		1	8					8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	5%	5%	5%	67%	67%	67%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

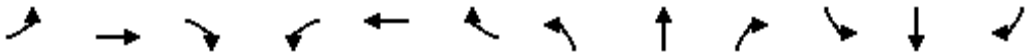
Intersection	
Int Delay, s/veh	17.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	600	25	70	495	43	40	30	155	16	52	57
Future Vol, veh/h	5	600	25	70	495	43	40	30	155	16	52	57
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	0	0	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	4	4	4	5	5	5	67	67	67
Mvmt Flow	5	600	25	70	495	43	40	30	155	16	52	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	539	0	0	629	0	0	1346	1306	617	1373	1297	526
Stage 1	-	-	-	-	-	-	627	627	-	658	658	-
Stage 2	-	-	-	-	-	-	719	679	-	715	639	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.15	6.55	6.25	7.77	7.17	6.87
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.77	6.17	-
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.545	4.045	3.345	4.103	4.603	3.903
Pot Cap-1 Maneuver	1019	-	-	944	-	-	127	158	484	90	121	444
Stage 1	-	-	-	-	-	-	466	472	-	362	374	-
Stage 2	-	-	-	-	-	-	415	447	-	334	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1018	-	-	940	-	-	65	145	482	48	111	440
Mov Cap-2 Maneuver	-	-	-	-	-	-	65	145	-	48	111	-
Stage 1	-	-	-	-	-	-	462	468	-	360	346	-
Stage 2	-	-	-	-	-	-	282	413	-	211	380	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	54.3	124
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	85	482	1018	-	-	940	-	-	134
HCM Lane V/C Ratio	0.824	0.322	0.005	-	-	0.074	-	-	0.933
HCM Control Delay (s)	139.1	16	8.6	-	-	9.1	-	-	124
HCM Lane LOS	F	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	4.3	1.4	0	-	-	0.2	-	-	6.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	735	159	105	526	100	312	40	45	35	35	54
Future Volume (vph)	57	735	159	105	526	100	312	40	45	35	35	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	944.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	57	735	159	105	526	100	312	40	45	35	35	54
Future Vol, veh/h	57	735	159	105	526	100	312	40	45	35	35	54
Conflicting Peds, #/hr	1	0	2	2	0	1	1	0	1	1	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	2	2	2	5	5	5	0	0	0
Mvmt Flow	57	735	159	105	526	100	312	40	45	35	35	54

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	627	0	0	896	0	0	1763	1768	818	1759	1797	578
Stage 1	-	-	-	-	-	-	931	931	-	787	787	-
Stage 2	-	-	-	-	-	-	832	837	-	972	1010	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.15	6.55	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.545	4.045	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	940	-	-	757	-	-	~ 65	82	371	67	81	519
Stage 1	-	-	-	-	-	-	316	342	-	388	406	-
Stage 2	-	-	-	-	-	-	359	378	-	306	320	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	939	-	-	756	-	-	~ 22	56	370	~ 19	55	518
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 22	56	-	~ 19	55	-
Stage 1	-	-	-	-	-	-	~ 276	299	-	339	317	-
Stage 2	-	-	-	-	-	-	~ 224	296	-	204	279	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1.5	$ 4955.3	$ 899
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	22	102	939	-	-	756	-	-	48
HCM Lane V/C Ratio	14.182	0.833	0.061	-	-	0.139	-	-	2.583
HCM Control Delay (s)	$ 6271.6	123.8	9.1	0	-	10.5	0	-	$ 899
HCM Lane LOS	F	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	39.2	4.7	0.2	-	-	0.5	-	-	13.1

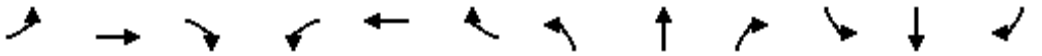
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	545	145	95	383	204	100	123	135	51	203	90
Future Volume (vph)	80	545	145	95	383	204	100	123	135	51	203	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			7	7			7					7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	6%	6%	6%	6%	6%	6%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	65.0	65.0		65.0	65.0		35.0	35.0		35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 89.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

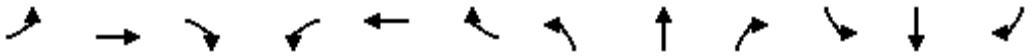
Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	545	145	95	383	204	100	123	135	51	203	90
Future Volume (veh/h)	80	545	145	95	383	204	100	123	135	51	203	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	80	545	145	95	383	204	100	123	135	51	203	90
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	4	4	3	3	3	6	6	6	6	6	6
Cap, veh/h	433	879	234	366	714	380	207	217	238	228	327	145
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	815	1399	372	747	1137	606	1046	783	860	1079	1184	525
Grp Volume(v), veh/h	80	0	690	95	0	587	100	0	258	51	0	293
Grp Sat Flow(s),veh/h/ln	815	0	1771	747	0	1743	1046	0	1643	1079	0	1709
Q Serve(g_s), s	5.9	0.0	22.8	8.5	0.0	18.2	8.9	0.0	13.0	4.1	0.0	14.4
Cycle Q Clear(g_c), s	24.1	0.0	22.8	31.4	0.0	18.2	23.3	0.0	13.0	17.1	0.0	14.4
Prop In Lane	1.00		0.21	1.00		0.35	1.00		0.52	1.00		0.31
Lane Grp Cap(c), veh/h	433	0	1112	366	0	1094	207	0	454	228	0	472
V/C Ratio(X)	0.18	0.00	0.62	0.26	0.00	0.54	0.48	0.00	0.57	0.22	0.00	0.62
Avail Cap(c_a), veh/h	433	0	1112	366	0	1094	249	0	519	270	0	540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	10.9	20.5	0.0	10.0	40.6	0.0	29.9	37.2	0.0	30.4
Incr Delay (d2), s/veh	0.9	0.0	2.6	1.7	0.0	1.9	2.5	0.0	1.6	0.5	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	9.0	1.7	0.0	7.0	2.4	0.0	5.3	1.1	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	13.5	22.2	0.0	11.9	43.0	0.0	31.5	37.7	0.0	32.1
LnGrp LOS	B	A	B	C	A	B	D	A	C	D	A	C
Approach Vol, veh/h		770			682			358			344	
Approach Delay, s/veh		13.9			13.4			34.7			33.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		65.0		31.2		65.0		31.2				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		60.4		30.4		60.4		30.4				
Max Q Clear Time (g_c+I1), s		26.1		25.3		33.4		19.1				
Green Ext Time (p_c), s		6.9		1.2		5.6		1.6				

Intersection Summary												
HCM 6th Ctrl Delay			20.2									
HCM 6th LOS			C									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	493	277	40	495	75	258	25	5	30	25	58
Future Volume (vph)	35	493	277	40	495	75	258	25	5	30	25	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	0%	0%	0%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	152

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	493	277	40	495	75	258	25	5	30	25	58
Future Vol, veh/h	35	493	277	40	495	75	258	25	5	30	25	58
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	2	2	2	3	3	3	0	0	0
Mvmt Flow	35	493	277	40	495	75	258	25	5	30	25	58

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	572	0	0	772	0	0	1360	1356	636	1334	1457	537
Stage 1	-	-	-	-	-	-	704	704	-	615	615	-
Stage 2	-	-	-	-	-	-	656	652	-	719	842	-
Critical Hdwy	4.14	-	-	4.12	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.236	-	-	2.218	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	991	-	-	843	-	-	~ 125	148	476	132	131	548
Stage 1	-	-	-	-	-	-	426	438	-	482	485	-
Stage 2	-	-	-	-	-	-	453	463	-	423	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	989	-	-	841	-	-	~ 84	128	474	100	113	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 84	128	-	100	113	-
Stage 1	-	-	-	-	-	-	397	409	-	450	450	-
Stage 2	-	-	-	-	-	-	355	430	-	367	357	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.6	$ 935.1	53.8
HCM LOS			F	F

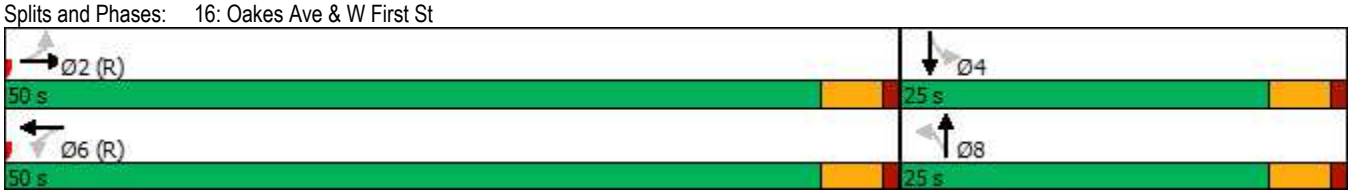
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	84	146	989	-	-	841	-	-	180
HCM Lane V/C Ratio	3.071	0.205	0.035	-	-	0.048	-	-	0.628
HCM Control Delay (s)	$ 1039.7	35.9	8.8	0	-	9.5	0	-	53.8
HCM Lane LOS	F	E	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	25.5	0.7	0.1	-	-	0.1	-	-	3.6

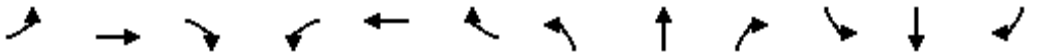
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	506	216	40	380	64	263	154	75	66	231	25
Future Volume (vph)	10	506	216	40	380	64	263	154	75	66	231	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	22		6	6		22						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	5%	5%	5%	9%	9%	9%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0		25.0	25.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St





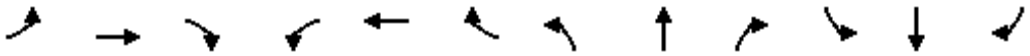
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	506	216	40	380	64	263	154	75	66	231	25
Future Volume (veh/h)	10	506	216	40	380	64	263	154	75	66	231	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1826	1826	1826	1767	1767	1767
Adj Flow Rate, veh/h	10	506	216	40	380	64	263	154	75	66	231	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	3	3	3	3	3	5	5	5	9	9	9
Cap, veh/h	660	670	286	294	843	142	240	285	139	256	385	42
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	929	1104	471	725	1389	234	1097	1044	508	1088	1410	153
Grp Volume(v), veh/h	10	0	722	40	0	444	263	0	229	66	0	256
Grp Sat Flow(s),veh/h/ln	929	0	1575	725	0	1623	1097	0	1552	1088	0	1562
Q Serve(g_s), s	0.3	0.0	25.0	2.5	0.0	0.0	9.8	0.0	9.4	4.1	0.0	10.7
Cycle Q Clear(g_c), s	0.3	0.0	25.0	27.5	0.0	0.0	20.5	0.0	9.4	13.6	0.0	10.7
Prop In Lane	1.00		0.30	1.00		0.14	1.00		0.33	1.00		0.10
Lane Grp Cap(c), veh/h	660	0	955	294	0	984	240	0	424	256	0	427
V/C Ratio(X)	0.02	0.00	0.76	0.14	0.00	0.45	1.10	0.00	0.54	0.26	0.00	0.60
Avail Cap(c_a), veh/h	660	0	955	294	0	984	240	0	424	256	0	427
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.00	0.81	0.93	0.00	0.93	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	0.0	10.7	7.5	0.0	0.0	34.6	0.0	23.2	29.0	0.0	23.7
Incr Delay (d2), s/veh	0.0	0.0	4.5	0.9	0.0	1.4	86.7	0.0	0.8	0.2	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	8.6	0.4	0.0	0.4	10.1	0.0	3.4	1.1	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	15.2	8.4	0.0	1.4	121.2	0.0	24.0	29.2	0.0	25.3
LnGrp LOS	A	A	B	A	A	A	F	A	C	C	A	C
Approach Vol, veh/h		732			484			492			322	
Approach Delay, s/veh		15.1			2.0			76.0			26.1	
Approach LOS		B			A			E			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	25.0	50.0	25.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	45.5	20.5	45.5	20.5
Max Q Clear Time (g_c+I1), s	27.0	15.6	29.5	22.5
Green Ext Time (p_c), s	5.5	0.5	3.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	316	177	30	471	40	76	35	25	5	15	78
Future Volume (vph)	45	316	177	30	471	40	76	35	25	5	15	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	7		7	7		7	4		41	41		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	27
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	316	177	30	471	40	76	35	25	5	15	78
Future Vol, veh/h	45	316	177	30	471	40	76	35	25	5	15	78
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2	5	5	5	0	0	0
Mvmt Flow	45	316	177	30	471	40	76	35	25	5	15	78
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	28.7	31.7	12.8	11.3
HCM LOS	D	D	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	8%	6%	5%
Vol Thru, %	26%	59%	87%	15%
Vol Right, %	18%	33%	7%	80%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	136	538	541	98
LT Vol	76	45	30	5
Through Vol	35	316	471	15
RT Vol	25	177	40	78
Lane Flow Rate	136	538	541	98
Geometry Grp	1	1	1	1
Degree of Util (X)	0.269	0.821	0.845	0.183
Departure Headway (Hd)	7.126	5.496	5.621	6.739
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	503	662	649	530
Service Time	5.183	3.513	3.637	4.803
HCM Lane V/C Ratio	0.27	0.813	0.834	0.185
HCM Control Delay	12.8	28.7	31.7	11.3
HCM Lane LOS	B	D	D	B
HCM 95th-tile Q	1.1	8.6	9.3	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	516	30	30	414	62	15	14	40	150	37	45
Future Volume (vph)	80	516	30	30	414	62	15	14	40	150	37	45
Satd. Flow (prot)	1736	1628	0	1770	1637	0	0	1799	1411	0	1808	1439
Flt Permitted	0.454			0.409				0.831			0.749	
Satd. Flow (perm)	826	1628	0	758	1637	0	0	1530	1367	0	1397	1403
Satd. Flow (RTOR)		7			18				40			45
Confl. Peds. (#/hr)	7		11	11		7	4		9	9		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	3%	3%	3%	1%	1%	1%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	80	546	0	30	476	0	0	29	40	0	187	45
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	50.0	50.0		50.0	50.0		25.0	25.0	50.0	25.0	25.0	50.0
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%	66.7%	33.3%	33.3%	66.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	51.6	51.6		51.6	51.6			14.4	51.6		14.4	51.6
Actuated g/C Ratio	0.69	0.69		0.69	0.69			0.19	0.69		0.19	0.69
v/c Ratio	0.14	0.49		0.06	0.42			0.10	0.04		0.70	0.05
Control Delay	7.7	10.3		5.6	7.2			23.1	2.2		41.3	2.1
Queue Delay	0.0	0.3		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	7.7	10.6		5.6	7.2			23.1	2.2		41.3	2.1
LOS	A	B		A	A			C	A		D	A
Approach Delay		10.2			7.2			11.0			33.7	
Approach LOS		B			A			B			C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	397	15	0	0	437
Future Volume (vph)	40	397	15	0	0	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	397	15	0	0	437
Future Vol, veh/h	40	397	15	0	0	437
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	7	7	0	0	4	4
Mvmt Flow	40	397	15	0	0	437

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	452	15	0	-	-	-
Stage 1	15	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	-	-
Pot Cap-1 Maneuver	556	1050	-	0	0	-
Stage 1	995	-	-	0	0	-
Stage 2	641	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	556	1050	-	-	-	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	641	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	971	-
HCM Lane V/C Ratio	-	0.45	-
HCM Control Delay (s)	-	11.7	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	2.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	10	0	410	92
Future Volume (vph)	0	0	10	0	410	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

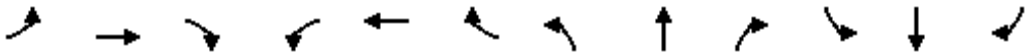
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	10	0	410	92
Future Vol, veh/h	0	0	10	0	410	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	5	5
Mvmt Flow	0	0	10	0	410	92

Major/Minor	Minor2		Major2	
Conflicting Flow All	912	92	0	0
Stage 1	912	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.15	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.245	-
Pot Cap-1 Maneuver	276	971	-	-
Stage 1	355	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	971	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	45	133	18	10	10	98	578	26	10	455	40
Future Volume (vph)	25	45	133	18	10	10	98	578	26	10	455	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	30		15	15		30	13		13	13		13
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

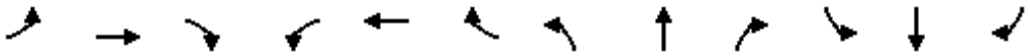
Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	45	133	18	10	10	98	578	26	10	455	40
Future Vol, veh/h	25	45	133	18	10	10	98	578	26	10	455	40
Conflicting Peds, #/hr	30	0	15	15	0	30	13	0	13	13	0	13
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	25	45	133	18	10	10	98	578	26	10	455	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1335	1321	503	1399	1328	634	508	0	0	617	0	0
Stage 1	508	508	-	800	800	-	-	-	-	-	-	-
Stage 2	827	813	-	599	528	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.12	-	-	4.14	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.218	-	-	2.236	-	-
Pot Cap-1 Maneuver	132	158	573	119	157	483	1057	-	-	953	-	-
Stage 1	551	542	-	382	400	-	-	-	-	-	-	-
Stage 2	369	395	-	492	531	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	103	130	558	57	130	463	1044	-	-	941	-	-
Mov Cap-2 Maneuver	103	130	-	57	130	-	-	-	-	-	-	-
Stage 1	467	527	-	324	339	-	-	-	-	-	-	-
Stage 2	292	335	-	333	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	64.6	69.3	1.2	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1044	-	-	245	92	941	-	-
HCM Lane V/C Ratio	0.094	-	-	0.829	0.413	0.011	-	-
HCM Control Delay (s)	8.8	0	-	64.6	69.3	8.9	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	6.5	1.7	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	43	35	0	10	82	363	33	5	292	10
Future Volume (vph)	5	0	43	35	0	10	82	363	33	5	292	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	18%	18%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

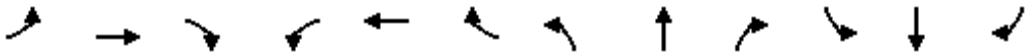
Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	0	43	35	0	10	82	363	33	5	292	10
Future Vol, veh/h	5	0	43	35	0	10	82	363	33	5	292	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	18	18	18	0	0	0	3	3	3	4	4	4
Mvmt Flow	5	0	43	35	0	10	82	363	33	5	292	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	856	867	297	873	856	380	302	0	0	396	0	0
Stage 1	307	307	-	544	544	-	-	-	-	-	-	-
Stage 2	549	560	-	329	312	-	-	-	-	-	-	-
Critical Hdwy	7.28	6.68	6.38	7.1	6.5	6.2	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.28	5.68	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.662	4.162	3.462	3.5	4	3.3	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	261	274	706	273	297	671	1253	-	-	1152	-	-
Stage 1	670	633	-	527	522	-	-	-	-	-	-	-
Stage 2	492	486	-	688	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	240	250	706	239	271	671	1253	-	-	1152	-	-
Mov Cap-2 Maneuver	240	250	-	239	271	-	-	-	-	-	-	-
Stage 1	614	630	-	483	478	-	-	-	-	-	-	-
Stage 2	444	445	-	643	658	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	20.4	1.4	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	587	279	1152	-	-
HCM Lane V/C Ratio	0.065	-	-	0.082	0.161	0.004	-	-
HCM Control Delay (s)	8.1	0	-	11.7	20.4	8.1	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.6	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	156	5	33	222	38	0	25	38	48	0	25
Future Volume (vph)	20	156	5	33	222	38	0	25	38	48	0	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	11%	11%	11%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	156	5	33	222	38	0	25	38	48	0	25
Future Vol, veh/h	20	156	5	33	222	38	0	25	38	48	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	0	0	0	11	11	11	0	0	0
Mvmt Flow	20	156	5	33	222	38	0	25	38	48	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	260	0	0	161	0	0	519	525	159	537	508	241
Stage 1	-	-	-	-	-	-	199	199	-	307	307	-
Stage 2	-	-	-	-	-	-	320	326	-	230	201	-
Critical Hdwy	4.15	-	-	4.1	-	-	7.21	6.61	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.599	4.099	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1287	-	-	1430	-	-	453	445	863	458	471	803
Stage 1	-	-	-	-	-	-	783	720	-	707	665	-
Stage 2	-	-	-	-	-	-	673	633	-	777	739	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1287	-	-	1430	-	-	424	425	863	404	450	803
Mov Cap-2 Maneuver	-	-	-	-	-	-	424	425	-	404	450	-
Stage 1	-	-	-	-	-	-	770	708	-	695	647	-
Stage 2	-	-	-	-	-	-	634	616	-	704	726	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.9	11.5	13.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	613	1287	-	-	1430	-	-	487
HCM Lane V/C Ratio	0.103	0.016	-	-	0.023	-	-	0.15
HCM Control Delay (s)	11.5	7.8	0	-	7.6	0	-	13.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.5

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	33	26	1126	59	51	341
Future Volume (vph)	33	26	1126	59	51	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1058		1613			1660
Travel Time (s)	28.9		31.4			32.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	33	26	1126	59	51	341
Future Vol, veh/h	33	26	1126	59	51	341
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	36	28	1224	64	55	371

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1737	1256	0	0	1288	0
Stage 1	1256	-	-	-	-	-
Stage 2	481	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	73	166	-	-	406	-
Stage 1	214	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	61	166	-	-	406	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	214	-	-	-	-	-
Stage 2	442	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	124.1	0	2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	85	406	-
HCM Lane V/C Ratio	-	-	0.754	0.137	-
HCM Control Delay (s)	-	-	124.1	15.3	0
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	3.8	0.5	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	55	415	180	87	260
Future Volume (vph)	88	55	415	180	87	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	892		1216			192
Travel Time (s)	24.3		23.7			3.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

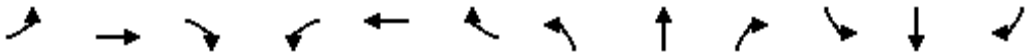
Intersection	
Int Delay, s/veh	3.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	55	415	180	87	260
Future Vol, veh/h	88	55	415	180	87	260
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	96	60	451	196	95	283

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1022	549	0	0	647	0
Stage 1	549	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	260	534	-	-	934	-
Stage 1	577	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	229	534	-	-	934	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	577	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.3	0	2.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	229	534	934	-
HCM Lane V/C Ratio	-	-	0.418	0.112	0.101	-
HCM Control Delay (s)	-	-	31.6	12.6	9.3	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	1.9	0.4	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	596	173	394	669	40	156	0	405	25	0	32
Future Volume (vph)	42	596	173	394	669	40	156	0	405	25	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			868			386	
Travel Time (s)		32.9			12.3			23.7			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1703

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	42	596	173	394	669	40	156	0	405	25	0	32
Future Vol, veh/h	42	596	173	394	669	40	156	0	405	25	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	46	648	188	428	727	43	170	0	440	27	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	770	0	0	836	0	0	2456	2460	742	2659	2533	749
Stage 1	-	-	-	-	-	-	834	834	-	1605	1605	-
Stage 2	-	-	-	-	-	-	1622	1626	-	1054	928	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	840	-	-	793	-	-	~ 21	30	~ 414	~ 15	27	410
Stage 1	-	-	-	-	-	-	361	382	-	132	164	-
Stage 2	-	-	-	-	-	-	~ 129	160	-	272	345	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	840	-	-	793	-	-	~ 3	1	~ 414	-	1	410
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 3	1	-	-	1	-
Stage 1	-	-	-	-	-	-	323	342	-	118	8	-
Stage 2	-	-	-	-	-	-	~ 6	8	-	-	308	-

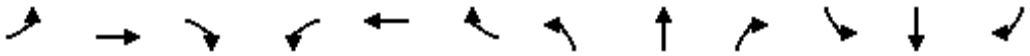
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	5.3	$ 7675.1	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	3	414	840	-	-	793	-	-	-
HCM Lane V/C Ratio	56.522	1.063	0.054	-	-	0.54	-	-	-
HCM Control Delay (s)	$ 27356.9	94	9.5	0	-	14.7	0	-	-
HCM Lane LOS	F	F	A	A	-	B	A	-	-
HCM 95th %tile Q(veh)	23.5	14.6	0.2	-	-	3.3	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Sunday LOS Calculations

(2025 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	0	5	0	0	0	0	10	5	135	20	0
Future Volume (vph)	115	0	5	0	0	0	0	10	5	135	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

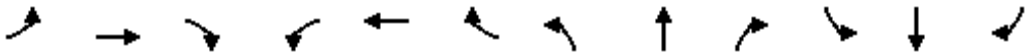
Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	0	5	0	0	0	0	10	5	135	20	0
Future Vol, veh/h	115	0	5	0	0	0	0	10	5	135	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	115	0	5	0	0	0	0	10	5	135	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	303	305	20	-	0	0	15	0	0
Stage 1	290	290	-	-	-	-	-	-	-
Stage 2	13	15	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	691	610	1061	0	-	-	1616	-	0
Stage 1	762	674	-	0	-	-	-	-	0
Stage 2	1012	885	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	633	0	1061	-	-	-	1616	-	-
Mov Cap-2 Maneuver	633	0	-	-	-	-	-	-	-
Stage 1	762	0	-	-	-	-	-	-	-
Stage 2	927	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	0	6.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	644	1616	-
HCM Lane V/C Ratio	-	-	0.186	0.084	-
HCM Control Delay (s)	-	-	11.9	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	5	110	5	120	0	0	135	865
Future Volume (vph)	0	0	0	20	5	110	5	120	0	0	135	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

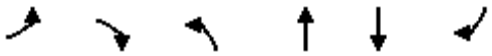
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	5	110	5	120	0	0	135	865
Future Vol, veh/h	0	0	0	20	5	110	5	120	0	0	135	865
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	20	5	110	5	120	0	0	135	865

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	698	1130	120	1000	0	-	-	-	0
Stage 1	130	130	-	-	-	-	-	-	-
Stage 2	568	1000	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	410	205	937	700	-	0	0	-	-
Stage 1	901	792	-	-	-	0	0	-	-
Stage 2	571	324	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	407	0	937	700	-	-	-	-	-
Mov Cap-2 Maneuver	407	0	-	-	-	-	-	-	-
Stage 1	894	0	-	-	-	-	-	-	-
Stage 2	571	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	700	-	781	-	-
HCM Lane V/C Ratio	0.007	-	0.173	-	-
HCM Control Delay (s)	10.2	0	10.6	-	-
HCM Lane LOS	B	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	45	15	215	955	20
Future Volume (vph)	15	45	15	215	955	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	45	15	215	955	20
Future Vol, veh/h	15	45	15	215	955	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	15	45	15	215	955	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1210	965	975	0	-	0
Stage 1	965	-	-	-	-	-
Stage 2	245	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	200	307	716	-	-	-
Stage 1	367	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	196	307	716	-	-	-
Mov Cap-2 Maneuver	196	-	-	-	-	-
Stage 1	359	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.2	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	716	-	269	-	-
HCM Lane V/C Ratio	0.021	-	0.223	-	-
HCM Control Delay (s)	10.1	-	22.2	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

LANE LEVEL OF SERVICE

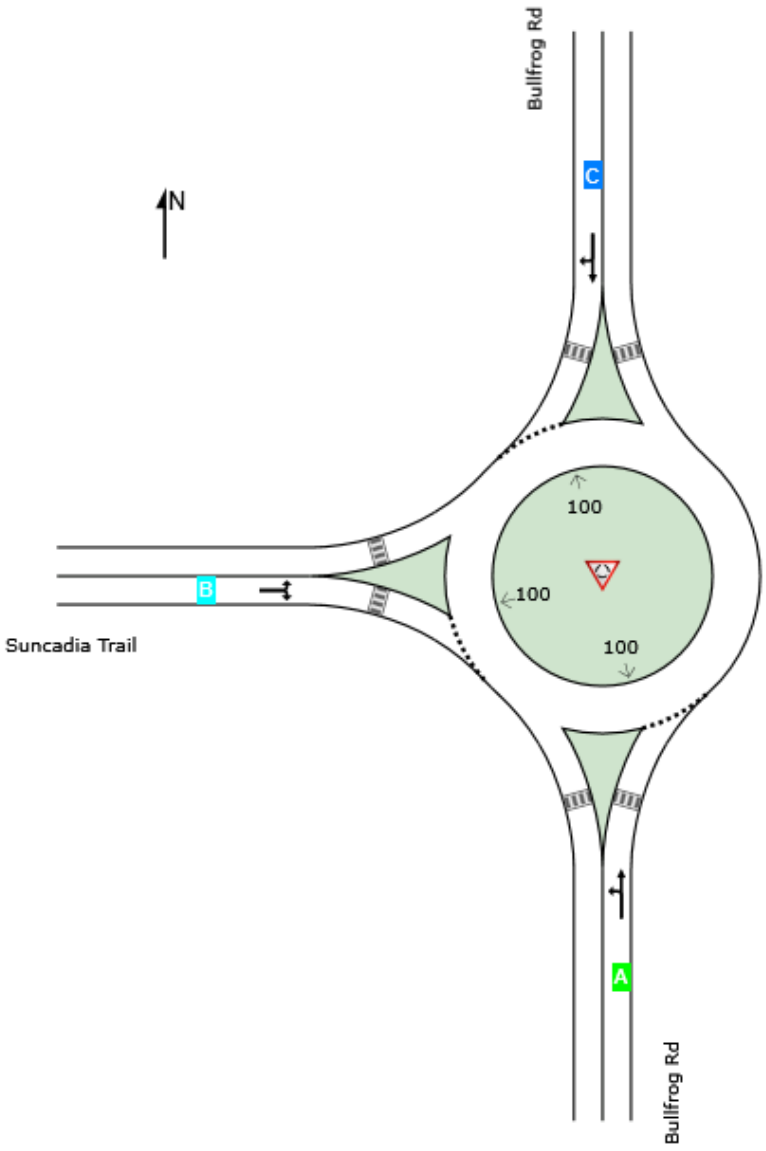
Lane Level of Service

Site: 4 [2025 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	C	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	230	0.6	230	0.6	1271	0.181	100	4.3	LOS A	0.9	22.5	Full	1600	0.0	0.0
Approach	230	0.6	230	0.6		0.181		4.3	LOS A	0.9	22.5				
North: Bullfrog Rd															
Lane 1[d]	930	1.0	930	1.0	1195	0.778	100	15.4	LOS C	11.8	296.6	Full	1600	0.0	0.0
Approach	930	1.0	930	1.0		0.778		15.4	LOS C	11.8	296.6				
West: Suncadia Trail															
Lane 1[d]	220	0.0	220	0.0	587	0.375	100	11.6	LOS B	1.8	44.8	Full	1600	0.0	0.0
Approach	220	0.0	220	0.0		0.375		11.6	LOS B	1.8	44.8				
All Vehicles	1380	0.8	1380	0.8		0.778		13.0	LOS B	11.8	296.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	130	100	230	0.6	1271	0.181	100	NA	NA
Approach	130	100	230	0.6		0.181			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	830	100	930	1.0	1195	0.778	100	NA	NA
Approach	830	100	930	1.0		0.778			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	75	145	220	0.0	587	0.375	100	NA	NA
Approach	75	145	220	0.0		0.375			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1380	0.8	0.778

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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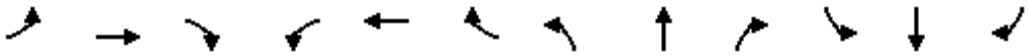


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	20	0	0	0	15	160	0	0	910	15
Future Volume (vph)	15	0	20	0	0	0	15	160	0	0	910	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	0	20	0	0	0	15	160	0	0	910	15
Future Vol, veh/h	15	0	20	0	0	0	15	160	0	0	910	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	15	0	20	0	0	0	15	160	0	0	910	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1108	1108	918	1118	1115	160	925	0	0	160	0	0
Stage 1	918	918	-	190	190	-	-	-	-	-	-	-
Stage 2	190	190	-	928	925	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	183	206	322	186	210	890	747	-	-	1425	-	-
Stage 1	319	344	-	816	747	-	-	-	-	-	-	-
Stage 2	800	734	-	324	351	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	201	322	171	205	890	747	-	-	1425	-	-
Mov Cap-2 Maneuver	180	201	-	171	205	-	-	-	-	-	-	-
Stage 1	312	344	-	798	731	-	-	-	-	-	-	-
Stage 2	782	718	-	304	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.5	0	0.9	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	747	-	-	241	-	1425	-	-
HCM Lane V/C Ratio	0.02	-	-	0.145	-	-	-	-
HCM Control Delay (s)	9.9	0	-	22.5	0	0	-	-
HCM Lane LOS	A	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

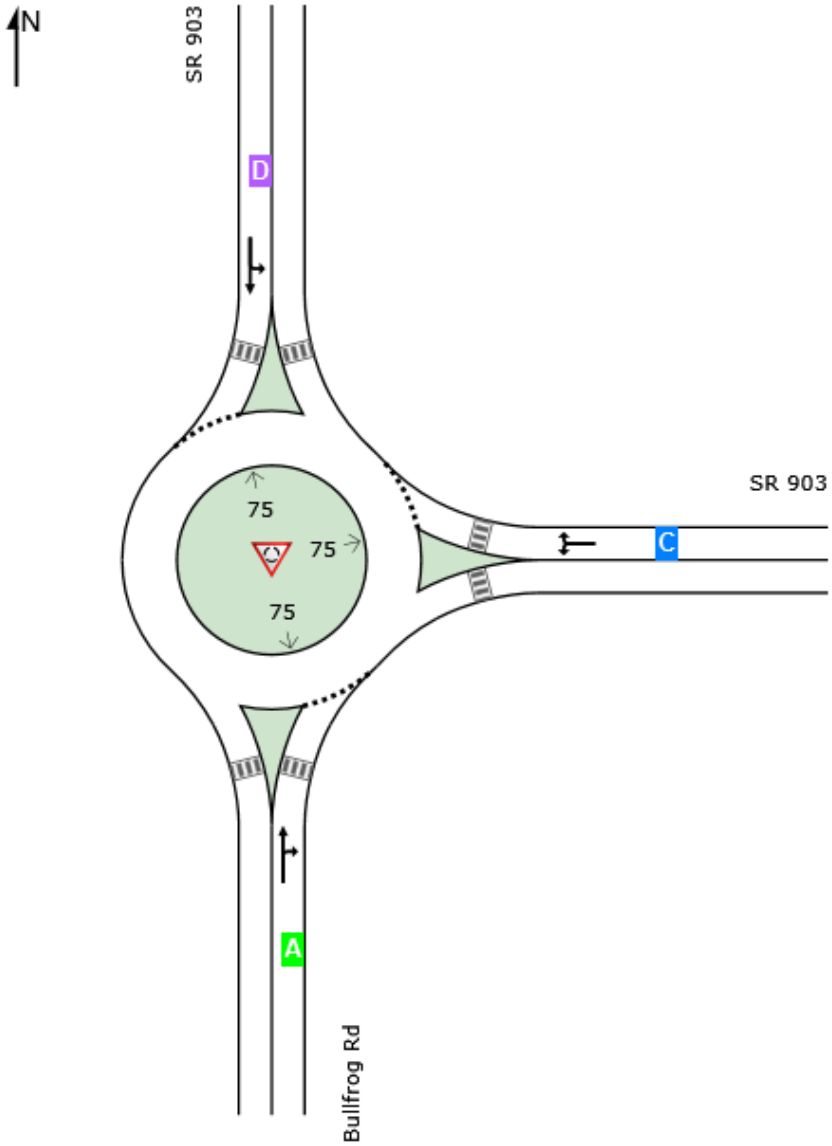
Lane Level of Service

Site: 6 [2025 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	C	D	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	175	0.0	175	0.0	1026	0.171	100	5.1	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	175	0.0	175	0.0		0.171		5.1	LOS A	0.8	19.6				
East: SR 903															
Lane 1[d]	970	1.1	970	1.1	1220	0.795	100	15.8	LOS C	11.2	283.3	Full	1600	0.0	0.0
Approach	970	1.1	970	1.1		0.795		15.8	LOS C	11.2	283.3				
North: SR 903															
Lane 1[d]	530	0.3	530	0.3	677	0.782	100	25.1	LOS D	8.6	215.8	Full	1600	0.0	0.0
Approach	530	0.3	530	0.3		0.782		25.1	LOS D	8.6	215.8				
All Vehicles	1675	0.7	1675	0.7		0.795		17.6	LOS C	11.2	283.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	110	65	175	0.0	1026	0.171	100	NA	NA
Approach	110	65	175	0.0		0.171			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	685	285	970	1.1	1220	0.795	100	NA	NA
Approach	685	285	970	1.1		0.795			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	290	240	530	0.3	677	0.782	100	NA	NA
Approach	290	240	530	0.3		0.782			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1675	0.7	0.795

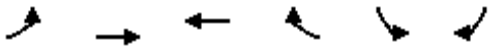
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	355	960	20	10	10
Future Volume (vph)	5	355	960	20	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

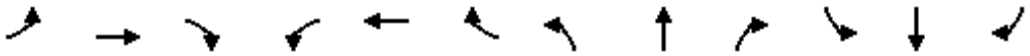
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	355	960	20	10	10
Future Vol, veh/h	5	355	960	20	10	10
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	5	355	960	20	10	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	985	0	-	0	1340	975
Stage 1	-	-	-	-	975	-
Stage 2	-	-	-	-	365	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	705	-	-	-	170	308
Stage 1	-	-	-	-	369	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	702	-	-	-	167	307
Mov Cap-2 Maneuver	-	-	-	-	167	-
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	703	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	23.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	702	-	-	-	216
HCM Lane V/C Ratio	0.007	-	-	-	0.093
HCM Control Delay (s)	10.2	0	-	-	23.4
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	310	50	20	900	5	85	0	45	10	0	0
Future Volume (vph)	0	310	50	20	900	5	85	0	45	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

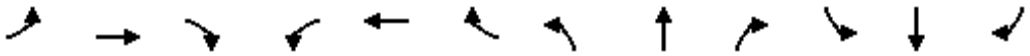
Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	310	50	20	900	5	85	0	45	10	0	0
Future Vol, veh/h	0	310	50	20	900	5	85	0	45	10	0	0
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	0	310	50	20	900	5	85	0	45	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	905	0	0	363	0	0	1281	1283	338	1301	1306	903
Stage 1	-	-	-	-	-	-	338	338	-	943	943	-
Stage 2	-	-	-	-	-	-	943	945	-	358	363	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	756	-	-	1201	-	-	142	164	702	139	161	339
Stage 1	-	-	-	-	-	-	674	639	-	318	344	-
Stage 2	-	-	-	-	-	-	314	339	-	664	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	756	-	-	1198	-	-	138	158	700	127	155	339
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	158	-	127	155	-
Stage 1	-	-	-	-	-	-	672	637	-	318	332	-
Stage 2	-	-	-	-	-	-	303	327	-	621	626	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	56.6	35.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	191	756	-	-	1198	-	-	127
HCM Lane V/C Ratio	0.681	-	-	-	0.017	-	-	0.079
HCM Control Delay (s)	56.6	0	-	-	8.1	0	-	35.8
HCM Lane LOS	F	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	4.1	0	-	-	0.1	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	340	40	20	875	25	70	0	15	10	0	0
Future Volume (vph)	20	340	40	20	875	25	70	0	15	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	340	40	20	875	25	70	0	15	10	0	0
Future Vol, veh/h	20	340	40	20	875	25	70	0	15	10	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	20	340	40	20	875	25	70	0	15	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	900	0	0	384	0	0	1332	1344	364	1336	1352	888
Stage 1	-	-	-	-	-	-	404	404	-	928	928	-
Stage 2	-	-	-	-	-	-	928	940	-	408	424	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	755	-	-	1180	-	-	131	152	681	132	151	345
Stage 1	-	-	-	-	-	-	623	599	-	324	349	-
Stage 2	-	-	-	-	-	-	321	342	-	624	590	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	755	-	-	1176	-	-	124	141	678	122	140	345
Mov Cap-2 Maneuver	-	-	-	-	-	-	124	141	-	122	140	-
Stage 1	-	-	-	-	-	-	599	576	-	313	337	-
Stage 2	-	-	-	-	-	-	310	330	-	589	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.2	60.1	37.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	145	755	-	-	1176	-	-	122
HCM Lane V/C Ratio	0.586	0.026	-	-	0.017	-	-	0.082
HCM Control Delay (s)	60.1	9.9	0	-	8.1	0	-	37.1
HCM Lane LOS	F	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	3	0.1	-	-	0.1	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	60	10	20	115
Future Volume (vph)	25	15	60	10	20	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

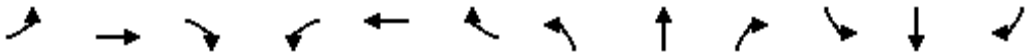
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	60	10	20	115
Future Vol, veh/h	25	15	60	10	20	115
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	60	10	20	115
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.3	7.8	7.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	15%	0%	86%
Vol Thru, %	0%	62%	14%
Vol Right, %	85%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	135	40	70
LT Vol	20	0	60
Through Vol	0	25	10
RT Vol	115	15	0
Lane Flow Rate	135	40	70
Geometry Grp	1	1	1
Degree of Util (X)	0.138	0.045	0.084
Departure Headway (Hd)	3.676	4.051	4.34
Convergence, Y/N	Yes	Yes	Yes
Cap	965	877	823
Service Time	1.735	2.107	2.384
HCM Lane V/C Ratio	0.14	0.046	0.085
HCM Control Delay	7.3	7.3	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.5	0.1	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	220	120	55	295	95	70	55	130	50	40	35
Future Volume (vph)	80	220	120	55	295	95	70	55	130	50	40	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

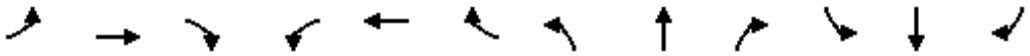
Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	80	220	120	55	295	95	70	55	130	50	40	35
Future Vol, veh/h	80	220	120	55	295	95	70	55	130	50	40	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	80	220	120	55	295	95	70	55	130	50	40	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	340	0	0	931	940	280	986	953	344
Stage 1	-	-	-	-	-	-	440	440	-	453	453	-
Stage 2	-	-	-	-	-	-	491	500	-	533	500	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1169	-	-	1219	-	-	247	264	759	229	261	703
Stage 1	-	-	-	-	-	-	596	578	-	590	573	-
Stage 2	-	-	-	-	-	-	559	543	-	534	546	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1219	-	-	187	235	759	143	232	702
Mov Cap-2 Maneuver	-	-	-	-	-	-	187	235	-	143	232	-
Stage 1	-	-	-	-	-	-	555	539	-	550	547	-
Stage 2	-	-	-	-	-	-	470	519	-	370	509	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	1	28.3	28.5
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	205	759	1169	-	-	1219	-	-	143	337
HCM Lane V/C Ratio	0.61	0.171	0.068	-	-	0.045	-	-	0.35	0.223
HCM Control Delay (s)	46.7	10.7	8.3	-	-	8.1	-	-	43.1	18.7
HCM Lane LOS	E	B	A	-	-	A	-	-	E	C
HCM 95th %tile Q(veh)	3.5	0.6	0.2	-	-	0.1	-	-	1.4	0.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	370	5	60	505	40	20	30	60	5	50	50
Future Volume (vph)	75	370	5	60	505	40	20	30	60	5	50	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

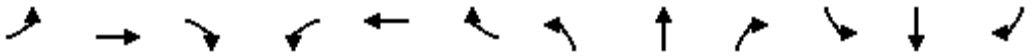
Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	370	5	60	505	40	20	30	60	5	50	50
Future Vol, veh/h	75	370	5	60	505	40	20	30	60	5	50	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	370	5	60	505	40	20	30	60	5	50	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	377	0	0	1220	1192	375	1215	1174	527
Stage 1	-	-	-	-	-	-	525	525	-	647	647	-
Stage 2	-	-	-	-	-	-	695	667	-	568	527	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	1027	-	-	1181	-	-	155	185	667	157	191	549
Stage 1	-	-	-	-	-	-	532	526	-	458	465	-
Stage 2	-	-	-	-	-	-	429	454	-	506	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	1179	-	-	99	162	666	111	167	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	162	-	111	167	-
Stage 1	-	-	-	-	-	-	492	487	-	424	440	-
Stage 2	-	-	-	-	-	-	328	430	-	400	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	28.5	31
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	129	666	1025	-	-	1179	-	-	241
HCM Lane V/C Ratio	0.388	0.09	0.073	-	-	0.051	-	-	0.436
HCM Control Delay (s)	49.6	10.9	8.8	-	-	8.2	-	-	31
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.6	0.3	0.2	-	-	0.2	-	-	2.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	255	70	70	600	10	320	15	10	5	10	10
Future Volume (vph)	15	255	70	70	600	10	320	15	10	5	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	109.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	255	70	70	600	10	320	15	10	5	10	10
Future Vol, veh/h	15	255	70	70	600	10	320	15	10	5	10	10
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	15	255	70	70	600	10	320	15	10	5	10	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	328	0	0	1082	1081	295	1088	1111	617
Stage 1	-	-	-	-	-	-	323	323	-	753	753	-
Stage 2	-	-	-	-	-	-	759	758	-	335	358	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	957	-	-	1237	-	-	~ 196	219	747	195	211	494
Stage 1	-	-	-	-	-	-	691	652	-	405	420	-
Stage 2	-	-	-	-	-	-	400	417	-	683	631	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	950	-	-	1233	-	-	~ 169	194	743	165	187	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 169	194	-	165	187	-
Stage 1	-	-	-	-	-	-	676	638	-	394	381	-
Stage 2	-	-	-	-	-	-	347	378	-	644	617	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.8	$ 436.7	21.7
HCM LOS			F	C

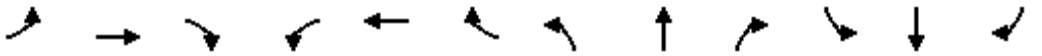
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	169	275	950	-	-	1233	-	-	240
HCM Lane V/C Ratio	1.893	0.091	0.016	-	-	0.057	-	-	0.104
HCM Control Delay (s)	$ 469.3	19.4	8.8	0	-	8.1	0	-	21.7
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	23.9	0.3	0	-	-	0.2	-	-	0.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	90	65	490	270	80	60	75	20	105	40
Future Volume (vph)	15	320	90	65	490	270	80	60	75	20	105	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 90.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



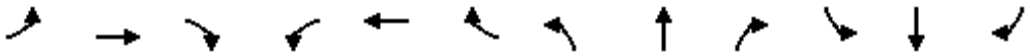
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	90	65	490	270	80	60	75	20	105	40
Future Volume (veh/h)	15	320	90	65	490	270	80	60	75	20	105	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	90	65	490	270	80	60	75	20	105	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	443	1017	286	707	821	452	206	132	165	209	226	86
Arrive On Green	0.72	0.72	0.72	0.72	0.72	0.72	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	706	1404	395	975	1133	624	1248	759	949	1260	1298	495
Grp Volume(v), veh/h	15	0	410	65	0	760	80	0	135	20	0	145
Grp Sat Flow(s),veh/h/ln	706	0	1799	975	0	1757	1248	0	1708	1260	0	1793
Q Serve(g_s), s	1.0	0.0	7.3	2.3	0.0	19.0	5.6	0.0	6.4	1.3	0.0	6.6
Cycle Q Clear(g_c), s	19.9	0.0	7.3	9.6	0.0	19.0	12.1	0.0	6.4	7.7	0.0	6.6
Prop In Lane	1.00		0.22	1.00		0.36	1.00		0.56	1.00		0.28
Lane Grp Cap(c), veh/h	443	0	1303	707	0	1273	206	0	297	209	0	312
V/C Ratio(X)	0.03	0.00	0.31	0.09	0.00	0.60	0.39	0.00	0.45	0.10	0.00	0.47
Avail Cap(c_a), veh/h	443	0	1303	707	0	1273	340	0	480	345	0	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.9	0.0	4.4	6.2	0.0	6.0	39.0	0.0	33.5	36.9	0.0	33.5
Incr Delay (d2), s/veh	0.1	0.0	0.6	0.3	0.0	2.1	1.7	0.0	1.5	0.3	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.5	0.5	0.0	6.4	1.8	0.0	2.8	0.4	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	5.1	6.4	0.0	8.1	40.7	0.0	35.0	37.2	0.0	35.1
LnGrp LOS	B	A	A	A	A	A	D	A	D	D	A	D
Approach Vol, veh/h		425			825			215			165	
Approach Delay, s/veh		5.3			8.0			37.1			35.3	
Approach LOS		A			A			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		70.0		20.3		70.0		20.3				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		65.4		25.4		65.4		25.4				
Max Q Clear Time (g_c+I1), s		21.9		14.1		21.0		9.7				
Green Ext Time (p_c), s		3.3		1.1		8.0		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			13.9									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	175	85	10	200	20	500	15	10	15	10	10
Future Volume (vph)	15	175	85	10	200	20	500	15	10	15	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	43.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	175	85	10	200	20	500	15	10	15	10	10
Future Vol, veh/h	15	175	85	10	200	20	500	15	10	15	10	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	15	175	85	10	200	20	500	15	10	15	10	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	220	0	0	261	0	0	489	489	220	491	521	210
Stage 1	-	-	-	-	-	-	249	249	-	230	230	-
Stage 2	-	-	-	-	-	-	240	240	-	261	291	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1349	-	-	1309	-	-	~ 489	480	820	478	451	815
Stage 1	-	-	-	-	-	-	755	701	-	760	703	-
Stage 2	-	-	-	-	-	-	763	707	-	731	661	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1308	-	-	~ 467	469	818	453	441	815
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 467	469	-	453	441	-
Stage 1	-	-	-	-	-	-	744	691	-	750	697	-
Stage 2	-	-	-	-	-	-	736	701	-	697	652	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.3	87.8	12.5
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	467	566	1349	-	-	1308	-	-	514
HCM Lane V/C Ratio	1.071	0.044	0.011	-	-	0.008	-	-	0.068
HCM Control Delay (s)	91.6	11.7	7.7	0	-	7.8	0	-	12.5
HCM Lane LOS	F	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	15.9	0.1	0	-	-	0	-	-	0.2

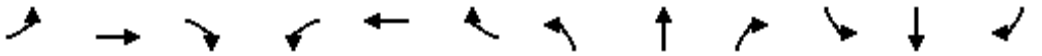
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	280	115	35	480	270	310	300	35	20	75	10
Future Volume (vph)	15	280	115	35	480	270	310	300	35	20	75	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

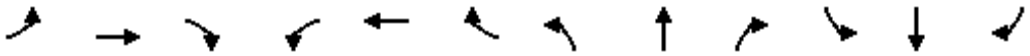
Splits and Phases: 16: Oakes Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	280	115	35	480	270	310	300	35	20	75	10
Future Volume (veh/h)	15	280	115	35	480	270	310	300	35	20	75	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	280	115	35	480	270	310	300	35	20	75	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	508	682	280	550	612	345	415	438	51	201	427	57
Arrive On Green	0.60	0.60	0.60	1.00	1.00	1.00	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	709	1130	464	994	1015	571	1298	1477	172	1033	1440	192
Grp Volume(v), veh/h	15	0	395	35	0	750	310	0	335	20	0	85
Grp Sat Flow(s),veh/h/ln	709	0	1594	994	0	1587	1298	0	1650	1033	0	1632
Q Serve(g_s), s	0.8	0.0	11.8	0.7	0.0	0.0	20.9	0.0	16.1	1.6	0.0	3.5
Cycle Q Clear(g_c), s	0.8	0.0	11.8	12.5	0.0	0.0	24.4	0.0	16.1	17.7	0.0	3.5
Prop In Lane	1.00		0.29	1.00		0.36	1.00		0.10	1.00		0.12
Lane Grp Cap(c), veh/h	508	0	961	550	0	957	415	0	490	201	0	484
V/C Ratio(X)	0.03	0.00	0.41	0.06	0.00	0.78	0.75	0.00	0.68	0.10	0.00	0.18
Avail Cap(c_a), veh/h	508	0	961	550	0	957	427	0	504	210	0	499
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.80	0.00	0.80	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	0.0	9.4	1.4	0.0	0.0	32.5	0.0	27.9	35.7	0.0	23.5
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.2	0.0	5.2	6.0	0.0	3.0	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.2	0.1	0.0	1.4	7.2	0.0	6.7	0.4	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	0.0	10.7	1.5	0.0	5.2	38.6	0.0	30.9	35.8	0.0	23.5
LnGrp LOS	A	A	B	A	A	A	D	A	C	D	A	C
Approach Vol, veh/h		410			785			645			105	
Approach Delay, s/veh		10.5			5.0			34.6			25.9	
Approach LOS		B			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		58.8		31.2		58.8		31.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		53.5		27.5		53.5		27.5				
Max Q Clear Time (g_c+I1), s		13.8		19.7		14.5		26.4				
Green Ext Time (p_c), s		3.1		0.2		7.5		0.3				

Intersection Summary												
HCM 6th Ctrl Delay			17.1									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	145	50	10	150	10	55	10	10	5	10	15
Future Volume (vph)	10	145	50	10	150	10	55	10	10	5	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	145	50	10	150	10	55	10	10	5	10	15
Future Vol, veh/h	10	145	50	10	150	10	55	10	10	5	10	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	10	145	50	10	150	10	55	10	10	5	10	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

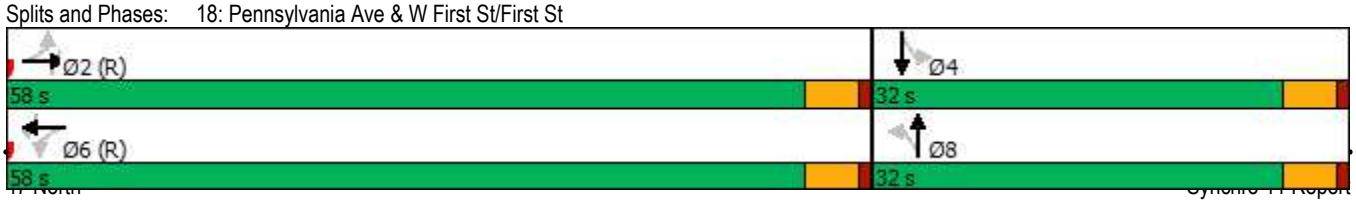
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	8.5	8.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	73%	5%	6%	17%
Vol Thru, %	13%	71%	88%	33%
Vol Right, %	13%	24%	6%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	205	170	30
LT Vol	55	10	10	5
Through Vol	10	145	150	10
RT Vol	10	50	10	15
Lane Flow Rate	75	205	170	30
Geometry Grp	1	1	1	1
Degree of Util (X)	0.101	0.241	0.206	0.038
Departure Headway (Hd)	4.824	4.232	4.359	4.552
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	743	851	825	786
Service Time	2.85	2.251	2.379	2.581
HCM Lane V/C Ratio	0.101	0.241	0.206	0.038
HCM Control Delay	8.4	8.6	8.5	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.9	0.8	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	285	20	25	720	50	5	15	15	60	15	15
Future Volume (vph)	20	285	20	25	720	50	5	15	15	60	15	15
Satd. Flow (prot)	1770	1656	0	1770	1657	0	0	1877	1454	0	1828	1454
Flt Permitted	0.318			0.574				0.933			0.755	
Satd. Flow (perm)	592	1656	0	1061	1657	0	0	1770	1416	0	1428	1414
Satd. Flow (RTOR)		7			7				18			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	305	0	25	770	0	0	20	15	0	75	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	71.8	71.8		71.8	71.8			12.6	71.8		12.6	71.8
Actuated g/C Ratio	0.80	0.80		0.80	0.80			0.14	0.80		0.14	0.80
v/c Ratio	0.04	0.23		0.03	0.58			0.08	0.01		0.38	0.01
Control Delay	3.8	3.3		4.8	8.7			30.2	2.6		38.1	2.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.8	3.3		4.8	8.7			30.2	2.6		38.1	2.6
LOS	A	A		A	A			C	A		D	A
Approach Delay		3.3			8.6			18.4			32.2	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	635	20	0	0	195
Future Volume (vph)	30	635	20	0	0	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	10.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	635	20	0	0	195
Future Vol, veh/h	30	635	20	0	0	195
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	30	635	20	0	0	195

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	215	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	195	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	771	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	836	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	771	1055	-	-	-	-
Mov Cap-2 Maneuver	771	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	836	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1038	-
HCM Lane V/C Ratio	-	0.641	-
HCM Control Delay (s)	-	14.4	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	4.8	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	200	40
Future Volume (vph)	0	0	25	0	200	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

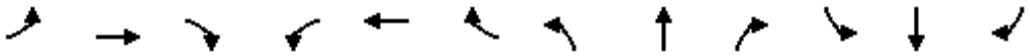
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	200	40
Future Vol, veh/h	0	0	25	0	200	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	200	40

Major/Minor	Minor2		Major2	
Conflicting Flow All	440	40	0	0
Stage 1	440	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	514	1037	-	-
Stage 1	581	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1037	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	35	55	15	5	10	90	215	5	5	300	40
Future Volume (vph)	5	35	55	15	5	10	90	215	5	5	300	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

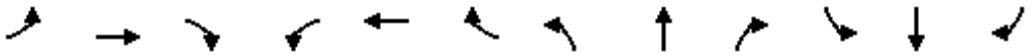
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	35	55	15	5	10	90	215	5	5	300	40
Future Vol, veh/h	5	35	55	15	5	10	90	215	5	5	300	40
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	5	35	55	15	5	10	90	215	5	5	300	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	781	750	345	788	768	254	355	0	0	225	0	0
Stage 1	345	345	-	403	403	-	-	-	-	-	-	-
Stage 2	436	405	-	385	365	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	315	342	702	311	334	790	1215	-	-	1344	-	-
Stage 1	675	640	-	628	603	-	-	-	-	-	-	-
Stage 2	603	602	-	642	627	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	273	305	685	240	298	763	1198	-	-	1338	-	-
Mov Cap-2 Maneuver	273	305	-	240	298	-	-	-	-	-	-	-
Stage 1	608	628	-	571	548	-	-	-	-	-	-	-
Stage 2	523	547	-	549	615	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	17.2	2.4	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1198	-	-	445	325	1338	-	-
HCM Lane V/C Ratio	0.075	-	-	0.213	0.092	0.004	-	-
HCM Control Delay (s)	8.2	0	-	15.3	17.2	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	20	25	0	5	35	135	5	0	225	10
Future Volume (vph)	0	0	20	25	0	5	35	135	5	0	225	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

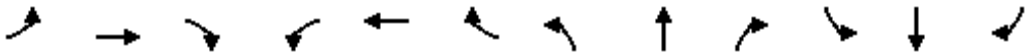
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	20	25	0	5	35	135	5	0	225	10
Future Vol, veh/h	0	0	20	25	0	5	35	135	5	0	225	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	20	25	0	5	35	135	5	0	225	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	440	440	230	448	443	138	235	0	0	140	0	0
Stage 1	230	230	-	208	208	-	-	-	-	-	-	-
Stage 2	210	210	-	240	235	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	531	514	814	524	512	916	1344	-	-	1456	-	-
Stage 1	777	718	-	799	734	-	-	-	-	-	-	-
Stage 2	797	732	-	768	714	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	517	500	814	500	498	916	1344	-	-	1456	-	-
Mov Cap-2 Maneuver	517	500	-	500	498	-	-	-	-	-	-	-
Stage 1	755	718	-	777	713	-	-	-	-	-	-	-
Stage 2	770	712	-	749	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	12	1.6	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1344	-	-	814	541	1456	-	-
HCM Lane V/C Ratio	0.026	-	-	0.025	0.055	-	-	-
HCM Control Delay (s)	7.8	0	-	9.5	12	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	145	5	15	95	10	10	0	10	25	0	5
Future Volume (vph)	10	145	5	15	95	10	10	0	10	25	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

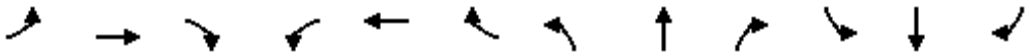
Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	145	5	15	95	10	10	0	10	25	0	5
Future Vol, veh/h	10	145	5	15	95	10	10	0	10	25	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	145	5	15	95	10	10	0	10	25	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	150	0	0	301	303	148	303	300	100
Stage 1	-	-	-	-	-	-	168	168	-	130	130	-
Stage 2	-	-	-	-	-	-	133	135	-	173	170	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1499	-	-	1444	-	-	655	613	904	653	616	961
Stage 1	-	-	-	-	-	-	839	763	-	878	792	-
Stage 2	-	-	-	-	-	-	875	789	-	834	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1499	-	-	1444	-	-	643	602	904	637	605	961
Mov Cap-2 Maneuver	-	-	-	-	-	-	643	602	-	637	605	-
Stage 1	-	-	-	-	-	-	833	758	-	872	783	-
Stage 2	-	-	-	-	-	-	861	780	-	819	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	9.9	10.6
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	751	1499	-	-	1444	-	-	675
HCM Lane V/C Ratio	0.027	0.007	-	-	0.01	-	-	0.044
HCM Control Delay (s)	9.9	7.4	0	-	7.5	0	-	10.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	270	85	5	605	0	405	5	5	0	5	20
Future Volume (vph)	5	270	85	5	605	0	405	5	5	0	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	126.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	270	85	5	605	0	405	5	5	0	5	20
Future Vol, veh/h	5	270	85	5	605	0	405	5	5	0	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	270	85	5	605	0	405	5	5	0	5	20

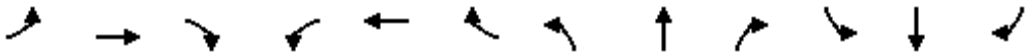
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	605	0	0	355	0	0	951	938	313	943	980	605
Stage 1	-	-	-	-	-	-	323	323	-	615	615	-
Stage 2	-	-	-	-	-	-	628	615	-	328	365	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	973	-	-	1209	-	-	~ 239	263	725	245	252	501
Stage 1	-	-	-	-	-	-	687	649	-	482	485	-
Stage 2	-	-	-	-	-	-	469	481	-	689	627	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	973	-	-	1209	-	-	~ 224	260	725	238	249	501
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 224	260	-	238	249	-
Stage 1	-	-	-	-	-	-	683	645	-	479	482	-
Stage 2	-	-	-	-	-	-	443	478	-	675	623	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 429.5	14.2
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	226	973	-	-	1209	-	-	417
HCM Lane V/C Ratio	1.836	0.005	-	-	0.004	-	-	0.06
HCM Control Delay (s)	$ 429.5	8.7	0	-	8	0	-	14.2
HCM Lane LOS	F	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	29	0	-	-	0	-	-	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

H-03



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	435	0	270	0	0	95	340
Future Volume (vph)	0	0	0	0	0	435	0	270	0	0	95	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

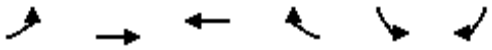
Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	435	0	270	0	0	95	340
Future Vol, veh/h	0	0	0	0	0	435	0	270	0	0	95	340
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	435	0	270	0	0	95	340

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	270	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	766	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	766	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	766	-	-
HCM Lane V/C Ratio	-	0.568	-	-
HCM Control Delay (s)	-	15.7	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	3.6	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	250	5	0	0	115	0
Future Volume (vph)	250	5	0	0	115	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	250	5	0	0	115	0
Future Vol, veh/h	250	5	0	0	115	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	250	5	0	0	115	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	9.6	8.8
HCM LOS	A	A

Lane	EBLn1	SBLn1
Vol Left, %	98%	100%
Vol Thru, %	2%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	255	115
LT Vol	250	115
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	255	115
Geometry Grp	1	1
Degree of Util (X)	0.319	0.155
Departure Headway (Hd)	4.504	4.851
Convergence, Y/N	Yes	Yes
Cap	803	742
Service Time	2.504	2.865
HCM Lane V/C Ratio	0.318	0.155
HCM Control Delay	9.6	8.8
HCM Lane LOS	A	A
HCM 95th-tile Q	1.4	0.5

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	260	5	350	535	85	0
Future Volume (vph)	260	5	350	535	85	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	11.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	260	5	350	535	85	0
Future Vol, veh/h	260	5	350	535	85	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	260	5	350	535	85	0

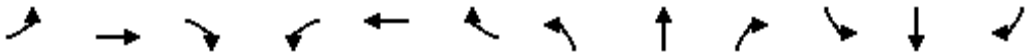
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	265	0	1498	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	1235	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1305	-	135	776
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	274	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1305	-	99	776
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	201	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	132.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	99	-	-	1305	-
HCM Lane V/C Ratio	0.859	-	-	0.268	-
HCM Control Delay (s)	132.3	-	-	8.8	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	4.8	-	-	1.1	-

Sunday LOS Calculations

(2025 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	0	5	0	0	0	0	10	5	157	20	0
Future Volume (vph)	161	0	5	0	0	0	0	10	5	157	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

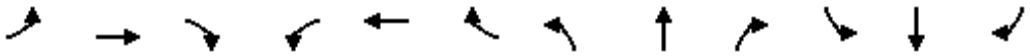
Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	161	0	5	0	0	0	0	10	5	157	20	0
Future Vol, veh/h	161	0	5	0	0	0	0	10	5	157	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	161	0	5	0	0	0	0	10	5	157	20	0

Major/Minor	Minor2					Major1			Major2		
Conflicting Flow All	347	349	20			-	0	0	15	0	0
Stage 1	334	334	-			-	-	-	-	-	-
Stage 2	13	15	-			-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21			-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-			-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-			-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309			-	-	-	2.2	-	-
Pot Cap-1 Maneuver	652	577	1061			0	-	-	1616	-	0
Stage 1	728	645	-			0	-	-	-	-	0
Stage 2	1012	885	-			0	-	-	-	-	0
Platoon blocked, %							-	-		-	
Mov Cap-1 Maneuver	588	0	1061			-	-	-	1616	-	-
Mov Cap-2 Maneuver	588	0	-			-	-	-	-	-	-
Stage 1	728	0	-			-	-	-	-	-	-
Stage 2	913	0	-			-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0	6.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	596	1616	-
HCM Lane V/C Ratio	-	-	0.279	0.097	-
HCM Control Delay (s)	-	-	13.4	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.3	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	20	5	133	5	166	0	0	157	910
Future Volume (vph)	0	0	0	20	5	133	5	166	0	0	157	910
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

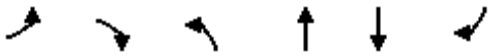
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	20	5	133	5	166	0	0	157	910
Future Vol, veh/h	0	0	0	20	5	133	5	166	0	0	157	910
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	20	5	133	5	166	0	0	157	910

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	788	1243	166	1067	0	-	-	-	0
Stage 1	176	176	-	-	-	-	-	-	-
Stage 2	612	1067	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	363	176	884	661	-	0	0	-	-
Stage 1	859	757	-	-	-	0	0	-	-
Stage 2	545	301	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	360	0	884	661	-	-	-	-	-
Mov Cap-2 Maneuver	360	0	-	-	-	-	-	-	-
Stage 1	852	0	-	-	-	-	-	-	-
Stage 2	545	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	661	-	743	-	-
HCM Lane V/C Ratio	0.008	-	0.213	-	-
HCM Control Delay (s)	10.5	0	11.1	-	-
HCM Lane LOS	B	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	45	15	284	1022	27
Future Volume (vph)	21	45	15	284	1022	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	45	15	284	1022	27
Future Vol, veh/h	21	45	15	284	1022	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	21	45	15	284	1022	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1350	1036	1049	0	-	0
Stage 1	1036	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	164	279	671	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	160	279	671	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	332	-	-	-	-	-
Stage 2	736	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27.4	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	671	-	226	-	-
HCM Lane V/C Ratio	0.022	-	0.292	-	-
HCM Control Delay (s)	10.5	-	27.4	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	-	-

LANE LEVEL OF SERVICE

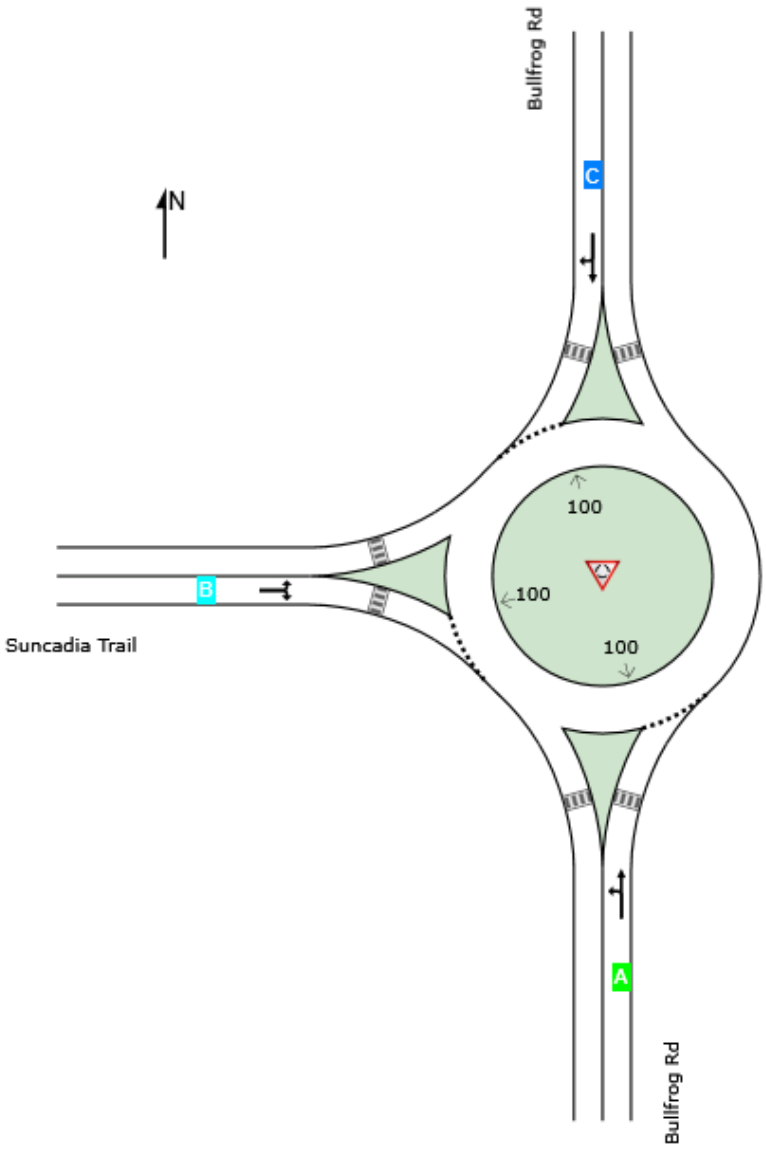
Lane Level of Service

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	C	B	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	301	0.6	301	0.6	1258	0.239	100	4.9	LOS A	1.3	31.7	Full	1600	0.0	0.0
Approach	301	0.6	301	0.6		0.239		4.9	LOS A	1.3	31.7				
North: Bullfrog Rd															
Lane 1[d]	1009	1.0	1009	1.0	1194	0.845	100	19.1	LOS C	22.4	565.1	Full	1600	0.0	0.0
Approach	1009	1.0	1009	1.0		0.845		19.1	LOS C	22.4	565.1				
West: Suncadia Trail															
Lane 1[d]	231	0.0	231	0.0	547	0.423	100	13.4	LOS B	2.1	51.7	Full	1600	0.0	0.0
Approach	231	0.0	231	0.0		0.423		13.4	LOS B	2.1	51.7				
All Vehicles	1541	0.8	1541	0.8		0.845		15.5	LOS C	22.4	565.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	131	170	301	0.6	1258	0.239	100	NA	NA
Approach	131	170	301	0.6		0.239			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	899	110	1009	1.0	1194	0.845	100	NA	NA
Approach	899	110	1009	1.0		0.845			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	85	146	231	0.0	547	0.423	100	NA	NA
Approach	85	146	231	0.0		0.423			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1541	0.8		0.845					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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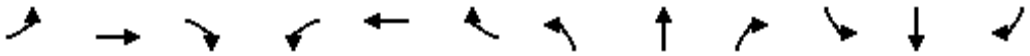


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	21	0	0	0	16	230	0	0	985	15
Future Volume (vph)	15	0	21	0	0	0	16	230	0	0	985	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	0	21	0	0	0	16	230	0	0	985	15
Future Vol, veh/h	15	0	21	0	0	0	16	230	0	0	985	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	15	0	21	0	0	0	16	230	0	0	985	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1255	1255	993	1265	1262	230	1000	0	0	230	0	0
Stage 1	993	993	-	262	262	-	-	-	-	-	-	-
Stage 2	262	262	-	1003	1000	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	145	168	291	147	171	814	700	-	-	1344	-	-
Stage 1	289	317	-	747	695	-	-	-	-	-	-	-
Stage 2	732	682	-	294	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	164	291	134	167	814	700	-	-	1344	-	-
Mov Cap-2 Maneuver	142	164	-	134	167	-	-	-	-	-	-	-
Stage 1	281	317	-	728	677	-	-	-	-	-	-	-
Stage 2	713	664	-	273	324	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.6	0	0.7	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	700	-	-	202	-	1344	-	-
HCM Lane V/C Ratio	0.023	-	-	0.178	-	-	-	-
HCM Control Delay (s)	10.3	0	-	26.6	0	0	-	-
HCM Lane LOS	B	A	-	D	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	-	0	-	-

LANE LEVEL OF SERVICE

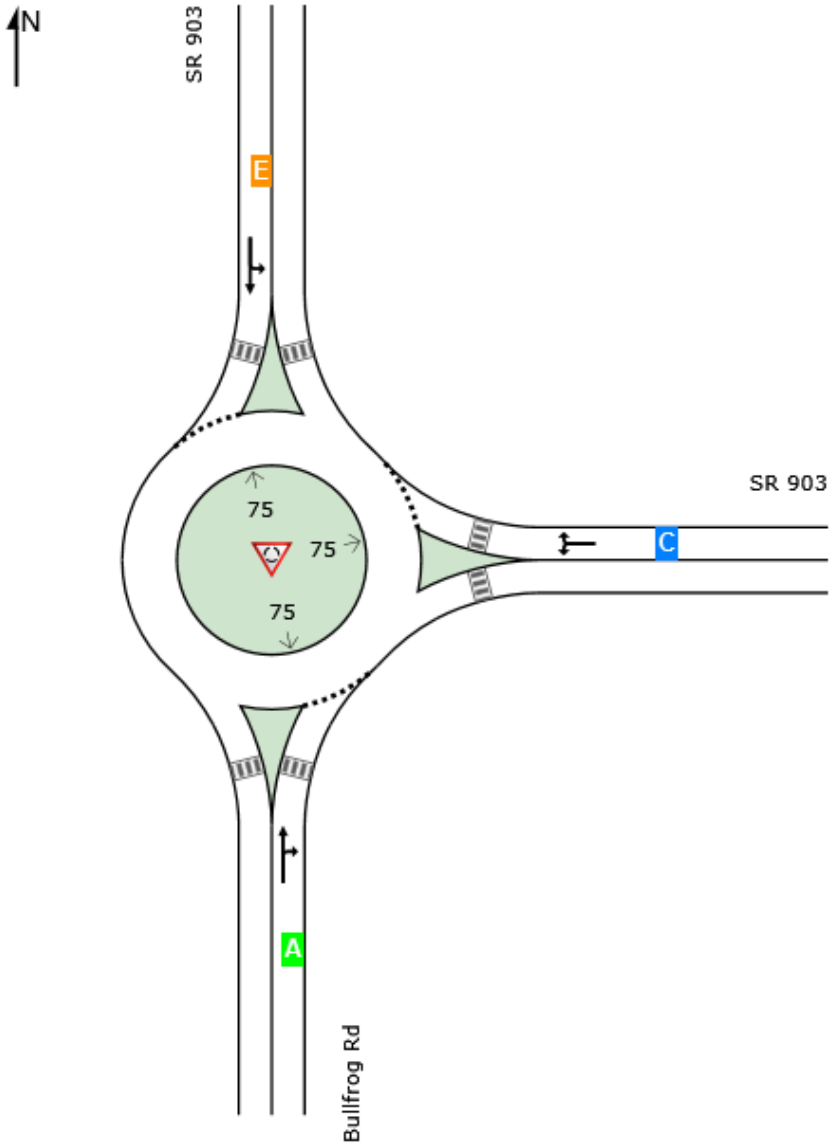
Lane Level of Service

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	C	E	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2025 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	245	0.0	245	0.0	1015	0.241	100	5.8	LOS A	1.2	29.4	Full	1600	0.0	0.0
Approach	245	0.0	245	0.0		0.241		5.8	LOS A	1.2	29.4				
East: SR 903															
Lane 1[d]	1016	1.1	1016	1.1	1180	0.861	100	20.6	LOS C	26.9	677.7	Full	1600	0.0	0.0
Approach	1016	1.1	1016	1.1		0.861		20.6	LOS C	26.9	677.7				
North: SR 903															
Lane 1[d]	581	0.3	581	0.3	654	0.889	100	37.1	LOS E	12.6	316.0	Full	1600	0.0	0.0
Approach	581	0.3	581	0.3		0.889		37.1	LOS E	12.6	316.0				
All Vehicles	1842	0.7	1842	0.7		0.889		23.8	LOS C	26.9	677.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	142	103	245	0.0	1015	0.241	100	NA	NA
Approach	142	103	245	0.0		0.241			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	719	297	1016	1.1	1180	0.861	100	NA	NA
Approach	719	297	1016	1.1		0.861			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	300	281	581	0.3	654	0.889	100	NA	NA
Approach	300	281	581	0.3		0.889			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1842	0.7	0.889

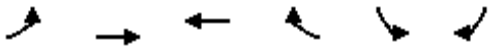
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	592	1196	20	10	15
Future Volume (vph)	8	592	1196	20	10	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

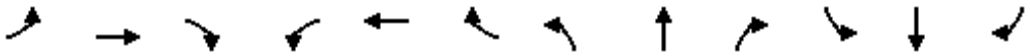
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	592	1196	20	10	15
Future Vol, veh/h	8	592	1196	20	10	15
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	8	592	1196	20	10	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1221	0	-	0	1819	1211
Stage 1	-	-	-	-	1211	-
Stage 2	-	-	-	-	608	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	575	-	-	-	86	224
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	547	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	572	-	-	-	83	223
Mov Cap-2 Maneuver	-	-	-	-	83	-
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	38.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	572	-	-	-	133
HCM Lane V/C Ratio	0.014	-	-	-	0.188
HCM Control Delay (s)	11.4	0	-	-	38.2
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	516	78	20	1102	5	114	0	45	10	0	5
Future Volume (vph)	3	516	78	20	1102	5	114	0	45	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	41.2

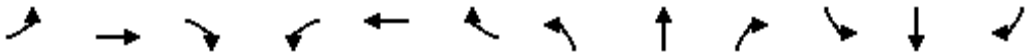
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	516	78	20	1102	5	114	0	45	10	0	5
Future Vol, veh/h	3	516	78	20	1102	5	114	0	45	10	0	5
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	3	516	78	20	1102	5	114	0	45	10	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1107	0	0	597	0	0	1711	1711	558	1729	1748	1105
Stage 1	-	-	-	-	-	-	564	564	-	1145	1145	-
Stage 2	-	-	-	-	-	-	1147	1147	-	584	603	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	634	-	-	985	-	-	~ 71	90	527	70	87	259
Stage 1	-	-	-	-	-	-	509	507	-	245	277	-
Stage 2	-	-	-	-	-	-	241	272	-	501	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	634	-	-	982	-	-	~ 66	84	525	61	82	259
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 66	84	-	61	82	-
Stage 1	-	-	-	-	-	-	504	502	-	243	262	-
Stage 2	-	-	-	-	-	-	224	258	-	455	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	$ 484.8	58.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	88	634	-	-	982	-	-	82
HCM Lane V/C Ratio	1.807	0.005	-	-	0.02	-	-	0.183
HCM Control Delay (s)	$ 484.8	10.7	0	-	8.7	0	-	58.5
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	13.3	0	-	-	0.1	-	-	0.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	524	59	20	1051	25	91	0	15	10	0	5
Future Volume (vph)	23	524	59	20	1051	25	91	0	15	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	21.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	524	59	20	1051	25	91	0	15	10	0	5
Future Vol, veh/h	23	524	59	20	1051	25	91	0	15	10	0	5
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	23	524	59	20	1051	25	91	0	15	10	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1076	0	0	587	0	0	1710	1720	558	1711	1737	1064
Stage 1	-	-	-	-	-	-	604	604	-	1104	1104	-
Stage 2	-	-	-	-	-	-	1106	1116	-	607	633	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	648	-	-	993	-	-	~ 72	89	529	72	88	273
Stage 1	-	-	-	-	-	-	485	488	-	258	289	-
Stage 2	-	-	-	-	-	-	255	283	-	487	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	648	-	-	989	-	-	~ 65	80	527	65	79	273
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 65	80	-	65	79	-
Stage 1	-	-	-	-	-	-	457	460	-	244	274	-
Stage 2	-	-	-	-	-	-	238	269	-	448	449	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.2	$ 353	54.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	74	648	-	-	989	-	-	87
HCM Lane V/C Ratio	1.432	0.035	-	-	0.02	-	-	0.172
HCM Control Delay (s)	$ 353	10.8	0	-	8.7	0	-	54.8
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	8.6	0.1	-	-	0.1	-	-	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	88	10	20	144
Future Volume (vph)	25	15	88	10	20	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

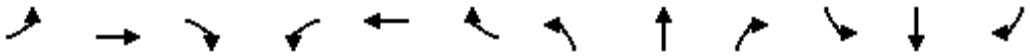
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	88	10	20	144
Future Vol, veh/h	25	15	88	10	20	144
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	88	10	20	144
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	8.1	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	12%	0%	90%
Vol Thru, %	0%	62%	10%
Vol Right, %	88%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	164	40	98
LT Vol	20	0	88
Through Vol	0	25	10
RT Vol	144	15	0
Lane Flow Rate	164	40	98
Geometry Grp	1	1	1
Degree of Util (X)	0.169	0.046	0.12
Departure Headway (Hd)	3.703	4.125	4.4
Convergence, Y/N	Yes	Yes	Yes
Cap	953	858	809
Service Time	1.785	2.201	2.455
HCM Lane V/C Ratio	0.172	0.047	0.121
HCM Control Delay	7.6	7.4	8.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.1	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	220	120	55	295	95	70	76	130	50	60	43
Future Volume (vph)	88	220	120	55	295	95	70	76	130	50	60	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

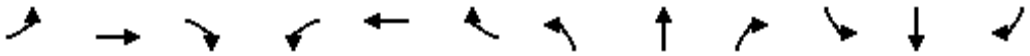
Intersection	
Int Delay, s/veh	13.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	88	220	120	55	295	95	70	76	130	50	60	43
Future Vol, veh/h	88	220	120	55	295	95	70	76	130	50	60	43
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	88	220	120	55	295	95	70	76	130	50	60	43

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	340	0	0	961	956	280	1012	969	344
Stage 1	-	-	-	-	-	-	456	456	-	453	453	-
Stage 2	-	-	-	-	-	-	505	500	-	559	516	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1169	-	-	1219	-	-	236	258	759	220	256	703
Stage 1	-	-	-	-	-	-	584	568	-	590	573	-
Stage 2	-	-	-	-	-	-	549	543	-	517	538	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1219	-	-	161	228	759	124	226	702
Mov Cap-2 Maneuver	-	-	-	-	-	-	161	228	-	124	226	-
Stage 1	-	-	-	-	-	-	540	525	-	546	547	-
Stage 2	-	-	-	-	-	-	438	519	-	339	498	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	1	41.1	31.9
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	190	759	1169	-	-	1219	-	-	124	315
HCM Lane V/C Ratio	0.768	0.171	0.075	-	-	0.045	-	-	0.403	0.327
HCM Control Delay (s)	68.1	10.7	8.3	-	-	8.1	-	-	52.4	21.9
HCM Lane LOS	F	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	5.1	0.6	0.2	-	-	0.1	-	-	1.7	1.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	370	5	60	505	40	20	51	60	5	69	50
Future Volume (vph)	75	370	5	60	505	40	20	51	60	5	69	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

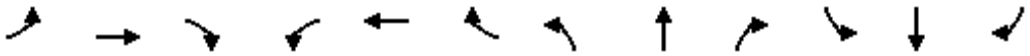
Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	370	5	60	505	40	20	51	60	5	69	50
Future Vol, veh/h	75	370	5	60	505	40	20	51	60	5	69	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	370	5	60	505	40	20	51	60	5	69	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	377	0	0	1230	1192	375	1225	1174	527
Stage 1	-	-	-	-	-	-	525	525	-	647	647	-
Stage 2	-	-	-	-	-	-	705	667	-	578	527	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	1027	-	-	1181	-	-	153	185	667	155	191	549
Stage 1	-	-	-	-	-	-	532	526	-	458	465	-
Stage 2	-	-	-	-	-	-	424	454	-	500	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	1179	-	-	86	162	666	97	167	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	162	-	97	167	-
Stage 1	-	-	-	-	-	-	492	487	-	424	440	-
Stage 2	-	-	-	-	-	-	308	430	-	378	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	38.5	39.6
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	130	666	1025	-	-	1179	-	-	223
HCM Lane V/C Ratio	0.546	0.09	0.073	-	-	0.051	-	-	0.556
HCM Control Delay (s)	61.9	10.9	8.8	-	-	8.2	-	-	39.6
HCM Lane LOS	F	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.7	0.3	0.2	-	-	0.2	-	-	3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	374	119	70	715	10	366	15	10	5	10	25
Future Volume (vph)	31	374	119	70	715	10	366	15	10	5	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	293.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	374	119	70	715	10	366	15	10	5	10	25
Future Vol, veh/h	31	374	119	70	715	10	366	15	10	5	10	25
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	31	374	119	70	715	10	366	15	10	5	10	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	733	0	0	496	0	0	1381	1372	439	1378	1426	732
Stage 1	-	-	-	-	-	-	499	499	-	868	868	-
Stage 2	-	-	-	-	-	-	882	873	-	510	558	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	867	-	-	1073	-	-	~ 122	147	620	123	137	424
Stage 1	-	-	-	-	-	-	555	545	-	350	372	-
Stage 2	-	-	-	-	-	-	~ 342	369	-	550	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	860	-	-	1070	-	-	~ 94	123	617	96	114	419
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 94	123	-	96	114	-
Stage 1	-	-	-	-	-	-	525	516	-	330	328	-
Stage 2	-	-	-	-	-	-	~ 276	326	-	498	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.8	$ 1307.7	27.3
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	94	181	860	-	-	1070	-	-	201
HCM Lane V/C Ratio	3.894	0.138	0.036	-	-	0.065	-	-	0.199
HCM Control Delay (s)	$ 1395.1	28.1	9.3	0	-	8.6	0	-	27.3
HCM Lane LOS	F	D	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	37.6	0.5	0.1	-	-	0.2	-	-	0.7

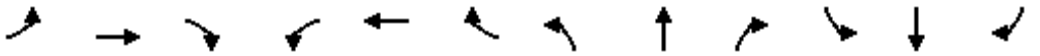
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	90	65	490	301	80	75	75	53	121	40
Future Volume (vph)	15	320	90	65	490	301	80	75	75	53	121	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 90.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



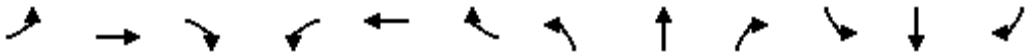
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	90	65	490	301	80	75	75	53	121	40
Future Volume (veh/h)	15	320	90	65	490	301	80	75	75	53	121	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	90	65	490	301	80	75	75	53	121	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	411	1007	283	697	777	478	204	157	157	208	246	81
Arrive On Green	0.72	0.72	0.72	0.72	0.72	0.72	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	685	1404	395	975	1084	666	1231	862	862	1243	1354	448
Grp Volume(v), veh/h	15	0	410	65	0	791	80	0	150	53	0	161
Grp Sat Flow(s),veh/h/ln	685	0	1799	975	0	1750	1231	0	1724	1243	0	1802
Q Serve(g_s), s	1.1	0.0	7.6	2.4	0.0	21.3	5.7	0.0	7.1	3.6	0.0	7.3
Cycle Q Clear(g_c), s	22.3	0.0	7.6	10.0	0.0	21.3	13.0	0.0	7.1	10.7	0.0	7.3
Prop In Lane	1.00		0.22	1.00		0.38	1.00		0.50	1.00		0.25
Lane Grp Cap(c), veh/h	411	0	1290	697	0	1255	204	0	314	208	0	328
V/C Ratio(X)	0.04	0.00	0.32	0.09	0.00	0.63	0.39	0.00	0.48	0.25	0.00	0.49
Avail Cap(c_a), veh/h	411	0	1290	697	0	1255	323	0	480	328	0	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	4.7	6.6	0.0	6.7	39.4	0.0	33.4	38.2	0.0	33.5
Incr Delay (d2), s/veh	0.2	0.0	0.6	0.3	0.0	2.4	1.7	0.0	1.6	0.9	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.6	0.5	0.0	7.3	1.8	0.0	3.1	1.2	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	0.0	5.4	6.8	0.0	9.1	41.1	0.0	35.0	39.1	0.0	35.1
LnGrp LOS	B	A	A	A	A	A	D	A	D	D	A	D
Approach Vol, veh/h		425			856			230			214	
Approach Delay, s/veh		5.6			8.9			37.1			36.1	
Approach LOS		A			A			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		70.0		21.2		70.0		21.2				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		65.4		25.4		65.4		25.4				
Max Q Clear Time (g_c+I1), s		24.3		15.0		23.3		12.7				
Green Ext Time (p_c), s		3.3		1.1		8.5		1.2				

Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	242	126	10	265	20	538	15	10	15	10	22
Future Volume (vph)	26	242	126	10	265	20	538	15	10	15	10	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	125.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	242	126	10	265	20	538	15	10	15	10	22
Future Vol, veh/h	26	242	126	10	265	20	538	15	10	15	10	22
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	26	242	126	10	265	20	538	15	10	15	10	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	285	0	0	369	0	0	669	663	307	666	716	275
Stage 1	-	-	-	-	-	-	358	358	-	295	295	-
Stage 2	-	-	-	-	-	-	311	305	-	371	421	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1277	-	-	1195	-	-	~ 371	382	733	365	348	750
Stage 1	-	-	-	-	-	-	660	628	-	701	658	-
Stage 2	-	-	-	-	-	-	699	662	-	637	579	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1277	-	-	1194	-	-	~ 342	368	732	339	335	750
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 342	368	-	339	335	-
Stage 1	-	-	-	-	-	-	642	611	-	683	651	-
Stage 2	-	-	-	-	-	-	661	655	-	596	563	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	286.9	13.8
HCM LOS			F	B

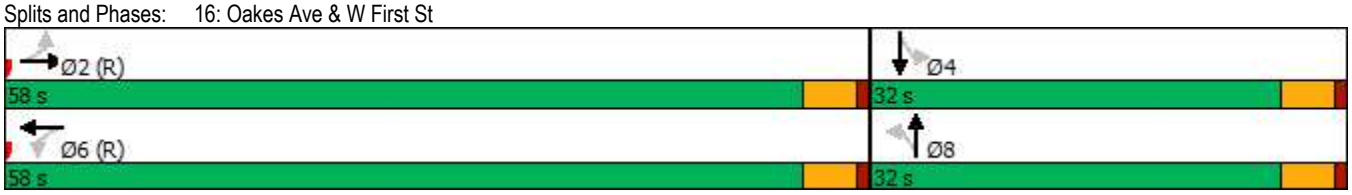
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	342	459	1277	-	-	1194	-	-	454
HCM Lane V/C Ratio	1.573	0.054	0.02	-	-	0.008	-	-	0.104
HCM Control Delay (s)	299.6	13.3	7.9	0	-	8	0	-	13.8
HCM Lane LOS	F	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	31	0.2	0.1	-	-	0	-	-	0.3

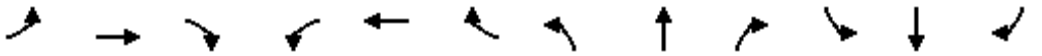
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	305	123	35	502	285	319	323	35	36	100	10
Future Volume (vph)	15	305	123	35	502	285	319	323	35	36	100	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St

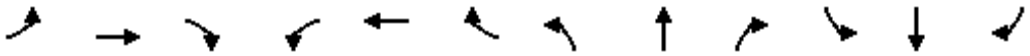




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	305	123	35	502	285	319	323	35	36	100	10
Future Volume (veh/h)	15	305	123	35	502	285	319	323	35	36	100	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	305	123	35	502	285	319	323	35	36	100	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	487	676	272	510	601	341	405	455	49	195	456	46
Arrive On Green	0.59	0.59	0.59	1.00	1.00	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	685	1137	458	965	1012	574	1270	1490	161	1012	1492	149
Grp Volume(v), veh/h	15	0	428	35	0	787	319	0	358	36	0	110
Grp Sat Flow(s),veh/h/ln	685	0	1595	965	0	1586	1270	0	1652	1012	0	1641
Q Serve(g_s), s	0.8	0.0	13.4	0.9	0.0	0.0	22.5	0.0	17.3	2.9	0.0	4.5
Cycle Q Clear(g_c), s	0.8	0.0	13.4	14.3	0.0	0.0	27.0	0.0	17.3	20.2	0.0	4.5
Prop In Lane	1.00		0.29	1.00		0.36	1.00		0.10	1.00		0.09
Lane Grp Cap(c), veh/h	487	0	948	510	0	943	405	0	505	195	0	501
V/C Ratio(X)	0.03	0.00	0.45	0.07	0.00	0.83	0.79	0.00	0.71	0.18	0.00	0.22
Avail Cap(c_a), veh/h	487	0	948	510	0	943	405	0	505	195	0	501
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.73	0.00	0.73	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	10.1	1.8	0.0	0.0	33.3	0.0	27.7	36.7	0.0	23.3
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.2	0.0	6.5	9.2	0.0	3.9	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.8	0.1	0.0	1.7	7.8	0.0	7.3	0.7	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	11.6	2.0	0.0	6.5	42.5	0.0	31.6	36.8	0.0	23.3
LnGrp LOS	A	A	B	A	A	A	D	A	C	D	A	C
Approach Vol, veh/h		443			822			677			146	
Approach Delay, s/veh		11.5			6.3			36.8			26.7	
Approach LOS		B			A			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		58.0		32.0		58.0		32.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		53.5		27.5		53.5		27.5				
Max Q Clear Time (g_c+I1), s		15.4		22.2		16.3		29.0				
Green Ext Time (p_c), s		3.4		0.2		8.1		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			18.7									
HCM 6th LOS			B									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	171	83	10	177	10	85	10	10	5	10	23
Future Volume (vph)	18	171	83	10	177	10	85	10	10	5	10	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	171	83	10	177	10	85	10	10	5	10	23
Future Vol, veh/h	18	171	83	10	177	10	85	10	10	5	10	23
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	18	171	83	10	177	10	85	10	10	5	10	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

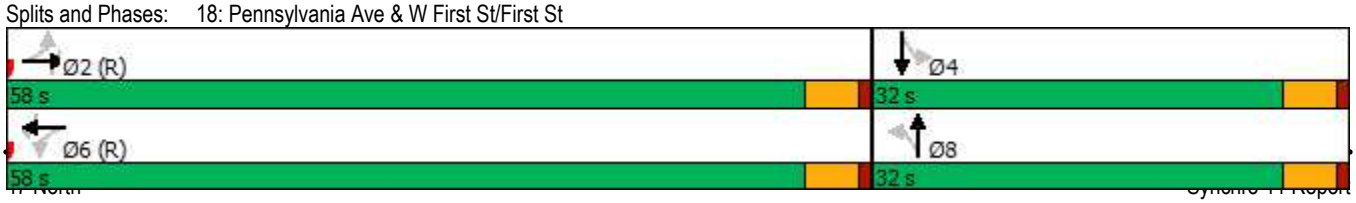
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	9.1	9	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	81%	7%	5%	13%
Vol Thru, %	10%	63%	90%	26%
Vol Right, %	10%	31%	5%	61%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	272	197	38
LT Vol	85	18	10	5
Through Vol	10	171	177	10
RT Vol	10	83	10	23
Lane Flow Rate	105	272	197	38
Geometry Grp	1	1	1	1
Degree of Util (X)	0.149	0.328	0.249	0.05
Departure Headway (Hd)	5.094	4.347	4.551	4.755
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	702	827	788	749
Service Time	3.139	2.379	2.585	2.807
HCM Lane V/C Ratio	0.15	0.329	0.25	0.051
HCM Control Delay	9	9.5	9.1	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1.4	1	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	326	20	25	757	76	5	19	15	90	18	15
Future Volume (vph)	20	326	20	25	757	76	5	19	15	90	18	15
Satd. Flow (prot)	1770	1658	0	1770	1649	0	0	1881	1454	0	1824	1454
Flt Permitted	0.282			0.549				0.941			0.745	
Satd. Flow (perm)	525	1658	0	1016	1649	0	0	1785	1416	0	1409	1414
Satd. Flow (RTOR)		6			10				18			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	346	0	25	833	0	0	24	15	0	108	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	70.6	70.6		70.6	70.6			13.8	70.6		13.8	70.6
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15	0.78		0.15	0.78
v/c Ratio	0.05	0.27		0.03	0.64			0.09	0.01		0.50	0.01
Control Delay	4.2	3.6		5.2	10.8			29.4	2.7		41.1	2.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.2	3.6		5.2	10.8			29.4	2.7		41.1	2.7
LOS	A	A		A	B			C	A		D	A
Approach Delay		3.7			10.6			19.1			36.4	
Approach LOS		A			B			B			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 82.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	667	20	0	0	228
Future Volume (vph)	30	667	20	0	0	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	11.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	667	20	0	0	228
Future Vol, veh/h	30	667	20	0	0	228
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	30	667	20	0	0	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	248	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	228	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	738	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	808	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	738	1055	-	-	-	-
Mov Cap-2 Maneuver	738	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1036	-
HCM Lane V/C Ratio	-	0.673	-
HCM Control Delay (s)	-	15.3	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	5.5	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	233	40
Future Volume (vph)	0	0	25	0	233	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

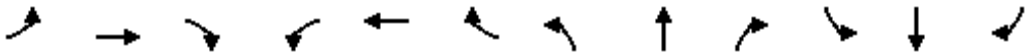
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	233	40
Future Vol, veh/h	0	0	25	0	233	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	233	40

Major/Minor	Minor2		Major2	
Conflicting Flow All	506	40	0	0
Stage 1	506	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	472	1037	-	-
Stage 1	543	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1037	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	35	61	21	5	10	97	228	12	5	314	40
Future Volume (vph)	5	35	61	21	5	10	97	228	12	5	314	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

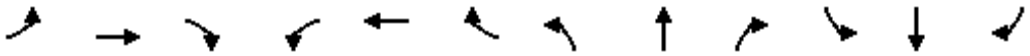
Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	35	61	21	5	10	97	228	12	5	314	40
Future Vol, veh/h	5	35	61	21	5	10	97	228	12	5	314	40
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	5	35	61	21	5	10	97	228	12	5	314	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	826	798	359	835	812	270	369	0	0	245	0	0
Stage 1	359	359	-	433	433	-	-	-	-	-	-	-
Stage 2	467	439	-	402	379	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	293	321	690	289	315	774	1201	-	-	1321	-	-
Stage 1	663	631	-	605	585	-	-	-	-	-	-	-
Stage 2	580	582	-	629	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	252	283	674	217	278	748	1184	-	-	1315	-	-
Mov Cap-2 Maneuver	252	283	-	217	278	-	-	-	-	-	-	-
Stage 1	591	619	-	545	527	-	-	-	-	-	-	-
Stage 2	498	524	-	532	606	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.9	19.7	2.4	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1184	-	-	432	281	1315	-	-
HCM Lane V/C Ratio	0.082	-	-	0.234	0.128	0.004	-	-
HCM Control Delay (s)	8.3	0	-	15.9	19.7	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	0.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	21	28	0	5	36	146	6	0	235	10
Future Volume (vph)	0	0	21	28	0	5	36	146	6	0	235	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

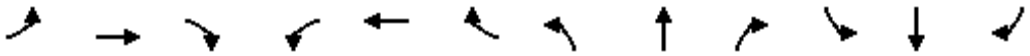
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	21	28	0	5	36	146	6	0	235	10
Future Vol, veh/h	0	0	21	28	0	5	36	146	6	0	235	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	21	28	0	5	36	146	6	0	235	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	464	464	240	472	466	149	245	0	0	152	0	0
Stage 1	240	240	-	221	221	-	-	-	-	-	-	-
Stage 2	224	224	-	251	245	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	512	498	804	506	497	903	1333	-	-	1441	-	-
Stage 1	768	711	-	786	724	-	-	-	-	-	-	-
Stage 2	783	722	-	758	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	498	483	804	482	482	903	1333	-	-	1441	-	-
Mov Cap-2 Maneuver	498	483	-	482	482	-	-	-	-	-	-	-
Stage 1	745	711	-	762	702	-	-	-	-	-	-	-
Stage 2	755	700	-	738	707	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	12.4	1.5	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1333	-	-	804	519	1441	-	-
HCM Lane V/C Ratio	0.027	-	-	0.026	0.064	-	-	-
HCM Control Delay (s)	7.8	0	-	9.6	12.4	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	150	5	16	104	11	10	0	12	28	0	5
Future Volume (vph)	10	150	5	16	104	11	10	0	12	28	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

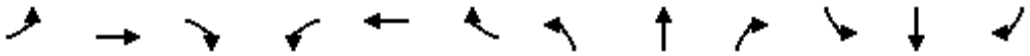
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	150	5	16	104	11	10	0	12	28	0	5
Future Vol, veh/h	10	150	5	16	104	11	10	0	12	28	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	150	5	16	104	11	10	0	12	28	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	115	0	0	155	0	0	317	320	153	321	317	110
Stage 1	-	-	-	-	-	-	173	173	-	142	142	-
Stage 2	-	-	-	-	-	-	144	147	-	179	175	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1487	-	-	1438	-	-	640	600	898	636	602	949
Stage 1	-	-	-	-	-	-	834	760	-	866	783	-
Stage 2	-	-	-	-	-	-	864	779	-	827	758	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1487	-	-	1438	-	-	627	589	898	618	591	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	627	589	-	618	591	-
Stage 1	-	-	-	-	-	-	828	755	-	860	774	-
Stage 2	-	-	-	-	-	-	849	770	-	810	753	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.9	9.9	10.8
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	751	1487	-	-	1438	-	-	652
HCM Lane V/C Ratio	0.029	0.007	-	-	0.011	-	-	0.051
HCM Control Delay (s)	9.9	7.4	0	-	7.5	0	-	10.8
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	286	85	5	622	0	418	5	5	0	5	20
Future Volume (vph)	5	286	85	5	622	0	418	5	5	0	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	148.3

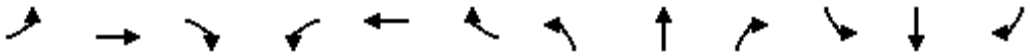
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	286	85	5	622	0	418	5	5	0	5	20
Future Vol, veh/h	5	286	85	5	622	0	418	5	5	0	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	286	85	5	622	0	418	5	5	0	5	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	622	0	0	371	0	0	984	971	329	976	1013	622
Stage 1	-	-	-	-	-	-	339	339	-	632	632	-
Stage 2	-	-	-	-	-	-	645	632	-	344	381	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	959	-	-	1193	-	-	~ 227	252	710	232	241	490
Stage 1	-	-	-	-	-	-	673	638	-	472	477	-
Stage 2	-	-	-	-	-	-	459	472	-	676	617	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	959	-	-	1193	-	-	~ 212	249	710	225	238	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 212	249	-	225	238	-
Stage 1	-	-	-	-	-	-	668	634	-	469	474	-
Stage 2	-	-	-	-	-	-	433	469	-	661	613	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 503.3	14.5
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	959	-	-	1193	-	-	404
HCM Lane V/C Ratio	2	0.005	-	-	0.004	-	-	0.062
HCM Control Delay (s)	$ 503.3	8.8	0	-	8	0	-	14.5
HCM Lane LOS	F	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	31.8	0	-	-	0	-	-	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	448	0	270	0	0	108	340
Future Volume (vph)	0	0	0	0	0	448	0	270	0	0	108	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

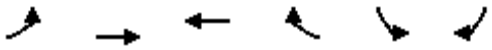
Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	448	0	270	0	0	108	340
Future Vol, veh/h	0	0	0	0	0	448	0	270	0	0	108	340
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	448	0	270	0	0	108	340

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	270	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	766	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	766	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	16.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	766	-	-
HCM Lane V/C Ratio	-	0.585	-	-
HCM Control Delay (s)	-	16.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	3.9	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	250	5	0	0	128	0
Future Volume (vph)	250	5	0	0	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	250	5	0	0	128	0
Future Vol, veh/h	250	5	0	0	128	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	250	5	0	0	128	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	9.7	8.9
HCM LOS	A	A

Lane	EBLn1	SBLn1
Vol Left, %	98%	100%
Vol Thru, %	2%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	255	128
LT Vol	250	128
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	255	128
Geometry Grp	1	1
Degree of Util (X)	0.321	0.173
Departure Headway (Hd)	4.527	4.853
Convergence, Y/N	Yes	Yes
Cap	798	741
Service Time	2.539	2.869
HCM Lane V/C Ratio	0.32	0.173
HCM Control Delay	9.7	8.9
HCM Lane LOS	A	A
HCM 95th-tile Q	1.4	0.6

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	276	5	350	552	85	0
Future Volume (vph)	276	5	350	552	85	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	12.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	276	5	350	552	85	0
Future Vol, veh/h	276	5	350	552	85	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	276	5	350	552	85	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	281	0	1531	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	1252	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1287	-	129	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	269	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1287	-	94	760
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	196	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	148.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	94	-	-	1287	-
HCM Lane V/C Ratio	0.904	-	-	0.272	-
HCM Control Delay (s)	148.4	-	-	8.8	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	5.1	-	-	1.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	20	281	24	20	1025
Future Volume (vph)	24	20	281	24	20	1025
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	937		1583			1690
Travel Time (s)	25.6		30.8			32.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	20	281	24	20	1025
Future Vol, veh/h	24	20	281	24	20	1025
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	26	22	305	26	22	1114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1476	318	0	0	331	0
Stage 1	318	-	-	-	-	-
Stage 2	1158	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	109	624	-	-	1003	-
Stage 1	641	-	-	-	-	-
Stage 2	241	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	103	624	-	-	1003	-
Mov Cap-2 Maneuver	103	-	-	-	-	-
Stage 1	641	-	-	-	-	-
Stage 2	227	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.2	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	166	1003	-
HCM Lane V/C Ratio	-	-	0.288	0.022	-
HCM Control Delay (s)	-	-	35.2	8.7	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	25	221	34	26	980
Future Volume (vph)	29	25	221	34	26	980
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	1001		1223			185
Travel Time (s)	27.3		23.8			3.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

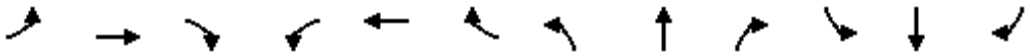
Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	29	25	221	34	26	980
Future Vol, veh/h	29	25	221	34	26	980
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	32	27	240	37	28	1065

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1380	259	0	0	277	0
Stage 1	259	-	-	-	-	-
Stage 2	1121	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	158	777	-	-	1280	-
Stage 1	782	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	149	777	-	-	1280	-
Mov Cap-2 Maneuver	149	-	-	-	-	-
Stage 1	782	-	-	-	-	-
Stage 2	293	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.6	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	149	777	1280	-
HCM Lane V/C Ratio	-	-	0.212	0.035	0.022	-
HCM Control Delay (s)	-	-	35.5	9.8	7.9	0
HCM Lane LOS	-	-	E	A	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	332	58	245	934	32	59	0	244	25	0	33
Future Volume (vph)	33	332	58	245	934	32	59	0	244	25	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			987			467	
Travel Time (s)		32.9			12.3			26.9			12.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	78.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	332	58	245	934	32	59	0	244	25	0	33
Future Vol, veh/h	33	332	58	245	934	32	59	0	244	25	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	36	361	63	266	1015	35	64	0	265	27	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1050	0	0	424	0	0	2048	2047	393	2162	2061	1033
Stage 1	-	-	-	-	-	-	465	465	-	1565	1565	-
Stage 2	-	-	-	-	-	-	1583	1582	-	597	496	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	659	-	-	1130	-	-	~ 41	56	654	34	54	281
Stage 1	-	-	-	-	-	-	576	561	-	139	171	-
Stage 2	-	-	-	-	-	-	136	168	-	488	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	659	-	-	1130	-	-	~ 19	22	654	~ 11	22	281
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	22	-	~ 11	22	-
Stage 1	-	-	-	-	-	-	535	521	-	129	74	-
Stage 2	-	-	-	-	-	-	~ 51	72	-	269	505	-

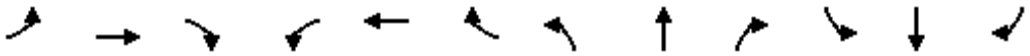
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	1.9	$ 300.8	$ 1079
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	19	654	659	-	-	1130	-	-	24
HCM Lane V/C Ratio	3.375	0.406	0.054	-	-	0.236	-	-	2.627
HCM Control Delay (s)	$ 1486.2	14.2	10.8	0	-	9.2	0	-	$ 1079
HCM Lane LOS	F	B	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	8.5	2	0.2	-	-	0.9	-	-	7.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Sunday LOS Calculations

(2031 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	5	5	0	0	0	0	15	5	205	20	0
Future Volume (vph)	145	5	5	0	0	0	0	15	5	205	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

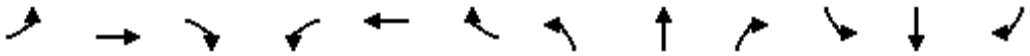
Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	145	5	5	0	0	0	0	15	5	205	20	0
Future Vol, veh/h	145	5	5	0	0	0	0	15	5	205	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	145	5	5	0	0	0	0	15	5	205	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	448	450	20	-	0	0	20	0	0
Stage 1	430	430	-	-	-	-	-	-	-
Stage 2	18	20	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	570	506	1061	0	-	-	1609	-	0
Stage 1	658	585	-	0	-	-	-	-	0
Stage 2	1007	881	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	496	0	1061	-	-	-	1609	-	-
Mov Cap-2 Maneuver	496	0	-	-	-	-	-	-	-
Stage 1	658	0	-	-	-	-	-	-	-
Stage 2	877	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0	6.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	505	1609	-
HCM Lane V/C Ratio	-	-	0.307	0.127	-
HCM Control Delay (s)	-	-	15.3	7.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.4	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	25	5	275	5	155	0	0	200	900
Future Volume (vph)	0	0	0	25	5	275	5	155	0	0	200	900
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

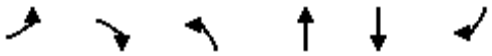
Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	25	5	275	5	155	0	0	200	900
Future Vol, veh/h	0	0	0	25	5	275	5	155	0	0	200	900
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	25	5	275	5	155	0	0	200	900

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	815	1265	155	1100	0	-	-	-	0
Stage 1	165	165	-	-	-	-	-	-	-
Stage 2	650	1100	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	350	171	896	642	-	0	0	-	-
Stage 1	869	766	-	-	-	0	0	-	-
Stage 2	523	290	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	347	0	896	642	-	-	-	-	-
Mov Cap-2 Maneuver	347	0	-	-	-	-	-	-	-
Stage 1	861	0	-	-	-	-	-	-	-
Stage 2	523	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	642	-	792	-	-
HCM Lane V/C Ratio	0.008	-	0.385	-	-
HCM Control Delay (s)	10.7	0	12.4	-	-
HCM Lane LOS	B	A	B	-	-
HCM 95th %tile Q(veh)	0	-	1.8	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	70	30	400	1030	25
Future Volume (vph)	20	70	30	400	1030	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	70	30	400	1030	25
Future Vol, veh/h	20	70	30	400	1030	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	20	70	30	400	1030	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1503	1043	1055	0	-	0
Stage 1	1043	-	-	-	-	-
Stage 2	460	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	132	276	668	-	-	-
Stage 1	336	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	126	276	668	-	-	-
Mov Cap-2 Maneuver	126	-	-	-	-	-
Stage 1	321	-	-	-	-	-
Stage 2	631	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.7	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	668	-	218	-	-
HCM Lane V/C Ratio	0.045	-	0.413	-	-
HCM Control Delay (s)	10.6	-	32.7	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	1.9	-	-

LANE LEVEL OF SERVICE

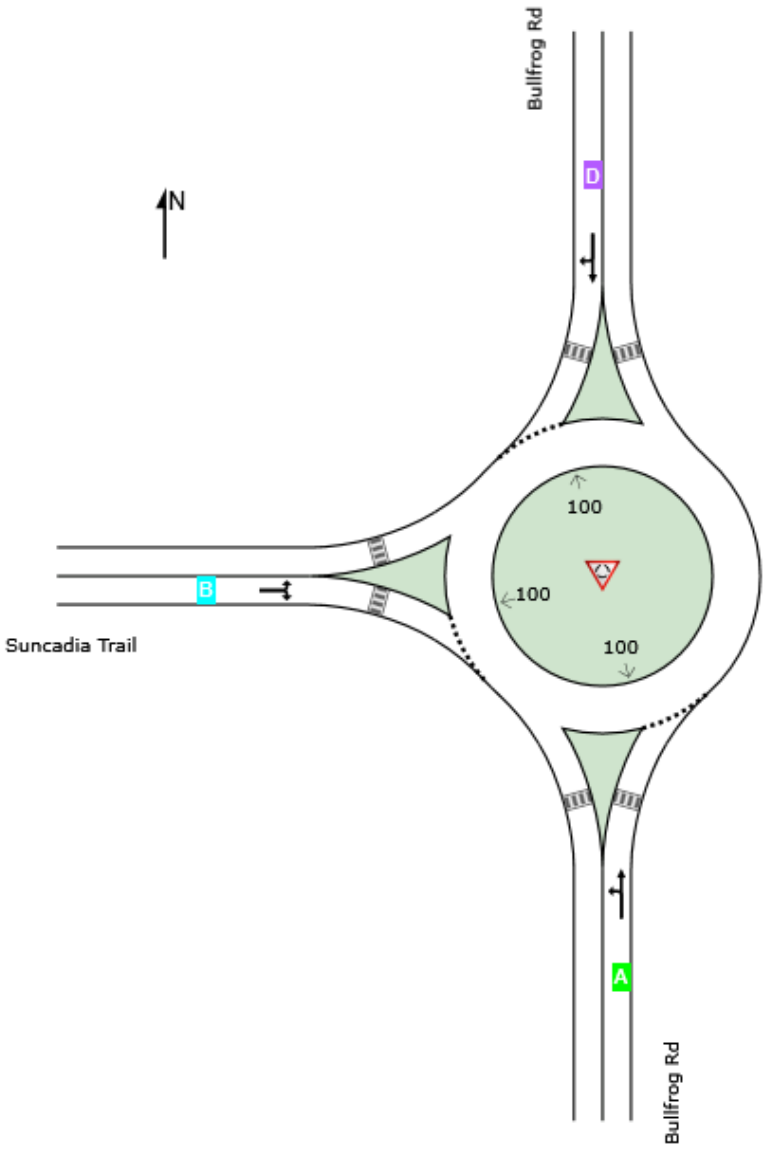
Lane Level of Service

Site: 4 [2031 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	D	B	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	420	0.6	420	0.6	1271	0.331	100	5.7	LOS A	2.0	49.4	Full	1600	0.0	0.0
Approach	420	0.6	420	0.6		0.331		5.7	LOS A	2.0	49.4				
North: Bullfrog Rd															
Lane 1[d]	935	1.0	935	1.0	1034	0.905	100	28.2	LOS D	31.3	789.8	Full	1600	0.0	0.0
Approach	935	1.0	935	1.0		0.905		28.2	LOS D	31.3	789.8				
West: Suncadia Trail															
Lane 1[d]	270	0.0	270	0.0	569	0.475	100	14.2	LOS B	2.5	63.1	Full	1600	0.0	0.0
Approach	270	0.0	270	0.0		0.475		14.2	LOS B	2.5	63.1				
All Vehicles	1625	0.7	1625	0.7		0.905		20.0	LOS C	31.3	789.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	270	150	420	0.6	1271	0.331	100	NA	NA
Approach	270	150	420	0.6		0.331			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	860	75	935	1.0	1034	0.905	100	NA	NA
Approach	860	75	935	1.0		0.905			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	75	195	270	0.0	569	0.475	100	NA	NA
Approach	75	195	270	0.0		0.475			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1625	0.7	0.905

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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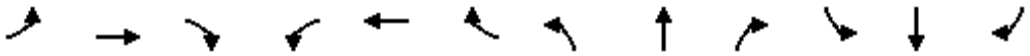
Project: T:\Active Projects\47 North - 5885\Planning - 5885\LOS\Revised Proposal 2022\Sidra\Bullfrog Rd & Suncadia Trail - Sunday UPDATE.sip9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	20	0	0	0	15	210	0	0	915	30
Future Volume (vph)	10	0	20	0	0	0	15	210	0	0	915	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	20	0	0	0	15	210	0	0	915	30
Future Vol, veh/h	10	0	20	0	0	0	15	210	0	0	915	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	10	0	20	0	0	0	15	210	0	0	915	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1170	1170	930	1180	1185	210	945	0	0	210	0	0
Stage 1	930	930	-	240	240	-	-	-	-	-	-	-
Stage 2	240	240	-	940	945	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	166	189	317	169	191	835	734	-	-	1367	-	-
Stage 1	314	339	-	768	711	-	-	-	-	-	-	-
Stage 2	752	698	-	319	343	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	163	185	317	155	187	835	734	-	-	1367	-	-
Mov Cap-2 Maneuver	163	185	-	155	187	-	-	-	-	-	-	-
Stage 1	307	339	-	750	695	-	-	-	-	-	-	-
Stage 2	735	682	-	299	343	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	0	0.7	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	734	-	-	241	-	1367	-	-
HCM Lane V/C Ratio	0.02	-	-	0.124	-	-	-	-
HCM Control Delay (s)	10	0	-	22.1	0	0	-	-
HCM Lane LOS	B	A	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	-	0	-	-

LANE LEVEL OF SERVICE

Lane Level of Service

Site: 6 [2031 Baseline (Site Folder: Sunday PM Peak Hour)]

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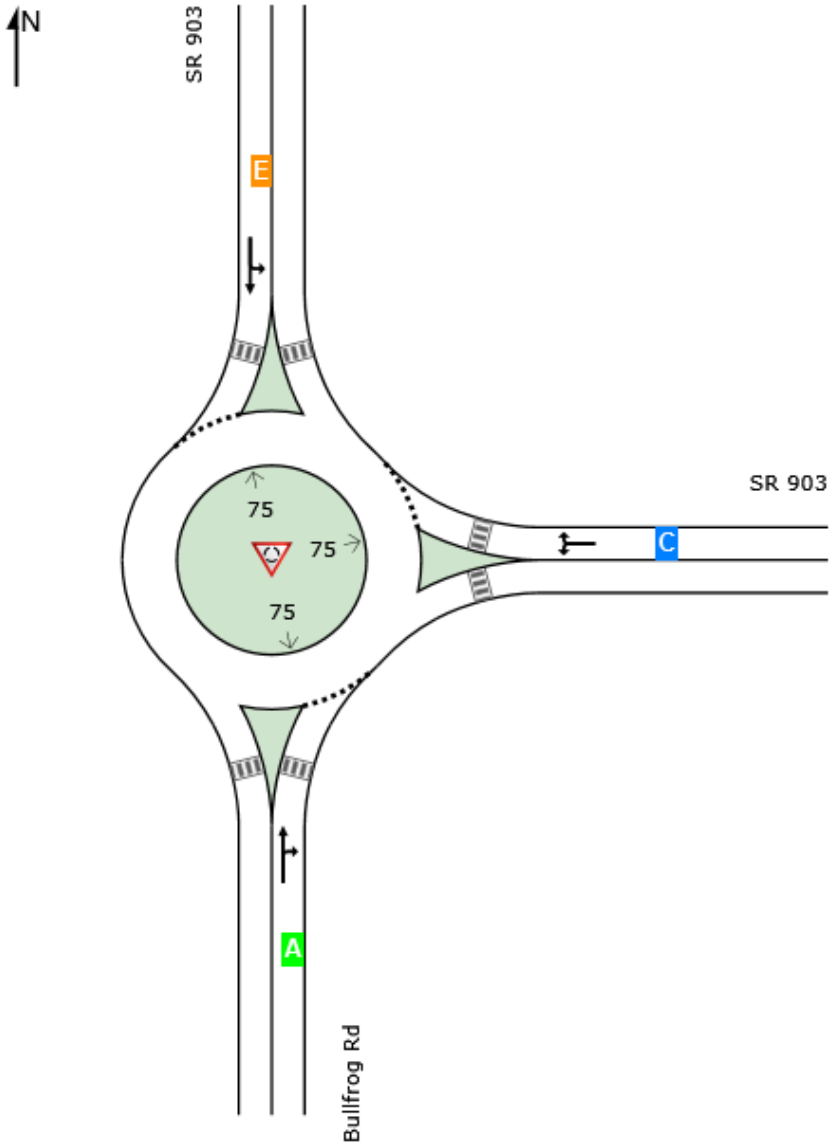
47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	C	E	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	220	0.0	220	0.0	969	0.227	100	5.9	LOS A	1.1	26.9	Full	1600	0.0	0.0
Approach	220	0.0	220	0.0		0.227		5.9	LOS A	1.1	26.9				
East: SR 903															
Lane 1[d]	1030	1.1	1030	1.1	1207	0.853	100	19.4	LOS C	21.1	532.2	Full	1600	0.0	0.0
Approach	1030	1.1	1030	1.1		0.853		19.4	LOS C	21.1	532.2				
North: SR 903															
Lane 1[d]	605	0.3	605	0.3	677	0.893	100	36.9	LOS E	13.6	340.8	Full	1600	0.0	0.0
Approach	605	0.3	605	0.3		0.893		36.9	LOS E	13.6	340.8				
All Vehicles	1855	0.7	1855	0.7		0.893		23.5	LOS C	21.1	532.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	120	100	220	0.0	969	0.227	100	NA	NA
Approach	120	100	220	0.0		0.227			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	685	345	1030	1.1	1207	0.853	100	NA	NA
Approach	685	345	1030	1.1		0.853			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	345	260	605	0.3	677	0.893	100	NA	NA
Approach	345	260	605	0.3		0.893			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1855	0.7	0.893

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0

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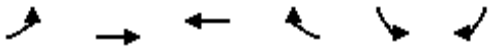


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	415	1100	30	10	10
Future Volume (vph)	5	415	1100	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

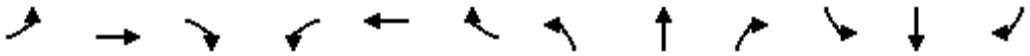
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	415	1100	30	10	10
Future Vol, veh/h	5	415	1100	30	10	10
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	5	415	1100	30	10	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1135	0	-	0	1545	1120
Stage 1	-	-	-	-	1120	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	619	-	-	-	127	254
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	616	-	-	-	124	253
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	310	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	29.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	616	-	-	-	166
HCM Lane V/C Ratio	0.008	-	-	-	0.12
HCM Control Delay (s)	10.9	0	-	-	29.6
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	50	20	1000	5	95	0	70	10	0	0
Future Volume (vph)	0	370	50	20	1000	5	95	0	70	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

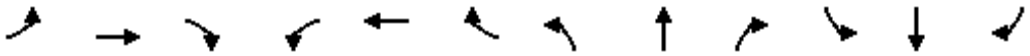
Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	370	50	20	1000	5	95	0	70	10	0	0
Future Vol, veh/h	0	370	50	20	1000	5	95	0	70	10	0	0
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	0	370	50	20	1000	5	95	0	70	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1005	0	0	423	0	0	1441	1443	398	1473	1466	1003
Stage 1	-	-	-	-	-	-	398	398	-	1043	1043	-
Stage 2	-	-	-	-	-	-	1043	1045	-	430	423	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	693	-	-	1142	-	-	110	131	649	106	129	297
Stage 1	-	-	-	-	-	-	626	601	-	280	309	-
Stage 2	-	-	-	-	-	-	276	304	-	607	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	693	-	-	1139	-	-	106	125	647	92	123	297
Mov Cap-2 Maneuver	-	-	-	-	-	-	106	125	-	92	123	-
Stage 1	-	-	-	-	-	-	624	599	-	280	297	-
Stage 2	-	-	-	-	-	-	265	292	-	541	589	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	128	48.8
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	693	-	-	1139	-	-	92
HCM Lane V/C Ratio	1.006	-	-	-	0.018	-	-	0.109
HCM Control Delay (s)	128	0	-	-	8.2	0	-	48.8
HCM Lane LOS	F	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	7.9	0	-	-	0.1	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	425	40	20	1010	5	70	15	30	10	0	0
Future Volume (vph)	20	425	40	20	1010	5	70	15	30	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	425	40	20	1010	5	70	15	30	10	0	0
Future Vol, veh/h	20	425	40	20	1010	5	70	15	30	10	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	20	425	40	20	1010	5	70	15	30	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1015	0	0	469	0	0	1542	1544	449	1561	1562	1013
Stage 1	-	-	-	-	-	-	489	489	-	1053	1053	-
Stage 2	-	-	-	-	-	-	1053	1055	-	508	509	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	683	-	-	1098	-	-	94	115	610	92	113	293
Stage 1	-	-	-	-	-	-	561	549	-	276	306	-
Stage 2	-	-	-	-	-	-	274	302	-	551	541	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	683	-	-	1094	-	-	88	105	608	73	104	293
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	105	-	73	104	-
Stage 1	-	-	-	-	-	-	536	525	-	265	293	-
Stage 2	-	-	-	-	-	-	262	289	-	488	517	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.2	151.8	62
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	116	683	-	-	1094	-	-	73
HCM Lane V/C Ratio	0.991	0.029	-	-	0.018	-	-	0.137
HCM Control Delay (s)	151.8	10.4	0	-	8.4	0	-	62
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	6.5	0.1	-	-	0.1	-	-	0.5

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	60	10	20	155
Future Volume (vph)	25	15	60	10	20	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

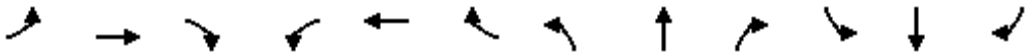
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	60	10	20	155
Future Vol, veh/h	25	15	60	10	20	155
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	60	10	20	155
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.9	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	11%	0%	86%
Vol Thru, %	0%	62%	14%
Vol Right, %	89%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	175	40	70
LT Vol	20	0	60
Through Vol	0	25	10
RT Vol	155	15	0
Lane Flow Rate	175	40	70
Geometry Grp	1	1	1
Degree of Util (X)	0.177	0.046	0.086
Departure Headway (Hd)	3.649	4.123	4.412
Convergence, Y/N	Yes	Yes	Yes
Cap	971	860	808
Service Time	1.714	2.187	2.463
HCM Lane V/C Ratio	0.18	0.047	0.087
HCM Control Delay	7.5	7.4	7.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	0.1	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	225	120	65	350	105	70	65	110	50	40	35
Future Volume (vph)	95	225	120	65	350	105	70	65	110	50	40	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

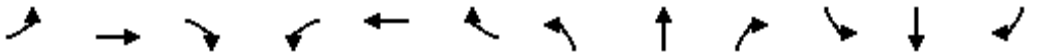
Intersection	
Int Delay, s/veh	13.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	225	120	65	350	105	70	65	110	50	40	35
Future Vol, veh/h	95	225	120	65	350	105	70	65	110	50	40	35
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	95	225	120	65	350	105	70	65	110	50	40	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	455	0	0	345	0	0	1046	1060	285	1096	1068	404
Stage 1	-	-	-	-	-	-	475	475	-	533	533	-
Stage 2	-	-	-	-	-	-	571	585	-	563	535	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1106	-	-	1214	-	-	206	224	754	193	223	651
Stage 1	-	-	-	-	-	-	570	557	-	534	528	-
Stage 2	-	-	-	-	-	-	506	498	-	514	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1106	-	-	1214	-	-	147	194	754	110	193	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	147	194	-	110	193	-
Stage 1	-	-	-	-	-	-	521	509	-	488	499	-
Stage 2	-	-	-	-	-	-	416	471	-	350	482	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	1	50.6	38.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	166	754	1106	-	-	1214	-	-	110	287
HCM Lane V/C Ratio	0.813	0.146	0.086	-	-	0.054	-	-	0.455	0.261
HCM Control Delay (s)	83.2	10.6	8.6	-	-	8.1	-	-	62.5	21.9
HCM Lane LOS	F	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	5.4	0.5	0.3	-	-	0.2	-	-	2	1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	365	5	60	505	40	20	30	65	5	50	50
Future Volume (vph)	75	365	5	60	505	40	20	30	65	5	50	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

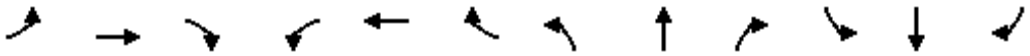
Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	365	5	60	505	40	20	30	65	5	50	50
Future Vol, veh/h	75	365	5	60	505	40	20	30	65	5	50	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	365	5	60	505	40	20	30	65	5	50	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	372	0	0	1215	1187	370	1212	1169	527
Stage 1	-	-	-	-	-	-	520	520	-	647	647	-
Stage 2	-	-	-	-	-	-	695	667	-	565	522	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	1027	-	-	1186	-	-	157	187	671	158	192	549
Stage 1	-	-	-	-	-	-	536	529	-	458	465	-
Stage 2	-	-	-	-	-	-	429	454	-	508	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	1184	-	-	100	164	670	111	168	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	164	-	111	168	-
Stage 1	-	-	-	-	-	-	496	489	-	424	440	-
Stage 2	-	-	-	-	-	-	328	430	-	399	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	27.3	30.8
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	131	670	1025	-	-	1184	-	-	242
HCM Lane V/C Ratio	0.382	0.097	0.073	-	-	0.051	-	-	0.434
HCM Control Delay (s)	48.5	11	8.8	-	-	8.2	-	-	30.8
HCM Lane LOS	E	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.6	0.3	0.2	-	-	0.2	-	-	2.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	315	70	110	700	20	345	15	15	5	15	20
Future Volume (vph)	15	315	70	110	700	20	345	15	15	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	258.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	15	315	70	110	700	20	345	15	15	5	15	20
Future Vol, veh/h	15	315	70	110	700	20	345	15	15	5	15	20
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	15	315	70	110	700	20	345	15	15	5	15	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	728	0	0	388	0	0	1335	1331	355	1335	1356	722
Stage 1	-	-	-	-	-	-	383	383	-	938	938	-
Stage 2	-	-	-	-	-	-	952	948	-	397	418	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	871	-	-	1176	-	-	~ 131	155	691	132	151	430
Stage 1	-	-	-	-	-	-	642	614	-	320	346	-
Stage 2	-	-	-	-	-	-	~ 313	341	-	633	594	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	864	-	-	1173	-	-	~ 98	126	688	101	123	425
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 98	126	-	101	123	-
Stage 1	-	-	-	-	-	-	626	599	-	311	289	-
Stage 2	-	-	-	-	-	-	~ 237	285	-	589	579	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.1	$ 1129.1	30.1
HCM LOS			F	D

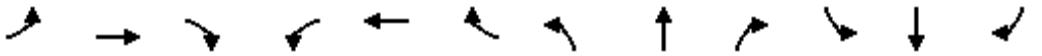
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	98	213	864	-	-	1173	-	-	183
HCM Lane V/C Ratio	3.52	0.141	0.017	-	-	0.094	-	-	0.219
HCM Control Delay (s)	$ 1225.1	24.7	9.2	0	-	8.4	0	-	30.1
HCM Lane LOS	F	C	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	34.6	0.5	0.1	-	-	0.3	-	-	0.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	95	65	490	300	80	75	85	20	130	55
Future Volume (vph)	15	320	95	65	490	300	80	75	85	20	130	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 90.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



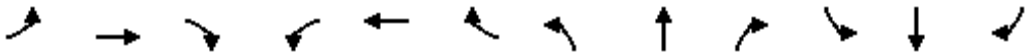
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	95	65	490	300	80	75	85	20	130	55
Future Volume (veh/h)	15	320	95	65	490	300	80	75	85	20	130	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	95	65	490	300	80	75	85	20	130	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	396	978	290	678	767	469	200	156	177	215	244	103
Arrive On Green	0.71	0.71	0.71	0.71	0.71	0.71	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	686	1385	411	971	1086	665	1205	804	911	1232	1255	531
Grp Volume(v), veh/h	15	0	415	65	0	790	80	0	160	20	0	185
Grp Sat Flow(s),veh/h/ln	686	0	1796	971	0	1750	1205	0	1716	1232	0	1786
Q Serve(g_s), s	1.1	0.0	8.2	2.5	0.0	22.4	5.9	0.0	7.7	1.4	0.0	8.6
Cycle Q Clear(g_c), s	23.5	0.0	8.2	10.7	0.0	22.4	14.5	0.0	7.7	9.0	0.0	8.6
Prop In Lane	1.00		0.23	1.00		0.38	1.00		0.53	1.00		0.30
Lane Grp Cap(c), veh/h	396	0	1268	678	0	1236	200	0	334	215	0	347
V/C Ratio(X)	0.04	0.00	0.33	0.10	0.00	0.64	0.40	0.00	0.48	0.09	0.00	0.53
Avail Cap(c_a), veh/h	396	0	1268	678	0	1236	296	0	471	314	0	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	5.2	7.2	0.0	7.3	40.1	0.0	33.1	37.2	0.0	33.5
Incr Delay (d2), s/veh	0.2	0.0	0.7	0.3	0.0	2.5	1.8	0.0	1.5	0.3	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.9	0.6	0.0	7.9	1.9	0.0	3.3	0.4	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.7	0.0	5.9	7.5	0.0	9.8	41.9	0.0	34.7	37.4	0.0	35.3
LnGrp LOS	B	A	A	A	A	A	D	A	C	D	A	D
Approach Vol, veh/h		430			855			240			205	
Approach Delay, s/veh		6.2			9.6			37.1			35.5	
Approach LOS		A			A			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		70.0		22.6		70.0		22.6				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		65.4		25.4		65.4		25.4				
Max Q Clear Time (g_c+I1), s		25.5		16.5		24.4		11.0				
Green Ext Time (p_c), s		3.3		1.1		8.5		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			15.7									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	230	105	10	300	30	500	20	10	25	25	15
Future Volume (vph)	20	230	105	10	300	30	500	20	10	25	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	108.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	230	105	10	300	30	500	20	10	25	25	15
Future Vol, veh/h	20	230	105	10	300	30	500	20	10	25	25	15
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	20	230	105	10	300	30	500	20	10	25	25	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	330	0	0	336	0	0	679	674	285	674	711	315
Stage 1	-	-	-	-	-	-	324	324	-	335	335	-
Stage 2	-	-	-	-	-	-	355	350	-	339	376	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1229	-	-	1229	-	-	~ 366	376	754	360	351	712
Stage 1	-	-	-	-	-	-	688	650	-	667	632	-
Stage 2	-	-	-	-	-	-	662	633	-	663	606	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1229	-	-	1228	-	-	~ 330	364	753	332	340	712
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 330	364	-	332	340	-
Stage 1	-	-	-	-	-	-	674	636	-	654	626	-
Stage 2	-	-	-	-	-	-	616	627	-	620	593	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.2	261.4	16.3
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	330	440	1229	-	-	1228	-	-	383
HCM Lane V/C Ratio	1.515	0.068	0.016	-	-	0.008	-	-	0.17
HCM Control Delay (s)	276.3	13.8	8	0	-	8	0	-	16.3
HCM Lane LOS	F	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	28	0.2	0.1	-	-	0	-	-	0.6

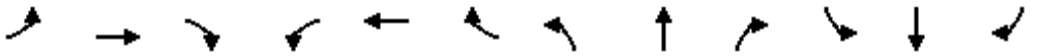
Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	280	115	35	440	270	365	325	35	20	95	10
Future Volume (vph)	15	280	115	35	440	270	365	325	35	20	95	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

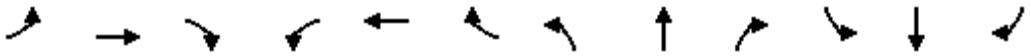
Splits and Phases: 16: Oakes Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	280	115	35	440	270	365	325	35	20	95	10
Future Volume (veh/h)	15	280	115	35	440	270	365	325	35	20	95	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	280	115	35	440	270	365	325	35	20	95	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	518	672	276	538	582	357	409	456	49	193	453	48
Arrive On Green	0.59	0.59	0.59	1.00	1.00	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	736	1130	464	994	980	601	1276	1491	161	1010	1483	156
Grp Volume(v), veh/h	15	0	395	35	0	710	365	0	360	20	0	105
Grp Sat Flow(s),veh/h/ln	736	0	1594	994	0	1581	1276	0	1652	1010	0	1639
Q Serve(g_s), s	0.8	0.0	12.0	0.8	0.0	0.0	23.2	0.0	17.4	1.6	0.0	4.3
Cycle Q Clear(g_c), s	0.8	0.0	12.0	12.8	0.0	0.0	27.5	0.0	17.4	19.0	0.0	4.3
Prop In Lane	1.00		0.29	1.00		0.38	1.00		0.10	1.00		0.10
Lane Grp Cap(c), veh/h	518	0	947	538	0	940	409	0	505	193	0	501
V/C Ratio(X)	0.03	0.00	0.42	0.07	0.00	0.76	0.89	0.00	0.71	0.10	0.00	0.21
Avail Cap(c_a), veh/h	518	0	947	538	0	940	409	0	505	193	0	501
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.79	0.00	0.79	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	9.8	1.4	0.0	0.0	34.5	0.0	27.7	36.2	0.0	23.2
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.2	0.0	4.5	20.5	0.0	4.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.3	0.1	0.0	1.2	10.4	0.0	7.3	0.4	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	11.1	1.6	0.0	4.5	55.0	0.0	31.8	36.3	0.0	23.3
LnGrp LOS	A	A	B	A	A	A	D	A	C	D	A	C
Approach Vol, veh/h		410			745			725			125	
Approach Delay, s/veh		11.0			4.4			43.5			25.3	
Approach LOS		B			A			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		58.0		32.0		58.0		32.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		53.5		27.5		53.5		27.5				
Max Q Clear Time (g_c+I1), s		14.0		21.0		14.8		29.5				
Green Ext Time (p_c), s		3.1		0.2		6.9		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	190	60	10	300	20	55	25	10	5	20	15
Future Volume (vph)	20	190	60	10	300	20	55	25	10	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	190	60	10	300	20	55	25	10	5	20	15
Future Vol, veh/h	20	190	60	10	300	20	55	25	10	5	20	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	20	190	60	10	300	20	55	25	10	5	20	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	10.8	9.2	8.6
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	61%	7%	3%	12%
Vol Thru, %	28%	70%	91%	50%
Vol Right, %	11%	22%	6%	38%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	270	330	40
LT Vol	55	20	10	5
Through Vol	25	190	300	20
RT Vol	10	60	20	15
Lane Flow Rate	90	270	330	40
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.339	0.415	0.058
Departure Headway (Hd)	5.344	4.522	4.527	5.177
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	667	791	792	686
Service Time	3.412	2.569	2.571	3.252
HCM Lane V/C Ratio	0.135	0.341	0.417	0.058
HCM Control Delay	9.2	9.9	10.8	8.6
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.5	1.5	2.1	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	285	20	25	720	50	5	15	20	75	15	15
Future Volume (vph)	25	285	20	25	720	50	5	15	20	75	15	15
Satd. Flow (prot)	1770	1656	0	1770	1657	0	0	1877	1454	0	1824	1454
Flt Permitted	0.316			0.574				0.931			0.748	
Satd. Flow (perm)	588	1656	0	1061	1657	0	0	1766	1416	0	1415	1414
Satd. Flow (RTOR)		7			7				20			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	305	0	25	770	0	0	20	20	0	90	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	71.4	71.4		71.4	71.4			13.0	71.4		13.0	71.4
Actuated g/C Ratio	0.79	0.79		0.79	0.79			0.14	0.79		0.14	0.79
v/c Ratio	0.05	0.23		0.03	0.59			0.08	0.02		0.44	0.01
Control Delay	3.9	3.4		5.0	9.0			29.7	2.7		39.7	2.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.9	3.4		5.0	9.0			29.7	2.7		39.7	2.6
LOS	A	A		A	A			C	A		D	A
Approach Delay		3.4			8.9			16.2			34.4	
Approach LOS		A			A			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	750	20	0	0	220
Future Volume (vph)	30	750	20	0	0	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	13.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	750	20	0	0	220
Future Vol, veh/h	30	750	20	0	0	220
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	30	750	20	0	0	220

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	240	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	746	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	814	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	746	1055	-	-	-	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	814	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1038	-
HCM Lane V/C Ratio	-	0.751	-
HCM Control Delay (s)	-	18.1	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	7.4	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	215	80
Future Volume (vph)	0	0	25	0	215	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

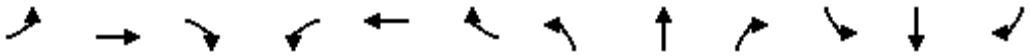
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	215	80
Future Vol, veh/h	0	0	25	0	215	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	215	80

Major/Minor	Minor2		Major2	
Conflicting Flow All	510	80	0	0
Stage 1	510	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	469	986	-	-
Stage 1	541	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	986	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	35	75	30	5	10	90	230	5	5	350	40
Future Volume (vph)	10	35	75	30	5	10	90	230	5	5	350	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

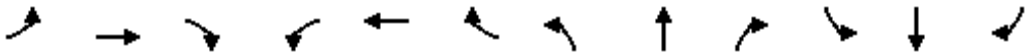
Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	35	75	30	5	10	90	230	5	5	350	40
Future Vol, veh/h	10	35	75	30	5	10	90	230	5	5	350	40
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	10	35	75	30	5	10	90	230	5	5	350	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	846	815	395	863	833	269	405	0	0	240	0	0
Stage 1	395	395	-	418	418	-	-	-	-	-	-	-
Stage 2	451	420	-	445	415	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	284	314	659	277	307	775	1165	-	-	1327	-	-
Stage 1	634	608	-	616	594	-	-	-	-	-	-	-
Stage 2	592	593	-	596	596	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	245	279	643	202	273	749	1148	-	-	1321	-	-
Mov Cap-2 Maneuver	245	279	-	202	273	-	-	-	-	-	-	-
Stage 1	569	596	-	558	538	-	-	-	-	-	-	-
Stage 2	511	537	-	488	585	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.8	22.5	2.3	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1148	-	-	424	250	1321	-	-
HCM Lane V/C Ratio	0.078	-	-	0.283	0.18	0.004	-	-
HCM Control Delay (s)	8.4	0	-	16.8	22.5	7.7	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.6	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	30	45	0	5	40	160	15	0	225	10
Future Volume (vph)	10	0	30	45	0	5	40	160	15	0	225	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

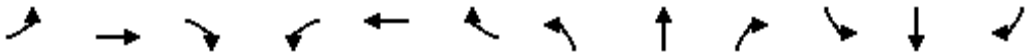
Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	30	45	0	5	40	160	15	0	225	10
Future Vol, veh/h	10	0	30	45	0	5	40	160	15	0	225	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	0	30	45	0	5	40	160	15	0	225	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	480	485	230	493	483	168	235	0	0	175	0	0
Stage 1	230	230	-	248	248	-	-	-	-	-	-	-
Stage 2	250	255	-	245	235	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	499	485	814	490	486	881	1344	-	-	1414	-	-
Stage 1	777	718	-	760	705	-	-	-	-	-	-	-
Stage 2	759	700	-	763	714	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	484	469	814	460	470	881	1344	-	-	1414	-	-
Mov Cap-2 Maneuver	484	469	-	460	470	-	-	-	-	-	-	-
Stage 1	751	718	-	735	682	-	-	-	-	-	-	-
Stage 2	730	677	-	735	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	13.3	1.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1344	-	-	695	483	1414	-	-
HCM Lane V/C Ratio	0.03	-	-	0.058	0.104	-	-	-
HCM Control Delay (s)	7.8	0	-	10.5	13.3	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	185	5	15	115	10	10	0	10	25	0	5
Future Volume (vph)	10	185	5	15	115	10	10	0	10	25	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

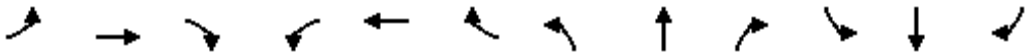
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	185	5	15	115	10	10	0	10	25	0	5
Future Vol, veh/h	10	185	5	15	115	10	10	0	10	25	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	185	5	15	115	10	10	0	10	25	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	125	0	0	190	0	0	361	363	188	363	360	120
Stage 1	-	-	-	-	-	-	208	208	-	150	150	-
Stage 2	-	-	-	-	-	-	153	155	-	213	210	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1474	-	-	1396	-	-	598	568	859	597	570	937
Stage 1	-	-	-	-	-	-	799	734	-	857	777	-
Stage 2	-	-	-	-	-	-	854	773	-	794	732	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1396	-	-	586	557	859	581	559	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	586	557	-	581	559	-
Stage 1	-	-	-	-	-	-	793	728	-	850	768	-
Stage 2	-	-	-	-	-	-	839	764	-	778	726	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.8	10.3	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	697	1474	-	-	1396	-	-	620
HCM Lane V/C Ratio	0.029	0.007	-	-	0.011	-	-	0.048
HCM Control Delay (s)	10.3	7.5	0	-	7.6	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	330	105	10	740	0	495	10	5	0	10	20
Future Volume (vph)	5	330	105	10	740	0	495	10	5	0	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	325

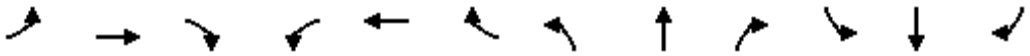
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	330	105	10	740	0	495	10	5	0	10	20
Future Vol, veh/h	5	330	105	10	740	0	495	10	5	0	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	330	105	10	740	0	495	10	5	0	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	740	0	0	435	0	0	1168	1153	383	1160	1205	740
Stage 1	-	-	-	-	-	-	393	393	-	760	760	-
Stage 2	-	-	-	-	-	-	775	760	-	400	445	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	867	-	-	1130	-	-	~ 170	197	662	174	185	420
Stage 1	-	-	-	-	-	-	630	604	-	401	417	-
Stage 2	-	-	-	-	-	-	~ 389	413	-	630	578	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	867	-	-	1130	-	-	~ 152	192	662	163	181	420
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 152	192	-	163	181	-
Stage 1	-	-	-	-	-	-	625	599	-	398	411	-
Stage 2	-	-	-	-	-	-	~ 356	407	-	610	573	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 1101.1	18.7
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	154	867	-	-	1130	-	-	292
HCM Lane V/C Ratio	3.312	0.006	-	-	0.009	-	-	0.103
HCM Control Delay (s)	$ 1101.1	9.2	0	-	8.2	0	-	18.7
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	48.4	0	-	-	0	-	-	0.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	530	0	335	0	0	115	415
Future Volume (vph)	0	0	0	0	0	530	0	335	0	0	115	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

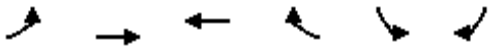
Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	530	0	335	0	0	115	415
Future Vol, veh/h	0	0	0	0	0	530	0	335	0	0	115	415
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	530	0	335	0	0	115	415

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	335	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	705	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	705	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	23.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	705	-	-
HCM Lane V/C Ratio	-	0.752	-	-
HCM Control Delay (s)	-	23.9	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	6.9	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	305	5	0	0	140	0
Future Volume (vph)	305	5	0	0	140	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	305	5	0	0	140	0
Future Vol, veh/h	305	5	0	0	140	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	305	5	0	0	140	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	10.5	9.2
HCM LOS	B	A

Lane	EBLn1	SBLn1
Vol Left, %	98%	100%
Vol Thru, %	2%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	310	140
LT Vol	305	140
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	310	140
Geometry Grp	1	1
Degree of Util (X)	0.393	0.194
Departure Headway (Hd)	4.565	4.991
Convergence, Y/N	Yes	Yes
Cap	791	721
Service Time	2.581	3.011
HCM Lane V/C Ratio	0.392	0.194
HCM Control Delay	10.5	9.2
HCM Lane LOS	B	A
HCM 95th-tile Q	1.9	0.7

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	315	5	425	655	105	0
Future Volume (vph)	315	5	425	655	105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	42.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	315	5	425	655	105	0
Future Vol, veh/h	315	5	425	655	105	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	315	5	425	655	105	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	320	0	1823	318
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	1505	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1246	-	~ 85	723
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	203	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1246	-	~ 56	723
Mov Cap-2 Maneuver	-	-	-	-	~ 56	-
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	134	-

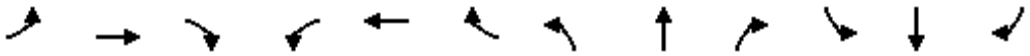
Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	$ 571.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	56	-	-	1246	-
HCM Lane V/C Ratio	1.875	-	-	0.341	-
HCM Control Delay (s)	$ 571.1	-	-	9.4	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	10	-	-	1.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Sunday LOS Calculations

(2031 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	232	5	5	0	0	0	0	15	5	246	20	0
Future Volume (vph)	232	5	5	0	0	0	0	15	5	246	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

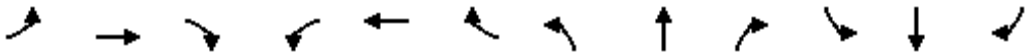
Intersection	
Int Delay, s/veh	14.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	232	5	5	0	0	0	0	15	5	246	20	0
Future Vol, veh/h	232	5	5	0	0	0	0	15	5	246	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	232	5	5	0	0	0	0	15	5	246	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	530	532	20	-	0	0	20	0	0
Stage 1	512	512	-	-	-	-	-	-	-
Stage 2	18	20	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	511	455	1061	0	-	-	1609	-	0
Stage 1	604	538	-	0	-	-	-	-	0
Stage 2	1007	881	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	432	0	1061	-	-	-	1609	-	-
Mov Cap-2 Maneuver	432	0	-	-	-	-	-	-	-
Stage 1	604	0	-	-	-	-	-	-	-
Stage 2	851	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23	0	7.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	437	1609	-
HCM Lane V/C Ratio	-	-	0.554	0.153	-
HCM Control Delay (s)	-	-	23	7.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	3.3	0.5	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	25	5	318	5	242	0	0	241	985
Future Volume (vph)	0	0	0	25	5	318	5	242	0	0	241	985
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

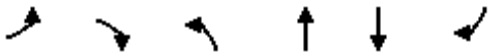
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	25	5	318	5	242	0	0	241	985
Future Vol, veh/h	0	0	0	25	5	318	5	242	0	0	241	985
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	25	5	318	5	242	0	0	241	985

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	986	1478	242	1226	0	-	-	-	0
Stage 1	252	252	-	-	-	-	-	-	-
Stage 2	734	1226	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	277	127	802	576	-	0	0	-	-
Stage 1	795	702	-	-	-	0	0	-	-
Stage 2	478	253	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	274	0	802	576	-	-	-	-	-
Mov Cap-2 Maneuver	274	0	-	-	-	-	-	-	-
Stage 1	787	0	-	-	-	-	-	-	-
Stage 2	478	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	576	-	703	-	-
HCM Lane V/C Ratio	0.009	-	0.495	-	-
HCM Control Delay (s)	11.3	0	15	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	0	-	2.8	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	70	30	530	1156	37
Future Volume (vph)	32	70	30	530	1156	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	70	30	530	1156	37
Future Vol, veh/h	32	70	30	530	1156	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	32	70	30	530	1156	37

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1765	1175	1193	0	-	0
Stage 1	1175	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	91	231	592	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	86	231	592	-	-	-
Mov Cap-2 Maneuver	86	-	-	-	-	-
Stage 1	276	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	68	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	592	-	151	-	-
HCM Lane V/C Ratio	0.051	-	0.675	-	-
HCM Control Delay (s)	11.4	-	68	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	3.8	-	-

LANE LEVEL OF SERVICE

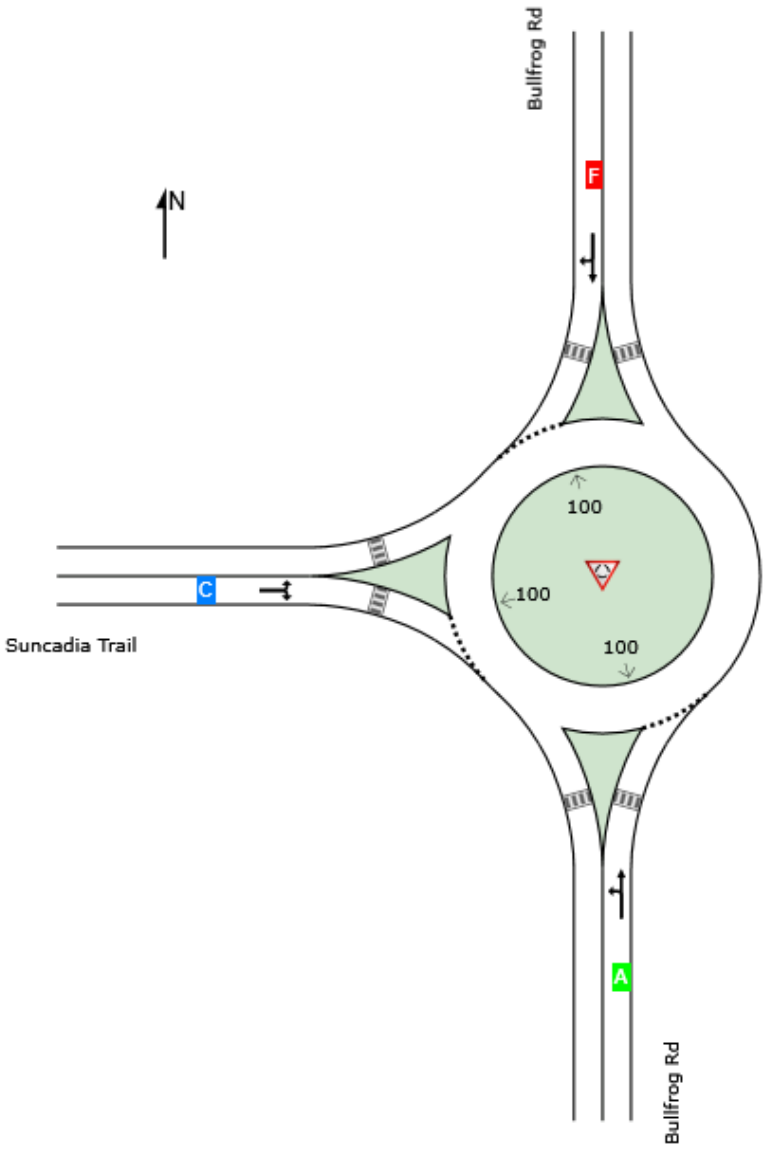
Lane Level of Service

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	F	C	E



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	555	0.6	555	0.6	1246	0.445	100	7.2	LOS A	3.1	77.3	Full	1600	0.0	0.0
Approach	555	0.6	555	0.6		0.445		7.2	LOS A	3.1	77.3				
North: Bullfrog Rd															
Lane 1[d]	1077	1.0	1077	1.0	1027	1.049	100	57.4	LOS F	60.0	1510.9	Full	1600	0.0	3.3
Approach	1077	1.0	1077	1.0		1.049		57.4	LOS F	60.0	1510.9				
West: Suncadia Trail															
Lane 1[d]	295	0.0	295	0.0	525	0.562	100	18.0	LOS C	3.2	79.1	Full	1600	0.0	0.0
Approach	295	0.0	295	0.0		0.562		18.0	LOS C	3.2	79.1				
All Vehicles	1927	0.7	1927	0.7		1.049		36.9	LOS E	60.0	1510.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	276	279	555	0.6	1246	0.445	100	NA	NA
Approach	276	279	555	0.6		0.445			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	984	93	1077	1.0	1027	1.049	100	NA	NA
Approach	984	93	1077	1.0		1.049			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	94	201	295	0.0	525	0.562	100	NA	NA
Approach	94	201	295	0.0		0.562			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1927	0.7	1.049

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	12.5	43.7	NA
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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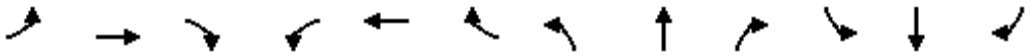


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	32	0	0	0	27	296	0	0	1001	30
Future Volume (vph)	10	0	32	0	0	0	27	296	0	0	1001	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	32	0	0	0	27	296	0	0	1001	30
Future Vol, veh/h	10	0	32	0	0	0	27	296	0	0	1001	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	10	0	32	0	0	0	27	296	0	0	1001	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1366	1366	1016	1382	1381	296	1031	0	0	296	0	0
Stage 1	1016	1016	-	350	350	-	-	-	-	-	-	-
Stage 2	350	350	-	1032	1031	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	121	144	282	122	145	748	682	-	-	1271	-	-
Stage 1	281	309	-	671	636	-	-	-	-	-	-	-
Stage 2	656	624	-	284	313	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	117	137	282	104	138	748	682	-	-	1271	-	-
Mov Cap-2 Maneuver	117	137	-	104	138	-	-	-	-	-	-	-
Stage 1	268	309	-	639	606	-	-	-	-	-	-	-
Stage 2	625	595	-	252	313	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.3	0	0.9	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	682	-	-	211	-	1271	-	-
HCM Lane V/C Ratio	0.04	-	-	0.199	-	-	-	-
HCM Control Delay (s)	10.5	0	-	26.3	0	0	-	-
HCM Lane LOS	B	A	-	D	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	-	0	-	-

LANE LEVEL OF SERVICE

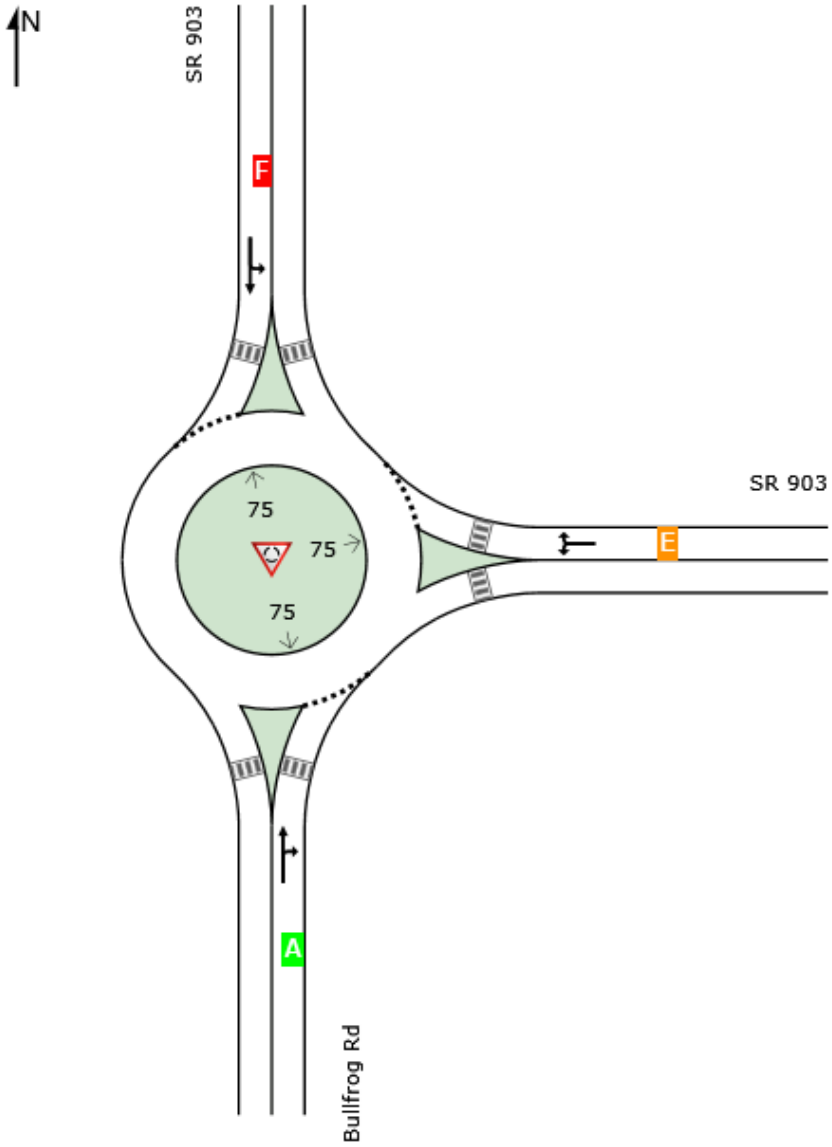
Lane Level of Service

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	E	F	E



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2031 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	306	0.0	306	0.0	948	0.323	100	7.2	LOS A	1.6	41.1	Full	1600	0.0	0.0
Approach	306	0.0	306	0.0		0.323		7.2	LOS A	1.6	41.1				
East: SR 903															
Lane 1[d]	1115	1.1	1115	1.1	1142	0.977	100	36.2	LOS E	56.0	1412.3	Full	1600	0.0	1.4
Approach	1115	1.1	1115	1.1		0.977		36.2	LOS E	56.0	1412.3				
North: SR 903															
Lane 1[d]	717	0.3	717	0.3	657	1.092	100	84.8	LOS F	35.3	883.9	Full	1600	0.0	0.0
Approach	717	0.3	717	0.3		1.092		84.8	LOS F	35.3	883.9				
All Vehicles	2138	0.7	2138	0.7		1.092		48.3	LOS E	56.0	1412.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	174	132	306	0.0	948	0.323	100	NA	NA
Approach	174	132	306	0.0		0.323			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	715	400	1115	1.1	1142	0.977	100	NA	NA
Approach	715	400	1115	1.1		0.977			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	401	316	717	0.3	657	1.092	100	NA	NA
Approach	401	316	717	0.3		1.092			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2138	0.7	1.092

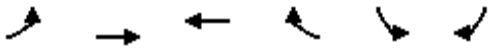
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	15.1	82.8	NA



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	704	1398	30	10	16
Future Volume (vph)	11	704	1398	30	10	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

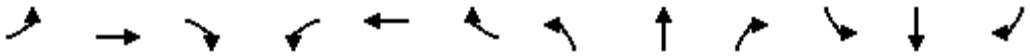
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	704	1398	30	10	16
Future Vol, veh/h	11	704	1398	30	10	16
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	11	704	1398	30	10	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1433	0	-	0	2144	1418
Stage 1	-	-	-	-	1418	-
Stage 2	-	-	-	-	726	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	477	-	-	-	54	170
Stage 1	-	-	-	-	226	-
Stage 2	-	-	-	-	483	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	475	-	-	-	51	169
Mov Cap-2 Maneuver	-	-	-	-	51	-
Stage 1	-	-	-	-	216	-
Stage 2	-	-	-	-	481	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	61.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	475	-	-	-	89
HCM Lane V/C Ratio	0.023	-	-	-	0.292
HCM Control Delay (s)	12.8	0	-	-	61.3
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	610	93	20	1249	5	138	0	70	10	0	6
Future Volume (vph)	6	610	93	20	1249	5	138	0	70	10	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	116.4

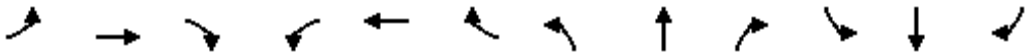
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	610	93	20	1249	5	138	0	70	10	0	6
Future Vol, veh/h	6	610	93	20	1249	5	138	0	70	10	0	6
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	6	610	93	20	1249	5	138	0	70	10	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1254	0	0	706	0	0	1967	1966	660	1996	2010	1252
Stage 1	-	-	-	-	-	-	672	672	-	1292	1292	-
Stage 2	-	-	-	-	-	-	1295	1294	-	704	718	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	558	-	-	897	-	-	~ 47	63	461	45	60	212
Stage 1	-	-	-	-	-	-	444	453	-	202	236	-
Stage 2	-	-	-	-	-	-	199	232	-	431	436	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	558	-	-	894	-	-	~ 42	57	460	36	54	212
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 42	57	-	36	54	-
Stage 1	-	-	-	-	-	-	435	443	-	198	219	-
Stage 2	-	-	-	-	-	-	179	215	-	359	427	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 1226.4	102.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	61	558	-	-	894	-	-	52
HCM Lane V/C Ratio	3.41	0.011	-	-	0.022	-	-	0.308
HCM Control Delay (s)	$ 1226.4	11.5	0	-	9.1	0	-	102.4
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	21.9	0	-	-	0.1	-	-	1.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	628	71	20	1222	5	101	15	30	10	0	6
Future Volume (vph)	26	628	71	20	1222	5	101	15	30	10	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	70.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	628	71	20	1222	5	101	15	30	10	0	6
Future Vol, veh/h	26	628	71	20	1222	5	101	15	30	10	0	6
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	26	628	71	20	1222	5	101	15	30	10	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1227	0	0	703	0	0	1988	1987	668	2003	2020	1225
Stage 1	-	-	-	-	-	-	720	720	-	1265	1265	-
Stage 2	-	-	-	-	-	-	1268	1267	-	738	755	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	568	-	-	899	-	-	~ 46	61	458	45	59	220
Stage 1	-	-	-	-	-	-	419	432	-	210	243	-
Stage 2	-	-	-	-	-	-	207	240	-	413	420	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	568	-	-	896	-	-	~ 40	52	456	29	51	220
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 40	52	-	29	51	-
Stage 1	-	-	-	-	-	-	385	397	-	194	226	-
Stage 2	-	-	-	-	-	-	187	223	-	343	386	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	$ 1011	131.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	51	568	-	-	896	-	-	43
HCM Lane V/C Ratio	2.863	0.046	-	-	0.022	-	-	0.372
HCM Control Delay (s)	$ 1011	11.6	0	-	9.1	0	-	131.8
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	15.4	0.1	-	-	0.1	-	-	1.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	103	10	20	198
Future Volume (vph)	25	15	103	10	20	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

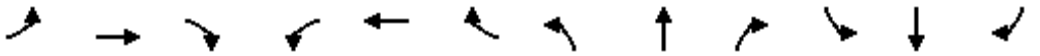
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	103	10	20	198
Future Vol, veh/h	25	15	103	10	20	198
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	103	10	20	198
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.5	8.3	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	9%	0%	91%
Vol Thru, %	0%	62%	9%
Vol Right, %	91%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	218	40	113
LT Vol	20	0	103
Through Vol	0	25	10
RT Vol	198	15	0
Lane Flow Rate	218	40	113
Geometry Grp	1	1	1
Degree of Util (X)	0.224	0.047	0.141
Departure Headway (Hd)	3.704	4.233	4.499
Convergence, Y/N	Yes	Yes	Yes
Cap	950	832	790
Service Time	1.803	2.332	2.569
HCM Lane V/C Ratio	0.229	0.048	0.143
HCM Control Delay	7.9	7.5	8.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.1	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	225	120	65	350	105	70	96	110	50	71	47
Future Volume (vph)	107	225	120	65	350	105	70	96	110	50	71	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

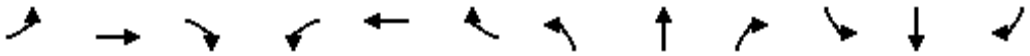
Intersection	
Int Delay, s/veh	29

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	107	225	120	65	350	105	70	96	110	50	71	47
Future Vol, veh/h	107	225	120	65	350	105	70	96	110	50	71	47
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	107	225	120	65	350	105	70	96	110	50	71	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	455	0	0	345	0	0	1092	1084	285	1135	1092	404
Stage 1	-	-	-	-	-	-	499	499	-	533	533	-
Stage 2	-	-	-	-	-	-	593	585	-	602	559	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1106	-	-	1214	-	-	192	217	754	181	216	651
Stage 1	-	-	-	-	-	-	554	544	-	534	528	-
Stage 2	-	-	-	-	-	-	492	498	-	490	514	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1106	-	-	1214	-	-	112	185	754	82	184	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	185	-	82	184	-
Stage 1	-	-	-	-	-	-	500	491	-	482	499	-
Stage 2	-	-	-	-	-	-	370	471	-	304	464	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	1	112.5	51.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	145	754	1106	-	-	1214	-	-	82	258
HCM Lane V/C Ratio	1.145	0.146	0.097	-	-	0.054	-	-	0.61	0.457
HCM Control Delay (s)	180.1	10.6	8.6	-	-	8.1	-	-	101.7	30.2
HCM Lane LOS	F	B	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	9.3	0.5	0.3	-	-	0.2	-	-	2.8	2.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	365	5	60	505	40	20	61	65	5	81	50
Future Volume (vph)	75	365	5	60	505	40	20	61	65	5	81	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

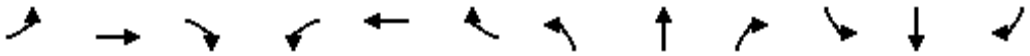
Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	365	5	60	505	40	20	61	65	5	81	50
Future Vol, veh/h	75	365	5	60	505	40	20	61	65	5	81	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	365	5	60	505	40	20	61	65	5	81	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	372	0	0	1231	1187	370	1228	1169	527
Stage 1	-	-	-	-	-	-	520	520	-	647	647	-
Stage 2	-	-	-	-	-	-	711	667	-	581	522	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	1027	-	-	1186	-	-	153	187	671	154	192	549
Stage 1	-	-	-	-	-	-	536	529	-	458	465	-
Stage 2	-	-	-	-	-	-	421	454	-	498	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1025	-	-	1184	-	-	79	164	670	90	168	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	79	164	-	90	168	-
Stage 1	-	-	-	-	-	-	496	489	-	424	440	-
Stage 2	-	-	-	-	-	-	296	430	-	365	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	43.8	46.3
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	130	670	1025	-	-	1184	-	-	216
HCM Lane V/C Ratio	0.623	0.097	0.073	-	-	0.051	-	-	0.63
HCM Control Delay (s)	70.2	11	8.8	-	-	8.2	-	-	46.3
HCM Lane LOS	F	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	3.2	0.3	0.2	-	-	0.2	-	-	3.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	439	131	110	820	20	418	15	15	5	15	39
Future Volume (vph)	33	439	131	110	820	20	418	15	15	5	15	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	757

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	439	131	110	820	20	418	15	15	5	15	39
Future Vol, veh/h	33	439	131	110	820	20	418	15	15	5	15	39
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	33	439	131	110	820	20	418	15	15	5	15	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	848	0	0	573	0	0	1655	1642	510	1646	1697	842
Stage 1	-	-	-	-	-	-	574	574	-	1058	1058	-
Stage 2	-	-	-	-	-	-	1081	1068	-	588	639	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	785	-	-	1005	-	-	~ 79	100	565	80	93	367
Stage 1	-	-	-	-	-	-	506	505	-	274	304	-
Stage 2	-	-	-	-	-	-	~ 265	299	-	499	474	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	779	-	-	1002	-	-	~ 47	74	562	53	68	363
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 47	74	-	53	68	-
Stage 1	-	-	-	-	-	-	473	472	-	255	239	-
Stage 2	-	-	-	-	-	-	~ 175	235	-	440	443	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1	$ 3471.7	48.3
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	47	131	779	-	-	1002	-	-	140
HCM Lane V/C Ratio	8.894	0.229	0.042	-	-	0.11	-	-	0.421
HCM Control Delay (s)	$ 3718	40.5	9.8	0	-	9	0	-	48.3
HCM Lane LOS	F	E	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	49.5	0.8	0.1	-	-	0.4	-	-	1.8

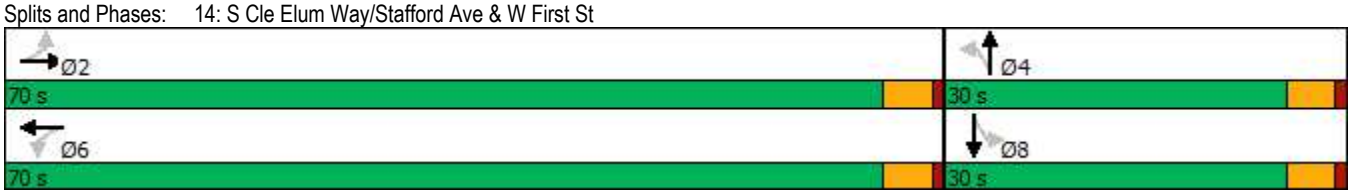
Notes

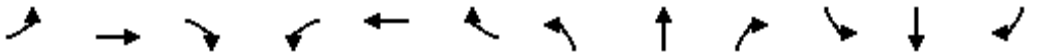
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	95	65	490	348	80	100	85	56	155	55
Future Volume (vph)	15	320	95	65	490	348	80	100	85	56	155	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 91.5	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St





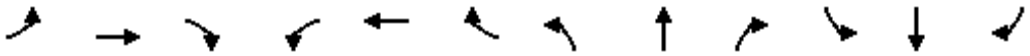
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	95	65	490	348	80	100	85	56	155	55
Future Volume (veh/h)	15	320	95	65	490	348	80	100	85	56	155	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	95	65	490	348	80	100	85	56	155	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	347	963	286	663	708	503	196	194	165	211	274	97
Arrive On Green	0.70	0.70	0.70	0.70	0.70	0.70	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	656	1385	411	971	1017	722	1178	939	798	1205	1327	471
Grp Volume(v), veh/h	15	0	415	65	0	838	80	0	185	56	0	210
Grp Sat Flow(s),veh/h/ln	656	0	1796	971	0	1740	1178	0	1737	1205	0	1798
Q Serve(g_s), s	1.3	0.0	8.6	2.7	0.0	26.6	6.2	0.0	8.9	4.1	0.0	9.9
Cycle Q Clear(g_c), s	27.9	0.0	8.6	11.3	0.0	26.6	16.0	0.0	8.9	13.0	0.0	9.9
Prop In Lane	1.00		0.23	1.00		0.42	1.00		0.46	1.00		0.26
Lane Grp Cap(c), veh/h	347	0	1249	663	0	1210	196	0	359	211	0	371
V/C Ratio(X)	0.04	0.00	0.33	0.10	0.00	0.69	0.41	0.00	0.52	0.26	0.00	0.57
Avail Cap(c_a), veh/h	347	0	1249	663	0	1210	271	0	469	288	0	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	5.7	7.9	0.0	8.4	40.7	0.0	33.1	38.9	0.0	33.5
Incr Delay (d2), s/veh	0.2	0.0	0.7	0.3	0.0	3.3	1.9	0.0	1.6	0.9	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.1	0.6	0.0	9.7	1.9	0.0	3.9	1.3	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.8	0.0	6.4	8.2	0.0	11.7	42.6	0.0	34.8	39.8	0.0	35.4
LnGrp LOS	B	A	A	A	A	B	D	A	C	D	A	D
Approach Vol, veh/h		430			903			265			266	
Approach Delay, s/veh		6.7			11.4			37.1			36.4	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	24.0	70.0	24.0
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	65.4	25.4	65.4	25.4
Max Q Clear Time (g_c+I1), s	29.9	18.0	28.6	15.0
Green Ext Time (p_c), s	3.3	1.1	9.2	1.4

Intersection Summary	
HCM 6th Ctrl Delay	17.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	287	160	10	360	30	548	20	10	25	25	27
Future Volume (vph)	32	287	160	10	360	30	548	20	10	25	25	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	225.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	287	160	10	360	30	548	20	10	25	25	27
Future Vol, veh/h	32	287	160	10	360	30	548	20	10	25	25	27
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	32	287	160	10	360	30	548	20	10	25	25	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	448	0	0	853	842	369	842	907	375
Stage 1	-	-	-	-	-	-	432	432	-	395	395	-
Stage 2	-	-	-	-	-	-	421	410	-	447	512	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1169	-	-	1118	-	-	~ 279	301	677	277	269	658
Stage 1	-	-	-	-	-	-	602	582	-	618	594	-
Stage 2	-	-	-	-	-	-	610	595	-	579	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1169	-	-	1117	-	-	~ 239	286	676	249	256	658
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 239	286	-	249	256	-
Stage 1	-	-	-	-	-	-	579	560	-	595	587	-
Stage 2	-	-	-	-	-	-	554	588	-	529	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.2	$ 595.8	19.7
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	239	354	1169	-	-	1117	-	-	322
HCM Lane V/C Ratio	2.293	0.085	0.027	-	-	0.009	-	-	0.239
HCM Control Delay (s)	$ 627.5	16.1	8.2	0	-	8.3	0	-	19.7
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	43.4	0.3	0.1	-	-	0	-	-	0.9

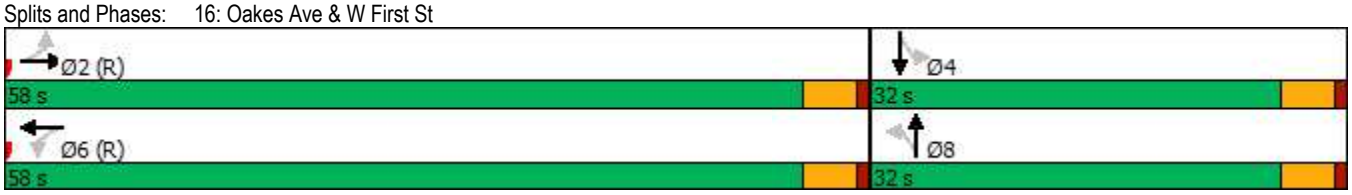
Notes

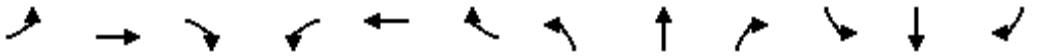
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	306	126	35	473	282	379	361	35	38	132	10
Future Volume (vph)	15	306	126	35	473	282	379	361	35	38	132	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St

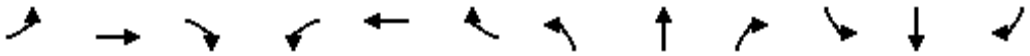




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	306	126	35	473	282	379	361	35	38	132	10
Future Volume (veh/h)	15	306	126	35	473	282	379	361	35	38	132	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	306	126	35	473	282	379	361	35	38	132	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	500	671	276	506	589	351	376	461	45	165	468	35
Arrive On Green	0.59	0.59	0.59	1.00	1.00	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	706	1129	465	961	991	591	1235	1508	146	978	1531	116
Grp Volume(v), veh/h	15	0	432	35	0	755	379	0	396	38	0	142
Grp Sat Flow(s),veh/h/ln	706	0	1594	961	0	1583	1235	0	1655	978	0	1647
Q Serve(g_s), s	0.8	0.0	13.6	0.9	0.0	0.0	21.6	0.0	19.7	3.3	0.0	5.9
Cycle Q Clear(g_c), s	0.8	0.0	13.6	14.5	0.0	0.0	27.5	0.0	19.7	23.0	0.0	5.9
Prop In Lane	1.00		0.29	1.00		0.37	1.00		0.09	1.00		0.07
Lane Grp Cap(c), veh/h	500	0	947	506	0	941	376	0	506	165	0	503
V/C Ratio(X)	0.03	0.00	0.46	0.07	0.00	0.80	1.01	0.00	0.78	0.23	0.00	0.28
Avail Cap(c_a), veh/h	500	0	947	506	0	941	376	0	506	165	0	503
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.67	0.00	0.67	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	10.2	1.8	0.0	0.0	36.5	0.0	28.5	39.0	0.0	23.7
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.2	0.0	4.9	48.1	0.0	7.2	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.8	0.1	0.0	1.3	13.4	0.0	8.7	0.8	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	11.7	2.0	0.0	4.9	84.6	0.0	35.7	39.3	0.0	23.9
LnGrp LOS	A	A	B	A	A	A	F	A	D	D	A	C
Approach Vol, veh/h		447			790			775			180	
Approach Delay, s/veh		11.5			4.8			59.6			27.1	
Approach LOS		B			A			E			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	58.0	32.0	58.0	32.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	53.5	27.5	53.5	27.5
Max Q Clear Time (g_c+I1), s	15.6	25.0	16.5	29.5
Green Ext Time (p_c), s	3.5	0.1	7.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	204	97	10	317	20	92	25	10	5	20	21
Future Volume (vph)	26	204	97	10	317	20	92	25	10	5	20	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	204	97	10	317	20	92	25	10	5	20	21
Future Vol, veh/h	26	204	97	10	317	20	92	25	10	5	20	21
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	26	204	97	10	317	20	92	25	10	5	20	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

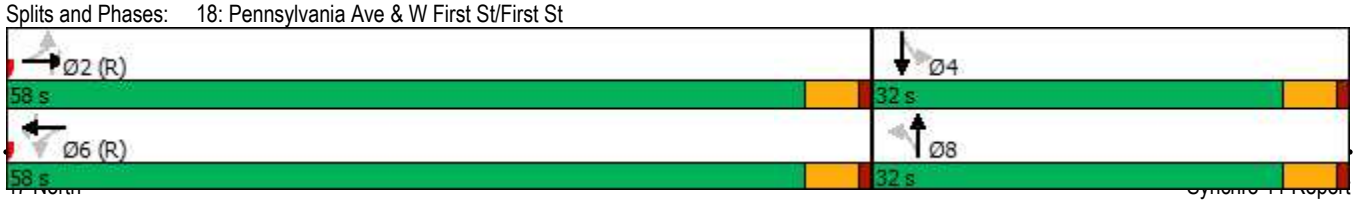
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.1	11.8	10.1	8.9
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	72%	8%	3%	11%
Vol Thru, %	20%	62%	91%	43%
Vol Right, %	8%	30%	6%	46%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	127	327	347	46
LT Vol	92	26	10	5
Through Vol	25	204	317	20
RT Vol	10	97	20	21
Lane Flow Rate	127	327	347	46
Geometry Grp	1	1	1	1
Degree of Util (X)	0.201	0.422	0.456	0.07
Departure Headway (Hd)	5.684	4.649	4.734	5.507
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	635	765	753	654
Service Time	3.685	2.732	2.816	3.513
HCM Lane V/C Ratio	0.2	0.427	0.461	0.07
HCM Control Delay	10.1	11.1	11.8	8.9
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	0.7	2.1	2.4	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	324	20	25	760	87	5	15	20	112	15	15
Future Volume (vph)	25	324	20	25	760	87	5	15	20	112	15	15
Satd. Flow (prot)	1770	1658	0	1770	1647	0	0	1877	1454	0	1820	1454
Flt Permitted	0.261			0.545				0.935			0.737	
Satd. Flow (perm)	486	1658	0	1008	1647	0	0	1774	1416	0	1393	1414
Satd. Flow (RTOR)		6			11				20			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	344	0	25	847	0	0	20	20	0	127	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	66.4	66.4		66.4	66.4			14.6	66.4		14.6	66.4
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.16	0.74		0.16	0.74
v/c Ratio	0.07	0.28		0.03	0.70			0.07	0.02		0.56	0.01
Control Delay	4.4	4.1		5.4	12.6			28.2	2.8		42.6	2.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.4	4.1		5.4	12.6			28.2	2.8		42.6	2.7
LOS	A	A		A	B			C	A		D	A
Approach Delay		4.1			12.4			15.5			38.4	
Approach LOS		A			B			B			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 83.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	800	20	0	0	268
Future Volume (vph)	30	800	20	0	0	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	15.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	800	20	0	0	268
Future Vol, veh/h	30	800	20	0	0	268
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	30	800	20	0	0	268

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	700	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	775	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	700	1055	-	-	-	-
Mov Cap-2 Maneuver	700	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1036	-
HCM Lane V/C Ratio	-	0.801	-
HCM Control Delay (s)	-	20.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	9	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	263	80
Future Volume (vph)	0	0	25	0	263	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

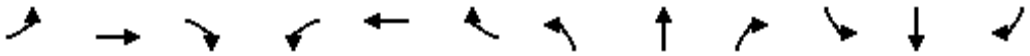
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	263	80
Future Vol, veh/h	0	0	25	0	263	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	263	80

Major/Minor	Minor2		Major2	
Conflicting Flow All	606	80	0	0
Stage 1	606	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	414	986	-	-
Stage 1	490	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	986	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	35	100	42	5	10	115	272	17	5	394	40
Future Volume (vph)	10	35	100	42	5	10	115	272	17	5	394	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

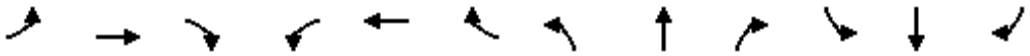
Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	35	100	42	5	10	115	272	17	5	394	40
Future Vol, veh/h	10	35	100	42	5	10	115	272	17	5	394	40
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	10	35	100	42	5	10	115	272	17	5	394	40

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	988	963	439	1018	975	317	449	0	0	294	0	0
Stage 1	439	439	-	516	516	-	-	-	-	-	-	-
Stage 2	549	524	-	502	459	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	228	258	622	218	253	728	1122	-	-	1268	-	-
Stage 1	601	582	-	546	538	-	-	-	-	-	-	-
Stage 2	524	533	-	555	570	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	191	221	607	143	216	703	1106	-	-	1262	-	-
Mov Cap-2 Maneuver	191	221	-	143	216	-	-	-	-	-	-	-
Stage 1	519	571	-	476	469	-	-	-	-	-	-	-
Stage 2	434	465	-	429	559	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.8	36	2.5	0.1
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1106	-	-	386	172	1262	-	-
HCM Lane V/C Ratio	0.104	-	-	0.376	0.331	0.004	-	-
HCM Control Delay (s)	8.6	0	-	19.8	36	7.9	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.7	1.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	36	51	0	5	46	190	21	0	257	10
Future Volume (vph)	10	0	36	51	0	5	46	190	21	0	257	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

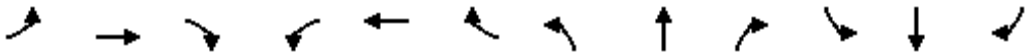
Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	36	51	0	5	46	190	21	0	257	10
Future Vol, veh/h	10	0	36	51	0	5	46	190	21	0	257	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	0	36	51	0	5	46	190	21	0	257	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	557	565	262	573	560	201	267	0	0	211	0	0
Stage 1	262	262	-	293	293	-	-	-	-	-	-	-
Stage 2	295	303	-	280	267	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	444	437	782	433	440	845	1308	-	-	1372	-	-
Stage 1	747	695	-	719	674	-	-	-	-	-	-	-
Stage 2	718	667	-	731	692	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	428	420	782	401	422	845	1308	-	-	1372	-	-
Mov Cap-2 Maneuver	428	420	-	401	422	-	-	-	-	-	-	-
Stage 1	717	695	-	690	647	-	-	-	-	-	-	-
Stage 2	685	640	-	697	692	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.8	14.9	1.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1308	-	-	663	421	1372	-	-
HCM Lane V/C Ratio	0.035	-	-	0.069	0.133	-	-	-
HCM Control Delay (s)	7.9	0	-	10.8	14.9	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	209	5	17	139	14	10	0	14	29	0	5
Future Volume (vph)	10	209	5	17	139	14	10	0	14	29	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

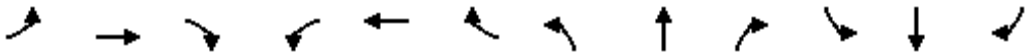
Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	209	5	17	139	14	10	0	14	29	0	5
Future Vol, veh/h	10	209	5	17	139	14	10	0	14	29	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	209	5	17	139	14	10	0	14	29	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	153	0	0	214	0	0	415	419	212	419	414	146
Stage 1	-	-	-	-	-	-	232	232	-	180	180	-
Stage 2	-	-	-	-	-	-	183	187	-	239	234	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1368	-	-	551	528	833	548	532	906
Stage 1	-	-	-	-	-	-	775	716	-	826	754	-
Stage 2	-	-	-	-	-	-	823	749	-	769	715	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1368	-	-	539	516	833	530	520	906
Mov Cap-2 Maneuver	-	-	-	-	-	-	539	516	-	530	520	-
Stage 1	-	-	-	-	-	-	769	710	-	819	743	-
Stage 2	-	-	-	-	-	-	807	739	-	750	709	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	10.5	11.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	679	1440	-	-	1368	-	-	564
HCM Lane V/C Ratio	0.035	0.007	-	-	0.012	-	-	0.06
HCM Control Delay (s)	10.5	7.5	0	-	7.7	0	-	11.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	361	105	10	771	0	520	10	5	0	10	20
Future Volume (vph)	5	361	105	10	771	0	520	10	5	0	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	397

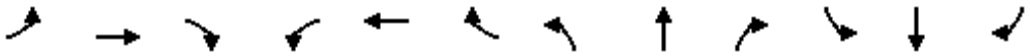
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	361	105	10	771	0	520	10	5	0	10	20
Future Vol, veh/h	5	361	105	10	771	0	520	10	5	0	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	361	105	10	771	0	520	10	5	0	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	771	0	0	466	0	0	1230	1215	414	1222	1267	771
Stage 1	-	-	-	-	-	-	424	424	-	791	791	-
Stage 2	-	-	-	-	-	-	806	791	-	431	476	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	844	-	-	1101	-	-	~ 154	180	636	158	170	403
Stage 1	-	-	-	-	-	-	606	585	-	386	404	-
Stage 2	-	-	-	-	-	-	~ 374	400	-	607	560	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	844	-	-	1101	-	-	~ 137	176	636	147	166	403
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 137	176	-	147	166	-
Stage 1	-	-	-	-	-	-	601	580	-	383	398	-
Stage 2	-	-	-	-	-	-	~ 341	394	-	587	556	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 1347	19.8
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	139	844	-	-	1101	-	-	273
HCM Lane V/C Ratio	3.849	0.006	-	-	0.009	-	-	0.11
HCM Control Delay (s)	$ 1347	9.3	0	-	8.3	0	-	19.8
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	53.3	0	-	-	0	-	-	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	555	0	335	0	0	140	415
Future Volume (vph)	0	0	0	0	0	555	0	335	0	0	140	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

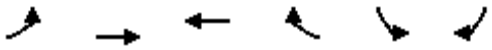
Intersection	
Int Delay, s/veh	10.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	555	0	335	0	0	140	415
Future Vol, veh/h	0	0	0	0	0	555	0	335	0	0	140	415
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	555	0	335	0	0	140	415

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	335	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	705	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	705	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	26.3	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	705	-	-
HCM Lane V/C Ratio	-	0.787	-	-
HCM Control Delay (s)	-	26.3	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	7.8	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	305	5	0	0	165	0
Future Volume (vph)	305	5	0	0	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	305	5	0	0	165	0
Future Vol, veh/h	305	5	0	0	165	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	305	5	0	0	165	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	10.7	9.5
HCM LOS	B	A

Lane	EBLn1	SBLn1
Vol Left, %	98%	100%
Vol Thru, %	2%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	310	165
LT Vol	305	165
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	310	165
Geometry Grp	1	1
Degree of Util (X)	0.399	0.229
Departure Headway (Hd)	4.63	4.997
Convergence, Y/N	Yes	Yes
Cap	778	719
Service Time	2.65	3.023
HCM Lane V/C Ratio	0.398	0.229
HCM Control Delay	10.7	9.5
HCM Lane LOS	B	A
HCM 95th-tile Q	1.9	0.9

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	346	5	425	686	105	0
Future Volume (vph)	346	5	425	686	105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	47.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	346	5	425	686	105	0
Future Vol, veh/h	346	5	425	686	105	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	346	5	425	686	105	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	351	0	1885	349
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	1536	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1213	-	~ 78	694
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	196	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1213	-	~ 51	694
Mov Cap-2 Maneuver	-	-	-	-	~ 51	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	127	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	$ 663.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	51	-	-	1213	-
HCM Lane V/C Ratio	2.059	-	-	0.35	-
HCM Control Delay (s)	$ 663.3	-	-	9.6	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	10.5	-	-	1.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	39	516	46	38	1147
Future Volume (vph)	46	39	516	46	38	1147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	688		1733			1540
Travel Time (s)	18.8		33.8			30.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	12

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	39	516	46	38	1147
Future Vol, veh/h	46	39	516	46	38	1147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	50	42	561	50	41	1247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1915	586	0	0	611	0
Stage 1	586	-	-	-	-	-
Stage 2	1329	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	56	431	-	-	773	-
Stage 1	473	-	-	-	-	-
Stage 2	196	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 46	431	-	-	773	-
Mov Cap-2 Maneuver	~ 46	-	-	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	162	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	254.9	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	78	773	-
HCM Lane V/C Ratio	-	-	1.185	0.053	-
HCM Control Delay (s)	-	-	254.9	9.9	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	6.9	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	111	66	257	116	67	966
Future Volume (vph)	111	66	257	116	67	966
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	928		1214			194
Travel Time (s)	25.3		23.6			3.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	14.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	111	66	257	116	67	966
Future Vol, veh/h	111	66	257	116	67	966
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	121	72	279	126	73	1050

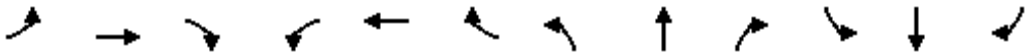
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1538	342	0	0	405	0
Stage 1	342	-	-	-	-	-
Stage 2	1196	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	127	698	-	-	1148	-
Stage 1	717	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 108	698	-	-	1148	-
Mov Cap-2 Maneuver	~ 108	-	-	-	-	-
Stage 1	717	-	-	-	-	-
Stage 2	241	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	127.4	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	108	698	1148	-
HCM Lane V/C Ratio	-	-	1.117	0.103	0.063	-
HCM Control Delay (s)	-	-	196.8	10.7	8.3	0
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	7.6	0.3	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	312	158	387	995	32	160	0	381	25	0	33
Future Volume (vph)	33	312	158	387	995	32	160	0	381	25	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			915			411	
Travel Time (s)		32.9			12.3			25.0			11.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	312	158	387	995	32	160	0	381	25	0	33
Future Vol, veh/h	33	312	158	387	995	32	160	0	381	25	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	36	339	172	421	1082	35	174	0	414	27	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1117	0	0	511	0	0	2457	2456	425	2646	2525	1100
Stage 1	-	-	-	-	-	-	497	497	-	1942	1942	-
Stage 2	-	-	-	-	-	-	1960	1959	-	704	583	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	622	-	-	1049	-	-	~ 21	30	627	~ 15	28	257
Stage 1	-	-	-	-	-	-	553	543	-	84	111	-
Stage 2	-	-	-	-	-	-	~ 82	109	-	426	497	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	622	-	-	1049	-	-	-	0	627	-	0	257
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	507	498	-	77	0	-
Stage 2	-	-	-	-	-	-	-	0	-	133	456	-

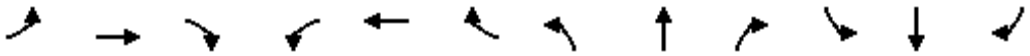
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	2.9		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	627	622	-	-	1049	-	-	-
HCM Lane V/C Ratio	-	0.66	0.058	-	-	0.401	-	-	-
HCM Control Delay (s)	-	21.2	11.1	0	-	10.7	0	-	-
HCM Lane LOS	-	C	B	A	-	B	A	-	-
HCM 95th %tile Q(veh)	-	4.9	0.2	-	-	2	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Sunday LOS Calculations

(2037 Baseline)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	5	5	0	0	0	0	20	10	265	20	0
Future Volume (vph)	155	5	5	0	0	0	0	20	10	265	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

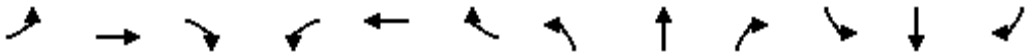
Intersection	
Int Delay, s/veh	11

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	155	5	5	0	0	0	0	20	10	265	20	0
Future Vol, veh/h	155	5	5	0	0	0	0	20	10	265	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	155	5	5	0	0	0	0	20	10	265	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	575	580	20	-	0	0	30	0	0
Stage 1	550	550	-	-	-	-	-	-	-
Stage 2	25	30	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	481	427	1061	0	-	-	1596	-	0
Stage 1	580	517	-	0	-	-	-	-	0
Stage 2	1000	872	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	400	0	1061	-	-	-	1596	-	-
Mov Cap-2 Maneuver	400	0	-	-	-	-	-	-	-
Stage 1	580	0	-	-	-	-	-	-	-
Stage 2	832	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.7	0	7.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	408	1596	-
HCM Lane V/C Ratio	-	-	0.404	0.166	-
HCM Control Delay (s)	-	-	19.7	7.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.9	0.6	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	35	5	480	5	170	0	0	250	995
Future Volume (vph)	0	0	0	35	5	480	5	170	0	0	250	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

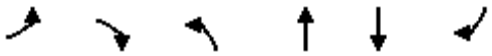
Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	35	5	480	5	170	0	0	250	995
Future Vol, veh/h	0	0	0	35	5	480	5	170	0	0	250	995
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	35	5	480	5	170	0	0	250	995

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	928	1425	170	1245	0	-	-	-	0
Stage 1	180	180	-	-	-	-	-	-	-
Stage 2	748	1245	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	300	137	879	566	-	0	0	-	-
Stage 1	856	754	-	-	-	0	0	-	-
Stage 2	471	248	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	297	0	879	566	-	-	-	-	-
Mov Cap-2 Maneuver	297	0	-	-	-	-	-	-	-
Stage 1	847	0	-	-	-	-	-	-	-
Stage 2	471	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.5	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	566	-	776	-	-
HCM Lane V/C Ratio	0.009	-	0.67	-	-
HCM Control Delay (s)	11.4	0	18.5	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	0	-	5.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	105	40	610	1140	30
Future Volume (vph)	20	105	40	610	1140	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	105	40	610	1140	30
Future Vol, veh/h	20	105	40	610	1140	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	20	105	40	610	1140	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1845	1155	1170	0	-	0
Stage 1	1155	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	81	237	604	-	-	-
Stage 1	297	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	76	237	604	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	277	-	-	-	-	-
Stage 2	494	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.3	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	604	-	177	-	-
HCM Lane V/C Ratio	0.066	-	0.706	-	-
HCM Control Delay (s)	11.4	-	63.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	4.3	-	-

LANE LEVEL OF SERVICE

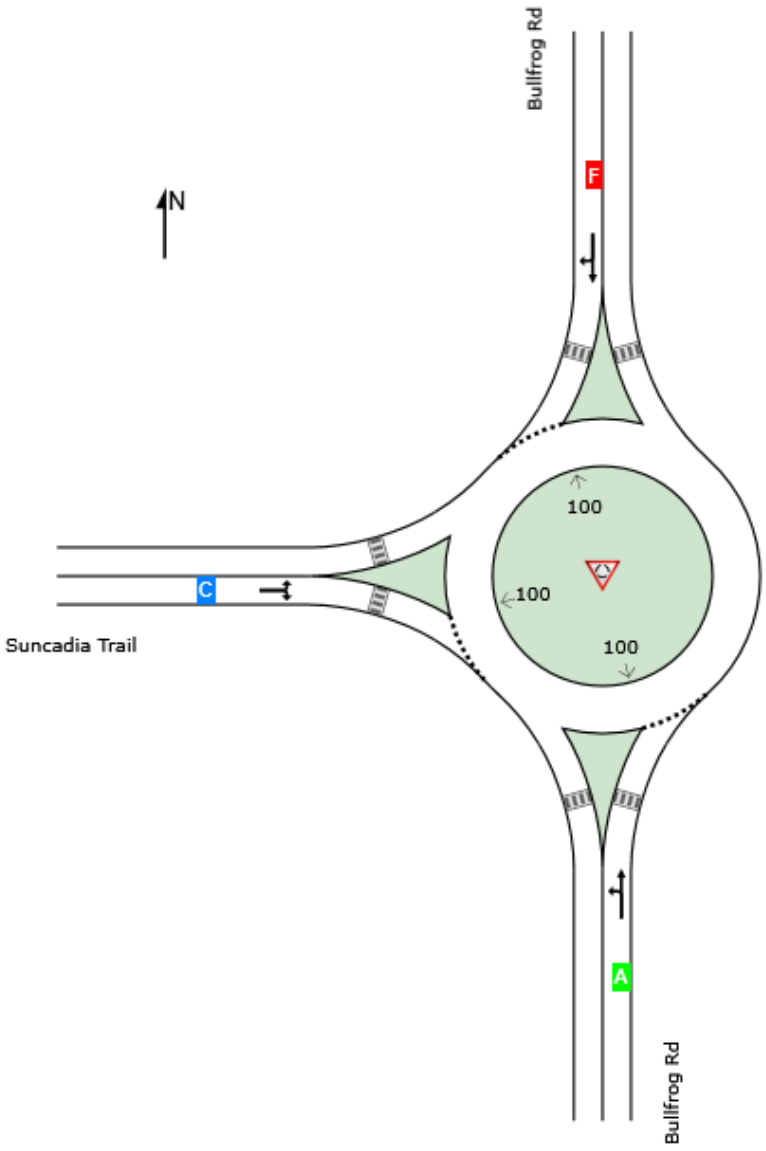
Lane Level of Service

Site: 4 [2037 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	F	C	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	630	0.6	630	0.6	1271	0.496	100	7.7	LOS A	3.8	95.0	Full	1600	0.0	0.0
Approach	630	0.6	630	0.6		0.496		7.7	LOS A	3.8	95.0				
North: Bullfrog Rd															
Lane 1[d]	1005	1.0	1005	1.0	866	1.160	100	100.3	LOS F	67.2	1692.8	Full	1600	0.0	6.7
Approach	1005	1.0	1005	1.0		1.160		100.3	LOS F	67.2	1692.8				
West: Suncadia Trail															
Lane 1[d]	335	0.0	335	0.0	615	0.545	100	15.2	LOS C	3.4	83.9	Full	1600	0.0	0.0
Approach	335	0.0	335	0.0		0.545		15.2	LOS C	3.4	83.9				
All Vehicles	1970	0.7	1970	0.7		1.160		56.2	LOS F	67.2	1692.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	440	190	630	0.6	1271	0.496	100	NA	NA
Approach	440	190	630	0.6		0.496			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	910	95	1005	1.0	866	1.160	100	NA	NA
Approach	910	95	1005	1.0		1.160			

West: Suncadia Trail

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	75	260	335	0.0	615	0.545	100	NA	NA
Approach	75	260	335	0.0		0.545			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1970	0.7	1.160

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	34.7	144.0	NA
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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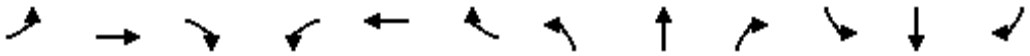


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	20	0	0	0	40	225	0	0	985	15
Future Volume (vph)	10	0	20	0	0	0	40	225	0	0	985	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	20	0	0	0	40	225	0	0	985	15
Future Vol, veh/h	10	0	20	0	0	0	40	225	0	0	985	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	10	0	20	0	0	0	40	225	0	0	985	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1298	1298	993	1308	1305	225	1000	0	0	225	0	0
Stage 1	993	993	-	305	305	-	-	-	-	-	-	-
Stage 2	305	305	-	1003	1000	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	135	158	291	138	162	819	700	-	-	1350	-	-
Stage 1	289	317	-	709	666	-	-	-	-	-	-	-
Stage 2	694	653	-	294	324	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	128	148	291	122	151	819	700	-	-	1350	-	-
Mov Cap-2 Maneuver	128	148	-	122	151	-	-	-	-	-	-	-
Stage 1	270	317	-	663	623	-	-	-	-	-	-	-
Stage 2	649	611	-	274	324	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.7	0	1.6	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	700	-	-	204	-	1350	-	-
HCM Lane V/C Ratio	0.057	-	-	0.147	-	-	-	-
HCM Control Delay (s)	10.5	0	-	25.7	0	0	-	-
HCM Lane LOS	B	A	-	D	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	-	0	-	-

LANE LEVEL OF SERVICE

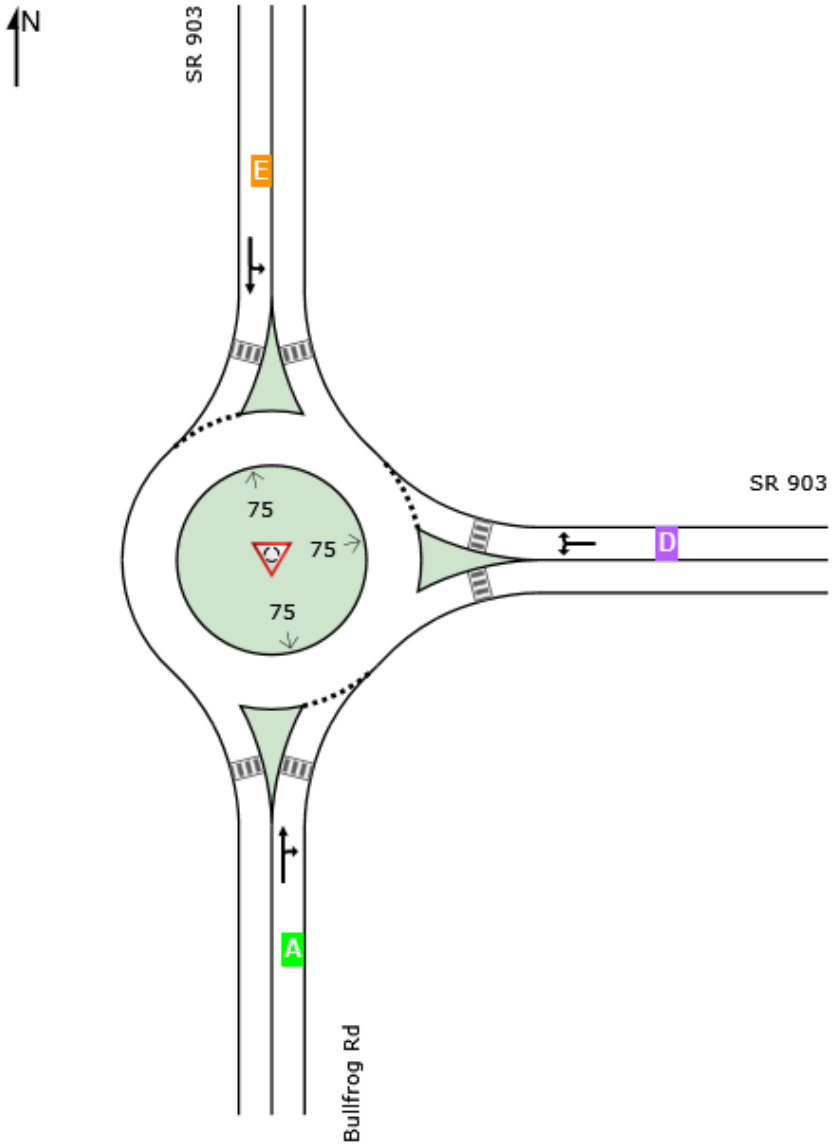
Lane Level of Service

Site: 6 [2037 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	D	E	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2037 Baseline (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	235	0.0	235	0.0	965	0.244	100	6.1	LOS A	1.2	29.2	Full	1600	0.0	0.0
Approach	235	0.0	235	0.0		0.244		6.1	LOS A	1.2	29.2				
East: SR 903															
Lane 1[d]	1160	1.1	1160	1.1	1220	0.951	100	28.7	LOS D	46.1	1163.9	Full	1600	0.0	0.0
Approach	1160	1.1	1160	1.1		0.951		28.7	LOS D	46.1	1163.9				
North: SR 903															
Lane 1[d]	600	0.3	600	0.3	633	0.948	100	47.9	LOS E	16.2	405.9	Full	1600	0.0	0.0
Approach	600	0.3	600	0.3		0.948		47.9	LOS E	16.2	405.9				
All Vehicles	1995	0.7	1995	0.7		0.951		31.8	LOS D	46.1	1163.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	110	125	235	0.0	965	0.244	100	NA	NA
Approach	110	125	235	0.0		0.244			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	750	410	1160	1.1	1220	0.951	100	NA	NA
Approach	750	410	1160	1.1		0.951			

North: SR 903

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	350	250	600	0.3	633	0.948	100	NA	NA
Approach	350	250	600	0.3		0.948			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1995	0.7	0.951

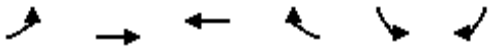
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	470	1200	30	20	10
Future Volume (vph)	5	470	1200	30	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

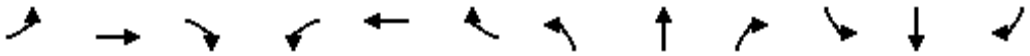
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	470	1200	30	20	10
Future Vol, veh/h	5	470	1200	30	20	10
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	5	470	1200	30	20	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1235	0	-	0	1700	1220
Stage 1	-	-	-	-	1220	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	568	-	-	-	102	222
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	565	-	-	-	100	221
Mov Cap-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	277	-
Stage 2	-	-	-	-	624	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	43.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	565	-	-	-	122
HCM Lane V/C Ratio	0.009	-	-	-	0.246
HCM Control Delay (s)	11.4	0	-	-	43.9
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	425	50	30	1100	30	165	0	90	10	10	20
Future Volume (vph)	0	425	50	30	1100	30	165	0	90	10	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	119.9

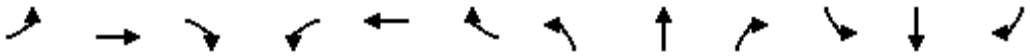
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	425	50	30	1100	30	165	0	90	10	10	20
Future Vol, veh/h	0	425	50	30	1100	30	165	0	90	10	10	20
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	0	425	50	30	1100	30	165	0	90	10	10	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1130	0	0	478	0	0	1643	1643	453	1670	1653	1115
Stage 1	-	-	-	-	-	-	453	453	-	1175	1175	-
Stage 2	-	-	-	-	-	-	1190	1190	-	495	478	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	622	-	-	1090	-	-	~ 79	99	605	77	99	255
Stage 1	-	-	-	-	-	-	584	568	-	236	268	-
Stage 2	-	-	-	-	-	-	228	260	-	560	559	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	622	-	-	1087	-	-	~ 63	91	603	62	91	255
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 63	91	-	62	91	-
Stage 1	-	-	-	-	-	-	582	566	-	236	248	-
Stage 2	-	-	-	-	-	-	187	241	-	476	557	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	$ 898.5	52.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	92	622	-	-	1087	-	-	114
HCM Lane V/C Ratio	2.772	-	-	-	0.028	-	-	0.351
HCM Control Delay (s)	$ 898.5	0	-	-	8.4	0	-	52.8
HCM Lane LOS	F	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	24.3	0	-	-	0.1	-	-	1.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	495	40	60	1100	50	70	20	15	10	0	0
Future Volume (vph)	20	495	40	60	1100	50	70	20	15	10	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	28.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	495	40	60	1100	50	70	20	15	10	0	0
Future Vol, veh/h	20	495	40	60	1100	50	70	20	15	10	0	0
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	20	495	40	60	1100	50	70	20	15	10	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1150	0	0	539	0	0	1804	1829	519	1818	1824	1125
Stage 1	-	-	-	-	-	-	559	559	-	1245	1245	-
Stage 2	-	-	-	-	-	-	1245	1270	-	573	579	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	608	-	-	1034	-	-	~ 61	77	557	61	78	252
Stage 1	-	-	-	-	-	-	513	511	-	215	248	-
Stage 2	-	-	-	-	-	-	213	239	-	508	504	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	608	-	-	1030	-	-	~ 51	61	555	38	62	252
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 51	61	-	38	62	-
Stage 1	-	-	-	-	-	-	487	485	-	205	207	-
Stage 2	-	-	-	-	-	-	178	200	-	452	478	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	$ 494.7	130.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	61	608	-	-	1030	-	-	38
HCM Lane V/C Ratio	1.721	0.033	-	-	0.058	-	-	0.263
HCM Control Delay (s)	$ 494.7	11.1	0	-	8.7	0	-	130.7
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9.6	0.1	-	-	0.2	-	-	0.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	60	10	20	230
Future Volume (vph)	25	15	60	10	20	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

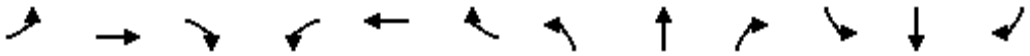
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	60	10	20	230
Future Vol, veh/h	25	15	60	10	20	230
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	60	10	20	230
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.6	8.1	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	8%	0%	86%
Vol Thru, %	0%	62%	14%
Vol Right, %	92%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	250	40	70
LT Vol	20	0	60
Through Vol	0	25	10
RT Vol	230	15	0
Lane Flow Rate	250	40	70
Geometry Grp	1	1	1
Degree of Util (X)	0.251	0.047	0.088
Departure Headway (Hd)	3.621	4.255	4.543
Convergence, Y/N	Yes	Yes	Yes
Cap	980	831	782
Service Time	1.692	2.337	2.612
HCM Lane V/C Ratio	0.255	0.048	0.09
HCM Control Delay	7.9	7.6	8.1
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.1	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	275	120	75	400	185	70	75	110	50	40	45
Future Volume (vph)	120	275	120	75	400	185	70	75	110	50	40	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

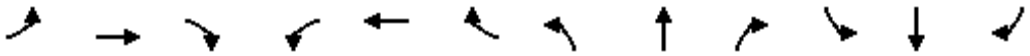
Intersection	
Int Delay, s/veh	36

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	120	275	120	75	400	185	70	75	110	50	40	45
Future Vol, veh/h	120	275	120	75	400	185	70	75	110	50	40	45
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	120	275	120	75	400	185	70	75	110	50	40	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	585	0	0	395	0	0	1261	1310	335	1311	1278	494
Stage 1	-	-	-	-	-	-	575	575	-	643	643	-
Stage 2	-	-	-	-	-	-	686	735	-	668	635	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	990	-	-	1164	-	-	147	159	707	137	168	579
Stage 1	-	-	-	-	-	-	503	503	-	465	472	-
Stage 2	-	-	-	-	-	-	438	425	-	451	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	990	-	-	1164	-	-	91	131	707	55	138	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	131	-	55	138	-
Stage 1	-	-	-	-	-	-	442	442	-	409	442	-
Stage 2	-	-	-	-	-	-	343	398	-	278	418	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.9	162.2	98.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	108	707	990	-	-	1164	-	-	55	231
HCM Lane V/C Ratio	1.343	0.156	0.121	-	-	0.064	-	-	0.909	0.368
HCM Control Delay (s)	276.9	11	9.1	-	-	8.3	-	-	214.9	29.4
HCM Lane LOS	F	B	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	10	0.5	0.4	-	-	0.2	-	-	4	1.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	370	5	60	545	40	20	30	65	5	50	50
Future Volume (vph)	75	370	5	60	545	40	20	30	65	5	50	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

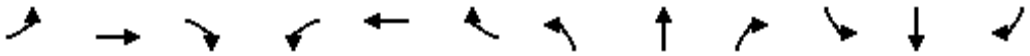
Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	370	5	60	545	40	20	30	65	5	50	50
Future Vol, veh/h	75	370	5	60	545	40	20	30	65	5	50	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	370	5	60	545	40	20	30	65	5	50	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	587	0	0	377	0	0	1260	1232	375	1257	1214	567
Stage 1	-	-	-	-	-	-	525	525	-	687	687	-
Stage 2	-	-	-	-	-	-	735	707	-	570	527	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	993	-	-	1181	-	-	146	176	667	147	181	521
Stage 1	-	-	-	-	-	-	532	526	-	435	446	-
Stage 2	-	-	-	-	-	-	408	435	-	505	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	991	-	-	1179	-	-	91	154	666	102	158	520
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	154	-	102	158	-
Stage 1	-	-	-	-	-	-	491	485	-	402	422	-
Stage 2	-	-	-	-	-	-	309	412	-	395	486	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	29.8	33.8
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	121	666	991	-	-	1179	-	-	227
HCM Lane V/C Ratio	0.413	0.098	0.076	-	-	0.051	-	-	0.463
HCM Control Delay (s)	54.3	11	8.9	-	-	8.2	-	-	33.8
HCM Lane LOS	F	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.8	0.3	0.2	-	-	0.2	-	-	2.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	380	80	120	900	50	365	15	30	10	20	20
Future Volume (vph)	20	380	80	120	900	50	365	15	30	10	20	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	601.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	380	80	120	900	50	365	15	30	10	20	20
Future Vol, veh/h	20	380	80	120	900	50	365	15	30	10	20	20
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	20	380	80	120	900	50	365	15	30	10	20	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	958	0	0	463	0	0	1652	1661	425	1658	1676	937
Stage 1	-	-	-	-	-	-	463	463	-	1173	1173	-
Stage 2	-	-	-	-	-	-	1189	1198	-	485	503	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	714	-	-	1104	-	-	~ 79	98	631	79	96	324
Stage 1	-	-	-	-	-	-	581	566	-	236	268	-
Stage 2	-	-	-	-	-	-	~ 230	260	-	567	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	709	-	-	1101	-	-	~ 46	71	628	50	70	320
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 46	71	-	50	70	-
Stage 1	-	-	-	-	-	-	557	543	-	225	204	-
Stage 2	-	-	-	-	-	-	~ 148	198	-	504	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	1	$ 2933.4	84.8
HCM LOS			F	F

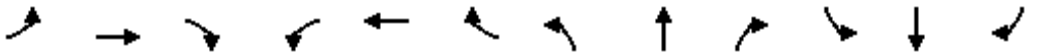
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	46	174	709	-	-	1101	-	-	91
HCM Lane V/C Ratio	7.935	0.259	0.028	-	-	0.109	-	-	0.549
HCM Control Delay (s)	$ 3291	32.8	10.2	0	-	8.7	0	-	84.8
HCM Lane LOS	F	D	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	43.1	1	0.1	-	-	0.4	-	-	2.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	105	90	490	300	95	90	95	20	140	60
Future Volume (vph)	15	320	105	90	490	300	95	90	95	20	140	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 91.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



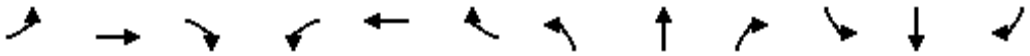
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	105	90	490	300	95	90	95	20	140	60
Future Volume (veh/h)	15	320	105	90	490	300	95	90	95	20	140	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	105	90	490	300	95	90	95	20	140	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	376	931	306	648	750	459	210	177	187	217	265	114
Arrive On Green	0.69	0.69	0.69	0.69	0.69	0.69	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	686	1348	442	962	1086	665	1189	837	884	1205	1250	536
Grp Volume(v), veh/h	15	0	425	90	0	790	95	0	185	20	0	200
Grp Sat Flow(s),veh/h/ln	686	0	1790	962	0	1750	1189	0	1721	1205	0	1786
Q Serve(g_s), s	1.2	0.0	9.1	4.0	0.0	24.1	7.3	0.0	9.0	1.4	0.0	9.4
Cycle Q Clear(g_c), s	25.3	0.0	9.1	13.1	0.0	24.1	16.7	0.0	9.0	10.4	0.0	9.4
Prop In Lane	1.00		0.25	1.00		0.38	1.00		0.51	1.00		0.30
Lane Grp Cap(c), veh/h	376	0	1237	648	0	1209	210	0	365	217	0	378
V/C Ratio(X)	0.04	0.00	0.34	0.14	0.00	0.65	0.45	0.00	0.51	0.09	0.00	0.53
Avail Cap(c_a), veh/h	376	0	1237	648	0	1209	277	0	462	285	0	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	5.9	8.6	0.0	8.2	40.5	0.0	32.9	37.5	0.0	33.1
Incr Delay (d2), s/veh	0.2	0.0	0.8	0.4	0.0	2.8	2.2	0.0	1.6	0.3	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.3	0.9	0.0	8.8	2.3	0.0	3.9	0.4	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.6	0.0	6.7	9.0	0.0	11.0	42.7	0.0	34.5	37.8	0.0	34.7
LnGrp LOS	B	A	A	A	A	B	D	A	C	D	A	C
Approach Vol, veh/h		440			880			280			220	
Approach Delay, s/veh		7.0			10.8			37.3			35.0	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	24.7	70.0	24.7
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	65.4	25.4	65.4	25.4
Max Q Clear Time (g_c+I1), s	27.3	18.7	26.1	12.4
Green Ext Time (p_c), s	3.4	1.1	8.6	1.3

Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	285	125	15	455	50	600	50	10	30	25	15
Future Volume (vph)	25	285	125	15	455	50	600	50	10	30	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	307.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	285	125	15	455	50	600	50	10	30	25	15
Future Vol, veh/h	25	285	125	15	455	50	600	50	10	30	25	15
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	25	285	125	15	455	50	600	50	10	30	25	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	505	0	0	411	0	0	929	934	350	939	971	480
Stage 1	-	-	-	-	-	-	399	399	-	510	510	-
Stage 2	-	-	-	-	-	-	530	535	-	429	461	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1060	-	-	1153	-	-	~ 248	266	693	238	247	574
Stage 1	-	-	-	-	-	-	627	602	-	535	528	-
Stage 2	-	-	-	-	-	-	~ 533	524	-	593	555	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1060	-	-	1152	-	-	~ 214	253	692	192	235	574
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 214	253	-	192	235	-
Stage 1	-	-	-	-	-	-	607	583	-	518	518	-
Stage 2	-	-	-	-	-	-	~ 485	515	-	517	537	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.2	$ 782.7	25.8
HCM LOS			F	D

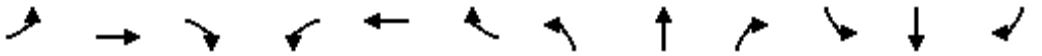
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	214	283	1060	-	-	1152	-	-	242
HCM Lane V/C Ratio	2.804	0.212	0.024	-	-	0.013	-	-	0.289
HCM Control Delay (s)	$ 858.9	21.1	8.5	0	-	8.2	0	-	25.8
HCM Lane LOS	F	C	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	52.5	0.8	0.1	-	-	0	-	-	1.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	280	115	35	440	270	445	350	75	20	125	25
Future Volume (vph)	15	280	115	35	440	270	445	350	75	20	125	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

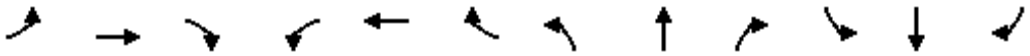
Splits and Phases: 16: Oakes Ave & W First St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	280	115	35	440	270	445	350	75	20	125	25
Future Volume (veh/h)	15	280	115	35	440	270	445	350	75	20	125	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	280	115	35	440	270	445	350	75	20	125	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	518	672	276	538	582	357	368	409	88	137	412	82
Arrive On Green	0.59	0.59	0.59	1.00	1.00	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	736	1130	464	994	980	601	1226	1340	287	954	1348	270
Grp Volume(v), veh/h	15	0	395	35	0	710	445	0	425	20	0	150
Grp Sat Flow(s),veh/h/ln	736	0	1594	994	0	1581	1226	0	1627	954	0	1617
Q Serve(g_s), s	0.8	0.0	12.0	0.8	0.0	0.0	21.1	0.0	22.1	1.8	0.0	6.4
Cycle Q Clear(g_c), s	0.8	0.0	12.0	12.8	0.0	0.0	27.5	0.0	22.1	23.9	0.0	6.4
Prop In Lane	1.00		0.29	1.00		0.38	1.00		0.18	1.00		0.17
Lane Grp Cap(c), veh/h	518	0	947	538	0	940	368	0	497	137	0	494
V/C Ratio(X)	0.03	0.00	0.42	0.07	0.00	0.76	1.21	0.00	0.85	0.15	0.00	0.30
Avail Cap(c_a), veh/h	518	0	947	538	0	940	368	0	497	137	0	494
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	0.79	0.00	0.79	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	9.8	1.4	0.0	0.0	36.7	0.0	29.4	40.6	0.0	23.9
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.2	0.0	4.5	117.4	0.0	13.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.3	0.1	0.0	1.2	20.2	0.0	10.3	0.4	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	11.1	1.6	0.0	4.5	154.1	0.0	42.4	40.8	0.0	24.0
LnGrp LOS	A	A	B	A	A	A	F	A	D	D	A	C
Approach Vol, veh/h		410			745			870			170	
Approach Delay, s/veh		11.0			4.4			99.6			26.0	
Approach LOS		B			A			F			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		58.0		32.0		58.0		32.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		53.5		27.5		53.5		27.5				
Max Q Clear Time (g_c+I1), s		14.0		25.9		14.8		29.5				
Green Ext Time (p_c), s		3.1		0.1		6.9		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			45.0									
HCM 6th LOS			D									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	225	75	25	400	40	70	25	10	5	20	30
Future Volume (vph)	20	225	75	25	400	40	70	25	10	5	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	225	75	25	400	40	70	25	10	5	20	30
Future Vol, veh/h	20	225	75	25	400	40	70	25	10	5	20	30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	20	225	75	25	400	40	70	25	10	5	20	30
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

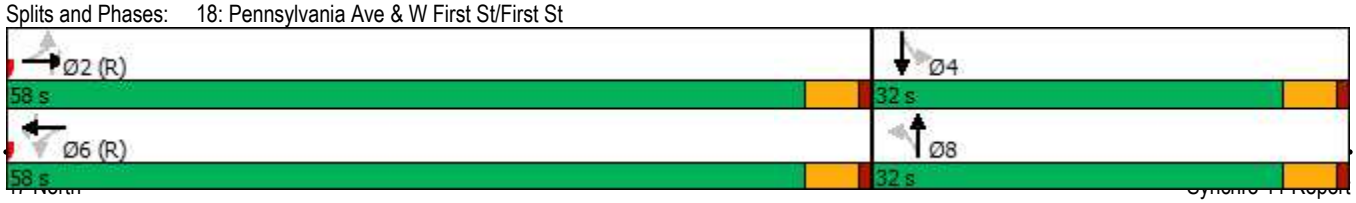
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	14.9	10.2	9.3
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	6%	5%	9%
Vol Thru, %	24%	70%	86%	36%
Vol Right, %	10%	23%	9%	55%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	320	465	55
LT Vol	70	20	25	5
Through Vol	25	225	400	20
RT Vol	10	75	40	30
Lane Flow Rate	105	320	465	55
Geometry Grp	1	1	1	1
Degree of Util (X)	0.174	0.434	0.606	0.087
Departure Headway (Hd)	5.952	4.888	4.695	5.69
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	742	758	631
Service Time	3.968	2.888	2.794	3.709
HCM Lane V/C Ratio	0.174	0.431	0.613	0.087
HCM Control Delay	10.2	11.6	14.9	9.3
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	0.6	2.2	4.1	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	285	20	25	720	50	5	15	25	80	35	15
Future Volume (vph)	45	285	20	25	720	50	5	15	25	80	35	15
Satd. Flow (prot)	1770	1656	0	1770	1657	0	0	1877	1454	0	1835	1454
Flt Permitted	0.312			0.574				0.930			0.780	
Satd. Flow (perm)	580	1656	0	1061	1657	0	0	1764	1416	0	1476	1414
Satd. Flow (RTOR)		7			7				25			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	305	0	25	770	0	0	20	25	0	115	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	70.6	70.6		70.6	70.6			13.8	70.6		13.8	70.6
Actuated g/C Ratio	0.78	0.78		0.78	0.78			0.15	0.78		0.15	0.78
v/c Ratio	0.10	0.23		0.03	0.59			0.07	0.02		0.51	0.01
Control Delay	4.2	3.6		5.2	9.4			28.9	2.6		40.9	2.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.2	3.6		5.2	9.4			28.9	2.6		40.9	2.7
LOS	A	A		A	A			C	A		D	A
Approach Delay		3.7			9.3			14.3			36.5	
Approach LOS		A			A			B			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	900	20	0	0	250
Future Volume (vph)	60	900	20	0	0	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	27.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	900	20	0	0	250
Future Vol, veh/h	60	900	20	0	0	250
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	60	900	20	0	0	250

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	270	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	717	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	789	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	717	1055	-	-	-	-
Mov Cap-2 Maneuver	717	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	35.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1025	-
HCM Lane V/C Ratio	-	0.937	-
HCM Control Delay (s)	-	35.3	-
HCM Lane LOS	-	E	-
HCM 95th %tile Q(veh)	-	15.3	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	255	100
Future Volume (vph)	0	0	25	0	255	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

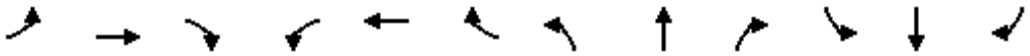
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	255	100
Future Vol, veh/h	0	0	25	0	255	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	255	100

Major/Minor	Minor2		Major2	
Conflicting Flow All	610	100	0	0
Stage 1	610	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	412	961	-	-
Stage 1	488	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	961	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	35	100	30	5	10	100	240	5	5	400	65
Future Volume (vph)	10	35	100	30	5	10	100	240	5	5	400	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

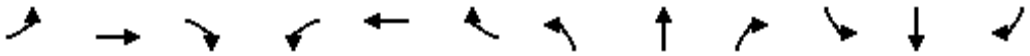
Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	35	100	30	5	10	100	240	5	5	400	65
Future Vol, veh/h	10	35	100	30	5	10	100	240	5	5	400	65
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	10	35	100	30	5	10	100	240	5	5	400	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	939	908	458	968	938	279	480	0	0	250	0	0
Stage 1	458	458	-	448	448	-	-	-	-	-	-	-
Stage 2	481	450	-	520	490	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	246	277	607	235	266	765	1093	-	-	1316	-	-
Stage 1	587	570	-	594	576	-	-	-	-	-	-	-
Stage 2	570	575	-	543	552	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	209	241	593	157	232	739	1077	-	-	1310	-	-
Mov Cap-2 Maneuver	209	241	-	157	232	-	-	-	-	-	-	-
Stage 1	516	559	-	527	511	-	-	-	-	-	-	-
Stage 2	482	511	-	417	542	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19	28.3	2.5	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1077	-	-	401	199	1310	-	-
HCM Lane V/C Ratio	0.093	-	-	0.362	0.226	0.004	-	-
HCM Control Delay (s)	8.7	0	-	19	28.3	7.8	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.6	0.8	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	40	45	0	5	60	185	20	10	300	20
Future Volume (vph)	10	0	40	45	0	5	60	185	20	10	300	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

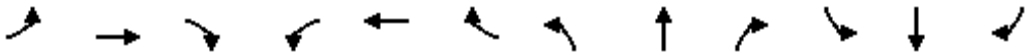
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	40	45	0	5	60	185	20	10	300	20
Future Vol, veh/h	10	0	40	45	0	5	60	185	20	10	300	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	0	40	45	0	5	60	185	20	10	300	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	648	655	310	665	655	195	320	0	0	205	0	0
Stage 1	330	330	-	315	315	-	-	-	-	-	-	-
Stage 2	318	325	-	350	340	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	386	388	735	376	388	851	1251	-	-	1378	-	-
Stage 1	687	649	-	700	659	-	-	-	-	-	-	-
Stage 2	698	653	-	671	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	366	364	735	338	364	851	1251	-	-	1378	-	-
Mov Cap-2 Maneuver	366	364	-	338	364	-	-	-	-	-	-	-
Stage 1	650	643	-	662	623	-	-	-	-	-	-	-
Stage 2	656	618	-	629	637	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	16.6	1.8	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1251	-	-	612	360	1378	-	-
HCM Lane V/C Ratio	0.048	-	-	0.082	0.139	0.007	-	-
HCM Control Delay (s)	8	0	-	11.4	16.6	7.6	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.5	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	215	5	15	140	10	10	0	10	45	0	5
Future Volume (vph)	10	215	5	15	140	10	10	0	10	45	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

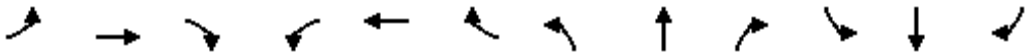
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	215	5	15	140	10	10	0	10	45	0	5
Future Vol, veh/h	10	215	5	15	140	10	10	0	10	45	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	215	5	15	140	10	10	0	10	45	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	150	0	0	220	0	0	416	418	218	418	415	145
Stage 1	-	-	-	-	-	-	238	238	-	175	175	-
Stage 2	-	-	-	-	-	-	178	180	-	243	240	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1444	-	-	1361	-	-	551	529	827	549	531	908
Stage 1	-	-	-	-	-	-	770	712	-	832	758	-
Stage 2	-	-	-	-	-	-	828	754	-	765	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1444	-	-	1361	-	-	539	518	827	534	520	908
Mov Cap-2 Maneuver	-	-	-	-	-	-	539	518	-	534	520	-
Stage 1	-	-	-	-	-	-	764	706	-	825	749	-
Stage 2	-	-	-	-	-	-	814	745	-	750	705	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.7	10.7	12.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	653	1444	-	-	1361	-	-	557
HCM Lane V/C Ratio	0.031	0.007	-	-	0.011	-	-	0.09
HCM Control Delay (s)	10.7	7.5	0	-	7.7	0	-	12.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	390	125	10	880	0	585	10	5	0	10	25
Future Volume (vph)	5	390	125	10	880	0	585	10	5	0	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	646.4

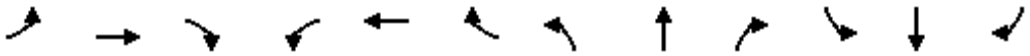
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	390	125	10	880	0	585	10	5	0	10	25
Future Vol, veh/h	5	390	125	10	880	0	585	10	5	0	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	390	125	10	880	0	585	10	5	0	10	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	880	0	0	515	0	0	1381	1363	453	1370	1425	880
Stage 1	-	-	-	-	-	-	463	463	-	900	900	-
Stage 2	-	-	-	-	-	-	918	900	-	470	525	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	768	-	-	1056	-	-	~ 121	147	605	125	137	349
Stage 1	-	-	-	-	-	-	~ 577	562	-	336	360	-
Stage 2	-	-	-	-	-	-	~ 324	356	-	578	533	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	768	-	-	1056	-	-	~ 104	143	605	115	133	349
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 104	143	-	115	133	-
Stage 1	-	-	-	-	-	-	~ 572	557	-	333	353	-
Stage 2	-	-	-	-	-	-	~ 287	349	-	558	528	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 2201.5	22.7
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	105	768	-	-	1056	-	-	238
HCM Lane V/C Ratio	5.714	0.007	-	-	0.009	-	-	0.147
HCM Control Delay (s)	$ 2201.5	9.7	0	-	8.4	0	-	22.7
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	65.3	0	-	-	0	-	-	0.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	630	0	395	0	0	135	490
Future Volume (vph)	0	0	0	0	0	630	0	395	0	0	135	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

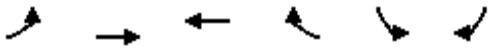
Intersection	
Int Delay, s/veh	20

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	630	0	395	0	0	135	490
Future Vol, veh/h	0	0	0	0	0	630	0	395	0	0	135	490
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	630	0	395	0	0	135	490

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	395	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	652	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	652	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	52.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	652	-	-
HCM Lane V/C Ratio	-	0.966	-	-
HCM Control Delay (s)	-	52.5	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	14.1	-	-



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	360	5	0	0	165	0
Future Volume (vph)	360	5	0	0	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	360	5	0	0	165	0
Future Vol, veh/h	360	5	0	0	165	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	360	5	0	0	165	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	11.7	9.7
HCM LOS	B	A

Lane	EBLn1	SBLn1
Vol Left, %	99%	100%
Vol Thru, %	1%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	365	165
LT Vol	360	165
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	365	165
Geometry Grp	1	1
Degree of Util (X)	0.47	0.235
Departure Headway (Hd)	4.639	5.133
Convergence, Y/N	Yes	Yes
Cap	777	700
Service Time	2.662	3.163
HCM Lane V/C Ratio	0.47	0.236
HCM Control Delay	11.7	9.7
HCM Lane LOS	B	A
HCM 95th-tile Q	2.5	0.9

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	375	5	505	775	125	0
Future Volume (vph)	375	5	505	775	125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	121.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	375	5	505	775	125	0
Future Vol, veh/h	375	5	505	775	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	375	5	505	775	125	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	380	0	2163	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	1785	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1184	-	~ 52	669
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	147	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1184	-	~ 30	669
Mov Cap-2 Maneuver	-	-	-	-	~ 30	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	~ 84	-

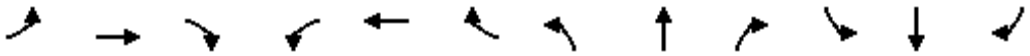
Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	$ 1693.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	30	-	-	1184	-
HCM Lane V/C Ratio	4.167	-	-	0.427	-
HCM Control Delay (s)	$ 1693.5	-	-	10.3	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	15	-	-	2.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Sunday LOS Calculations

(2037 With Project)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	242	5	5	0	0	0	0	20	10	306	20	0
Future Volume (vph)	242	5	5	0	0	0	0	20	10	306	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1200			1208			347			614	
Travel Time (s)		18.2			18.3			6.8			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Free			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

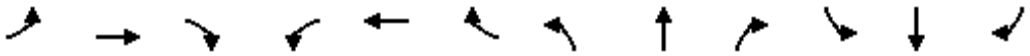
Intersection	
Int Delay, s/veh	19.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	242	5	5	0	0	0	0	20	10	306	20	0
Future Vol, veh/h	242	5	5	0	0	0	0	20	10	306	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	242	5	5	0	0	0	0	20	10	306	20	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	657	662	20	-	0	0	30	0	0
Stage 1	632	632	-	-	-	-	-	-	-
Stage 2	25	30	-	-	-	-	-	-	-
Critical Hdwy	6.41	6.51	6.21	-	-	-	4.1	-	-
Critical Hdwy Stg 1	5.41	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.41	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	431	383	1061	0	-	-	1596	-	0
Stage 1	532	475	-	0	-	-	-	-	0
Stage 2	1000	872	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	347	0	1061	-	-	-	1596	-	-
Mov Cap-2 Maneuver	347	0	-	-	-	-	-	-	-
Stage 1	532	0	-	-	-	-	-	-	-
Stage 2	806	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.2	0	7.3
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	SBL	SBT
Capacity (veh/h)	-	-	352	1596	-
HCM Lane V/C Ratio	-	-	0.716	0.192	-
HCM Control Delay (s)	-	-	37.2	7.8	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	5.3	0.7	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	35	5	523	5	257	0	0	291	1080
Future Volume (vph)	0	0	0	35	5	523	5	257	0	0	291	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1191			1224			614			1462	
Travel Time (s)		18.0			18.5			12.0			28.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

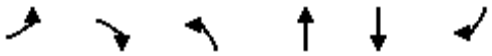
Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	35	5	523	5	257	0	0	291	1080
Future Vol, veh/h	0	0	0	35	5	523	5	257	0	0	291	1080
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	1	1	1
Mvmt Flow	0	0	0	35	5	523	5	257	0	0	291	1080

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	1098	1638	257	1371	0	-	-	-	0
Stage 1	267	267	-	-	-	-	-	-	-
Stage 2	831	1371	-	-	-	-	-	-	-
Critical Hdwy	6.4	6.5	6.2	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.4	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	238	102	787	507	-	0	0	-	-
Stage 1	782	692	-	-	-	0	0	-	-
Stage 2	431	216	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	235	0	787	507	-	-	-	-	-
Mov Cap-2 Maneuver	235	0	-	-	-	-	-	-	-
Stage 1	773	0	-	-	-	-	-	-	-
Stage 2	431	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	29.6	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	507	-	686	-	-
HCM Lane V/C Ratio	0.01	-	0.821	-	-
HCM Control Delay (s)	12.2	0	29.6	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0	-	8.8	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	105	40	740	1266	42
Future Volume (vph)	32	105	40	740	1266	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	12.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	105	40	740	1266	42
Future Vol, veh/h	32	105	40	740	1266	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	32	105	40	740	1266	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2107	1287	1308	0	-	0
Stage 1	1287	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	56	199	536	-	-	-
Stage 1	257	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	199	536	-	-	-
Mov Cap-2 Maneuver	52	-	-	-	-	-
Stage 1	238	-	-	-	-	-
Stage 2	429	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	195	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	536	-	120	-	-
HCM Lane V/C Ratio	0.075	-	1.142	-	-
HCM Control Delay (s)	12.3	-	195	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	8.3	-	-

LANE LEVEL OF SERVICE

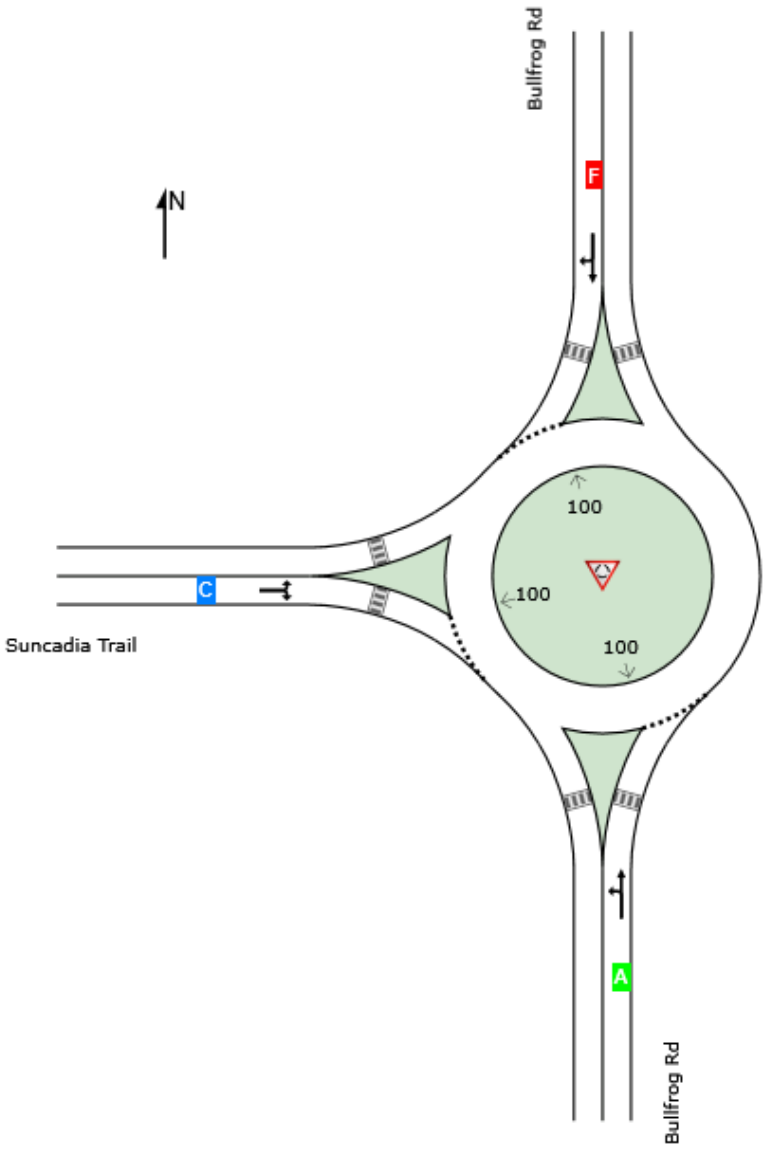
Lane Level of Service

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	F	C	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 4 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / Suncadia Trail
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	765	0.6	765	0.6	1246	0.614	100	9.9	LOS A	5.7	143.5	Full	1600	0.0	0.0
Approach	765	0.6	765	0.6		0.614		9.9	LOS A	5.7	143.5				
North: Bullfrog Rd															
Lane 1[d]	1147	1.0	1147	1.0	861	1.332	100	169.9	LOS F	107.6	2712.0	Full	1600	0.0	23.8
Approach	1147	1.0	1147	1.0		1.332		169.9	LOS F	107.6	2712.0				
West: Suncadia Trail															
Lane 1[d]	360	0.0	360	0.0	620	0.580	100	16.3	LOS C	3.8	94.9	Full	1600	0.0	0.0
Approach	360	0.0	360	0.0		0.580		16.3	LOS C	3.8	94.9				
All Vehicles	2272	0.7	2272	0.7		1.332		91.7	LOS F	107.6	2712.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	446	319	765	0.6	1246	0.614	100	NA	NA
Approach	446	319	765	0.6		0.614			

North: Bullfrog Rd

Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1034	113	1147	1.0	861	1.332	100	NA	NA
Approach	1034	113	1147	1.0		1.332			

West: Suncadia Trail

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	94	266	360	0.0	620	0.580	100	NA	NA
Approach	94	266	360	0.0		0.580			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2272	0.7	1.332

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	71.5	299.0	NA
West: Suncadia Trail				
Lane 1	0.0	0.0	0.0	0.0

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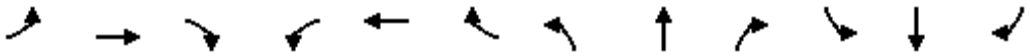


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	32	0	0	0	52	311	0	0	1071	15
Future Volume (vph)	10	0	32	0	0	0	52	311	0	0	1071	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		888			397			1119			1103	
Travel Time (s)		24.2			10.8			21.8			21.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	7%	7%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	32	0	0	0	52	311	0	0	1071	15
Future Vol, veh/h	10	0	32	0	0	0	52	311	0	0	1071	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	7	7	0	0	0	0	0	0	1	1	1
Mvmt Flow	10	0	32	0	0	0	52	311	0	0	1071	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1494	1494	1079	1510	1501	311	1086	0	0	311	0	0
Stage 1	1079	1079	-	415	415	-	-	-	-	-	-	-
Stage 2	415	415	-	1095	1086	-	-	-	-	-	-	-
Critical Hdwy	7.17	6.57	6.27	7.1	6.5	6.2	4.1	-	-	4.11	-	-
Critical Hdwy Stg 1	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.17	5.57	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.563	4.063	3.363	3.5	4	3.3	2.2	-	-	2.209	-	-
Pot Cap-1 Maneuver	99	120	259	100	123	734	650	-	-	1255	-	-
Stage 1	259	289	-	619	596	-	-	-	-	-	-	-
Stage 2	605	584	-	261	295	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	92	108	259	81	111	734	650	-	-	1255	-	-
Mov Cap-2 Maneuver	92	108	-	81	111	-	-	-	-	-	-	-
Stage 1	234	289	-	559	538	-	-	-	-	-	-	-
Stage 2	546	527	-	229	295	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.8	0	1.6	0
HCM LOS	D	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	650	-	-	181	-	1255	-	-
HCM Lane V/C Ratio	0.08	-	-	0.232	-	-	-	-
HCM Control Delay (s)	11	0	-	30.8	0	0	-	-
HCM Lane LOS	B	A	-	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	-	0	-	-

LANE LEVEL OF SERVICE

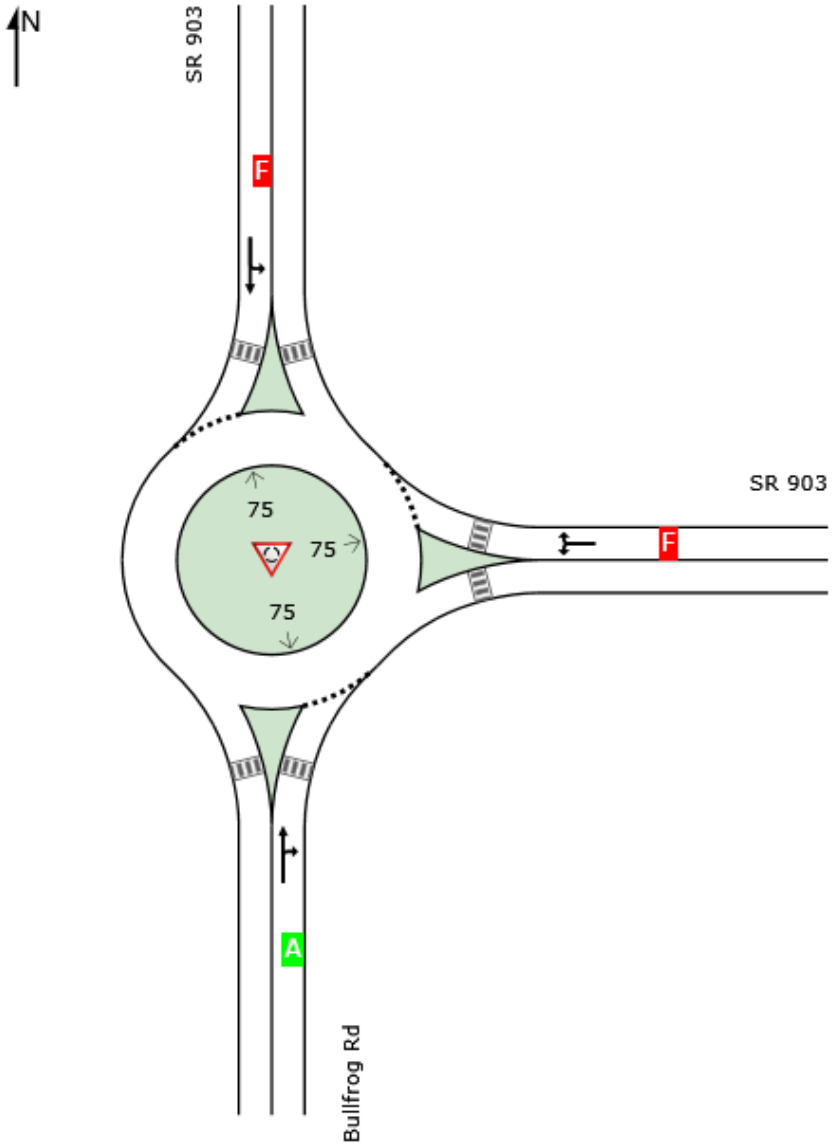
Lane Level of Service

Site: 6 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	F	F	F



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 6 [2037 With Project - Alt 6 Revised Proposal (Site Folder: Sunday PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

47 North
Bullfrog Rd / SR 903
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	321	0.0	321	0.0	949	0.338	100	7.4	LOS A	1.8	43.9	Full	1600	0.0	0.0
Approach	321	0.0	321	0.0		0.338		7.4	LOS A	1.8	43.9				
East: SR 903															
Lane 1[d]	1245	1.1	1245	1.1	1154	1.079	100	61.5	LOS F	84.9	2141.3	Full	1600	0.0	14.4
Approach	1245	1.1	1245	1.1		1.079		61.5	LOS F	84.9	2141.3				
North: SR 903															
Lane 1[d]	712	0.3	712	0.3	651	1.093	100	85.4	LOS F	35.1	879.3	Full	1600	0.0	0.0
Approach	712	0.3	712	0.3		1.093		85.4	LOS F	35.1	879.3				
All Vehicles	2278	0.7	2278	0.7		1.093		61.3	LOS F	84.9	2141.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	164	157	321	0.0	949	0.338	100	NA	NA
Approach	164	157	321	0.0		0.338			

East: SR 903

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	780	465	1245	1.1	1154	1.079	100	NA	NA
Approach	780	465	1245	1.1		1.079			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	406	306	712	0.3	651	1.093	100	NA	NA
Approach	406	306	712	0.3		1.093			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2278	0.7	1.093

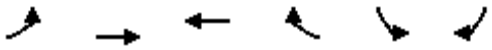
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: SR 903				
Lane 1	0.0	22.9	71.4	NA
North: SR 903				
Lane 1	0.0	15.1	83.7	NA



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	759	1498	30	20	16
Future Volume (vph)	11	759	1498	30	20	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

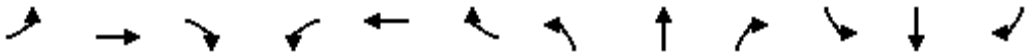
Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	759	1498	30	20	16
Future Vol, veh/h	11	759	1498	30	20	16
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	11	759	1498	30	20	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1533	0	-	0	2299	1518
Stage 1	-	-	-	-	1518	-
Stage 2	-	-	-	-	781	-
Critical Hdwy	4.11	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	437	-	-	-	43	148
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	455	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	435	-	-	-	41	147
Mov Cap-2 Maneuver	-	-	-	-	41	-
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	453	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	130.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	435	-	-	-	60
HCM Lane V/C Ratio	0.025	-	-	-	0.6
HCM Control Delay (s)	13.5	0	-	-	130.9
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	665	93	30	1349	30	208	0	90	10	10	26
Future Volume (vph)	6	665	93	30	1349	30	208	0	90	10	10	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	549.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	665	93	30	1349	30	208	0	90	10	10	26
Future Vol, veh/h	6	665	93	30	1349	30	208	0	90	10	10	26
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	6	665	93	30	1349	30	208	0	90	10	10	26

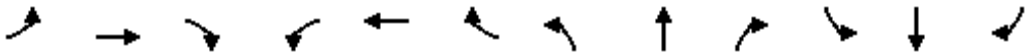
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1379	0	0	761	0	0	2169	2166	715	2193	2197	1364
Stage 1	-	-	-	-	-	-	727	727	-	1424	1424	-
Stage 2	-	-	-	-	-	-	1442	1439	-	769	773	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	500	-	-	856	-	-	~ 34	47	429	33	46	182
Stage 1	-	-	-	-	-	-	414	428	-	170	204	-
Stage 2	-	-	-	-	-	-	~ 164	197	-	397	412	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	500	-	-	854	-	-	~ 20	39	428	23	38	182
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 20	39	-	23	38	-
Stage 1	-	-	-	-	-	-	404	418	-	166	173	-
Stage 2	-	-	-	-	-	-	~ 112	167	-	307	402	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	$ 4610.4	194.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	28	500	-	-	854	-	-	55
HCM Lane V/C Ratio	10.643	0.012	-	-	0.035	-	-	0.836
HCM Control Delay (s)	$ 4610.4	12.3	0	-	9.4	0	-	194.9
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	36.8	0	-	-	0.1	-	-	3.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	698	71	60	1312	50	101	20	15	10	0	6
Future Volume (vph)	26	698	71	60	1312	50	101	20	15	10	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		374			1851			514			309	
Travel Time (s)		8.5			42.1			14.0			8.4	
Confl. Peds. (#/hr)			4	4								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	145.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	698	71	60	1312	50	101	20	15	10	0	6
Future Vol, veh/h	26	698	71	60	1312	50	101	20	15	10	0	6
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	0	0	0
Mvmt Flow	26	698	71	60	1312	50	101	20	15	10	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1362	0	0	773	0	0	2250	2272	738	2260	2282	1337
Stage 1	-	-	-	-	-	-	790	790	-	1457	1457	-
Stage 2	-	-	-	-	-	-	1460	1482	-	803	825	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	505	-	-	847	-	-	~ 30	40	418	29	40	189
Stage 1	-	-	-	-	-	-	383	402	-	163	196	-
Stage 2	-	-	-	-	-	-	161	189	-	380	390	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	505	-	-	844	-	-	~ 21	25	416	~ 7	25	189
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 21	25	-	~ 7	25	-
Stage 1	-	-	-	-	-	-	347	364	-	148	137	-
Stage 2	-	-	-	-	-	-	109	132	-	315	353	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	$ 2423.6	$ 908.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	24	505	-	-	844	-	-	11
HCM Lane V/C Ratio	5.667	0.051	-	-	0.071	-	-	1.455
HCM Control Delay (s)	$ 2423.6	12.5	0	-	9.6	0	-	$ 908.5
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	17	0.2	-	-	0.2	-	-	2.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	25	15	103	10	20	273
Future Volume (vph)	25	15	103	10	20	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	358			633	311	
Travel Time (s)	9.8			17.3	8.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	0%	0%	4%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

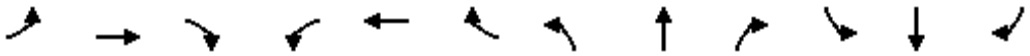
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	15	103	10	20	273
Future Vol, veh/h	25	15	103	10	20	273
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	5	5	0	0	4	4
Mvmt Flow	25	15	103	10	20	273
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.7	8.6	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	91%
Vol Thru, %	0%	62%	9%
Vol Right, %	93%	38%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	293	40	113
LT Vol	20	0	103
Through Vol	0	25	10
RT Vol	273	15	0
Lane Flow Rate	293	40	113
Geometry Grp	1	1	1
Degree of Util (X)	0.309	0.05	0.149
Departure Headway (Hd)	3.795	4.49	4.741
Convergence, Y/N	Yes	Yes	Yes
Cap	949	798	760
Service Time	1.805	2.512	2.741
HCM Lane V/C Ratio	0.309	0.05	0.149
HCM Control Delay	8.5	7.7	8.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.3	0.2	0.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	275	120	75	400	185	70	106	110	50	71	57
Future Volume (vph)	132	275	120	75	400	185	70	106	110	50	71	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	80		0	70		0	70		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		218			305			227			311	
Travel Time (s)		5.9			8.3			6.2			8.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	86.6

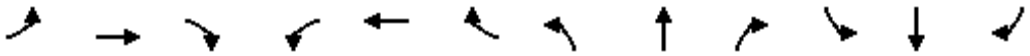
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	132	275	120	75	400	185	70	106	110	50	71	57
Future Vol, veh/h	132	275	120	75	400	185	70	106	110	50	71	57
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	80	-	-	70	-	0	70	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	0	0	0
Mvmt Flow	132	275	120	75	400	185	70	106	110	50	71	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	585	0	0	395	0	0	1307	1334	335	1350	1302	494
Stage 1	-	-	-	-	-	-	599	599	-	643	643	-
Stage 2	-	-	-	-	-	-	708	735	-	707	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	990	-	-	1164	-	-	137	154	707	129	162	579
Stage 1	-	-	-	-	-	-	488	490	-	465	472	-
Stage 2	-	-	-	-	-	-	426	425	-	429	464	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	990	-	-	1164	-	-	~ 62	125	707	~ 27	132	578
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 62	125	-	~ 27	132	-
Stage 1	-	-	-	-	-	-	423	425	-	403	442	-
Stage 2	-	-	-	-	-	-	301	398	-	236	402	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.9	$ 346.3	236.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	89	707	990	-	-	1164	-	-	27	201
HCM Lane V/C Ratio	1.978	0.156	0.133	-	-	0.064	-	-	1.852	0.637
HCM Control Delay (s)	$ 555.9	11	9.2	-	-	8.3	-	-	$ 714.5	49.9
HCM Lane LOS	F	B	A	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	15.2	0.5	0.5	-	-	0.2	-	-	6	3.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	370	5	60	545	40	20	61	65	5	81	50
Future Volume (vph)	75	370	5	60	545	40	20	61	65	5	81	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	175		0	75		0	0		0
Storage Lanes	1		0	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		494			1886			361			514	
Travel Time (s)		13.5			51.4			9.8			14.0	
Confl. Peds. (#/hr)	2		2	2		2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

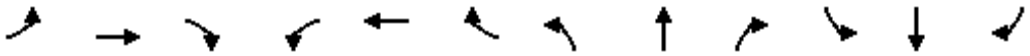
Intersection	
Int Delay, s/veh	11.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	370	5	60	545	40	20	61	65	5	81	50
Future Vol, veh/h	75	370	5	60	545	40	20	61	65	5	81	50
Conflicting Peds, #/hr	2	0	2	2	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	175	-	-	75	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	2	2	2	4	4	4	3	3	3
Mvmt Flow	75	370	5	60	545	40	20	61	65	5	81	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	587	0	0	377	0	0	1276	1232	375	1273	1214	567
Stage 1	-	-	-	-	-	-	525	525	-	687	687	-
Stage 2	-	-	-	-	-	-	751	707	-	586	527	-
Critical Hdwy	4.11	-	-	4.12	-	-	7.14	6.54	6.24	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.13	5.53	-
Follow-up Hdwy	2.209	-	-	2.218	-	-	3.536	4.036	3.336	3.527	4.027	3.327
Pot Cap-1 Maneuver	993	-	-	1181	-	-	142	176	667	144	181	521
Stage 1	-	-	-	-	-	-	532	526	-	435	446	-
Stage 2	-	-	-	-	-	-	400	435	-	495	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	991	-	-	1179	-	-	70	154	666	82	158	520
Mov Cap-2 Maneuver	-	-	-	-	-	-	70	154	-	82	158	-
Stage 1	-	-	-	-	-	-	491	485	-	402	422	-
Stage 2	-	-	-	-	-	-	277	412	-	361	486	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.8	51.2	52.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	119	666	991	-	-	1179	-	-	203
HCM Lane V/C Ratio	0.681	0.098	0.076	-	-	0.051	-	-	0.67
HCM Control Delay (s)	83.5	11	8.9	-	-	8.2	-	-	52.7
HCM Lane LOS	F	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	3.6	0.3	0.2	-	-	0.2	-	-	4.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	504	141	120	1020	50	438	15	30	10	20	39
Future Volume (vph)	38	504	141	120	1020	50	438	15	30	10	20	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	70		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1851			1050			401			441	
Travel Time (s)		50.5			28.6			10.9			12.0	
Confl. Peds. (#/hr)	8		3	3		8	4		2	2		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2236.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱			↕	
Traffic Vol, veh/h	38	504	141	120	1020	50	438	15	30	10	20	39
Future Vol, veh/h	38	504	141	120	1020	50	438	15	30	10	20	39
Conflicting Peds, #/hr	8	0	3	3	0	8	4	0	2	2	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	70	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	3	3	3	1	1	1	1	1	1	0	0	0
Mvmt Flow	38	504	141	120	1020	50	438	15	30	10	20	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1078	0	0	648	0	0	1973	1972	580	1968	2017	1057
Stage 1	-	-	-	-	-	-	654	654	-	1293	1293	-
Stage 2	-	-	-	-	-	-	1319	1318	-	675	724	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.11	6.51	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.509	4.009	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	643	-	-	943	-	-	~ 47	63	516	48	59	276
Stage 1	-	-	-	-	-	-	457	465	-	202	235	-
Stage 2	-	-	-	-	-	-	~ 194	228	-	447	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	638	-	-	940	-	-	~ 16	38	514	22	36	273
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 16	38	-	22	36	-
Stage 1	-	-	-	-	-	-	~ 412	419	-	181	159	-
Stage 2	-	-	-	-	-	-	~ 99	154	-	367	391	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.9	$ 11185.7	278.2
HCM LOS			F	F

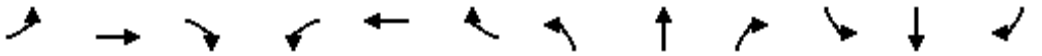
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	16	99	638	-	-	940	-	-	60
HCM Lane V/C Ratio	27.375	0.455	0.06	-	-	0.128	-	-	1.15
HCM Control Delay (s)	$ 12327.9	68.6	11	0	-	9.4	0	-	278.2
HCM Lane LOS	F	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	55.7	1.9	0.2	-	-	0.4	-	-	5.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	320	105	90	490	348	95	115	95	56	165	60
Future Volume (vph)	15	320	105	90	490	348	95	115	95	56	165	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	90		0	100		0	150		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1886			1034			457			401	
Travel Time (s)		51.4			28.2			12.5			10.9	
Confl. Peds. (#/hr)			1	1					2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	2	2		6	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	33.6	33.6		32.6	32.6		31.6	31.6		28.6	28.6	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6	4.6		4.6	4.6		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 92.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 14: S Cle Elum Way/Stafford Ave & W First St



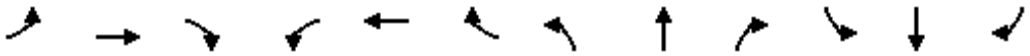
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	320	105	90	490	348	95	115	95	56	165	60
Future Volume (veh/h)	15	320	105	90	490	348	95	115	95	56	165	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	320	105	90	490	348	95	115	95	56	165	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	327	918	301	634	693	492	205	213	176	212	294	107
Arrive On Green	0.68	0.68	0.68	0.68	0.68	0.68	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	656	1348	442	962	1017	722	1162	953	787	1178	1317	479
Grp Volume(v), veh/h	15	0	425	90	0	838	95	0	210	56	0	225
Grp Sat Flow(s),veh/h/ln	656	0	1790	962	0	1740	1162	0	1739	1178	0	1796
Q Serve(g_s), s	1.4	0.0	9.5	4.1	0.0	28.5	7.6	0.0	10.2	4.2	0.0	10.7
Cycle Q Clear(g_c), s	29.9	0.0	9.5	13.7	0.0	28.5	18.3	0.0	10.2	14.5	0.0	10.7
Prop In Lane	1.00		0.25	1.00		0.42	1.00		0.45	1.00		0.27
Lane Grp Cap(c), veh/h	327	0	1219	634	0	1184	205	0	389	212	0	401
V/C Ratio(X)	0.05	0.00	0.35	0.14	0.00	0.71	0.46	0.00	0.54	0.26	0.00	0.56
Avail Cap(c_a), veh/h	327	0	1219	634	0	1184	253	0	460	261	0	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.6	0.0	6.4	9.3	0.0	9.4	41.2	0.0	32.9	39.3	0.0	33.1
Incr Delay (d2), s/veh	0.3	0.0	0.8	0.5	0.0	3.6	2.3	0.0	1.7	0.9	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.5	0.9	0.0	10.7	2.3	0.0	4.5	1.3	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	7.2	9.7	0.0	13.0	43.5	0.0	34.6	40.3	0.0	34.9
LnGrp LOS	B	A	A	A	A	B	D	A	C	D	A	C
Approach Vol, veh/h		440			928			305			281	
Approach Delay, s/veh		7.6			12.7			37.4			35.9	
Approach LOS		A			B			D			D	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	70.0	26.1	70.0	26.1
Change Period (Y+Rc), s	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	65.4	25.4	65.4	25.4
Max Q Clear Time (g_c+I1), s	31.9	20.3	30.5	16.5
Green Ext Time (p_c), s	3.3	1.0	9.3	1.4

Intersection Summary	
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	342	180	15	515	50	648	50	10	30	25	27
Future Volume (vph)	37	342	180	15	515	50	648	50	10	30	25	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	150		0	0		0
Storage Lanes	0		0	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1050			503			379			273	
Travel Time (s)		28.6			13.7			10.3			7.4	
Confl. Peds. (#/hr)			1	1					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	8%	8%	8%
Parking (#/hr)								0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	520

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	342	180	15	515	50	648	50	10	30	25	27
Future Vol, veh/h	37	342	180	15	515	50	648	50	10	30	25	27
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	2	2	2	8	8	8
Mvmt Flow	37	342	180	15	515	50	648	50	10	30	25	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	565	0	0	523	0	0	1103	1102	434	1107	1167	540
Stage 1	-	-	-	-	-	-	507	507	-	570	570	-
Stage 2	-	-	-	-	-	-	596	595	-	537	597	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.12	6.52	6.22	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.18	5.58	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.518	4.018	3.318	3.572	4.072	3.372
Pot Cap-1 Maneuver	1007	-	-	1049	-	-	~ 189	212	622	183	189	530
Stage 1	-	-	-	-	-	-	~ 548	539	-	496	496	-
Stage 2	-	-	-	-	-	-	~ 490	492	-	517	482	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1007	-	-	1048	-	-	~ 151	196	621	137	175	530
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 151	196	-	137	175	-
Stage 1	-	-	-	-	-	-	~ 518	510	-	470	486	-
Stage 2	-	-	-	-	-	-	~ 432	482	-	434	456	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	$ 1412.2	35.2
HCM LOS			F	E

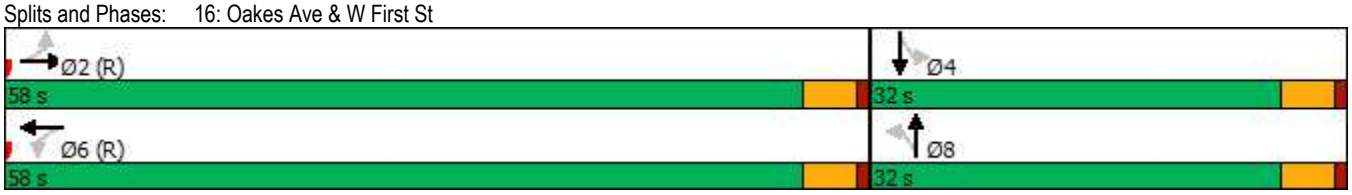
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	151	221	1007	-	-	1048	-	-	199
HCM Lane V/C Ratio	4.291	0.271	0.037	-	-	0.014	-	-	0.412
HCM Control Delay (s)	$ 1540.4	27.3	8.7	0	-	8.5	0	-	35.2
HCM Lane LOS	F	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	65.8	1.1	0.1	-	-	0	-	-	1.9

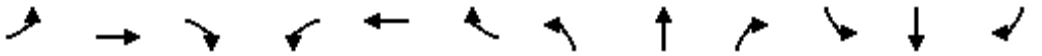
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	306	126	35	473	282	459	386	75	38	162	25
Future Volume (vph)	15	306	126	35	473	282	459	386	75	38	162	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	100		0	150		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1034			490			313			379	
Travel Time (s)		28.2			13.4			8.5			10.3	
Confl. Peds. (#/hr)	12		13	13		12	8		5	5		8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)		0	0		0	0		0	0		0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	29.5	29.5		28.5	28.5		27.5	27.5		29.5	29.5	
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 16: Oakes Ave & W First St

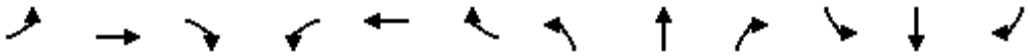




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	306	126	35	473	282	459	386	75	38	162	25
Future Volume (veh/h)	15	306	126	35	473	282	459	386	75	38	162	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90	1.00	1.00	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	15	306	126	35	473	282	459	386	75	38	162	25
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	1	1	1	2	2	2	3	3	3
Cap, veh/h	500	671	276	506	589	351	336	417	81	110	431	66
Arrive On Green	0.59	0.59	0.59	1.00	1.00	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	706	1129	465	961	991	591	1187	1366	265	924	1410	218
Grp Volume(v), veh/h	15	0	432	35	0	755	459	0	461	38	0	187
Grp Sat Flow(s),veh/h/ln	706	0	1594	961	0	1583	1187	0	1631	924	0	1627
Q Serve(g_s), s	0.8	0.0	13.6	0.9	0.0	0.0	19.4	0.0	24.6	2.9	0.0	8.1
Cycle Q Clear(g_c), s	0.8	0.0	13.6	14.5	0.0	0.0	27.5	0.0	24.6	27.5	0.0	8.1
Prop In Lane	1.00		0.29	1.00		0.37	1.00		0.16	1.00		0.13
Lane Grp Cap(c), veh/h	500	0	947	506	0	941	336	0	498	110	0	497
V/C Ratio(X)	0.03	0.00	0.46	0.07	0.00	0.80	1.37	0.00	0.92	0.35	0.00	0.38
Avail Cap(c_a), veh/h	500	0	947	506	0	941	336	0	498	110	0	497
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.95	0.66	0.00	0.66	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.6	0.0	10.2	1.8	0.0	0.0	37.6	0.0	30.2	43.9	0.0	24.5
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.2	0.0	4.9	183.4	0.0	22.8	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.8	0.1	0.0	1.3	24.6	0.0	12.6	0.9	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	11.7	2.0	0.0	4.9	221.0	0.0	53.1	44.6	0.0	24.7
LnGrp LOS	A	A	B	A	A	A	F	A	D	D	A	C
Approach Vol, veh/h		447			790			920			225	
Approach Delay, s/veh		11.5			4.7			136.9			28.1	
Approach LOS		B			A			F			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		58.0		32.0		58.0		32.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		53.5		27.5		53.5		27.5				
Max Q Clear Time (g_c+I1), s		15.6		29.5		16.5		29.5				
Green Ext Time (p_c), s		3.5		0.0		7.6		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			59.2									
HCM 6th LOS			E									



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	239	112	25	417	40	107	25	10	5	20	36
Future Volume (vph)	26	239	112	25	417	40	107	25	10	5	20	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		503			709			369			307	
Travel Time (s)		13.7			19.3			10.1			8.4	
Confl. Peds. (#/hr)	1		1	1		1			10	10		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	239	112	25	417	40	107	25	10	5	20	36
Future Vol, veh/h	26	239	112	25	417	40	107	25	10	5	20	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	26	239	112	25	417	40	107	25	10	5	20	36
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

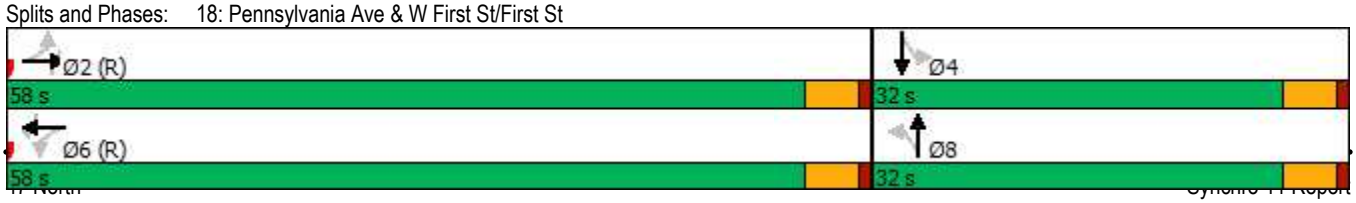
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.8	18	11.3	9.8
HCM LOS	B	C	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	75%	7%	5%	8%
Vol Thru, %	18%	63%	87%	33%
Vol Right, %	7%	30%	8%	59%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	377	482	61
LT Vol	107	26	25	5
Through Vol	25	239	417	20
RT Vol	10	112	40	36
Lane Flow Rate	142	377	482	61
Geometry Grp	1	1	1	1
Degree of Util (X)	0.246	0.531	0.675	0.102
Departure Headway (Hd)	6.246	5.073	5.041	6.026
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	574	709	718	592
Service Time	4.301	3.113	3.078	4.089
HCM Lane V/C Ratio	0.247	0.532	0.671	0.103
HCM Control Delay	11.3	13.8	18	9.8
HCM Lane LOS	B	B	C	A
HCM 95th-tile Q	1	3.2	5.3	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	324	20	25	760	87	5	15	25	117	35	15
Future Volume (vph)	45	324	20	25	760	87	5	15	25	117	35	15
Satd. Flow (prot)	1770	1658	0	1770	1647	0	0	1877	1454	0	1830	1454
Flt Permitted	0.257			0.544				0.933			0.762	
Satd. Flow (perm)	478	1658	0	1006	1647	0	0	1770	1416	0	1442	1414
Satd. Flow (RTOR)		6			11				25			18
Confl. Peds. (#/hr)	4		8	8		4	5		4	4		5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)		0	0		0	0			0			0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	344	0	25	847	0	0	20	25	0	152	15
Turn Type	Perm	NA		Perm	NA		Perm	NA	custom	Perm	NA	custom
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		2	4		6
Detector Phase	2	2		6	6		8	8	2	4	4	6
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		8.0	8.0	20.0	8.0	8.0	20.0
Minimum Split (s)	34.5	34.5		34.5	34.5		35.5	35.5	34.5	34.5	34.5	34.5
Total Split (s)	58.0	58.0		58.0	58.0		32.0	32.0	58.0	32.0	32.0	58.0
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%	64.4%	35.6%	35.6%	64.4%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None	C-Min	None	None	C-Min
Act Effct Green (s)	65.6	65.6		65.6	65.6			15.4	65.6		15.4	65.6
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.17	0.73		0.17	0.73
v/c Ratio	0.13	0.28		0.03	0.70			0.07	0.02		0.62	0.01
Control Delay	4.9	4.2		5.6	13.2			27.6	2.7		43.8	2.7
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	4.9	4.2		5.6	13.2			27.6	2.7		43.8	2.7
LOS	A	A		A	B			C	A		D	A
Approach Delay		4.3			13.0			13.8			40.1	
Approach LOS		A			B			B			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 83.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Pennsylvania Ave & W First St/First St



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	950	20	0	0	298
Future Volume (vph)	60	950	20	0	0	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1328		651			197
Travel Time (s)	22.6		17.8			5.4
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	5%	5%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	34.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	950	20	0	0	298
Future Vol, veh/h	60	950	20	0	0	298
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	5	5	3	3
Mvmt Flow	60	950	20	0	0	298

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	318	20	0	-	-	-
Stage 1	20	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	673	1055	-	0	0	-
Stage 1	1000	-	-	0	0	-
Stage 2	751	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	673	1055	-	-	-	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.8	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1021	-
HCM Lane V/C Ratio	-	0.989	-
HCM Control Delay (s)	-	45.8	-
HCM Lane LOS	-	E	-
HCM 95th %tile Q(veh)	-	18.8	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	25	0	303	100
Future Volume (vph)	0	0	25	0	303	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	40		25			25
Link Distance (ft)	1319		225			651
Travel Time (s)	22.5		6.1			17.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free		Stop			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

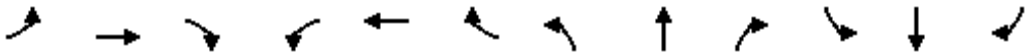
Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	303	100
Future Vol, veh/h	0	0	25	0	303	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	0	25	0	303	100

Major/Minor	Minor2		Major2	
Conflicting Flow All	706	100	0	0
Stage 1	706	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	363	961	-	-
Stage 1	442	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	961	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach	NB	SB
HCM Control Delay, s		
HCM LOS	-	

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	35	125	42	5	10	125	282	17	5	444	65
Future Volume (vph)	10	35	125	42	5	10	125	282	17	5	444	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		425			424			572			450	
Travel Time (s)		11.6			11.6			15.6			12.3	
Confl. Peds. (#/hr)	31		10	10		31	15		5	5		15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

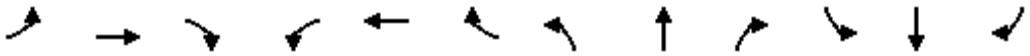
Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	35	125	42	5	10	125	282	17	5	444	65
Future Vol, veh/h	10	35	125	42	5	10	125	282	17	5	444	65
Conflicting Peds, #/hr	31	0	10	10	0	31	15	0	5	5	0	15
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Mvmt Flow	10	35	125	42	5	10	125	282	17	5	444	65

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1081	1056	502	1123	1080	327	524	0	0	304	0	0
Stage 1	502	502	-	546	546	-	-	-	-	-	-	-
Stage 2	579	554	-	577	534	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	197	227	573	185	220	719	1053	-	-	1257	-	-
Stage 1	555	545	-	526	521	-	-	-	-	-	-	-
Stage 2	504	517	-	506	528	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	161	189	559	108	183	694	1038	-	-	1251	-	-
Mov Cap-2 Maneuver	161	189	-	108	183	-	-	-	-	-	-	-
Stage 1	468	534	-	448	443	-	-	-	-	-	-	-
Stage 2	408	440	-	361	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.5	51.5	2.6	0.1
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1038	-	-	361	132	1251	-	-
HCM Lane V/C Ratio	0.12	-	-	0.471	0.432	0.004	-	-
HCM Control Delay (s)	8.9	0	-	23.5	51.5	7.9	0	-
HCM Lane LOS	A	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	2.4	1.9	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	46	51	0	5	66	215	26	10	332	20
Future Volume (vph)	10	0	46	51	0	5	66	215	26	10	332	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		534			273			671			424	
Travel Time (s)		14.6			7.4			18.3			11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

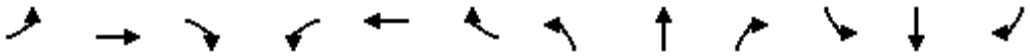
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	0	46	51	0	5	66	215	26	10	332	20
Future Vol, veh/h	10	0	46	51	0	5	66	215	26	10	332	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	0	46	51	0	5	66	215	26	10	332	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	725	735	342	745	732	228	352	0	0	241	0	0
Stage 1	362	362	-	360	360	-	-	-	-	-	-	-
Stage 2	363	373	-	385	372	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	343	349	705	333	351	816	1218	-	-	1337	-	-
Stage 1	661	629	-	662	630	-	-	-	-	-	-	-
Stage 2	660	622	-	642	622	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	322	324	705	294	326	816	1218	-	-	1337	-	-
Mov Cap-2 Maneuver	322	324	-	294	326	-	-	-	-	-	-	-
Stage 1	619	623	-	620	590	-	-	-	-	-	-	-
Stage 2	615	583	-	595	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	19	1.7	0.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1218	-	-	581	312	1337	-	-
HCM Lane V/C Ratio	0.054	-	-	0.096	0.179	0.007	-	-
HCM Control Delay (s)	8.1	0	-	11.9	19	7.7	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.6	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	239	5	17	164	14	10	0	14	49	0	5
Future Volume (vph)	10	239	5	17	164	14	10	0	14	49	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		591			657			282			328	
Travel Time (s)		16.1			17.9			7.7			8.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

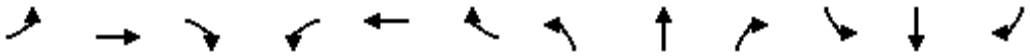
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	239	5	17	164	14	10	0	14	49	0	5
Future Vol, veh/h	10	239	5	17	164	14	10	0	14	49	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	239	5	17	164	14	10	0	14	49	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	178	0	0	244	0	0	470	474	242	474	469	171
Stage 1	-	-	-	-	-	-	262	262	-	205	205	-
Stage 2	-	-	-	-	-	-	208	212	-	269	264	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1410	-	-	1334	-	-	507	492	802	504	495	878
Stage 1	-	-	-	-	-	-	747	695	-	802	736	-
Stage 2	-	-	-	-	-	-	799	731	-	741	694	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1410	-	-	1334	-	-	496	481	802	487	484	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	496	481	-	487	484	-
Stage 1	-	-	-	-	-	-	741	689	-	796	726	-
Stage 2	-	-	-	-	-	-	783	721	-	722	688	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.7	10.9	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	638	1410	-	-	1334	-	-	508
HCM Lane V/C Ratio	0.038	0.007	-	-	0.013	-	-	0.106
HCM Control Delay (s)	10.9	7.6	0	-	7.7	0	-	12.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	421	125	10	911	0	610	10	5	0	10	25
Future Volume (vph)	5	421	125	10	911	0	610	10	5	0	10	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		317			738			139			160	
Travel Time (s)		4.8			11.2			3.2			3.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	781

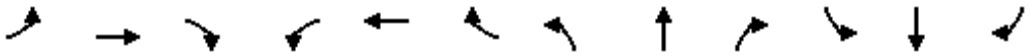
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	421	125	10	911	0	610	10	5	0	10	25
Future Vol, veh/h	5	421	125	10	911	0	610	10	5	0	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	1	1	1	3	3	3	0	0	0
Mvmt Flow	5	421	125	10	911	0	610	10	5	0	10	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	911	0	0	546	0	0	1443	1425	484	1432	1487	911
Stage 1	-	-	-	-	-	-	494	494	-	931	931	-
Stage 2	-	-	-	-	-	-	949	931	-	501	556	-
Critical Hdwy	4.12	-	-	4.11	-	-	7.13	6.53	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.209	-	-	3.527	4.027	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	748	-	-	1028	-	-	~ 109	135	581	113	126	335
Stage 1	-	-	-	-	-	-	~ 555	545	-	323	348	-
Stage 2	-	-	-	-	-	-	~ 312	344	-	556	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	748	-	-	1028	-	-	~ 92	131	581	103	122	335
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 92	131	-	103	122	-
Stage 1	-	-	-	-	-	-	~ 549	540	-	320	341	-
Stage 2	-	-	-	-	-	-	~ 275	337	-	536	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	$ 2662.6	24
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	93	748	-	-	1028	-	-	224
HCM Lane V/C Ratio	6.72	0.007	-	-	0.01	-	-	0.156
HCM Control Delay (s)	$ 2662.6	9.8	0	-	8.5	0	-	24
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	69.9	0	-	-	0	-	-	0.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	655	0	395	0	0	160	490
Future Volume (vph)	0	0	0	0	0	655	0	395	0	0	160	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		1099			1211			1321			778	
Travel Time (s)		18.7			20.6			30.0			17.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	5%	5%	5%	3%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Free			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	23.7

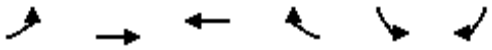
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	655	0	395	0	0	160	490
Future Vol, veh/h	0	0	0	0	0	655	0	395	0	0	160	490
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	3	3	5	5	5	3	3	3
Mvmt Flow	0	0	0	0	0	655	0	395	0	0	160	490

Major/Minor	Minor1			Major1			Major2			
Conflicting Flow All	-	-	395	-	0	-	-	-	0	
Stage 1	-	-	-	-	-	-	-	-	-	
Stage 2	-	-	-	-	-	-	-	-	-	
Critical Hdwy	-	-	6.23	-	-	-	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	
Follow-up Hdwy	-	-	3.327	-	-	-	-	-	-	
Pot Cap-1 Maneuver	0	0	~ 652	0	-	0	0	-	-	
Stage 1	0	0	-	0	-	0	0	-	-	
Stage 2	0	0	-	0	-	0	0	-	-	
Platoon blocked, %					-			-	-	
Mov Cap-1 Maneuver	-	0	~ 652	-	-	-	-	-	-	
Mov Cap-2 Maneuver	-	0	-	-	-	-	-	-	-	
Stage 1	-	0	-	-	-	-	-	-	-	
Stage 2	-	0	-	-	-	-	-	-	-	

Approach	WB	NB	SB
HCM Control Delay, s	61.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT	SBR
Capacity (veh/h)	-	652	-	-
HCM Lane V/C Ratio	-	1.005	-	-
HCM Control Delay (s)	-	61.5	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	15.9	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	360	5	0	0	190	0
Future Volume (vph)	360	5	0	0	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		40	40		30	
Link Distance (ft)		952	1145		1321	
Travel Time (s)		16.2	19.5		30.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	0%	0%	8%	8%
Shared Lane Traffic (%)						
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	11.3
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	360	5	0	0	190	0
Future Vol, veh/h	360	5	0	0	190	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	6	6	0	0	8	8
Mvmt Flow	360	5	0	0	190	0
Number of Lanes	0	1	0	0	1	0

Approach	EB	SB
Opposing Approach		
Opposing Lanes	0	0
Conflicting Approach Left	SB	
Conflicting Lanes Left	1	0
Conflicting Approach Right		EB
Conflicting Lanes Right	0	1
HCM Control Delay	12	10.1
HCM LOS	B	B

Lane	EBLn1	SBLn1
Vol Left, %	99%	100%
Vol Thru, %	1%	0%
Vol Right, %	0%	0%
Sign Control	Stop	Stop
Traffic Vol by Lane	365	190
LT Vol	360	190
Through Vol	5	0
RT Vol	0	0
Lane Flow Rate	365	190
Geometry Grp	1	1
Degree of Util (X)	0.477	0.271
Departure Headway (Hd)	4.706	5.141
Convergence, Y/N	Yes	Yes
Cap	766	699
Service Time	2.733	3.176
HCM Lane V/C Ratio	0.477	0.272
HCM Control Delay	12	10.1
HCM Lane LOS	B	B
HCM 95th-tile Q	2.6	1.1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	406	5	505	806	125	0
Future Volume (vph)	406	5	505	806	125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Link Speed (mph)	45			45	30	
Link Distance (ft)	732			222	60	
Travel Time (s)	11.1			3.4	1.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	139.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	406	5	505	806	125	0
Future Vol, veh/h	406	5	505	806	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	2	2
Mvmt Flow	406	5	505	806	125	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	411	0	2225	409
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	1816	-
Critical Hdwy	-	-	4.11	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.209	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1153	-	~ 47	642
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	142	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1153	-	~ 26	642
Mov Cap-2 Maneuver	-	-	-	-	~ 26	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	~ 80	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	$ 2016.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	26	-	-	1153	-
HCM Lane V/C Ratio	4.808	-	-	0.438	-
HCM Control Delay (s)	$ 2016.8	-	-	10.5	-
HCM Lane LOS	F	-	-	B	-
HCM 95th %tile Q(veh)	15.4	-	-	2.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	39	726	46	38	1262
Future Volume (vph)	46	39	726	46	38	1262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	729		1562			1711
Travel Time (s)	19.9		30.4			33.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	50%	50%	3%	50%	50%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	32.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	39	726	46	38	1262
Future Vol, veh/h	46	39	726	46	38	1262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	50	3	50	50	3
Mvmt Flow	50	42	789	50	41	1372

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2268	814	0	0	839	0
Stage 1	814	-	-	-	-	-
Stage 2	1454	-	-	-	-	-
Critical Hdwy	6.9	6.7	-	-	4.6	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.75	-	-	2.65	-
Pot Cap-1 Maneuver	~ 32	313	-	-	623	-
Stage 1	363	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 23	313	-	-	623	-
Mov Cap-2 Maneuver	~ 23	-	-	-	-	-
Stage 1	363	-	-	-	-	-
Stage 2	121	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 814.4	0	0.3
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	40	623	-
HCM Lane V/C Ratio	-	-	2.31	0.066	-
HCM Control Delay (s)	-	-	$ 814.4	11.2	0
HCM Lane LOS	-	-	F	B	A
HCM 95th %tile Q(veh)	-	-	10	0.2	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	111	66	297	116	67	1036
Future Volume (vph)	111	66	297	116	67	1036
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25		35			35
Link Distance (ft)	965		1296			114
Travel Time (s)	26.3		25.2			2.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	21

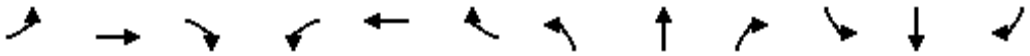
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	111	66	297	116	67	1036
Future Vol, veh/h	111	66	297	116	67	1036
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	121	72	323	126	73	1126

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1658	386	0	0	449	0
Stage 1	386	-	-	-	-	-
Stage 2	1272	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	~ 107	660	-	-	1106	-
Stage 1	685	-	-	-	-	-
Stage 2	262	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 88	660	-	-	1106	-
Mov Cap-2 Maneuver	~ 88	-	-	-	-	-
Stage 1	685	-	-	-	-	-
Stage 2	216	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	197.9	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	88	660	1106	-
HCM Lane V/C Ratio	-	-	1.371	0.109	0.066	-
HCM Control Delay (s)	-	-	$ 308.9	11.1	8.5	0
HCM Lane LOS	-	-	F	B	A	A
HCM 95th %tile Q(veh)	-	-	9.1	0.4	0.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	367	158	387	1095	32	160	0	381	25	0	33
Future Volume (vph)	33	367	158	387	1095	32	160	0	381	25	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		2173			814			804			363	
Travel Time (s)		32.9			12.3			21.9			9.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	33	367	158	387	1095	32	160	0	381	25	0	33
Future Vol, veh/h	33	367	158	387	1095	32	160	0	381	25	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	2
Mvmt Flow	36	399	172	421	1190	35	174	0	414	27	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1225	0	0	571	0	0	2625	2624	485	2814	2693	1208
Stage 1	-	-	-	-	-	-	557	557	-	2050	2050	-
Stage 2	-	-	-	-	-	-	2068	2067	-	764	643	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.318
Pot Cap-1 Maneuver	566	-	-	997	-	-	~ 16	24	580	~ 11	21	223
Stage 1	-	-	-	-	-	-	513	511	-	72	98	-
Stage 2	-	-	-	-	-	-	~ 70	96	-	395	467	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	566	-	-	997	-	-	-	0	580	-	0	223
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	464	462	-	65	0	-
Stage 2	-	-	-	-	-	-	-	0	-	102	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	2.9		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	580	566	-	-	997	-	-	-
HCM Lane V/C Ratio	-	0.714	0.063	-	-	0.422	-	-	-
HCM Control Delay (s)	-	25.2	11.8	0	-	11.2	0	-	-
HCM Lane LOS	-	D	B	A	-	B	A	-	-
HCM 95th %tile Q(veh)	-	5.8	0.2	-	-	2.1	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX G

Roadway Peak Hour Volume and LOS Calculations

APPENDIX G
ROADWAY WEEKDAY PEAK HOUR VOLUME AND LEVEL OF SERVICE

						Year 2031 Weekday												Year 2037 Weekday											
						'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal			'Baseline'[3]			With Alt 6			'Baseline'[3]			With Revised Proposal		
Functional Class	Road Name	Direction of (E/O, W/O, S/O, N/O)	Nearest Crossroad	Number of Lanes	Idealized Roadway Capacity (vph)[1]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]
Freeways	I-90 Eastbound Off-ramp (Exit 84)	to	W 1st Street	1	1,200	530	44%	A	542	45%	A	--	--	--	545	45%	A	590	49%	A	604	50%	A	--	--	--	605	50%	A
	I-90 Westbound On-ramp (Exit 84)	from	W 1st Street	1	1,200	320	27%	A	328	27%	A	--	--	--	331	28%	A	360	30%	A	371	31%	A	--	--	--	371	31%	A
	I-90 Westbound Off-ramp (Exit 84A)	to	N Oakes Ave	1	1,200	340	28%	A	390	33%	A	--	--	--	392	33%	A	400	33%	A	448	37%	A	--	--	--	452	38%	A
	I-90 Eastbound On-ramp (Exit 84A)	from	N Oakes Ave	1	1,200	240	20%	A	267	22%	A	--	--	--	280	23%	A	280	23%	A	318	27%	A	--	--	--	320	27%	A
	I-90 Eastbound On-ramp (Exit 80)	from	Bullfrog Road	1	1,200	245	20%	A	269	22%	A	270	23%	A	303	25%	A	335	28%	A	367	31%	A	360	30%	A	393	33%	A
	I-90 Westbound Off-ramp (Exit 80)	to	Bullfrog Road	1	1,200	355	30%	A	405	34%	A	400	33%	A	459	38%	A	555	46%	A	610	51%	A	600	50%	A	659	55%	A
Major Collector	SR 903 (W 1st St) (Eastbound Only)	W/O	N Pennsylvania Ave	1	1,000	430	43%	A	483	48%	A	--	--	--	466	47%	A	460	46%	A	495	50%	A	--	--	--	496	50%	A
	SR 903 (W 2nd St)	W/O	N Oakes Ave	2	2,000	1,040	52%	A	1,301	65%	B	--	--	--	1,246	62%	B	1,320	66%	B	1,514	76%	C	--	--	--	1,526	76%	C
	SR 903	W/O	N Stafford Ave/ S Cle Elum Way	2	2,000	1,130	57%	A	1,537	77%	C	--	--	--	1,478	74%	C	1,310	66%	B	1,638	82%	**D**	--	--	--	1,658	83%	**D**
	W 1st St	E/O	N Pine St	2	2,000	1,000	50%	A	1,000	50%	A	--	--	--	1,059	53%	A	1,130	57%	A	1,185	59%	A	--	--	--	1,189	59%	A
	N Pennsylvania Ave	N/O	SR 903	2	2,000	240	12%	A	290	15%	A	--	--	--	293	15%	A	300	15%	A	350	18%	A	--	--	--	353	18%	A
	N Oakes Ave	N/O	Railroad Ave	2	2,000	670	34%	A	747	37%	A	--	--	--	764	38%	A	810	41%	A	898	45%	A	--	--	--	904	45%	A
	Bullfrog Road	S/O	SR 903	2	2,000	480	24%	A	625	31%	A	710	36%	A	904	45%	A	500	25%	A	686	34%	A	730	37%	A	924	46%	A

1. The City of Cle Elum's major collector idealized capacities are 1,000 vph/ln, with 400 vph for two-way left-turn (TWLT) lanes.
2. LOS = Level of Service. Bold indicates does not meet LOS standard. (LOS A = 0.60 V/C, LOS B = 0.61 to 0.70 V/C, LOS C = 0.71 to 0.80 V/C, LOS D = 0.81 to 0.90 V/C, LOS E = 0.91 to 1.0 V/C, LOS F = >1.0 V/C).
3. DASHES indicate baseline volumes are consistent with the FSEIS and did not change with this update.

APPENDIX G
ROADWAY FRIDAY PEAK HOUR VOLUME AND LEVEL OF SERVICE

						Year 2031 Friday										Year 2037 Friday									
						'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal				'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal		
Functional Class	Road Name	Direction of (E/O, W/O, S/O, N/O)	Nearest Crossroad	Number of Lanes	Idealized Roadway Capacity (vph)[1]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]
Freeways	I-90 Eastbound Off-ramp (Exit 84)	to	W 1st Street	1	1,200	745	62%	B	757	63%	B	--	--	--	760	63%	B	780	65%	B	794	66%	B	--	--	--	795	66%	B
	I-90 Westbound On-ramp (Exit 84)	from	W 1st Street	1	1,200	310	26%	A	318	27%	A	--	--	--	321	27%	A	325	27%	A	336	28%	A	--	--	--	336	28%	A
	I-90 Westbound Off-ramp (Exit 84A)	to	N Oakes Ave	1	1,200	320	27%	A	370	31%	A	--	--	--	372	31%	A	385	32%	A	433	36%	A	--	--	--	437	36%	A
	I-90 Eastbound On-ramp (Exit 84A)	from	N Oakes Ave	1	1,200	315	26%	A	342	29%	A	--	--	--	355	30%	A	370	31%	A	408	34%	A	--	--	--	410	34%	A
	I-90 Eastbound On-ramp (Exit 80)	from	Bullfrog Road	1	1,200	300	25%	A	324	27%	A	--	--	--	333	28%	A	400	33%	A	432	36%	A	--	--	--	433	36%	A
	I-90 Westbound Off-ramp (Exit 80)	to	Bullfrog Road	1	1,200	450	38%	A	500	42%	A	--	--	--	509	42%	A	620	52%	A	675	56%	A	--	--	--	679	57%	A
Major Collector	SR 903 (W 1st St) (Eastbound Only)	W/O	N Pennsylvania Ave	1	1,000	555	56%	A	608	61%	B	--	--	--	591	59%	A	590	59%	A	625	63%	B	--	--	--	626	63%	B
	SR 903 (W 2nd St)	W/O	N Oakes Ave	2	2,000	1,125	56%	A	1,386	69%	B	--	--	--	1,331	67%	B	1,410	71%	C	1,604	80%	C	--	--	--	1,616	81%	**D**
	SR 903	W/O	N Stafford Ave/ S Cle Elum Way	2	2,000	1,300	65%	B	1,707	85%	**D**	--	--	--	1,648	82%	**D**	1,495	75%	C	1,823	91%	**E**	--	--	--	1,843	92%	**E**
	W 1st St	E/O	N Pine St	2	2,000	1,165	58%	A	1,165	58%	A	--	--	--	1,224	61%	B	1,320	66%	B	1,375	69%	B	--	--	--	1,379	69%	B
	N Pennsylvania Ave	N/O	SR 903	2	2,000	275	14%	A	325	16%	A	--	--	--	328	16%	A	335	17%	A	385	19%	A	--	--	--	388	19%	A
	N Oakes Ave	N/O	Railroad Ave	2	2,000	750	38%	A	827	41%	A	--	--	--	844	42%	A	885	44%	A	973	49%	A	--	--	--	979	49%	A
	Bullfrog Road	S/O	SR 903	2	2,000	655	33%	A	800	40%	A	--	--	--	849	42%	A	650	33%	A	836	42%	A	--	--	--	844	42%	A

1. The City of Cle Elum's major collector idealized capacities are 1,000 vph/ln, with 400 vph for two-way left-turn (TWLT) lanes.
2. LOS = Level of Service. Bold indicates does not meet LOS standard. (LOS A = 0.60 V/C, LOS B = 0.61 to 0.70 V/C, LOS C = 0.71 to 0.80 V/C, LOS D = 0.81 to 0.90 V/C, LOS E = 0.91 to 1.0 V/C, LOS F = >1.0 V/C).
3. DASHES indicate baseline volumes are consistent with the FSEIS and did not change with this update.

APPENDIX G
ROADWAY SUNDAY PEAK HOUR VOLUME AND LEVEL OF SERVICE

						Year 2031 Sunday												Year 2037 Sunday											
						'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal			'Baseline'			With Alt 6			'Baseline'[3]			With Revised Proposal		
Functional Class	Road Name	Direction of (E/O, W/O, S/O, N/O)	Nearest Crossroad	Number of Lanes	Idealized Roadway Capacity (vph)[1]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]	PM Peak Hour Vol (vph)	% of Peak Volume vs Roadway Capacity	Level of Service (LOS)[2]
Freeways	I-90 Eastbound Off-ramp (Exit 84)	to	W 1st Street	1	1,200	440	37%	A	450	38%	A	--	--	--	452	38%	A	515	43%	A	525	44%	A	--	--	--	527	44%	A
	I-90 Westbound On-ramp (Exit 84)	from	W 1st Street	1	1,200	455	38%	A	465	39%	A	--	--	--	467	39%	A	515	43%	A	525	44%	A	--	--	--	527	44%	A
	I-90 Westbound Off-ramp (Exit 84A)	to	N Oakes Ave	1	1,200	780	65%	B	821	68%	B	--	--	--	830	69%	B	960	80%	C	1,002	84%	**D**	--	--	--	1,010	84%	**D**
	I-90 Eastbound On-ramp (Exit 84A)	from	N Oakes Ave	1	1,200	215	18%	A	254	21%	A	--	--	--	263	22%	A	255	21%	A	294	25%	A	--	--	--	303	25%	A
	I-90 Eastbound On-ramp (Exit 80)	from	Bullfrog Road	1	1,200	215	18%	A	249	21%	A	--	--	--	256	21%	A	280	23%	A	314	26%	A	--	--	--	321	27%	A
	I-90 Westbound Off-ramp (Exit 80)	to	Bullfrog Road	1	1,200	305	25%	A	341	28%	A	--	--	--	348	29%	A	520	43%	A	556	46%	A	--	--	--	563	47%	A
Major Collector	SR 903 (W 1st St) (Eastbound Only)	W/O	N Pennsylvania Ave	1	1,000	330	33%	A	391	39%	A	--	--	--	369	37%	A	350	35%	A	386	39%	A	--	--	--	389	39%	A
	SR 903 (W 2nd St)	W/O	N Oakes Ave	2	2,000	1,170	59%	A	1,421	71%	C	--	--	--	1,414	71%	C	1,505	75%	C	1,707	85%	**D**	--	--	--	1,749	87%	**D**
	SR 903	W/O	N Stafford Ave/ S Cle Elum Way	2	2,000	1,465	73%	C	1,868	93%	**E**	--	--	--	1,880	94%	**E**	1,765	88%	**D**	2,109	105%	**F**	--	--	--	2,180	109%	**F**
	W 1st St	E/O	N Pine St	2	2,000	1,040	52%	A	1,040	52%	A	--	--	--	1,040	52%	A	1,085	54%	A	1,085	54%	A	--	--	--	1,085	54%	A
	N Pennsylvania Ave	N/O	SR 903	2	2,000	195	10%	A	235	12%	A	--	--	--	269	13%	A	240	12%	A	301	15%	A	--	--	--	314	16%	A
	N Oakes Ave	N/O	Railroad Ave	2	2,000	970	49%	A	1,050	53%	A	--	--	--	1,068	53%	A	1,145	57%	A	1,226	61%	B	--	--	--	1,243	62%	B
	Bullfrog Road	S/O	SR 903	2	2,000	1,165	58%	A	1,308	65%	B	--	--	--	1,337	67%	B	1,235	62%	B	1,377	69%	B	--	--	--	1,407	70%	B

1. The City of Cle Elum's major collector idealized capacities are 1,000 vph/ln, with 400 vph for two-way left-turn (TWLT) lanes.
2. LOS = Level of Service. Bold indicates does not meet LOS standard. (LOS A = 0.60 V/C, LOS B = 0.61 to 0.70 V/C, LOS C = 0.71 to 0.80 V/C, LOS D = 0.81 to 0.90 V/C, LOS E = 0.91 to 1.0 V/C, LOS F = >1.0 V/C).
3. DASHES indicate baseline volumes are consistent with the FSEIS and did not change with this update.

APPENDIX H

Intersection LOS Calculations with Mitigation

Compact Roundabout

LANE LEVEL OF SERVICE

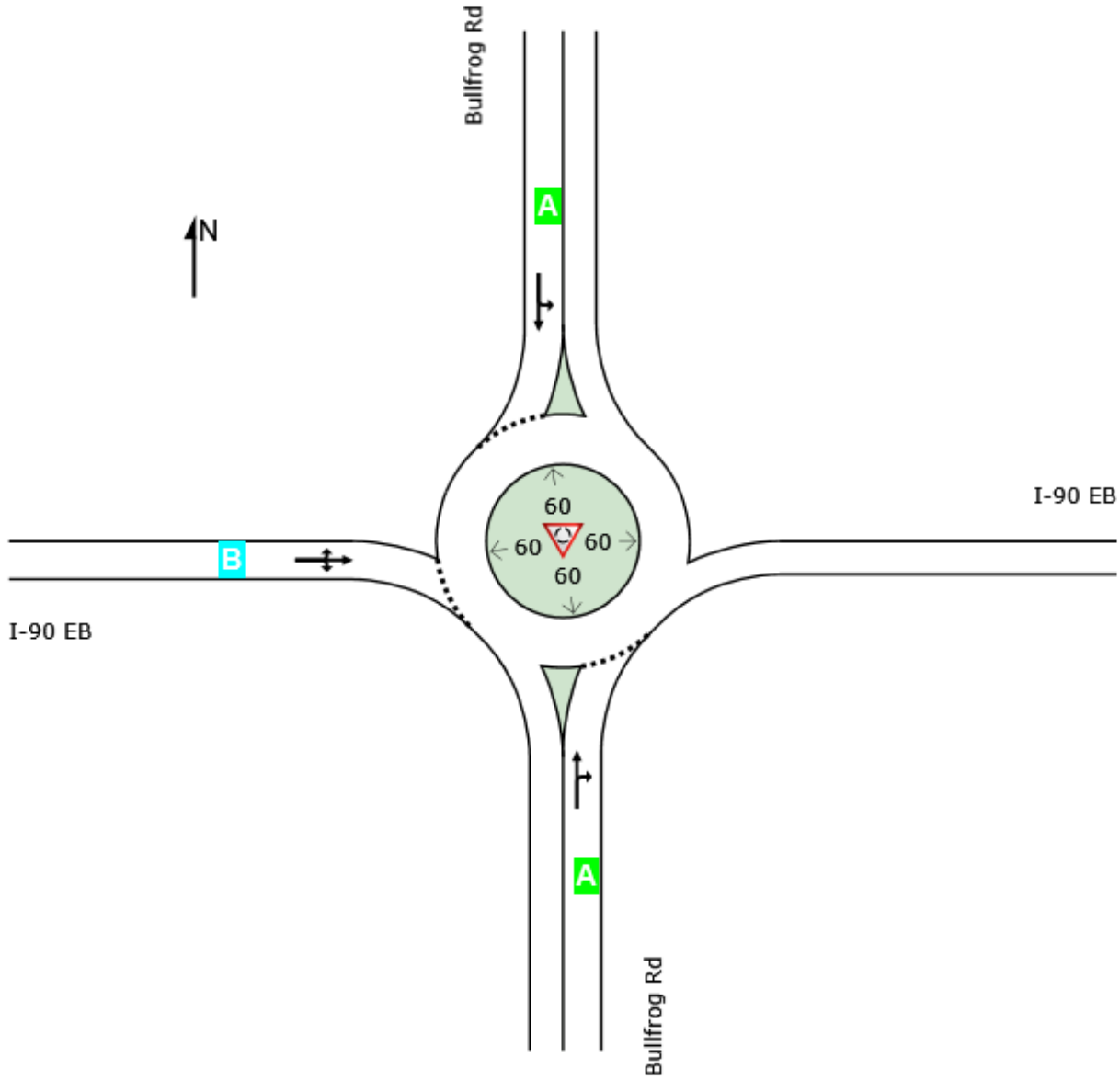
Lane Level of Service

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	B	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	50	0.0	50	0.0	823	0.061	100	6.9	LOS A	0.3	8.1	Full	1600	0.0	0.0
Approach	50	0.0	50	0.0		0.061		6.9	LOS A	0.3	8.1				
North: Bullfrog Rd															
Lane 1[d]	293	4.0	293	4.0	1319	0.222	100	7.6	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	293	4.0	293	4.0		0.222		7.6	LOS A	0.0	0.0				
West: I-90 EB															
Lane 1[d]	421	3.5	421	3.5	1056	0.399	100	11.3	LOS B	2.2	57.6	Full	1600	0.0	0.0
Approach	421	3.5	421	3.5		0.399		11.3	LOS B	2.2	57.6				
All Vehicles	764	3.5	764	3.5		0.399		9.6	LOS A	2.2	57.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	20	30	50	0.0	823	0.061	100	NA	NA
Approach	20	30	50	0.0		0.061			

North: Bullfrog Rd

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	263	30	293	4.0	1319	0.222	100	NA	NA
Approach	263	30	293	4.0		0.222			

West: I-90 EB

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	381	10	30	421	3.5	1056	0.399	100	NA	NA
Approach	381	10	30	421	3.5		0.399			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	764	3.5	0.399

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: I-90 EB				
Lane 1	0.0	0.0	0.0	0.0

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LANE LEVEL OF SERVICE

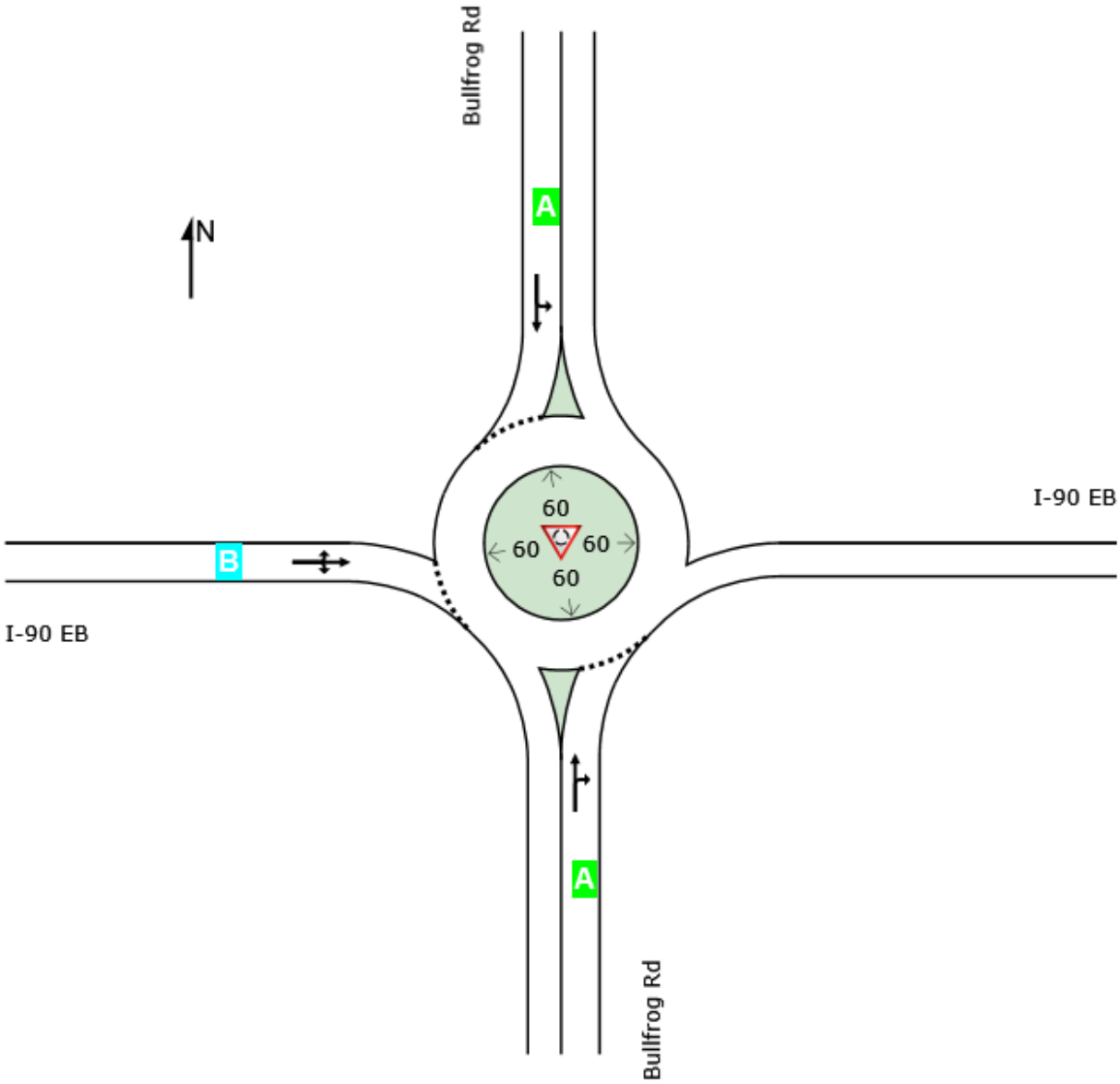
Lane Level of Service

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	A	A	B	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	45	16.7	45	16.7	431	0.104	100	12.1	LOS B	0.6	15.8	Full	1600	0.0	0.0
Approach	45	16.7	45	16.7		0.104		12.1	LOS B	0.6	15.8				
North: Bullfrog Rd															
Lane 1[d]	313	22.4	313	22.4	1137	0.275	100	8.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	313	22.4	313	22.4		0.275		8.0	LOS A	0.0	0.0				
West: I-90 EB															
Lane 1[d]	631	1.3	631	1.3	1034	0.610	100	13.5	LOS B	5.1	128.3	Full	1600	0.0	0.0
Approach	631	1.3	631	1.3		0.610		13.5	LOS B	5.1	128.3				
All Vehicles	989	8.7	989	8.7		0.610		11.7	LOS B	5.1	128.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	35	45	16.7	431	0.104	100	NA	NA
Approach	10	35	45	16.7		0.104			

North: Bullfrog Rd

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	293	20	313	22.4	1137	0.275	100	NA	NA
Approach	293	20	313	22.4		0.275			

West: I-90 EB

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	611	5	15	631	1.3	1034	0.610	100	NA	NA
Approach	611	5	15	631	1.3		0.610			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	989	8.7	0.610

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: I-90 EB				
Lane 1	0.0	0.0	0.0	0.0

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LANE LEVEL OF SERVICE

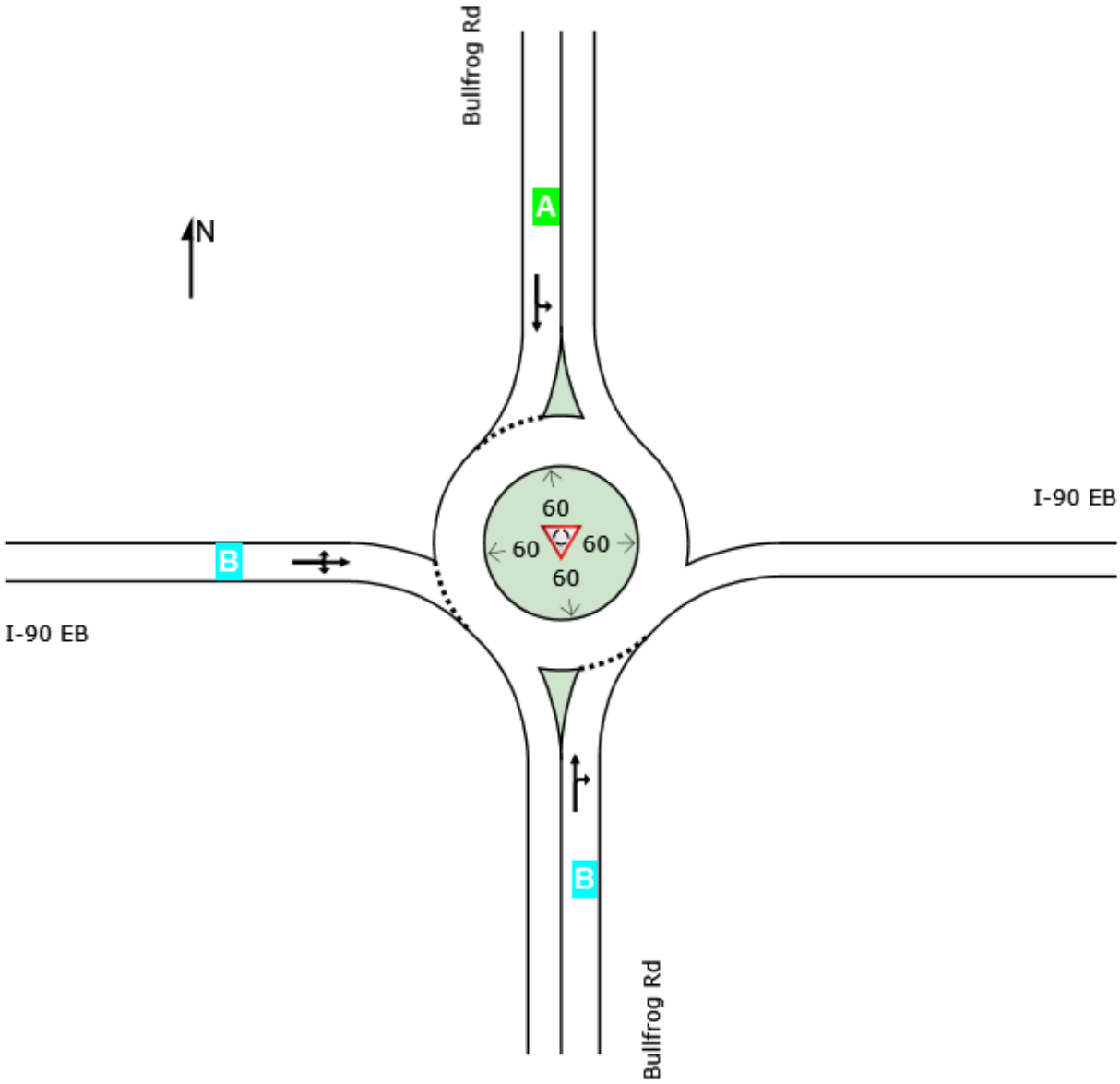
Lane Level of Service

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	North	West	
LOS	B	A	B	B



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 1 [I-90 EB Ramps / Bullfrog Rd (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

I-90 EB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	20	0.0	20	0.0	971	0.021	100	5.6	LOS A	0.1	2.4	Full	1600	0.0	0.0
Approach	20	0.0	20	0.0		0.021		5.6	LOS A	0.1	2.4				
North: Bullfrog Rd															
Lane 1[d]	266	0.0	266	0.0	1366	0.195	100	7.7	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	266	0.0	266	0.0		0.195		7.7	LOS A	0.0	0.0				
West: I-90 EB															
Lane 1[d]	242	0.9	242	0.9	1122	0.216	100	10.9	LOS B	1.0	26.0	Full	1600	0.0	0.0
Approach	242	0.9	242	0.9		0.216		10.9	LOS B	1.0	26.0				
All Vehicles	528	0.4	528	0.4		0.216		9.1	LOS A	1.0	26.0				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	5	20	0.0	971	0.021	100	NA	NA
Approach	15	5	20	0.0		0.021			

North: Bullfrog Rd

Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	246	20	266	0.0	1366	0.195	100	NA	NA
Approach	246	20	266	0.0		0.195			

West: I-90 EB

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	232	5	5	242	0.9	1122	0.216	100	NA	NA
Approach	232	5	5	242	0.9		0.216			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	528	0.4	0.216

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
West: I-90 EB				
Lane 1	0.0	0.0	0.0	0.0

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LANE LEVEL OF SERVICE

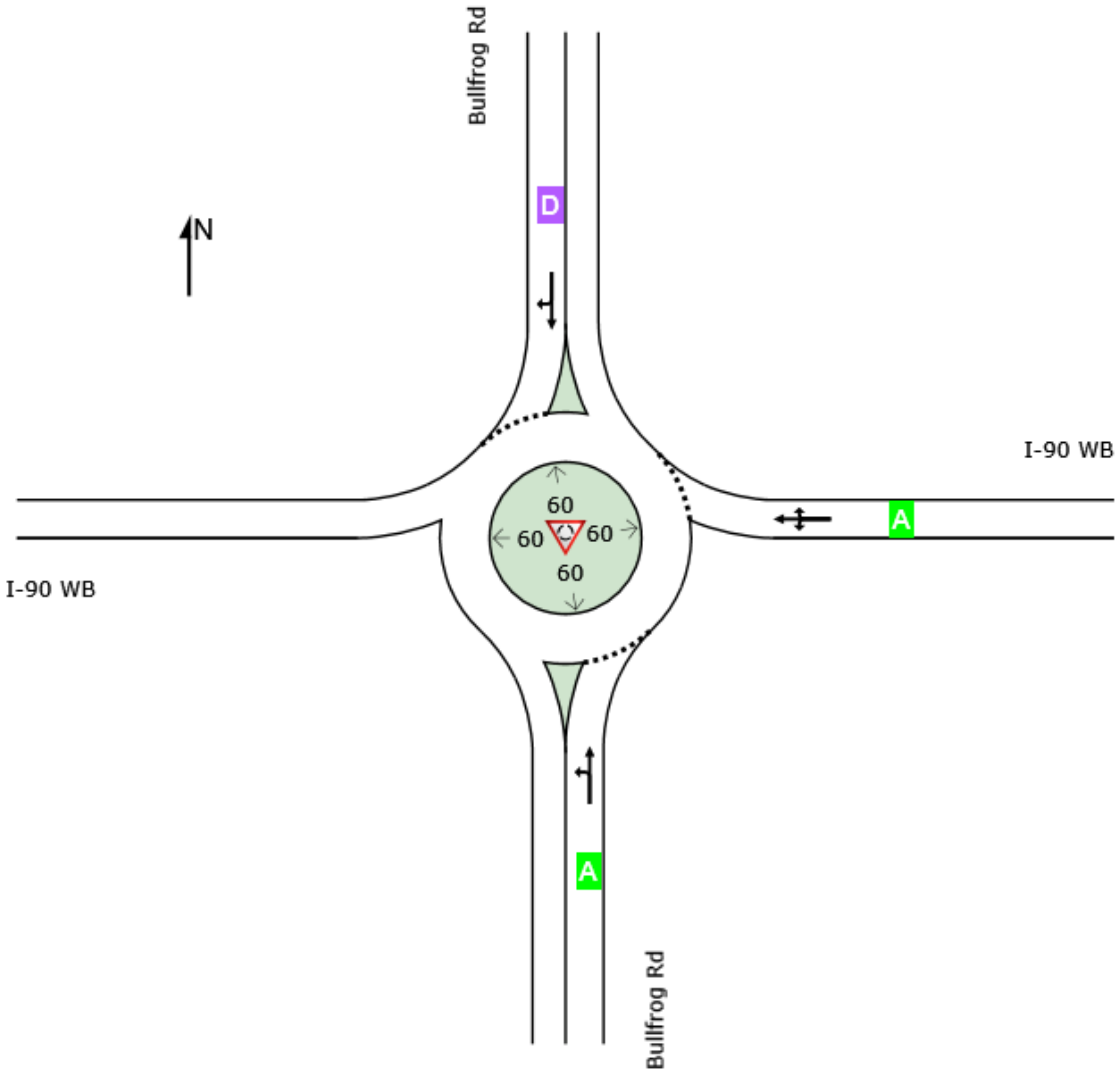
Lane Level of Service

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	391	3.7	391	3.7	1322	0.296	100	3.8	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	391	3.7	391	3.7		0.296		3.8	LOS A	0.0	0.0				
East: I-90 WB															
Lane 1[d]	459	3.8	459	3.8	981	0.468	100	8.2	LOS A	2.8	72.3	Full	1600	0.0	0.0
Approach	459	3.8	459	3.8		0.468		8.2	LOS A	2.8	72.3				
North: Bullfrog Rd															
Lane 1[d]	478	3.2	478	3.2	1268	0.377	100	4.0	LOS A	2.5	64.1	Full	1600	0.0	0.0
Approach	478	3.2	478	3.2		0.377		4.0	LOS A	2.5	64.1				
All Vehicles	1328	3.6	1328	3.6		0.468		5.4	LOS A	2.8	72.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	381	391	3.7	1322	0.296	100	NA	NA
Approach	10	381	391	3.7		0.296			

East: I-90 WB

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	30	10	419	459	3.8	981	0.468	100	NA	NA
Approach	30	10	419	459	3.8		0.468			

North: Bullfrog Rd									
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	263	215	478	3.2	1268	0.377	100	NA	NA
Approach	263	215	478	3.2		0.377			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1328	3.6	0.468

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: I-90 WB				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0

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LANE LEVEL OF SERVICE

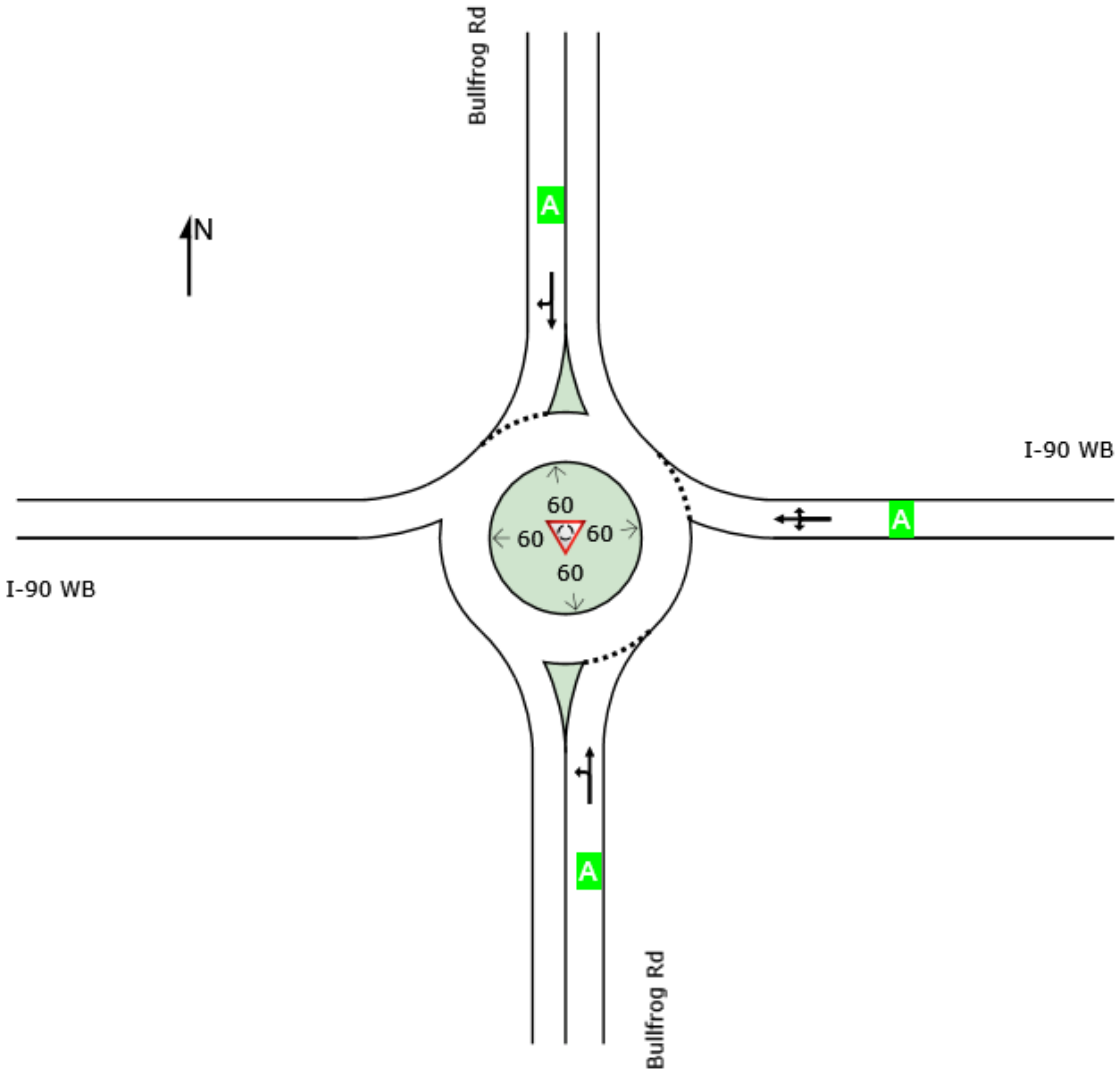
Lane Level of Service

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	621	1.3	621	1.3	1350	0.460	100	3.7	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	621	1.3	621	1.3		0.460		3.7	LOS A	0.0	0.0				
East: I-90 WB															
Lane 1[d]	509	16.4	509	16.4	695	0.732	100	18.1	LOS B	7.7	217.5	Full	1600	0.0	0.0
Approach	509	16.4	509	16.4		0.732		18.1	LOS B	7.7	217.5				
North: Bullfrog Rd															
Lane 1[d]	403	7.6	403	7.6	1175	0.343	100	4.2	LOS A	2.3	61.8	Full	1600	0.0	0.0
Approach	403	7.6	403	7.6		0.343		4.2	LOS A	2.3	61.8				
All Vehicles	1533	8.0	1533	8.0		0.732		8.6	LOS A	7.7	217.5				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	616	621	1.3	1350	0.460	100	NA	NA
Approach	5	616	621	1.3		0.460			

East: I-90 WB

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	60	5	444	509	16.4	695	0.732	100	NA	NA
Approach	60	5	444	509	16.4		0.732			

North: Bullfrog Rd									
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	253	150	403	7.6	1175	0.343	100	NA	NA
Approach	253	150	403	7.6		0.343			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1533	8.0		0.732					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: I-90 WB				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

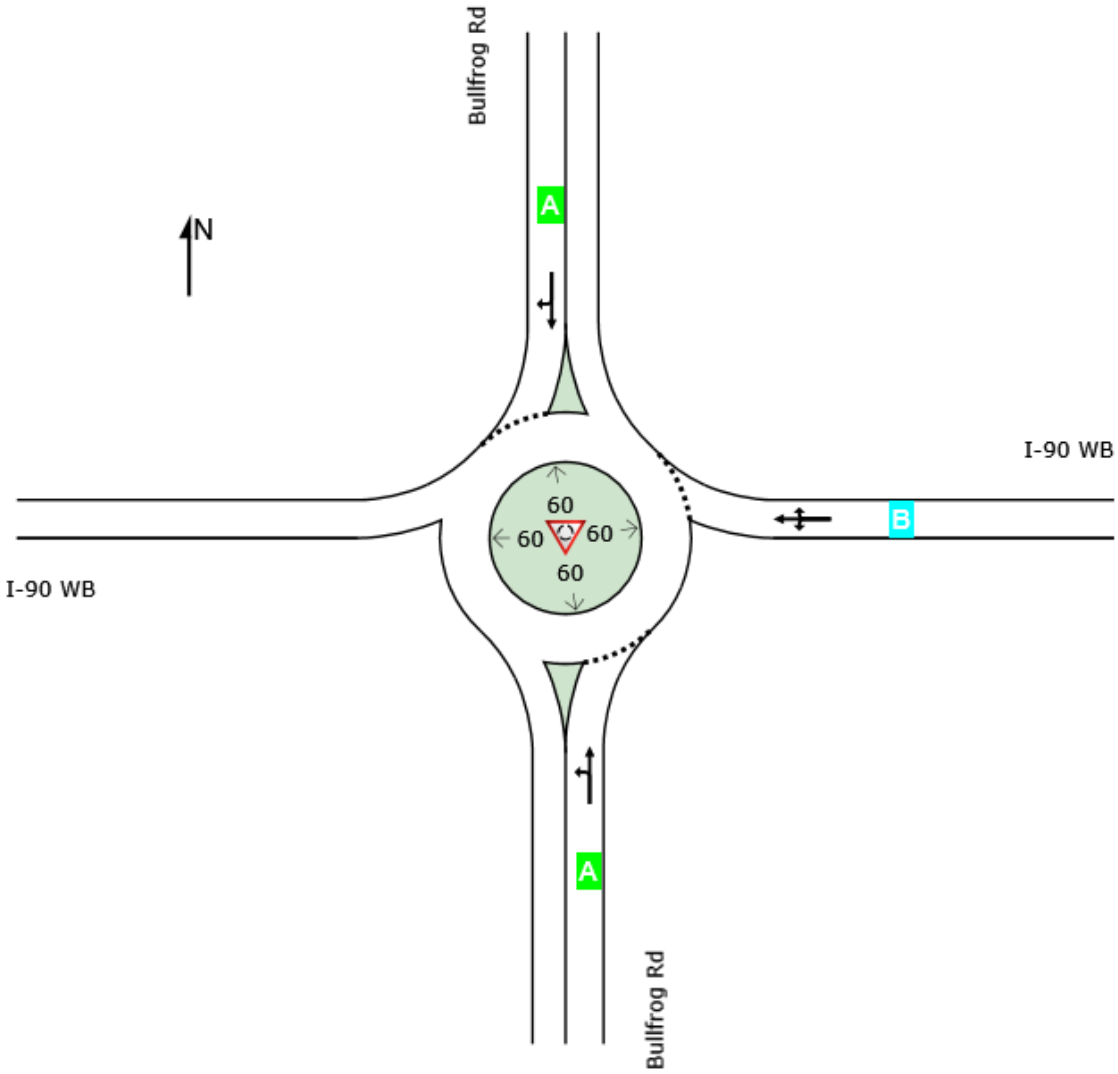
Lane Level of Service

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	B	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 2 [I-90 WB Ramps / Bullfrog Rd (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

I-90 WB / Bullfrog Rd
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	247	0.0	247	0.0	1366	0.181	100	3.7	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	247	0.0	247	0.0		0.181		3.7	LOS A	0.0	0.0				
East: I-90 WB															
Lane 1[d]	348	0.0	348	0.0	1149	0.303	100	6.7	LOS A	1.6	39.2	Full	1600	0.0	0.0
Approach	348	0.0	348	0.0		0.303		6.7	LOS A	1.6	39.2				
North: Bullfrog Rd															
Lane 1[d]	1226	0.9	1226	0.9	1316	0.932	100	5.0	LOS D	33.0	830.4	Full	1600	0.0	0.0
Approach	1226	0.9	1226	0.9		0.932		5.0	LOS A	33.0	830.4				
All Vehicles	1821	0.6	1821	0.6		0.932		5.2	LOS A	33.0	830.4				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	242	247	0.0	1366	0.181	100	NA	NA
Approach	5	242	247	0.0		0.181			

East: I-90 WB

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	5	318	348	0.0	1149	0.303	100	NA	NA
Approach	25	5	318	348	0.0		0.303			

North: Bullfrog Rd										
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	241	985	1226	0.9	1316	0.932	100	NA	NA	
Approach	241	985	1226	0.9		0.932				
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	1821	0.6		0.932						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: I-90 WB				
Lane 1	0.0	0.0	0.0	0.0
North: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0

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Organisation: TENW | Licence: PLUS / 1PC | Processed: Wednesday, January 11, 2023 3:37:49 PM
Project: T:\Active Projects\47 North - 5885\Planning - 5885\LOS\Mitigation Files for Revised Proposal\2 - I-90 WB & Bullfrog.sip9

LANE LEVEL OF SERVICE

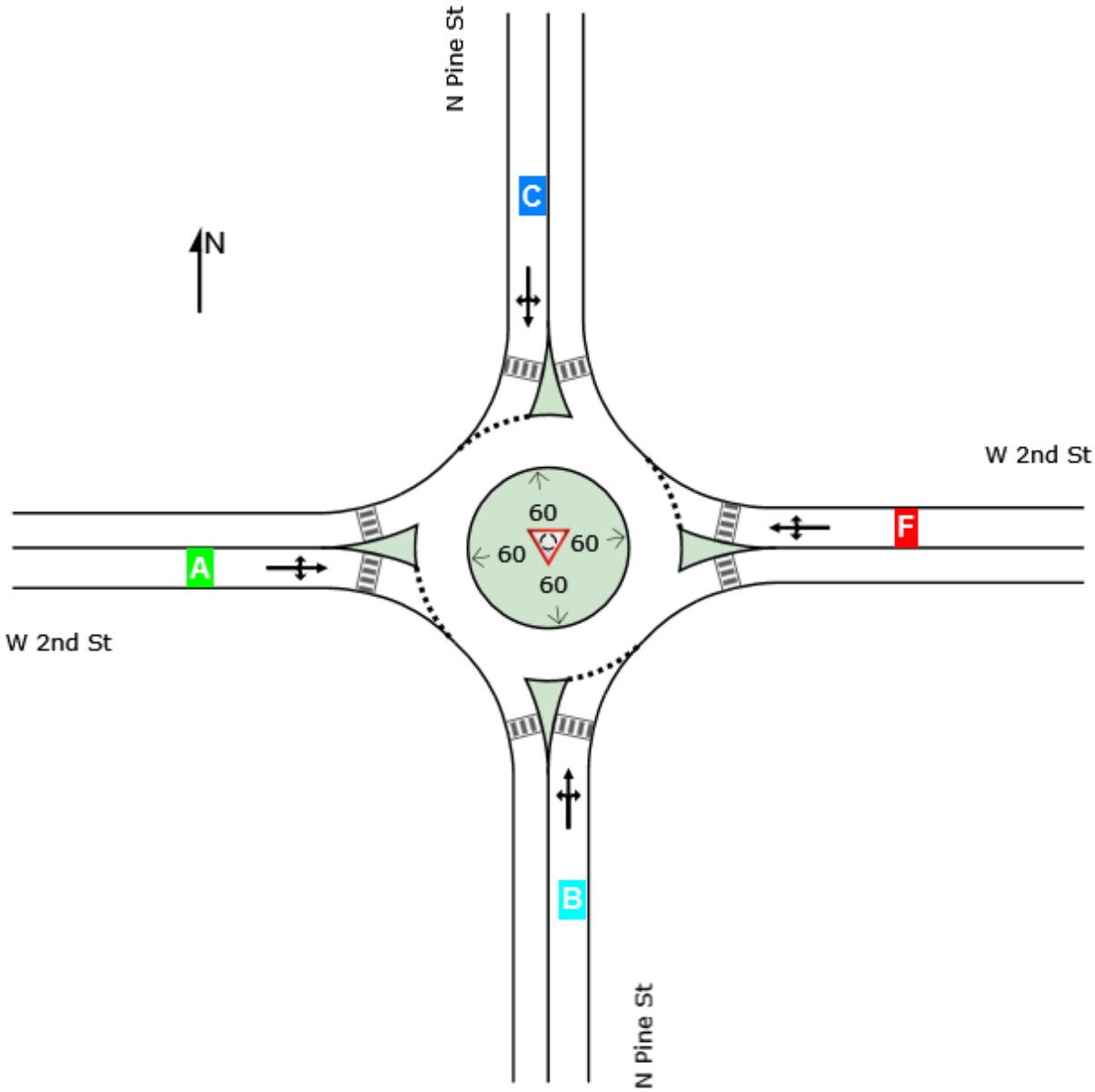
Lane Level of Service

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	F	C	A	E



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	273	3.0	273	3.0	663	0.412	100	15.4	LOS B	2.8	71.6	Full	1600	0.0	0.0
Approach	273	3.0	273	3.0		0.412		15.4	LOS B	2.8	71.6				
East: W 2nd St															
Lane 1[d]	687	1.9	687	1.9	1042	0.659	100	7.7	LOS A	6.6	167.8	Full	1600	0.0	0.0
Approach	687	1.9	687	1.9		0.659		7.7	LOS A	6.6	167.8				
North: N Pine St															
Lane 1[d]	39	0.0	39	0.0	574	0.068	100	12.7	LOS B	0.4	10.7	Full	1600	0.0	0.0
Approach	39	0.0	39	0.0		0.068		12.7	LOS B	0.4	10.7				
West: W 2nd St															
Lane 1[d]	896	5.2	896	5.2	1264	0.709	100	5.1	LOS A	9.1	236.3	Full	1600	0.0	0.0
Approach	896	5.2	896	5.2		0.709		5.1	LOS A	9.1	236.3				
All Vehicles	1895	3.6	1895	3.6		0.709		7.7	LOS A	9.1	236.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	252	1	20	273	3.0	663	0.412	100	NA	NA
Approach	252	1	20	273	3.0		0.412			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	667	10	687	1.9	1042	0.659	100	NA	NA
Approach	10	667	10	687	1.9		0.659			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	20	1	18	39	0.0	574	0.068	100	NA	NA	
Approach	20	1	18	39	0.0		0.068				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	15	761	120	896	5.2	1264	0.709	100	NA	NA	
Approach	15	761	120	896	5.2		0.709				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1895	3.6		0.709							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

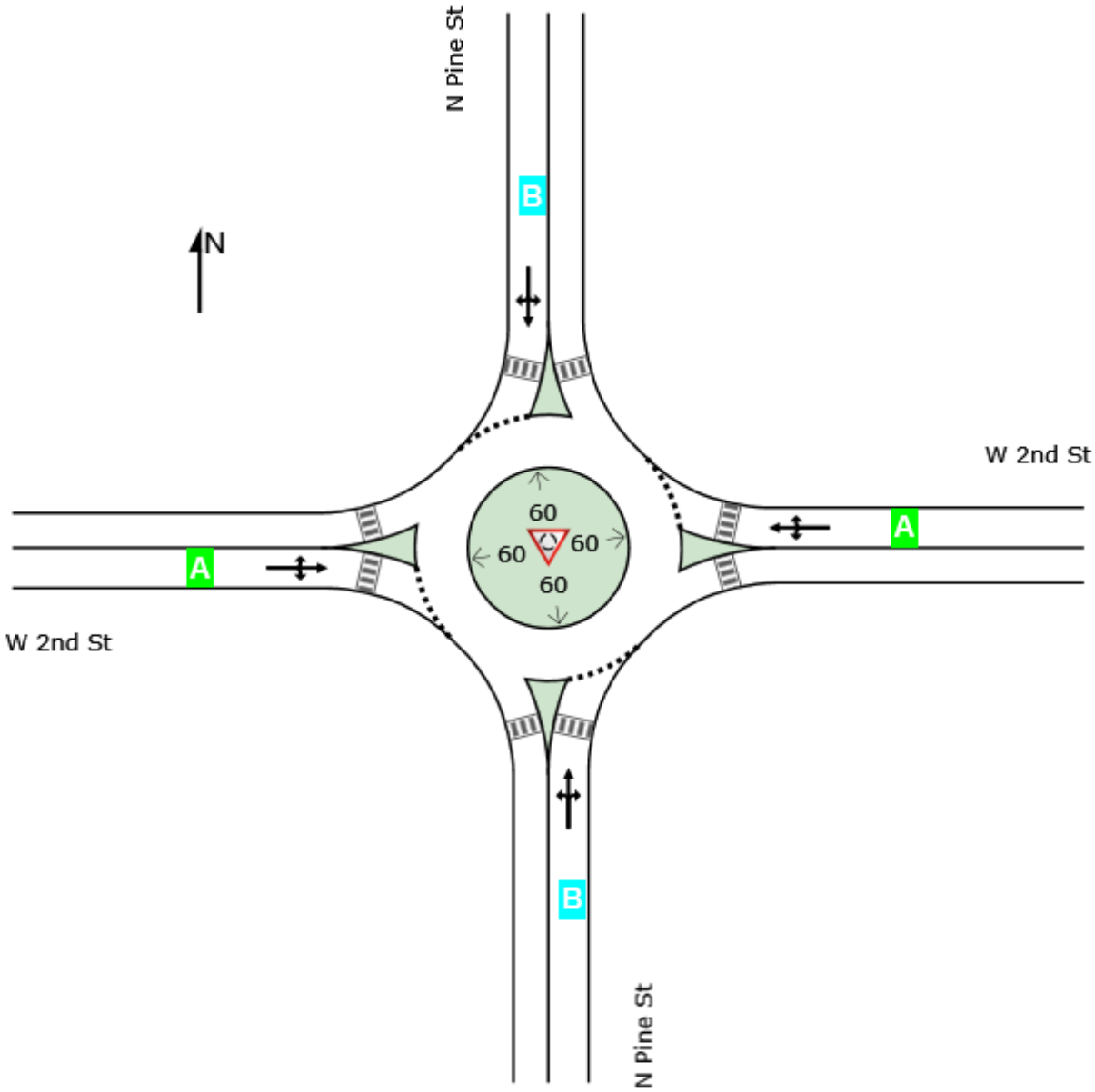
Lane Level of Service

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	A	B	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	312	3.0	312	3.0	526	0.593	100	21.8	LOS C	5.5	140.0	Full	1600	0.0	0.0
Approach	312	3.0	312	3.0		0.593		21.8	LOS C	5.5	140.0				
East: W 2nd St															
Lane 1[d]	817	4.1	817	4.1	943	0.867	100	14.4	LOS D	15.3	396.2	Full	1600	0.0	0.0
Approach	817	4.1	817	4.1		0.867		14.4	LOS B	15.3	396.2				
North: N Pine St															
Lane 1[d]	68	0.0	68	0.0	390	0.175	100	15.6	LOS B	1.3	31.3	Full	1600	0.0	0.0
Approach	68	0.0	68	0.0		0.175		15.6	LOS B	1.3	31.3				
West: W 2nd St															
Lane 1[d]	986	6.0	986	6.0	1228	0.803	100	5.6	LOS A	13.4	351.1	Full	1600	0.0	0.0
Approach	986	6.0	986	6.0		0.803		5.6	LOS A	13.4	351.1				
All Vehicles	2183	4.7	2183	4.7		0.867		11.5	LOS B	15.3	396.2				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	297	10	5	312	3.0	526	0.593	100	NA	NA
Approach	297	10	5	312	3.0		0.593			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	792	10	817	4.1	943	0.867	100	NA	NA
Approach	15	792	10	817	4.1		0.867			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	20	15	33	68	0.0	390	0.175	100	NA	NA	
Approach	20	15	33	68	0.0		0.175				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	25	861	100	986	6.0	1228	0.803	100	NA	NA	
Approach	25	861	100	986	6.0		0.803				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2183	4.7	0.867								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

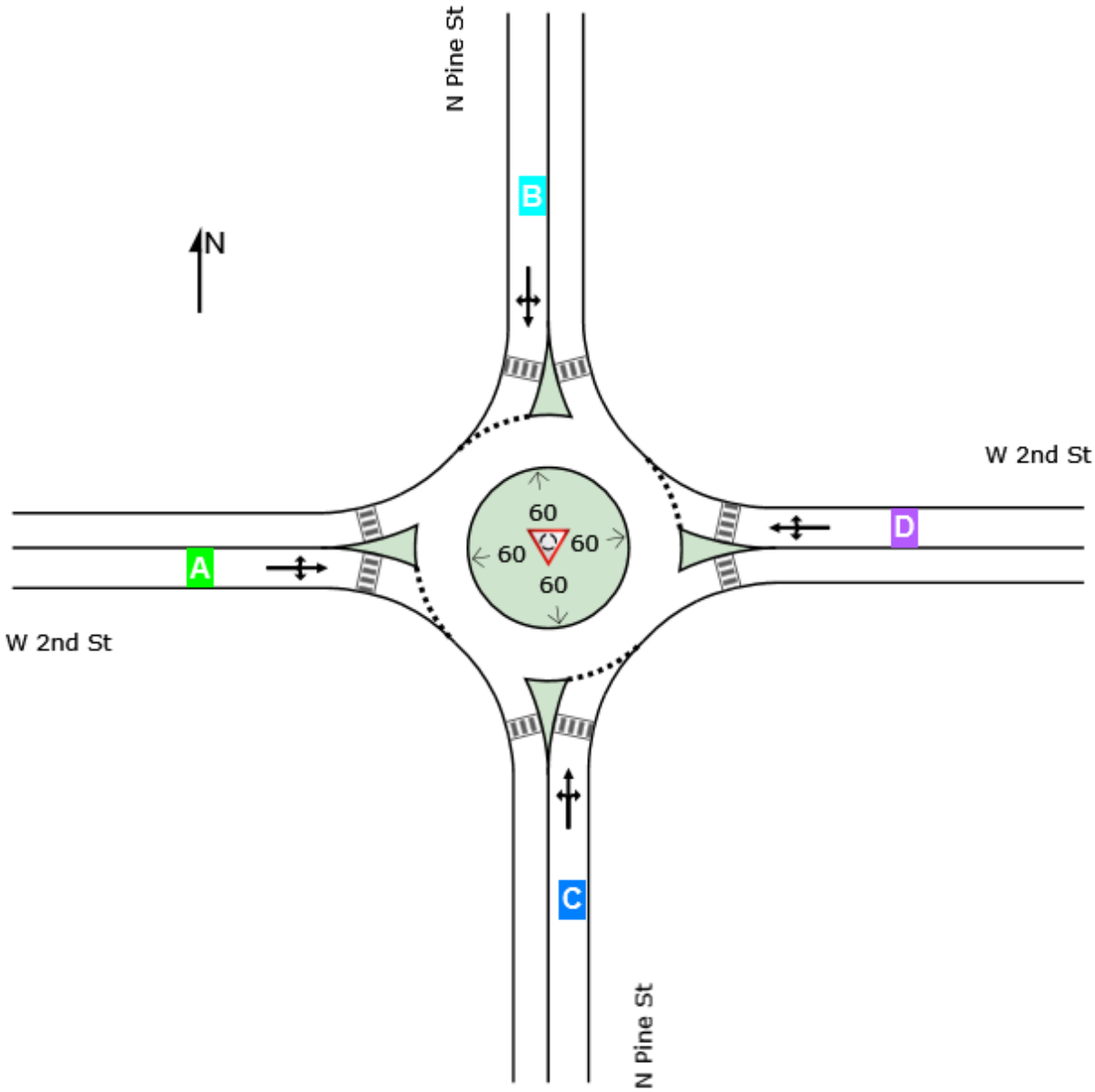
Lane Level of Service

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	B	B	A	B



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 9 [Pine St / 2nd St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	284	1.7	284	1.7	800	0.355	100	12.5	LOS B	2.1	54.1	Full	1600	0.0	0.0
Approach	284	1.7	284	1.7		0.355		12.5	LOS B	2.1	54.1				
East: W 2nd St															
Lane 1[d]	1247	1.3	1247	1.3	1051	1.186	100	97.0	LOS F	82.6	2085.7	Full	1600	0.0	13.5
Approach	1247	1.3	1247	1.3		1.186		97.0	LOS F	82.6	2085.7				
North: N Pine St															
Lane 1[d]	27	0.0	27	0.0	271	0.100	100	22.1	LOS C	0.7	18.2	Full	1600	0.0	0.0
Approach	27	0.0	27	0.0		0.100		22.1	LOS C	0.7	18.2				
West: W 2nd St															
Lane 1[d]	715	2.0	715	2.0	1292	0.553	100	5.1	LOS A	5.0	125.8	Full	1600	0.0	0.0
Approach	715	2.0	715	2.0		0.553		5.1	LOS A	5.0	125.8				
All Vehicles	2273	1.6	2273	1.6		1.186		56.6	LOS E	82.6	2085.7				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	239	15	30	284	1.7	800	0.355	100	NA	NA
Approach	239	15	30	284	1.7		0.355			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	20	1222	5	1247	1.3	1051	1.186	100	NA	NA
Approach	20	1222	5	1247	1.3		1.186			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	20	1	6	27	0.0	271	0.100	100	NA	NA	
Approach	20	1	6	27	0.0		0.100				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	26	618	71	715	2.0	1292	0.553	100	NA	NA	
Approach	26	618	71	715	2.0		0.553				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2273	1.6	1.186								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	48.9	167.6	NA
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

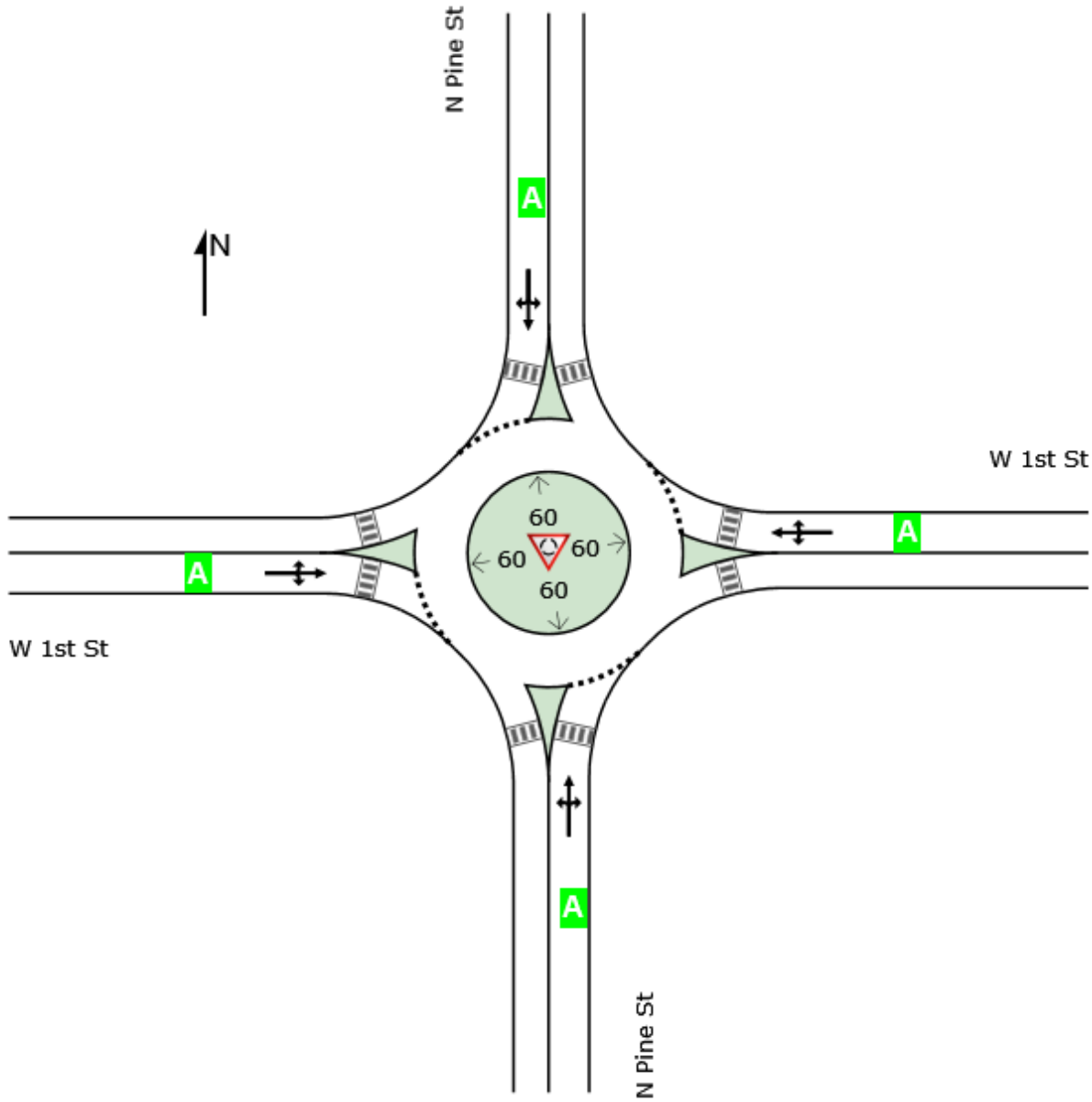
Lane Level of Service

Site: 6 [Pine St / 1st St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 6 [Pine St / 1st St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	210	4.6	210	4.6	732	0.287	100	9.1	LOS A	1.7	44.2	Full	1600	0.0	0.0
Approach	210	4.6	210	4.6		0.287		9.1	LOS A	1.7	44.2				
East: W 1st St															
Lane 1[d]	536	5.0	536	5.0	1064	0.504	100	7.1	LOS A	3.4	88.9	Full	1600	0.0	0.0
Approach	536	5.0	536	5.0		0.504		7.1	LOS A	3.4	88.9				
North: N Pine St															
Lane 1[d]	152	5.9	152	5.9	841	0.181	100	8.0	LOS A	1.0	25.3	Full	1600	0.0	0.0
Approach	152	5.9	152	5.9		0.181		8.0	LOS A	1.0	25.3				
West: W 1st St															
Lane 1[d]	617	5.5	617	5.5	1122	0.550	100	6.9	LOS A	4.1	106.4	Full	1600	0.0	0.0
Approach	617	5.5	617	5.5		0.550		6.9	LOS A	4.1	106.4				
All Vehicles	1515	5.2	1515	5.2		0.550		7.4	LOS A	4.1	106.4				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	22	79	109	210	4.6	732	0.287	100	NA	NA
Approach	22	79	109	210	4.6		0.287			

East: W 1st St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	87	355	93	536	5.0	1064	0.504	100	NA	NA
Approach	87	355	93	536	5.0		0.504			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	28	46	78	152	5.9	841	0.181	100	NA	NA	
Approach	28	46	78	152	5.9		0.181				
West: W 1st St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	128	478	11	617	5.5	1122	0.550	100	NA	NA	
Approach	128	478	11	617	5.5		0.550				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1515	5.2		0.550							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 1st St				
Lane 1	0.0	0.0	0.0	0.0
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 1st St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

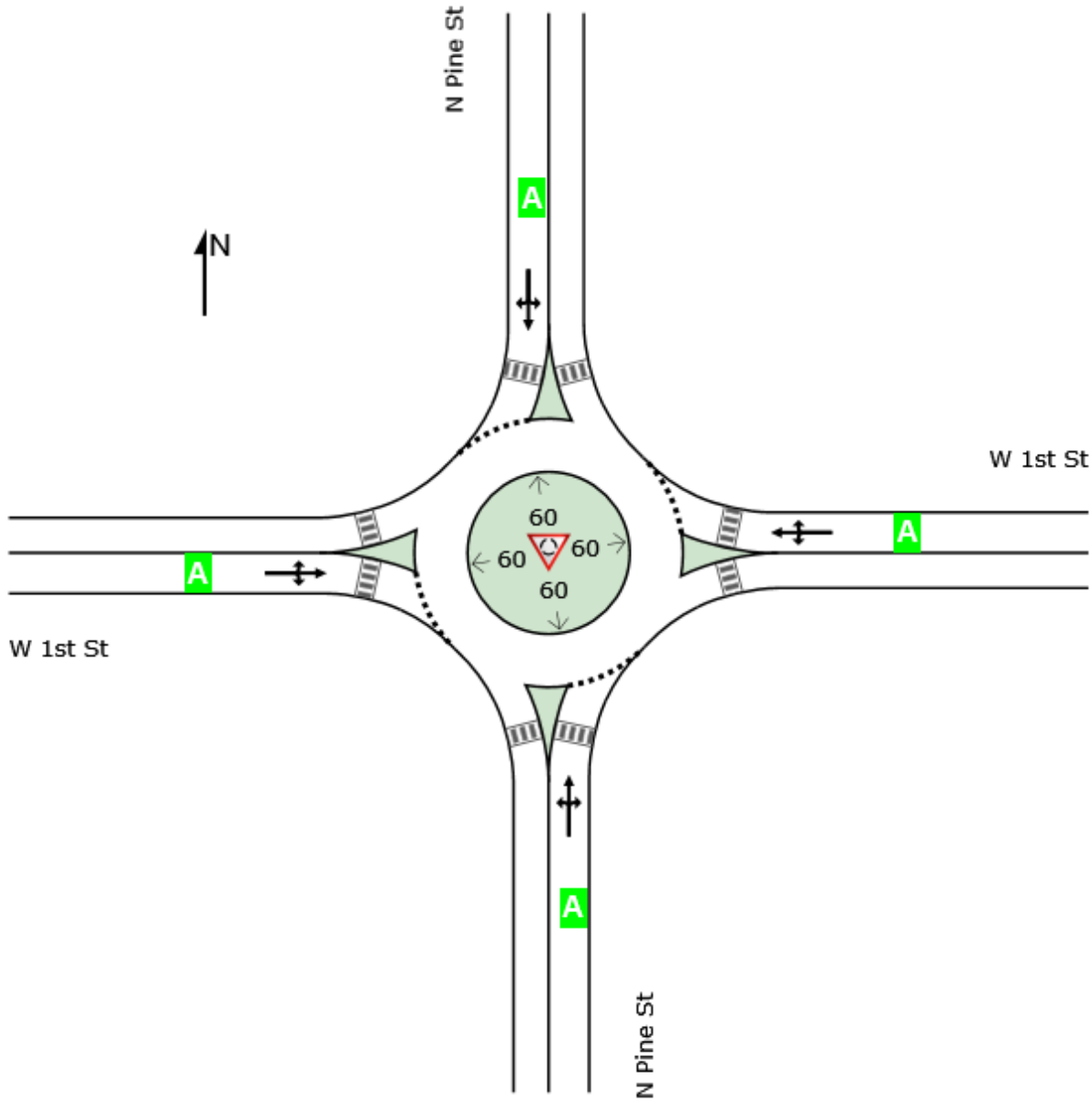
Lane Level of Service

Site: 6 [Pine St / 1st St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 6 [Pine St / 1st St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	288	4.7	288	4.7	596	0.483	100	13.0	LOS B	3.7	96.7	Full	1600	0.0	0.0
Approach	288	4.7	288	4.7		0.483		13.0	LOS B	3.7	96.7				
East: W 1st St															
Lane 1[d]	525	3.5	525	3.5	1038	0.506	100	7.2	LOS A	3.4	88.6	Full	1600	0.0	0.0
Approach	525	3.5	525	3.5		0.506		7.2	LOS A	3.4	88.6				
North: N Pine St															
Lane 1[d]	136	3.0	136	3.0	877	0.155	100	7.5	LOS A	0.8	21.3	Full	1600	0.0	0.0
Approach	136	3.0	136	3.0		0.155		7.5	LOS A	0.8	21.3				
West: W 1st St															
Lane 1[d]	816	3.5	816	3.5	1159	0.704	100	7.1	LOS A	6.8	175.6	Full	1600	0.0	0.0
Approach	816	3.5	816	3.5		0.704		7.1	LOS A	6.8	175.6				
All Vehicles	1765	3.7	1765	3.7		0.704		8.1	LOS A	6.8	175.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	43	76	168	288	4.7	596	0.483	100	NA	NA
Approach	43	76	168	288	4.7		0.483			

East: W 1st St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	350	99	525	3.5	1038	0.506	100	NA	NA
Approach	76	350	99	525	3.5		0.506			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	17	57	62	136	3.0	877	0.155	100	NA	NA	
Approach	17	57	62	136	3.0		0.155				
West: W 1st St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	159	620	38	816	3.5	1159	0.704	100	NA	NA	
Approach	159	620	38	816	3.5		0.704				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1765	3.7	0.704								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 1st St				
Lane 1	0.0	0.0	0.0	0.0
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 1st St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

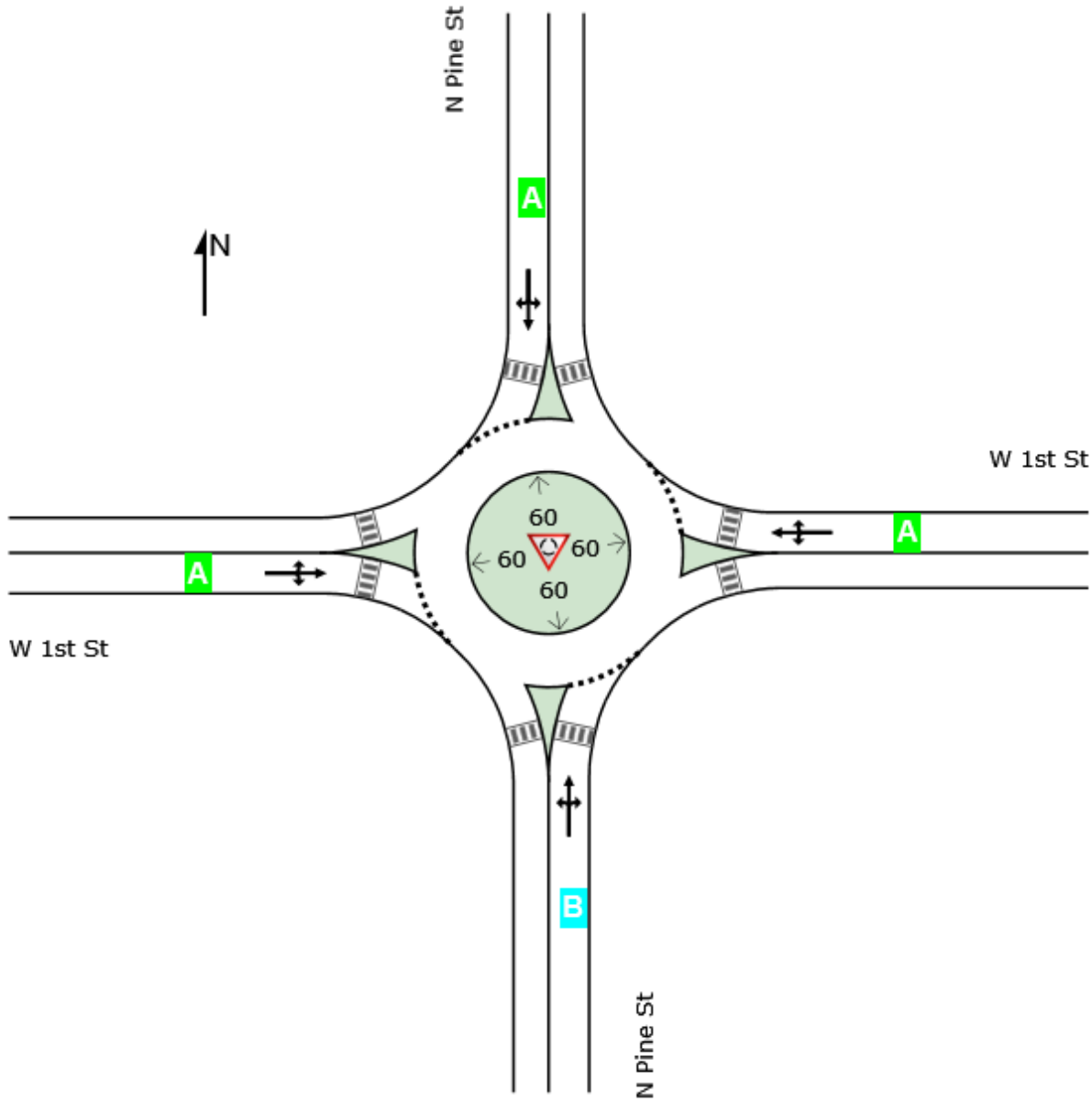
Lane Level of Service

Site: 6 [Pine St / 1st St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 6 [Pine St / 1st St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Pine St / 1st St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Pine St															
Lane 1[d]	187	3.5	187	3.5	811	0.231	100	8.3	LOS A	1.3	33.6	Full	1600	0.0	0.0
Approach	187	3.5	187	3.5		0.231		8.3	LOS A	1.3	33.6				
East: W 1st St															
Lane 1[d]	658	2.1	658	2.1	1068	0.616	100	7.8	LOS A	5.2	131.9	Full	1600	0.0	0.0
Approach	658	2.1	658	2.1		0.616		7.8	LOS A	5.2	131.9				
North: N Pine St															
Lane 1[d]	148	2.6	148	2.6	781	0.189	100	7.9	LOS A	1.1	28.2	Full	1600	0.0	0.0
Approach	148	2.6	148	2.6		0.189		7.9	LOS A	1.1	28.2				
West: W 1st St															
Lane 1[d]	564	3.5	564	3.5	1148	0.491	100	7.0	LOS A	3.5	89.1	Full	1600	0.0	0.0
Approach	564	3.5	564	3.5		0.491		7.0	LOS A	3.5	89.1				
All Vehicles	1557	2.8	1557	2.8		0.616		7.6	LOS A	5.2	131.9				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Pine St

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	22	95	71	187	3.5	811	0.231	100	NA	NA
Approach	22	95	71	187	3.5		0.231			

East: W 1st St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	65	508	85	658	2.1	1068	0.616	100	NA	NA
Approach	65	508	85	658	2.1		0.616			

North: N Pine St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	5	88	54	148	2.6	781	0.189	100	NA	NA	
Approach	5	88	54	148	2.6		0.189				
West: W 1st St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	162	397	5	564	3.5	1148	0.491	100	NA	NA	
Approach	162	397	5	564	3.5		0.491				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1557	2.8	0.616								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
East: W 1st St				
Lane 1	0.0	0.0	0.0	0.0
North: N Pine St				
Lane 1	0.0	0.0	0.0	0.0
West: W 1st St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

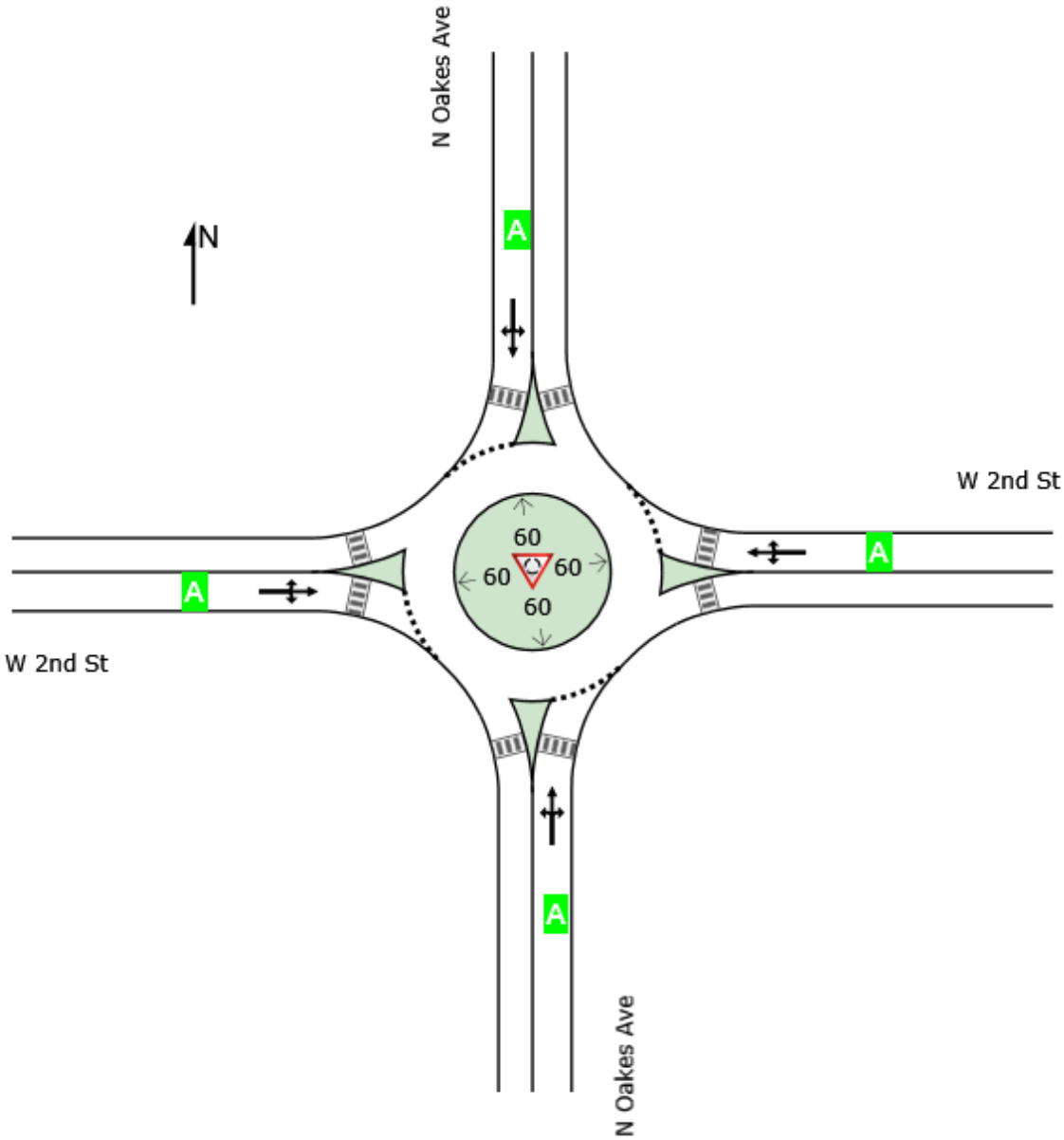
Lane Level of Service

Site: 13 [Oakes Ave / 2nd St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 15 [Oakes Ave / 2nd St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Oakes Ave															
Lane 1[d]	223	1.4	223	1.4	877	0.254	100	7.9	LOS A	1.4	36.4	Full	1600	0.0	0.0
Approach	223	1.4	223	1.4		0.254		7.9	LOS A	1.4	36.4				
East: W 2nd St															
Lane 1[d]	370	3.5	370	3.5	1049	0.353	100	3.1	LOS A	2.1	54.7	Full	1600	0.0	0.0
Approach	370	3.5	370	3.5		0.353		3.1	LOS A	2.1	54.7				
North: N Oakes Ave															
Lane 1[d]	88	5.9	88	5.9	831	0.106	100	5.8	LOS A	0.5	13.8	Full	1600	0.0	0.0
Approach	88	5.9	88	5.9		0.106		5.8	LOS A	0.5	13.8				
West: W 2nd St															
Lane 1[d]	695	6.5	695	6.5	1213	0.573	100	2.5	LOS A	5.0	132.6	Full	1600	0.0	0.0
Approach	695	6.5	695	6.5		0.573		2.5	LOS A	5.0	132.6				
All Vehicles	1376	4.8	1376	4.8		0.573		3.7	LOS A	5.0	132.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Oakes Ave

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	183	30	10	223	1.4	877	0.254	100	NA	NA
Approach	183	30	10	223	1.4		0.254			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	330	30	370	3.5	1049	0.353	100	NA	NA
Approach	10	330	30	370	3.5		0.353			

North: N Oakes Ave											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	30	20	38	88	5.9	831	0.106	100	NA	NA	
Approach	30	20	38	88	5.9		0.106				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	50	448	197	695	6.5	1213	0.573	100	NA	NA	
Approach	50	448	197	695	6.5		0.573				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1376	4.8	0.573								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

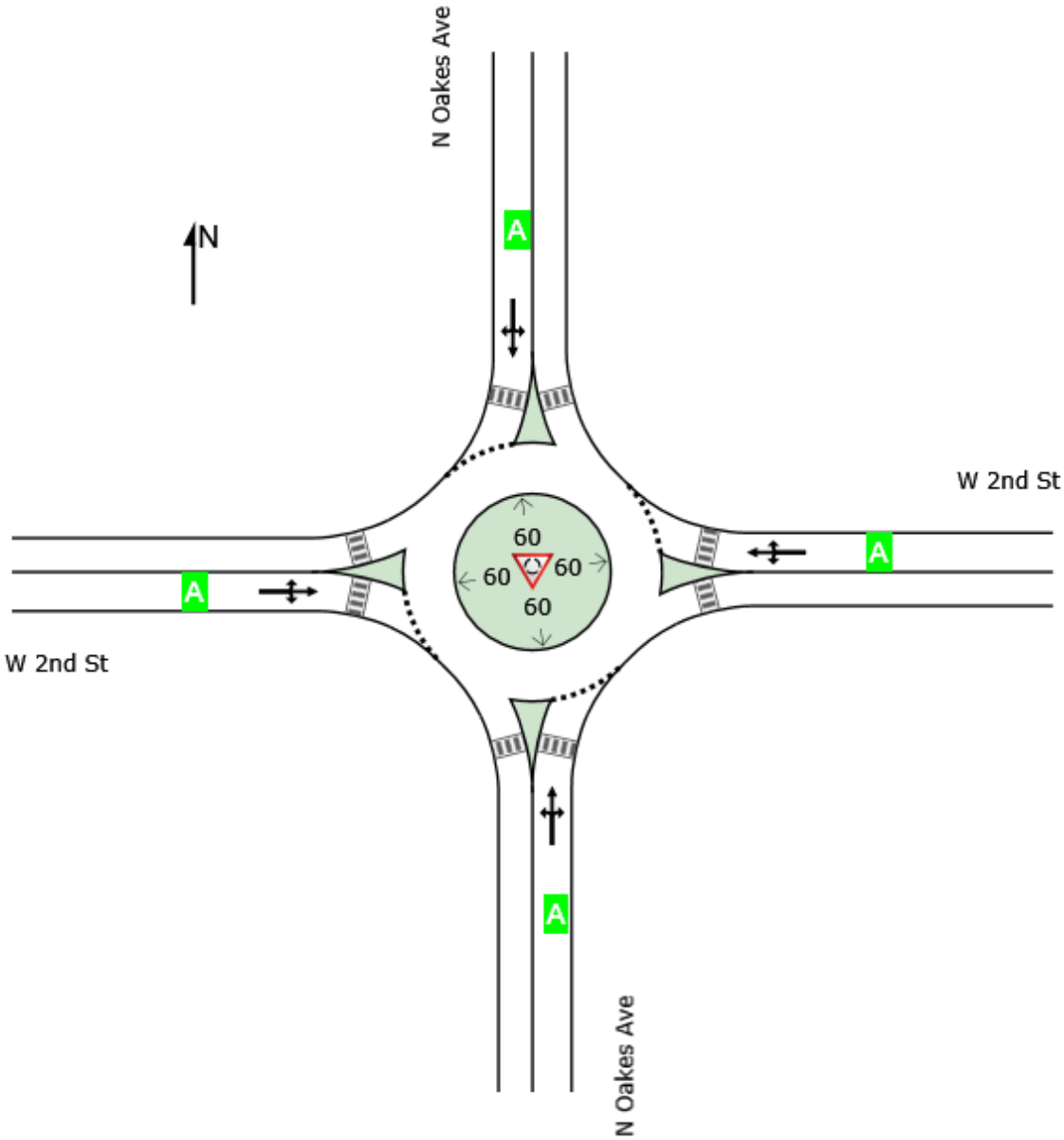
Lane Level of Service

Site: 15 [Oakes Ave / 2nd St (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 15 [Oakes Ave / 2nd St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Oakes Ave															
Lane 1[d]	273	3.3	273	3.3	899	0.304	100	7.9	LOS A	1.7	44.0	Full	1600	0.0	0.0
Approach	273	3.3	273	3.3		0.304		7.9	LOS A	1.7	44.0				
East: W 2nd St															
Lane 1[d]	425	1.8	425	1.8	1035	0.411	100	3.5	LOS A	2.6	67.0	Full	1600	0.0	0.0
Approach	425	1.8	425	1.8		0.411		3.5	LOS A	2.6	67.0				
North: N Oakes Ave															
Lane 1[d]	98	0.0	98	0.0	841	0.117	100	5.8	LOS A	0.6	15.8	Full	1600	0.0	0.0
Approach	98	0.0	98	0.0		0.117		5.8	LOS A	0.6	15.8				
West: W 2nd St															
Lane 1[d]	680	4.0	680	4.0	1234	0.551	100	2.4	LOS A	4.6	118.6	Full	1600	0.0	0.0
Approach	680	4.0	680	4.0		0.551		2.4	LOS A	4.6	118.6				
All Vehicles	1476	3.0	1476	3.0		0.551		3.9	LOS A	4.6	118.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Oakes Ave

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	243	25	5	273	3.3	899	0.304	100	NA	NA
Approach	243	25	5	273	3.3		0.304			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	20	360	45	425	1.8	1035	0.411	100	NA	NA
Approach	20	360	45	425	1.8		0.411			

North: N Oakes Ave											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	25	25	48	98	0.0	841	0.117	100	NA	NA	
Approach	25	25	48	98	0.0		0.117				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	30	413	237	680	4.0	1234	0.551	100	NA	NA	
Approach	30	413	237	680	4.0		0.551				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1476	3.0	0.551								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

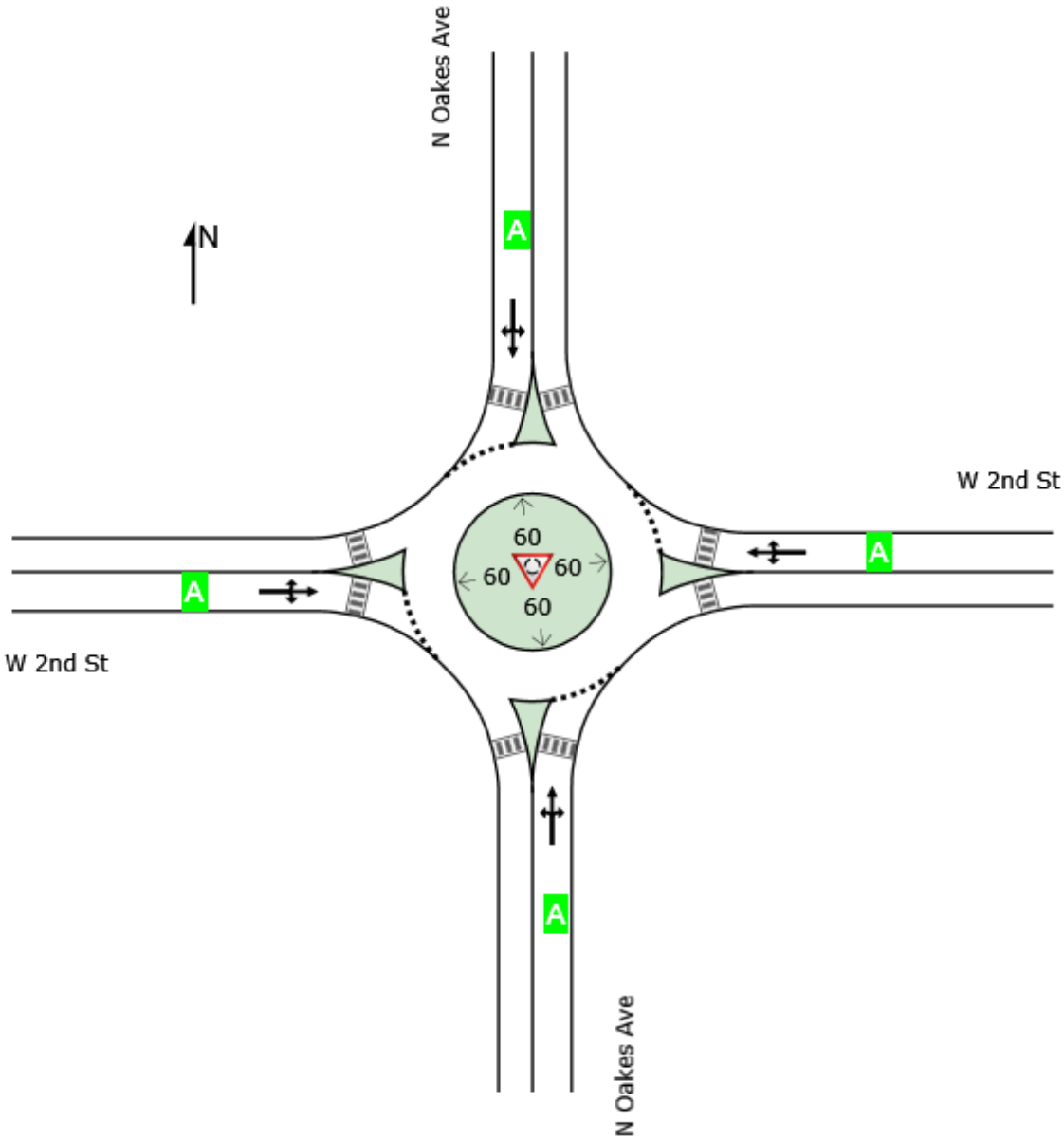
Lane Level of Service

Site: 15 [Oakes Ave / 2nd St (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 13 [Oakes Ave / 2nd St (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

N Oakes Ave / 2nd St
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: N Oakes Ave															
Lane 1[d]	578	1.5	578	1.5	1027	0.563	100	8.3	LOS A	4.3	108.8	Full	1600	0.0	0.0
Approach	578	1.5	578	1.5		0.563		8.3	LOS A	4.3	108.8				
East: W 2nd St															
Lane 1[d]	400	0.5	400	0.5	807	0.496	100	6.3	LOS A	3.9	96.7	Full	1600	0.0	0.0
Approach	400	0.5	400	0.5		0.496		6.3	LOS A	3.9	96.7				
North: N Oakes Ave															
Lane 1[d]	77	7.7	77	7.7	541	0.142	100	9.7	LOS A	0.8	21.6	Full	1600	0.0	0.0
Approach	77	7.7	77	7.7		0.142		9.7	LOS A	0.8	21.6				
West: W 2nd St															
Lane 1[d]	479	2.3	479	2.3	1256	0.382	100	2.2	LOS A	2.7	67.5	Full	1600	0.0	0.0
Approach	479	2.3	479	2.3		0.382		2.2	LOS A	2.7	67.5				
All Vehicles	1534	1.8	1534	1.8		0.563		5.9	LOS A	4.3	108.8				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: N Oakes Ave

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	548	20	10	578	1.5	1027	0.563	100	NA	NA
Approach	548	20	10	578	1.5		0.563			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	360	30	400	0.5	807	0.496	100	NA	NA
Approach	10	360	30	400	0.5		0.496			

North: N Oakes Ave											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	25	25	27	77	7.7	541	0.142	100	NA	NA	
Approach	25	25	27	77	7.7		0.142				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	32	287	160	479	2.3	1256	0.382	100	NA	NA	
Approach	32	287	160	479	2.3		0.382				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	1534	1.8	0.563								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: N Oakes Ave				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

Lane Level of Service

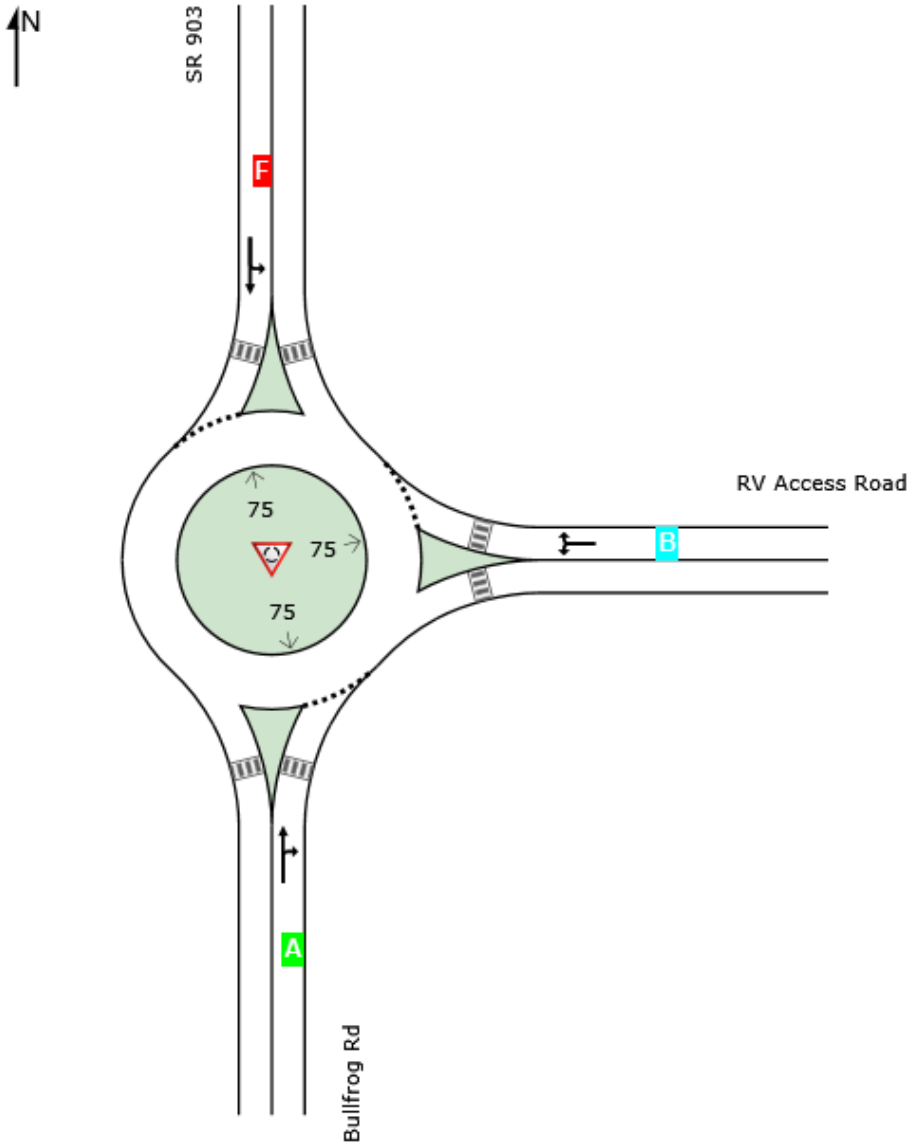
Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	A	B	E	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	799	6.8	799	6.8	1187	0.673	100	11.5	LOS B	6.8	180.3	Full	1600	0.0	0.0
Approach	799	6.8	799	6.8		0.673		11.5	LOS B	6.8	180.3				
East: RV Access Road															
Lane 1[d]	64	50.0	64	50.0	334	0.192	100	14.2	LOS B	0.4	14.4	Full	1600	0.0	0.0
Approach	64	50.0	64	50.0		0.192		14.2	LOS B	0.4	14.4				
North: SR 903															
Lane 1[d]	518	8.0	518	8.0	1212	0.428	100	6.9	LOS A	2.8	73.9	Full	1600	0.0	0.0
Approach	518	8.0	518	8.0		0.428		6.9	LOS A	2.8	73.9				
All Vehicles	1382	9.2	1382	9.2		0.673		10.0	LOS A	6.8	180.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	735	64	799	6.8	1187	0.673	100	NA	NA
Approach	735	64	799	6.8		0.673			

East: RV Access Road

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	36	28	64	50.0	334	0.192	100	NA	NA
Approach	36	28	64	50.0		0.192			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	55	463	518	8.0	1212	0.428	100	NA	NA
Approach	55	463	518	8.0		0.428			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1382	9.2	0.673

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: RV Access Road				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

Lane Level of Service

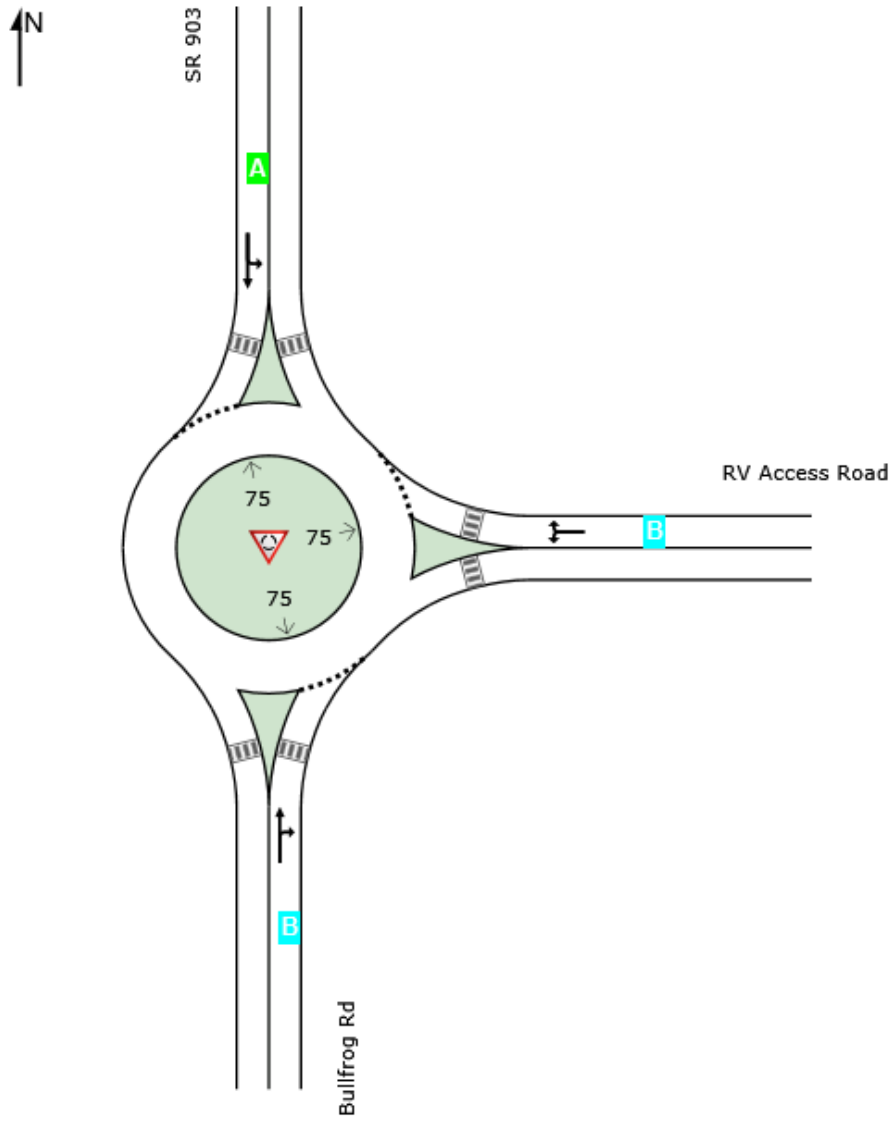
Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	1103	5.7	1103	5.7	1199	0.920	100	24.0	LOS C	23.3	610.1	Full	1600	0.0	0.0
Approach	1103	5.7	1103	5.7		0.920		24.0	LOS C	23.3	610.1				
East: RV Access Road															
Lane 1[d]	64	50.0	64	50.0	215	0.298	100	25.1	LOS D	0.6	20.3	Full	1600	0.0	0.0
Approach	64	50.0	64	50.0		0.298		25.1	LOS D	0.6	20.3				
North: SR 903															
Lane 1[d]	377	9.9	377	9.9	1192	0.317	100	5.8	LOS A	1.7	46.3	Full	1600	0.0	0.0
Approach	377	9.9	377	9.9		0.317		5.8	LOS A	1.7	46.3				
All Vehicles	1545	8.6	1545	8.6		0.920		19.6	LOS C	23.3	610.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1039	64	1103	5.7	1199	0.920	100	NA	NA
Approach	1039	64	1103	5.7		0.920			

East: RV Access Road

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	36	28	64	50.0	215	0.298	100	NA	NA
Approach	36	28	64	50.0		0.298			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	55	322	377	9.9	1192	0.317	100	NA	NA
Approach	55	322	377	9.9		0.317			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1545	8.6	0.920

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: RV Access Road				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

Lane Level of Service

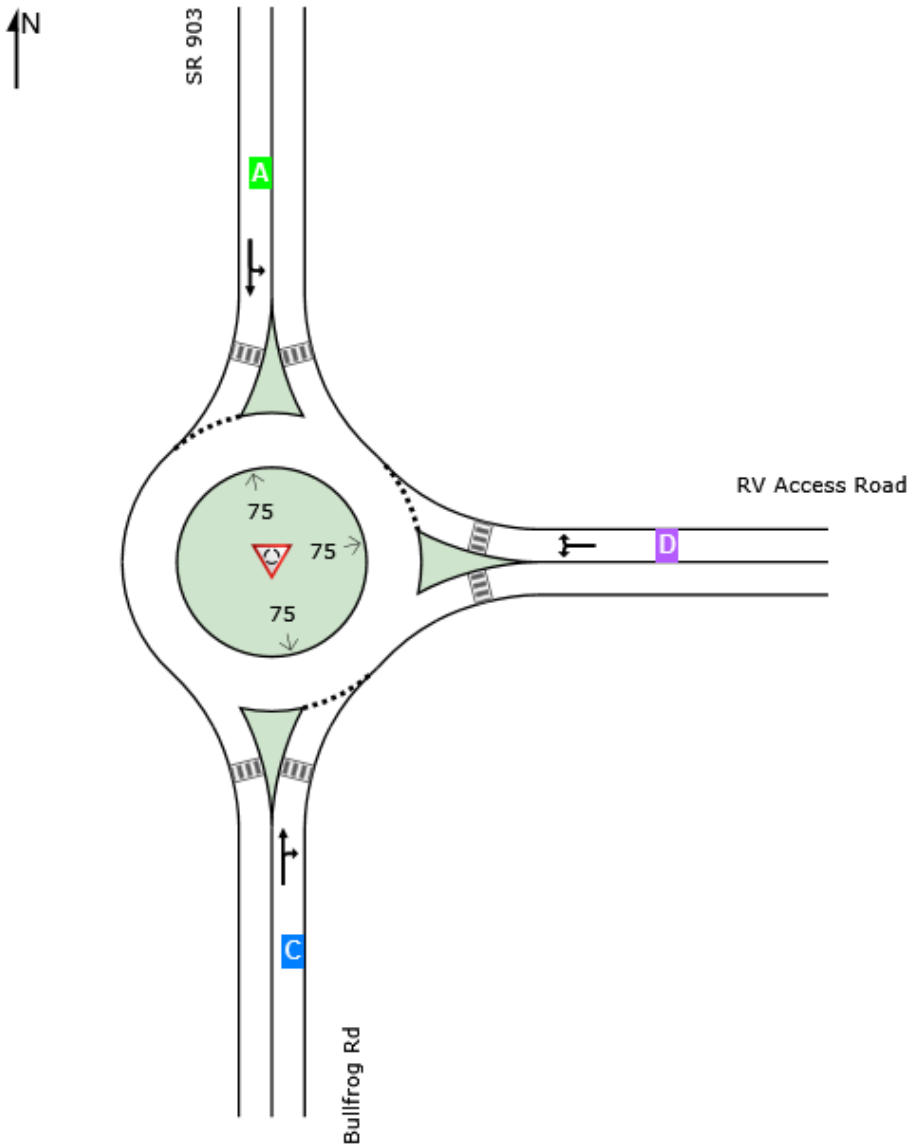
Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches			Intersection
	South	East	North	
LOS	C	D	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

LANE SUMMARY

Site: 28 [Bullfrog Rd / RV Access Road (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Bullfrog Rd / RV Access Road

Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Bullfrog Rd															
Lane 1[d]	611	6.8	611	6.8	1218	0.501	100	7.9	LOS A	3.7	97.7	Full	1600	0.0	0.0
Approach	611	6.8	611	6.8		0.501		7.9	LOS A	3.7	97.7				
East: RV Access Road															
Lane 1[d]	92	50.0	92	50.0	429	0.215	100	11.7	LOS B	0.5	18.4	Full	1600	0.0	0.0
Approach	92	50.0	92	50.0		0.215		11.7	LOS B	0.5	18.4				
North: SR 903															
Lane 1[d]	1288	4.5	1288	4.5	1224	1.053	100	44.5	LOS F	86.1	2229.1	Full	1600	0.0	15.8
Approach	1288	4.5	1288	4.5		1.053		44.5	LOS E	86.1	2229.1				
All Vehicles	1991	7.3	1991	7.3		1.053		31.8	LOS D	86.1	2229.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Bullfrog Rd

Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	561	50	611	6.8	1218	0.501	100	NA	NA
Approach	561	50	611	6.8		0.501			

East: RV Access Road

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	50	42	92	50.0	429	0.215	100	NA	NA
Approach	50	42	92	50.0		0.215			

North: SR 903

Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.

From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	41	1247	1288	4.5	1224	1.053	100	NA	NA
Approach	41	1247	1288	4.5		1.053			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1991	7.3	1.053

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bullfrog Rd				
Lane 1	0.0	0.0	0.0	0.0
East: RV Access Road				
Lane 1	0.0	0.0	0.0	0.0
North: SR 903				
Lane 1	0.0	16.1	47.4	NA

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Project: T:\Active Projects\47 North - 5885\Planning - 5885\LOS\Mitigation Files for Revised Proposal\28 - Bullfrog Rd & RV Access Road.sip9

LANE LEVEL OF SERVICE

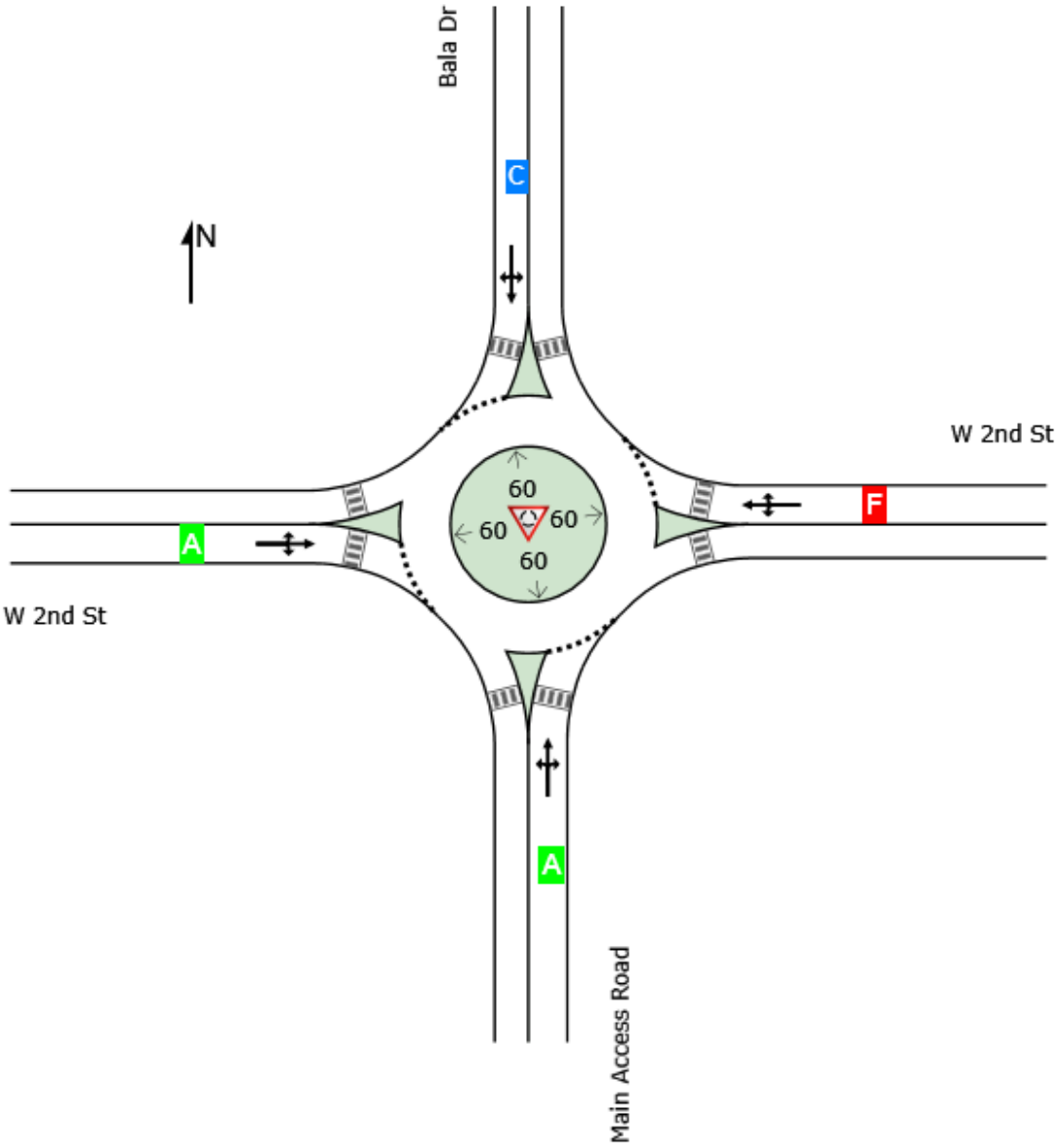
Lane Level of Service

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	F	C	A	F



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Main Access Road															
Lane 1[d]	611	3.0	611	3.0	716	0.853	100	17.9	LOS D	13.1	336.4	Full	1600	0.0	0.0
Approach	611	3.0	611	3.0		0.853		17.9	LOS B	13.1	336.4				
East: W 2nd St															
Lane 1[d]	971	3.0	971	3.0	1075	0.903	100	15.1	LOS D	19.6	502.5	Full	1600	0.0	0.0
Approach	971	3.0	971	3.0		0.903		15.1	LOS B	19.6	502.5				
North: Bala Dr															
Lane 1[d]	85	3.0	85	3.0	320	0.265	100	15.5	LOS B	1.9	49.1	Full	1600	0.0	0.0
Approach	85	3.0	85	3.0		0.265		15.5	LOS B	1.9	49.1				
West: W 2nd St															
Lane 1[d]	740	3.0	740	3.0	827	0.895	100	19.7	LOS D	16.5	422.9	Full	1600	0.0	0.0
Approach	740	3.0	740	3.0		0.895		19.7	LOS B	16.5	422.9				
All Vehicles	2407	3.0	2407	3.0		0.903		17.3	LOS B	19.6	502.5				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Main Access Road

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	170	1	440	611	3.0	716	0.853	100	NA	NA
Approach	170	1	440	611	3.0		0.853			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	428	499	43	971	3.0	1075	0.903	100	NA	NA
Approach	428	499	43	971	3.0		0.903			

North: Bala Dr											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	49	1	35	85	3.0	320	0.265	100	NA	NA	
Approach	49	1	35	85	3.0		0.265				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	46	507	188	740	3.0	827	0.895	100	NA	NA	
Approach	46	507	188	740	3.0		0.895				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2407	3.0		0.903							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Main Access Road				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0
North: Bala Dr				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

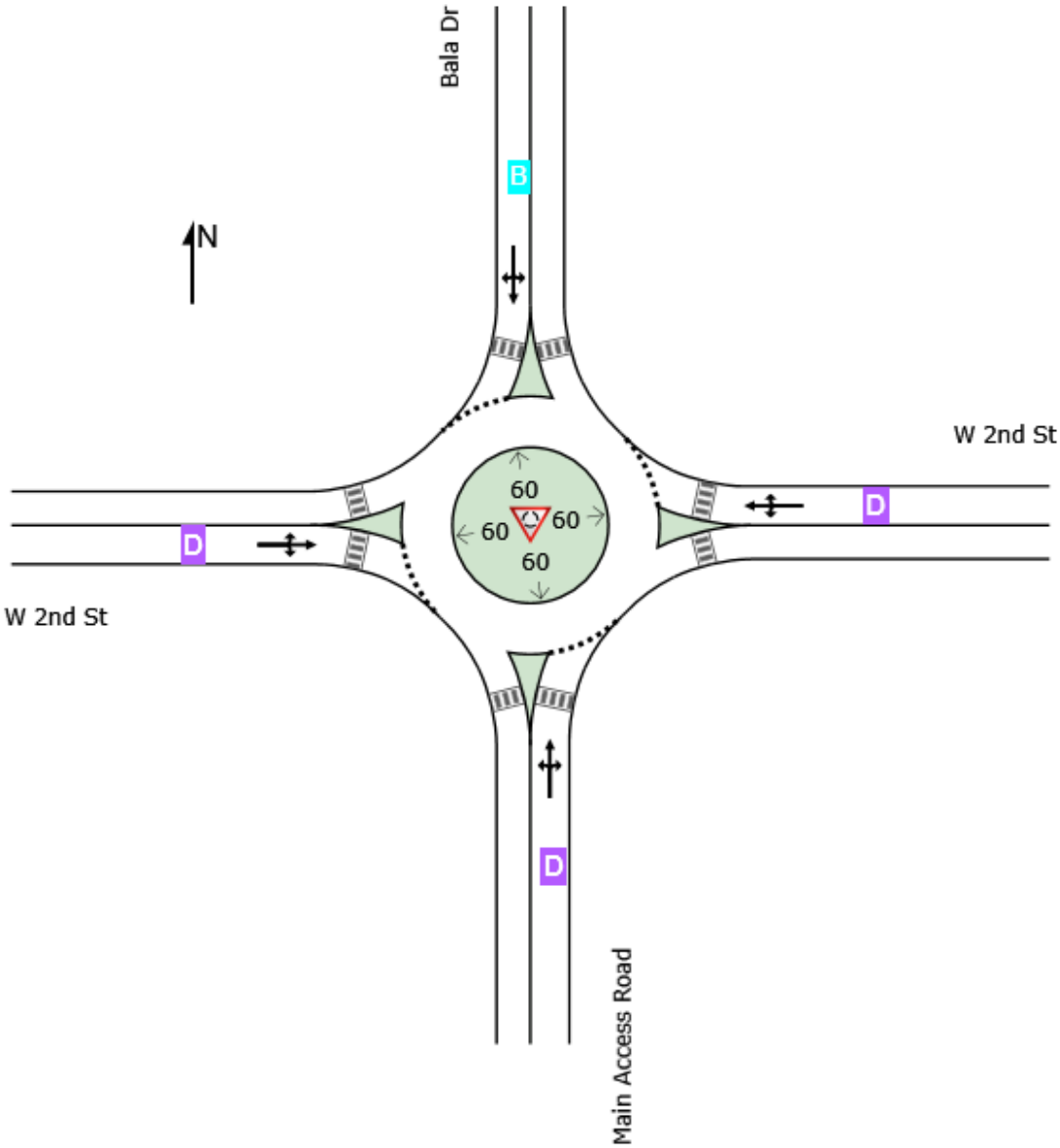
Lane Level of Service

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Weekday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	B	B



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Main Access Road															
Lane 1[d]	611	3.0	611	3.0	656	0.931	100	27.8	LOS D	17.9	458.1	Full	1600	0.0	0.0
Approach	611	3.0	611	3.0		0.931		27.8	LOS C	17.9	458.1				
East: W 2nd St															
Lane 1[d]	1117	3.0	1117	3.0	1074	1.040	100	39.3	LOS F	45.0	1153.3	Full	1600	0.0	0.0
Approach	1117	3.0	1117	3.0		1.040		39.3	LOS D	45.0	1153.3				
North: Bala Dr															
Lane 1[d]	85	3.0	85	3.0	255	0.332	100	19.2	LOS B	2.4	62.0	Full	1600	0.0	0.0
Approach	85	3.0	85	3.0		0.332		19.2	LOS B	2.4	62.0				
West: W 2nd St															
Lane 1[d]	800	4.1	800	4.1	824	0.971	100	29.1	LOS E	24.4	629.5	Full	1600	0.0	0.0
Approach	800	4.1	800	4.1		0.971		29.1	LOS C	24.4	629.5				
All Vehicles	2613	3.3	2613	3.3		1.040		32.8	LOS C	45.0	1153.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Main Access Road

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	170	1	440	611	3.0	656	0.931	100	NA	NA
Approach	170	1	440	611	3.0		0.931			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	428	646	43	1117	3.0	1074	1.040	100	NA	NA
Approach	428	646	43	1117	3.0		1.040			

North: Bala Dr											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	49	1	35	85	3.0	255	0.332	100	NA	NA	
Approach	49	1	35	85	3.0		0.332				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	46	566	188	800	4.1	824	0.971	100	NA	NA	
Approach	46	566	188	800	4.1		0.971				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2613	3.3		1.040							

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Main Access Road				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	10.8	36.2	NA
North: Bala Dr				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

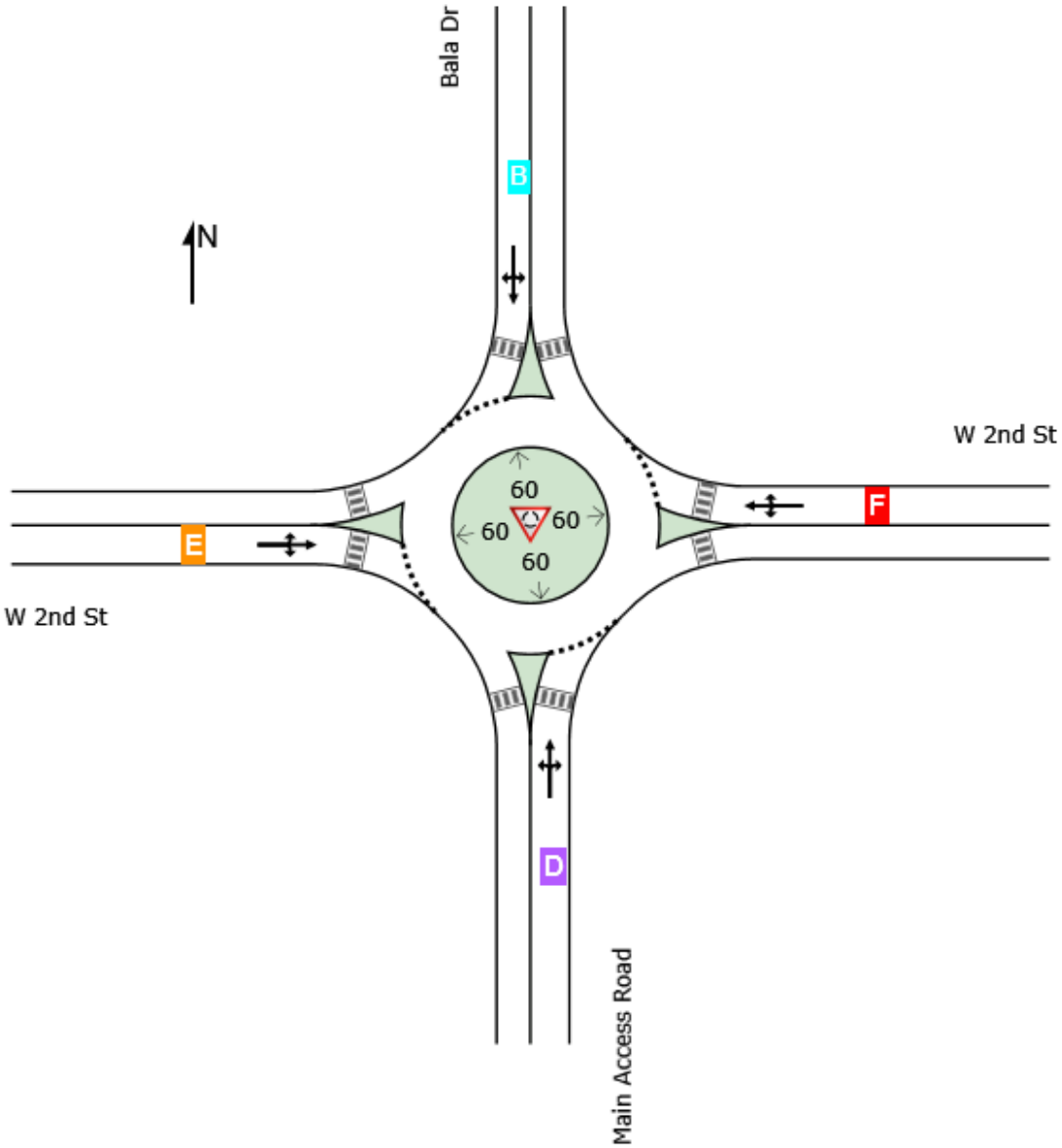
Lane Level of Service

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Friday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	D	B	C	C



Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

LANE SUMMARY

Site: 30 [Main Access Road / 2nd St / Bala Dr (Site Folder: 2031 Sunday With Project (Revised Proposal) - PM Peak Hour)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Main Access Road / 2nd St / Bala Dr
Site Category: 2031 With Project (Revised Proposal) - PM Peak Hour
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Main Access Road															
Lane 1[d]	589	3.0	589	3.0	909	0.648	100	7.9	LOS A	6.4	162.9	Full	1600	0.0	0.0
Approach	589	3.0	589	3.0		0.648		7.9	LOS A	6.4	162.9				
East: W 2nd St															
Lane 1[d]	1537	3.0	1537	3.0	1087	1.414	100	197.7	LOS F	161.3	4128.6	Full	1600	0.0	54.8
Approach	1537	3.0	1537	3.0		1.414		197.7	LOS F	161.3	4128.6				
North: Bala Dr															
Lane 1[d]	75	3.0	75	3.0	238	0.316	100	20.3	LOS C	2.3	58.9	Full	1600	0.0	0.0
Approach	75	3.0	75	3.0		0.316		20.3	LOS C	2.3	58.9				
West: W 2nd St															
Lane 1[d]	547	3.0	547	3.0	952	0.574	100	7.9	LOS A	4.9	125.5	Full	1600	0.0	0.0
Approach	547	3.0	547	3.0		0.574		7.9	LOS A	4.9	125.5				
All Vehicles	2748	3.0	2748	3.0		1.414		114.4	LOS F	161.3	4128.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Main Access Road

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	174	1	414	589	3.0	909	0.648	100	NA	NA
Approach	174	1	414	589	3.0		0.648			

East: W 2nd St

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	421	1082	35	1537	3.0	1087	1.414	100	NA	NA
Approach	421	1082	35	1537	3.0		1.414			

North: Bala Dr											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	38	1	36	75	3.0	238	0.316	100	NA	NA	
Approach	38	1	36	75	3.0		0.316				
West: W 2nd St											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	36	339	172	547	3.0	952	0.574	100	NA	NA	
Approach	36	339	172	547	3.0		0.574				
	Total	%HV	Deg.Satn (v/c)								
All Vehicles	2748	3.0	1.414								

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Main Access Road				
Lane 1	0.0	0.0	0.0	0.0
East: W 2nd St				
Lane 1	0.0	112.5	372.4	NA
North: Bala Dr				
Lane 1	0.0	0.0	0.0	0.0
West: W 2nd St				
Lane 1	0.0	0.0	0.0	0.0

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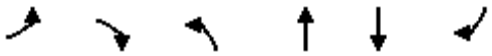
Refuge / Merge Lane



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	65	80	130	670	388	51
Future Volume (vph)	65	80	130	670	388	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	15%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

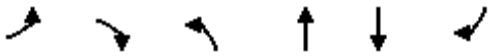
Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	80	130	670	388	51
Future Vol, veh/h	65	80	130	670	388	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	15	4	4	3	3
Mvmt Flow	65	80	130	670	388	51

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1344	414	439	0	-	0
Stage 1	414	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.55	6.35	4.14	-	-	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	2.236	-	-	-
Pot Cap-1 Maneuver	157	611	1110	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	139	611	1110	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	565	-	-	-	-	-
Stage 2	364	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.1	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1110	-	382	-	-
HCM Lane V/C Ratio	0.117	-	0.38	-	-
HCM Control Delay (s)	8.7	-	20.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.4	-	1.7	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	105	95	965	298	31
Future Volume (vph)	50	105	95	965	298	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	2%	2%	5%	5%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

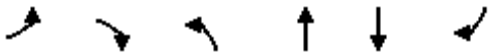
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	105	95	965	298	31
Future Vol, veh/h	50	105	95	965	298	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	13	13	2	2	5	5
Mvmt Flow	50	105	95	965	298	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1469	314	329	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	1155	-	-	-	-	-
Critical Hdwy	6.53	6.33	4.12	-	-	-
Critical Hdwy Stg 1	5.53	-	-	-	-	-
Critical Hdwy Stg 2	5.53	-	-	-	-	-
Follow-up Hdwy	3.617	3.417	2.218	-	-	-
Pot Cap-1 Maneuver	133	701	1231	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	123	701	1231	-	-	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	661	-	-	-	-	-
Stage 2	285	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.6	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1231	-	418	-	-
HCM Lane V/C Ratio	0.077	-	0.371	-	-
HCM Control Delay (s)	8.2	-	18.6	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1.7	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	70	30	530	1156	37
Future Volume (vph)	32	70	30	530	1156	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Link Speed (mph)	15			35	35	
Link Distance (ft)	535			2708	698	
Travel Time (s)	24.3			52.8	13.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	0%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.1

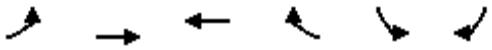
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	70	30	530	1156	37
Future Vol, veh/h	32	70	30	530	1156	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	0	0	1	1
Mvmt Flow	32	70	30	530	1156	37

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1765	1175	1193	0	-	0
Stage 1	1175	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.1	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.2	-	-	-
Pot Cap-1 Maneuver	91	231	592	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	86	231	592	-	-	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	276	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	34.5	0.6	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	592	-	221	-	-
HCM Lane V/C Ratio	0.051	-	0.462	-	-
HCM Control Delay (s)	11.4	-	34.5	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	2.2	-	-

Turn Restrictions



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	903	875	30	0	18
Future Volume (vph)	12	903	875	30	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	6%	2%	2%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

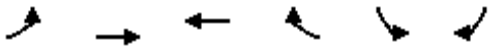
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	903	875	30	0	18
Future Vol, veh/h	12	903	875	30	0	18
Conflicting Peds, #/hr	0	0	0	0	0	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	6	2	2	0	0
Mvmt Flow	12	903	875	30	0	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	905	0	-	0	-	893
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.254	-	-	-	-	3.3
Pot Cap-1 Maneuver	735	-	-	-	0	343
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	735	-	-	-	-	342
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	735	-	-	-	342
HCM Lane V/C Ratio	0.016	-	-	-	0.053
HCM Control Delay (s)	10	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	963	1010	40	0	18
Future Volume (vph)	7	963	1010	40	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)						7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	3%	3%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

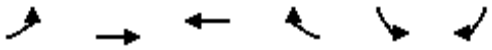
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	963	1010	40	0	18
Future Vol, veh/h	7	963	1010	40	0	18
Conflicting Peds, #/hr	0	0	0	0	0	7
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	7	963	1010	40	0	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1050	0	-	0	-	1037
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.236	-	-	-	-	3.3
Pot Cap-1 Maneuver	655	-	-	-	0	283
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	655	-	-	-	-	281
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	655	-	-	-	281
HCM Lane V/C Ratio	0.011	-	-	-	0.064
HCM Control Delay (s)	10.6	0	-	-	18.7
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	11	714	1398	30	0	16
Future Volume (vph)	11	714	1398	30	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25	25		30	
Link Distance (ft)		814	1314		535	
Travel Time (s)		22.2	35.8		12.2	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

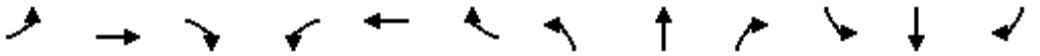
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	714	1398	30	0	16
Future Vol, veh/h	11	714	1398	30	0	16
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	11	714	1398	30	0	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1433	0	-	0	-	1418
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.11	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.209	-	-	-	-	3.3
Pot Cap-1 Maneuver	477	-	-	-	0	170
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	475	-	-	-	-	169
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	28.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	475	-	-	-	169
HCM Lane V/C Ratio	0.023	-	-	-	0.095
HCM Control Delay (s)	12.8	0	-	-	28.5
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕				↱			↱
Traffic Volume (vph)	15	776	122	30	887	10	0	0	110	0	0	8
Future Volume (vph)	15	776	122	30	887	10	0	0	110	0	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	5%	5%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

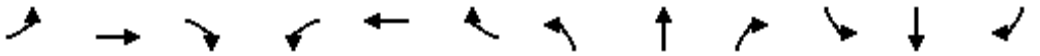
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕				↱			↱
Traffic Vol, veh/h	15	776	122	30	887	10	0	0	110	0	0	8
Future Vol, veh/h	15	776	122	30	887	10	0	0	110	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	0	0	0
Mvmt Flow	15	776	122	30	887	10	0	0	110	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	897	0	0	898	0	0	-	-	837	-	-	893
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.15	-	-	4.13	-	-	-	-	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	-	-	3.3	-	-	3.3
Pot Cap-1 Maneuver	744	-	-	752	-	-	0	0	370	0	0	343
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	744	-	-	752	-	-	-	-	370	-	-	343
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	18.8	15.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	370	744	-	-	752	-	-	343
HCM Lane V/C Ratio	0.297	0.02	-	-	0.04	-	-	0.023
HCM Control Delay (s)	18.8	9.9	0	-	10	0	-	15.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.1	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	826	147	40	1042	5	0	0	130	0	0	8
Future Volume (vph)	5	826	147	40	1042	5	0	0	130	0	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			4	4					1	1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	4%	3%	3%	3%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

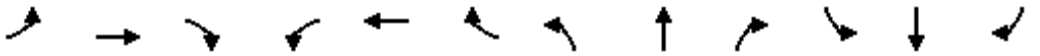
Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕				↱			↱
Traffic Vol, veh/h	5	826	147	40	1042	5	0	0	130	0	0	8
Future Vol, veh/h	5	826	147	40	1042	5	0	0	130	0	0	8
Conflicting Peds, #/hr	0	0	4	4	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	4	4	3	3	3	1	1	1	0	0	0
Mvmt Flow	5	826	147	40	1042	5	0	0	130	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1047	0	0	977	0	0	-	-	905	-	-	1045
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	4.13	-	-	-	-	6.21	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	-	-	3.309	-	-	3.3
Pot Cap-1 Maneuver	657	-	-	702	-	-	0	0	336	0	0	280
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	657	-	-	699	-	-	-	-	334	-	-	280
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	22.5	18.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	334	657	-	-	699	-	-	280
HCM Lane V/C Ratio	0.389	0.008	-	-	0.057	-	-	0.029
HCM Control Delay (s)	22.5	10.5	0	-	10.5	0	-	18.2
HCM Lane LOS	C	B	A	-	B	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0.2	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	610	93	20	1387	5	0	0	70	0	0	6
Future Volume (vph)	6	610	93	20	1387	5	0	0	70	0	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1314			374			633			254	
Travel Time (s)		35.8			10.2			17.3			6.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕				↱			↱
Traffic Vol, veh/h	6	610	93	20	1387	5	0	0	70	0	0	6
Future Vol, veh/h	6	610	93	20	1387	5	0	0	70	0	0	6
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	1	1	1	1	1	3	3	3	0	0	0
Mvmt Flow	6	610	93	20	1387	5	0	0	70	0	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1392	0	0	706	0	0	-	-	660	-	-	1390
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.11	-	-	4.11	-	-	-	-	6.23	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	-	-	3.327	-	-	3.3
Pot Cap-1 Maneuver	495	-	-	897	-	-	0	0	461	0	0	176
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	495	-	-	894	-	-	-	-	460	-	-	176
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	14.2	26.2
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	460	495	-	-	894	-	-	176
HCM Lane V/C Ratio	0.152	0.012	-	-	0.022	-	-	0.034
HCM Control Delay (s)	14.2	12.4	0	-	9.1	0	-	26.2
HCM Lane LOS	B	B	A	-	A	A	-	D
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.1

APPENDIX I

Detailed Pro-Rata Share Calculations – Method A and Method B

47 NORTH WEEKDAY PM PEAK HOUR PRO-RATA CALCULATIONS

#	Intersection	Year Improvement is Needed	Year 2025				Year 2031				Year 2037			
				SEIS Alternative 6 Revised Proposal				SEIS Alternative 6 Revised Proposal				SEIS Alternative 6 Revised Proposal		
			Baseline Traffic Volumes	Revised Proposal Project Trips	Traffic Volumes with Revised Proposal	Revised Proposal Pro-Rata Share	Baseline Traffic Volumes	SEIS Alt 6 Rev. Project Trips	Traffic Volumes with SEIS Alt 6 Rev.	SEIS Alt 6 Rev. Pro-Rata Share	Baseline Traffic Volumes	SEIS Alt 6 Rev. Project Trips	Traffic Volumes with SEIS Alt 6 Rev.	SEIS Alt 6 Rev. Pro-Rata Share
1	Bullfrog Rd / I 90 EB Ramps	2031 Alt 6 Revised Proposal					590	174	764	22.8%				
2	Bullfrog Rd / I 90 WB Ramps	2037 Baseline									1,350	278	1,628	17.1%
3	Tumble Creek Dr / Bullfrog Rd	2031 Alt 6 Revised Proposal					1080	304	1384	22.0%				
7	Denny Ave / W Second St (SR 903)	2025 Alt 6 Revised Proposa	1000	514	1514	33.9%								
8	Ranger Station Rd / Miller Ave / W Second St (SR 9	2025 Baseline	1110	505	1615	31.3%								
9	N Pine St / W Second St (SR 903)	2025 Alt 6 Revised Proposa	990	426	1416	30.1%								
11	Douglas Munro Blvd / W First St	2025 baseline	1185	70	1255	5.6%								
12	Pine St / W First St	2025 baseline	1085	51	1136	4.5%								
13	N Stafford Ave / W Second St (SR 903)	2025 baseline	1080	366	1446	25.3%								
15	N Oakes Ave / W Second St	2025 Alt 6 Revised Proposa	870	240	1110	21.6%								
21	SR 903 / Pennsylvania Ave	2031 Alt 6 Revised Proposal					1030	183	1213	15.1%				

Appendix D

HOSPITAL DISTRICT NO. 2 CALL DATA

City of Cle Elum, Washington
Kittitas Valley Hospital District #2
Calls and Transport Services 2016-2022
Friday, December 16, 2022

	2022 KVHD 2		2021 KVHD 2		2020 KVHD 2		2019 KVHD 2		2018 KVHD 2		2017 KVHD 2		2016 KVHD 2		KVHD 2 7-Year Average		
	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	
Totals	**1420**	**779**	**1425**	**769**	**1394**	**764**	**1600**	**786**	**1455**	**806**	**1357**	**751**	**1219**	**766**	**1410**	**774**	**55%**
January	175	82	147	72	117	60	139	74	124	67	120	59	104	68	132	69	
February	123	60	120	61	110	65	129	69	110	54	109	61	86	51	112	60	
March	116	64	117	61	97	54	145	76	90	59	90	55	79	50	105	60	
April	110	65	110	56	73	40	119	62	100	56	78	40	83	53	96	53	
May	124	67	124	67	114	56	123	67	134	84	139	81	84	53	120	68	
June	144	84	142	75	131	70	148	72	132	65	132	68	126	85	136	74	
July	147	85	151	86	140	79	140	70	147	70	141	68	133	100	143	80	
August	127	70	155	89	138	77	141	65	160	83	140	81	132	69	142	76	
September	116	65	138	72	134	70	165	66	129	70	106	63	127	77	131	69	
October	129	69	122	74	105	68	121	45	115	69	106	60	90	59	113	63	
November	109	68	99	56	122	58	113	57	88	55	76	50	54	43	94	55	
December					113	67	117	63	126	74	120	65	121	58	85	47	
% Change	0%	1%	2%	1%	-13%	-3%	10%	-2%	7%	7%	11%	-2%					

City of Cle Elum, Washington
Kittitas Valley Hospital District #2
Calls and Transport Services 2016-2022
Friday, December 16, 2022

KITTCOMM Calls for Emergency Medical Services	2022		2021		2020		2019		2018		2017		2016		7 Year Average	
Calls to Hospital District 2	1420		1425		1394		1600		1455		1455		1455		10204	1457.714
Calls to Cle Elum Fire District	425	30%	414	29%	377	27%	521	33%	419	29%	357	25%	229	16%	2742	27%
Outisde of Cle Elum (assumed subject to verification)	995	70%	1011	71%	1017	73%	1079	67%	1036	71%	1098	75%	1226	84%	7462	73%

City of Cle Elum, Washington
Kittitas Valley Hospital District #2
Calls and Transport Services 2018-2022
Thursday, December 15, 2022

	2022 KVHD 2		2022 Cle Elum Fire		2021 KVHD 2		2020 KVHD 2		2019 KVHD 2		2018 KVHD 2		KVHD 2 5-Year Average	
	Calls	Transports	Calls	% of KVHD2	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports	Calls	Transports
Totals	**1420**	**779**	**425**		**1425**	**769**	**1394**	**764**	**1600**	**786**	**1455**	**806**	**1459**	**781**
January	175	82	41	23%	147	72	117	60	139	74	124	67	140	71
February	123	60	32	26%	120	61	110	65	129	69	110	54	118	62
March	116	64	28	24%	117	61	97	54	145	76	90	59	113	63
April	110	65	37	34%	110	56	73	40	119	62	100	56	102	56
May	124	67	29	23%	124	67	114	56	123	67	134	84	124	68
June	144	84	31	22%	142	75	131	70	148	72	132	65	139	73
July	147	85	34	23%	151	86	140	79	140	70	147	70	145	78
August	127	70	50	39%	155	89	138	77	141	65	160	83	144	77
September	116	65	34	29%	138	72	134	70	165	66	129	70	136	69
October	129	69	40	31%	122	74	105	68	121	45	115	69	118	65
November	109	68	48	44%	99	56	122	58	113	57	88	55	106	59
December			21	#DIV/0!			113	67	117	63	126	74	71	41

Appendix E

FISCAL CONDITIONS REPORT

47° N Fiscal Assessment
Support for SEIS Addendum

February 23, 2023

Prepared for: 47° N

ECONorthwest
ECONOMICS · FINANCE · PLANNING

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1. Overview

ECONorthwest is supporting EA Engineering on a Supplemental Environmental Impact Statement (SEIS) Addendum for the 47° North Project in Cle Elum. Draft and Final SEISs were issued in 2020 and 2021, respectively. ECONorthwest previously prepared the Fiscal and Economic analysis for the DSEIS and FSEIS. This report provides an updated analysis of the fiscal impacts to address agency impacts resulting from a Revised Proposal from Sun Communities. Sun Communities has purchased the 47° N site from Suncadia and has provided updated information about the scale, mix, value, and timing of their real estate development plans. This analysis also addresses the additional 50 affordable housing units and commercial center that are now incorporated into the project (these were not part of the project under SEIS Alternative 6), as well as proposed changes to development timing.

2. Updated Land Development Program

The fiscal impact analysis considers the marginal fiscal effects of 47° N by comparing the additional revenue generated by the development with the additional operational costs needed to serve the development. Comparing revenues and costs from development is a complicated task. For example, city revenues derived from development (e.g., property tax, sales tax, real estate excise tax, and other taxes or fees) all flow to different funds, some of which are available for use citywide in an annual budgeting process, and some of which are restricted in use in different ways.

Revenues also accrue over a period and may not be available at the time that an investment (a cost) is incurred. In this analysis, the approach is to estimate the present value of the total costs of providing service increases, and the present value of total revenue sources that are available to the city and other service providers. This analysis relies on a set of assumptions about revenues and costs which are plugged into a cash flow revenue model. The model is also based on development assumptions, including phasing and timing of development, to estimate changes in affected taxes. Assumptions about the type and expected delivery of development is outlined in the development program submitted by Sun Communities in the exhibit below.

Exhibit 1: Revised Project Land Development Program by Type, Scale, and Timing
Source: Sun Communities, 2022.

			Residential (units)				Commercial (square footage)			
Phase	Start	Finish	Single Family	Multi-family	Affordable	RV and Glamping	Grocery	Retail	Restaurant	Office
1	2023	2025	250	96	24	327	50,000	14,000	6,000	0
2	2025	2027	150	84	26	300	0	14,000	6,000	10,000
3	2027	2028	127	0	0	0	0	14,000	6,000	0
4	2029	2031	0	0	0	0	0	14,000	6,000	10,000
Total			527	180	50	627	50,000	56,000	24,000	20,000

The development of these projects will also fuel the growth of tax bases attributable to 47° N. The exhibit below summarizes the major valuation assumptions used to derive new construction, assessed value, and taxable retail sales tax basis. Construction and market values were provided by Sun Communities and are inclusive of land preparation and infrastructure investment.

Exhibit 2: Revised Project Valuation Assumptions for Major Tax Bases

Source: Sun Communities and ECONorthwest calculations, 2022.[1]

Residential	Construction Value (unit)	Market Value (unit)	Taxable Retail Sales (unit)
Single Family	$143,700	$368,700	$3,000
Multifamily	$202,100	$242,500	$2,500
Affordable	$147,400	$176,800	$2,000
RV Sites	$116,400	$169,600	$0

Commercial	Construction Value (sf)	Market Value (sf)	Taxable Retail Sales (sf)
Grocery Store	$230	$300	$230
Retail	$230	$300	$300
Restaurant	$230	$300	$330
Office	$230	$300	$0

Note: The anticipated sale price for single family homes will be $225,000 but this value is exclusive of improvements to the underlying land which will be owned by Sun Communities.

[1] The market value of single-family homes refers to the estimated sale price of the home. Sun Communities will maintain ownership of the underlying land.

3. Comparison to SEIS Alternative 6

This updated fiscal impact analysis builds on the previous DSEIS and FSEIS analyses and compares the fiscal impacts of the Revised Proposal to SEIS Alternative 6. As appropriate, references are made to SEIS Alternative 5 as well. No methods in the analysis have changed from the previous analysis; however, several assumptions have been updated in this updated analysis. These changes are described below.

Time Frame

The base year of the updated analysis incorporates information collected in 2022. The time horizon of the analysis shows impacts through 2037. The buildout year for the Revised Proposal is 2031 but 2037 is retained as an endpoint for the analysis so it can be compared to buildout of SEIS Alternative 6.

Development Program and Timing

The updated development program provided by Sun Communities differs from SEIS Alternative 6 in the following ways:

- **Timing.** Development in the revised program reaches full buildout sooner in the analysis period (2031).
- **Valuation.** Sun Communities has provided detailed information related to the following elements of their program:
    - Market valuation of for the commercial and residential properties.
    - Construction costs of the commercial and residential properties.
    - Economic productivity estimates of the commercial properties.
    - Land preparation and infrastructure construction estimates of the commercial and residential properties.

Within respect to timing, the amount of buildout varies between the alternatives:

- Alternative 5 assumed development occurring in phases starting in 2021 and reaching full buildout in 2051
- Alternative 6 assumed development occurring in phases starting in 2021 and reaching full buildout in 2036

The implication of these timing disparities between Alternative 5, Alternative 6, and the revised program presents challenges that makes simple yearly comparisons between alternatives very difficult. These include:

- Annual revenues are influenced by the degree of one-time construction related taxes versus the on-going operational taxes that flow once buildings are occupied. An extended buildout will have a larger share of one-time revenues as part of its total revenue mix.

- Annual expenditures are driven by the development program. A program that delivers buildout earlier will reach the full extent of the public service impacts sooner.

As a result, comparing the impacts of the Revised Proposal several years post-buildout to Alternative 6 at buildout is not an apples-to-apples comparison. The decrease in one-time revenues that is observed post-buildout would, in fact, occur for any of the alternatives after construction is complete.

Tax Policy

Tax policy was updated for all the affected jurisdictions. This update included the following meaningful information:

- City of Cle Elum
    - The property tax rate and levy calculations were updated with 2022 valuations for 2023 taxes.
    - The revenue sharing with Kittitas County for the public safety sales tax was added.
    - Business license fees were added.
    - The second 0.25% of the real estate excise taxes was adopted by the city.
- Kittitas Hospital District #2
    - The property tax rate and levy calculations were updated with 2022 valuations for 2023 taxes.
- Cle Elum-Roslyn School District
    - The property tax rate and levy calculations were updated to focus on the calculation methods for the enrichment levy because of the state McCleary decision.

Public Service Costs

Outside of the changes to the estimated staffing impacts identified in the Public Services section of the SEIS Addendum, the fiscal analysis has also updated employee compensation estimates. As analyzed with the SEIS Addendum, staff are incurred on a prorated basis depending on the amount of population (households and RV effective population) in any given year depending on buildout. The updated proposal by Sun Communities also assumes that all roads and parks will be privately constructed and maintained, which results in no public works or parks service responsibilities by the city of Cle Elum and, therefore, no cost impacts in these areas.

4. City of Cle Elum

The city of Cle Elum is the local service provider for police, fire, public works, community development, parks, and other local services. To support these services, the city collects a range of general and restricted taxes, these include the following.

Tax Revenues

The following description of tax revenues is included for reference. Tax revenues were calculated based on the changes in the components of the city's tax base resulting from development at the site. Elements of growth that influence revenues include the timing, scale, and quality of the project's development as well as the population and employment impacts of the development once complete.

The updated proposal by Sun Communities also assumes that all roads, parks and utilities will be privately constructed and maintained, which results in no public works or parks service responsibilities by the city of Cle Elum and, therefore, no cost impacts in these areas. Therefore, the analysis seeks to isolate general tax revenues and public safety restricted revenues that can be used to fund police and fire related costs (e.g., the city collects some funds like the criminal justice sales tax that can only be used on public safety purposes). These revenues are separate from other revenues the city will see that can be dedicated to areas where there is anticipated to be no service impacts.

Tax revenues are estimated in three categories:

- **One-time Revenues.** These general-purpose revenues (or for public safety) are tied to the construction of housing and commercial products. Specifically, they include the retail sales tax on construction (material and labor).
- **Recurring Revenues.** These general-purpose revenues (or for public safety) are derived from the occupation of residential and commercial structures by residents, businesses, and employees. Specific revenues include the property tax, retail sales tax (resulting from new sales tax sourcing rules), and utility taxes.
- **Restricted Revenues.** These revenues are statutorily restricted to fund certain capital expenses and are generally not available to fund public safety service costs. Specific revenues include the real estate excise tax and the hotel-motel tax.

Property Taxes

The analysis models the city's property tax so that it conforms to the levy limit factor and adjusts for changes to new construction and assessed value growth. Specifically:

- A limit factor of 1% plus an add-on value of new construction is assumed in calculating the city's maximum allowable levy.

- New construction is added in the year that a project is developed per the development program and affects the levy calculation in the following year.
- Property tax revenues are lagged a year from which the assessed value is recorded to account for the assessment cycle and subsequent tax payments.
- New construction at the city level is capped at 1.7% of the city's overall assessed value base (the city historical average); however, this cap can be exceeded by growth within 47° N.
- Assessed value growth once placed on the city's assessment base is assumed to be revalued at 2.5% a year.

The effect of these assumptions results in property tax revenue growth over the study period as new construction grows the city's levy pass the 1% limit factor. Much of this effect is explained by the structural/ legislative parameters explained above but is best represented by the steady lowering of the city's levy rate, which is estimated to fall over the study period. The analysis does not impose any policy choices by elected officials or voters such as "banking" levy capacity or voter-approved levy lid lifts.

Sales & Use Taxes

Of the 8.1% sales tax currently collected in the city on taxable retail sales purchases, a 1% "local" share of the tax accrues to local jurisdiction. The city receives 85% of the 1% local tax and Kittitas County gets 15%. This tax is levied on retail sales area and on construction activity (considered a taxable retail sales). Due to sales tax sourcing laws, taxable retail sales also apply to certain online purchases and the delivery of personal and commercial goods.

Cle Elum also receives a population pro-rata share of the city allocation of Kittitas County's 0.1% criminal justice sales tax that goes to the incorporated cities in the county. Increase in the criminal justice tax is modeled on net increases in population due to development.

Kittitas County also levies a 0.3% public safety sales tax that must be used on public safety costs. The county shares revenue with the towns of Cle Elum, Roslyn, Ellensburg, Kittitas, and South Cle Elum. Increase in the public safety sale tax revenue sharing going to Cle Elum is modeled on net increases in population due to development.

Utility Taxes

The city imposes utility taxes on gross purchases of electricity, water, wastewater, solid waste, telephones, cable, and natural gas. Current tax rates are used for this analysis. A generalized utility expenditure productivity factor (on a per square foot basis of development) was used to generate estimates of utility purchases. The city's current utility tax rates:

- Water: 6.0%
- Wastewater: 6.0%
- Electric: 6.0%
- Natural Gas: 6.0%
- Telephone/Mobile: 6.0%

State Shared Motor Vehicle Fuel Tax & Liquor Board/Taxes

Local governments receive a gas tax distribution that is restricted for street purposes from the state of Washington. Cities also receive pro rata payments from Liquor Excise Tax, Liquor Board Profits, and Marijuana Excise Tax. The distribution is determined using a formula that is heavily weighted towards population. The analysis uses population growth as proxy of this formula to derive these revenues to the city.

Business License Fees

The city levies a fee for the privilege of doing business in the city. Since there are no identified number of businesses at 47° N at this time, the analysis assumes that the average business consists of 10 employees and would be levied at the $100 per business per year fee.

Real Estate Excise Tax (REET)

Real estate transactions are subject to a 0.5% tax on the value of the transaction within the city as of 2022. REET revenues are placed in the capital restricted funds to finance capital projects. REET revenues are uncertain given volatility in the real estate market. Since REET is based on the total value of real estate transactions each year, the amount of REET revenues the city receives can vary substantially from year to year based on the normal fluctuations in the real estate market. During years when the real estate market is active, revenues are higher, and during softer real estate markets, revenues are lower.

For the purposes of this analysis, it is assumed that all new single-family homes would be sold initially and then 14.3% of all market value would turn over (re-sold) in any given year (this assumption is based on the market value of sales in Cle Elum in 2021 subject to the REET as percentage of the city's assessed value base). It is assumed that all the commercial components of the development program are sold a single time once the project reaches buildout in 2031. Sun Communities has indicated it expects that approximately 50% of the single-family units would be rentals, with an assumed 10% of the rented units being purchased each year. At full buildout, it is anticipated that an average of 10% of the single-family homes would be rented (consistent with other communities). This does not impact the REET assumptions since tenure (rental and ownership) are still a part of the real estate transaction base.

Special Hotel/Motel Tax

A two percent hotel tax is imposed by the city of Cle Elum. The Special Hotel/Motel and Convention and Trade Center taxes are in addition to state and local sales tax for businesses that provide lodging. These revenues must be used for tourism promotion, acquisition of tourism-related facilities, or operation of tourism-related facilities. Revenues are estimated using the information provided by Sun Communities for the RV facilities.

Service Impacts

City of Cle Elum police and fire service provision will be impacted by proposed development. The Revised Proposal by Sun Communities assumes that all road and parks will be privately

constructed and maintained, which will result in no public works or parks service responsibilities by the city and, therefore, no cost impacts. The analysis uses the Public Service impact analysis in the SEIS Addendum to inform employee cost estimates on a per FTE (full-time equivalent) basis.

Police Services

The Public Services analysis in the SEIS Addendum estimates that 8.0 officers will be needed at development buildout of the Revised Proposal. Officers are added to meet proportionate demand based on the officer to population growth ratios used in the Public Services section. Refer to the Public Services section of the Addendum and the SEIS for additional information about the different methods for estimating demand. Note that the population method includes the population from the proposed residential units, as well as a proxy population calculated for the RV sites to conservatively analyze impacts on police service. As noted in the Public Services discussion, the RV proxy population used in the analysis is likely overly conservative and overestimates probable impacts associated with the RV element of the proposal. The following assumptions are used to approximate the cost of a police officer:

- The salary schedule for a police officer with 12 months of experience per the salary schedule in the city of Cle Elum. This level equates to an annual salary of $59,496 in 2022.
- A benefit multiplier of 38.1% is used based on the *Employer Costs for Employee Compensation for state and local government workers by occupational and industry group* as estimated by the U.S. Bureau of Labor Statistic's National Compensation Survey (May 2021 release).
- An annual non-labor cost of $10,000 per full-time equivalent (FTE) to account for training, radio, equipment, vehicle, and other overhead costs.
- All costs are inflated to the year of incurrence at a rate of 3.0% to account for inflation and other salary step increases.

The city's police department submitted staffing and cost information for the project's impacts on police service using a methodology recommended by the International City Managers Association (ICMA)The Public Services section (using a population-based to service-based formula) and the police department's ICMA method both estimate a need for 8 police officers. The Public Services section reaches the full allotment upon buildout in 2031 (e.g., officers are added to meet proportionate demand based on the officer to population growth ratios used in the Public Services section). The police department's ICMA method assumes 4 officers are brought on in 2023 and the remaining 4 are added in 2027. However, the methods and assumptions used by the department were not documented in a manner such that the analysis could be explained or reproduced. Therefore, that aspect of the analysis is not included in this updated fiscal impact analysis.

Fire Services

The Public Services analysis for the SEIS Addendum estimates an impact of 1.6 firefighters will be needed at development buildout under the Revised Proposal. Firefighters are added to meet

demand proportionate to population growth at 47° N (see the note above and in the Public Services section regarding the RV proxy population). The following assumptions are used to approximate the cost of a firefighter:

- An annual salary of $56,740 in 2022 is assumed based on the U.S. Bureau of Labor Statistics May 2021 State Occupational Employment and Wage Estimate for Washington State using the Eastern Washington Nonmetropolitan Area that includes Kittitas County (the average annual wage is used).
- A benefit multiplier of 38.1% is used based on the *Employer Costs for Employee Compensation for state and local government workers by occupational and industry group* as estimated by the U.S. Bureau of Labor Statistic's National Compensation Survey (May 2021 release).
- An annual non-labor cost of $5,000 per full-time equivalent to account for training, equipment, and other overhead costs.
- All costs are inflated to the year of incurrence at a rate of 3.0%.

Fiscal Impacts

Exhibit 3 and Exhibit 4 summarize the cost and revenue impact of the 47° N development under the Revised Proposal to the City of Cle Elem. On the revenue side, the summary includes restricted revenues of REET (both 0.25% parts), the hotel-motel tax, and the motor vehicle fuel tax (as part of state shared revenues) that cannot be used to fund police or fire service costs. By 2037, annual city costs are estimated to be $1.4 million a year. By 2037, annual city revenues are estimated to be $2.1 million a year. Buildout of the Revised Proposal would occur in 2031; results to 2037 are provided to facilitate comparisons to SEIS Alternative 6. As noted above, comparing the Revised Proposal after buildout to Alternative 6 at buildout may not be an apples-to-apples comparison.

Exhibit 3: Revised Proposal – Summary of Cost Impacts for Cle Elum

Source: ECONorthwest calculations, 2022.

	2023	2024	2025	2026	2027	2028	2029	2030
Police	$0	$197,000	$405,000	$581,000	$766,000	$835,000	$908,000	$935,000
Fire	$0	$37,000	$75,000	$108,000	$143,000	$155,000	$169,000	$174,000
Total	$0	$233,000	$481,000	$689,000	$908,000	$991,000	$1,077,000	$1,109,000

	2031	2032	2033	2034	2035	2036	2037
Police	$963,000	$992,000	$1,022,000	$1,053,000	$1,084,000	$1,117,000	$1,150,000
Fire	$179,000	$185,000	$190,000	$196,000	$202,000	$208,000	$214,000
Total	$1,142,000	$1,177,000	$1,212,000	$1,248,000	$1,286,000	$1,324,000	$1,364,000

Exhibit 4: Revised Proposal – Summary of Revenue Impacts for Cle Elum

Source: ECONorthwest calculations, 2022.

	2023	2024	2025	2026	2027	2028	2029	2030
Property Tax	$0	$199,000	$404,000	$549,000	$698,000	$759,000	$822,000	$840,000
Sales Tax on Construction	$587,000	$605,000	$415,000	$427,000	$112,000	$115,000	$35,000	$36,000
Sales Tax Ongoing	$0	$83,000	$171,000	$209,000	$250,000	$290,000	$333,000	$376,000
Utility Taxes	$36,000	$73,000	$102,000	$133,000	$144,000	$155,000	$160,000	$165,000
Criminal Justice & Public Safety	$0	$43,000	$89,000	$123,000	$159,000	$180,000	$203,000	$209,000
State Shared Taxes	$0	$16,000	$34,000	$47,000	$60,000	$68,000	$77,000	$79,000
Business License Fees	$0	$0	$1,000	$1,000	$1,000	$1,000	$2,000	$2,000
REET	$0	$236,000	$269,000	$208,000	$230,000	$230,000	$249,000	$149,000
Hotel-Motel Tax	$0	$101,000	$209,000	$314,000	$424,000	$437,000	$450,000	$464,000
Total	$623,000	$1,256,000	$1,484,000	$1,698,000	$1,654,000	$1,800,000	$1,881,000	$1,857,000

	2031	2032	2033	2034	2035	2036	2037
Property Tax	$858,000	$866,000	$875,000	$884,000	$893,000	$902,000	$912,000
Sales Tax on Construction	$0	$0	$0	$0	$0	$0	$0
Sales Tax Ongoing	$422,000	$434,000	$448,000	$461,000	$475,000	$489,000	$504,000
Utility Taxes	$170,000	$174,000	$178,000	$183,000	$187,000	$192,000	$197,000
Criminal Justice & Public Safety	$215,000	$222,000	$228,000	$235,000	$242,000	$249,000	$257,000
State Shared Taxes	$82,000	$84,000	$87,000	$89,000	$92,000	$95,000	$97,000
Business License Fees	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
REET	$618,000	$157,000	$161,000	$165,000	$169,000	$173,000	$177,000
Hotel-Motel Tax	$478,000	$492,000	$507,000	$522,000	$538,000	$554,000	$570,000
Total	$2,366,000	$1,939,000	$1,978,000	$2,019,000	$2,060,000	$2,102,000	$2,145,000

Exhibit 5 summarizes the net annual surplus or deficit of the estimate costs and revenues. For revenues, restricted revenues of the REET, hotel-motel tax, and motor vehicle fuel taxes are excluded from the balance since they cannot be used to fund these public services. Development at 47° N is estimated to create fiscal surpluses that accumulate over time; $8.7 million in restricted revenues are excluded from the general revenue fund and would be additive to this operating surplus.

By year 2037, which is 6 years after buildout of the Revised Proposal, the city is estimated to have a cumulative revenue surplus of $2.9 million of general revenues to support police and fire expenses with the Revised Proposal. Initial annual surplus revenues coming from one-time sales taxes on construction will fall once development is complete and will combine with rising services costs to produce a situation where annual surpluses give way to a small deficit in only 2037. However, on top of the $2.9 million in cumulative general revenues to support police and fire, the city will also have an additional $9.7 million in other restricted revenues for which it has no corresponding public service cost to account for (this is additive to the $2.9 million cumulative surplus in 2037 covering public safety costs).

Exhibit 5: Revised Proposal – Surplus/Deficit of Costs and Revenues for Cle Elum
Source: ECONorthwest calculation, 2022.

	2023	2024	2025	2026	2027	2028	2029	2030
Total Costs	$0	$233,000	$481,000	$689,000	$908,000	$991,000	$1,077,000	$1,109,000
Total Non-Restricted Revenues	$623,000	$911,000	$990,000	$1,154,000	$972,000	$1,101,000	$1,146,000	$1,207,000
Annual Surplus/Deficit	$623,000	$678,000	$509,000	$465,000	$64,000	$110,000	$69,000	$98,000
Cumulative Impact	$623,000	$1,301,000	$1,810,000	$2,275,000	$2,339,000	$2,449,000	$2,518,000	$2,616,000
Other Cumulative Restricted Revenues	$0	$345,000	$839,000	$1,383,000	$2,065,000	$2,764,000	$3,499,000	$4,149,000

	2031	2032	2033	2034	2035	2036	2037
Total Costs	$1,142,000	$1,177,000	$1,212,000	$1,248,000	$1,286,000	$1,324,000	$1,364,000
Total Non-Restricted Revenues	$1,231,000	$1,250,000	$1,269,000	$1,290,000	$1,309,000	$1,330,000	$1,352,000
Annual Surplus/Deficit	$89,000	$73,000	$57,000	$42,000	$23,000	$6,000	-$12,000
Cumulative Impact	$2,705,000	$2,778,000	$2,835,000	$2,877,000	$2,900,000	$2,906,000	$2,894,000
Other Cumulative Restricted Revenues	$5,284,000	$5,973,000	$6,682,000	$7,411,000	$8,162,000	$8,934,000	$9,727,000

Comparison of Revised Proposal to SEIS Alternative 5 and SEIS Alternative 6

The SEIS estimated that Alternative 5 and Alternative 6 would result in cumulative fiscal surpluses to the City in 2037 ($6.3 million and $2. million, respectively). The fiscal surplus of the Revised Proposal would similarly result in a positive surplus.

5. Kittitas Hospital District #2

Kittitas Hospital District No. 2 operates Medic One ambulance services and responds to calls from a point about halfway to Ellensburg all the way to Snoqualmie Pass. The District also owns KVH Family Medicine Clinic in Cle Elum where medical services are provided. The District leases the clinic building to Kittitas Valley Healthcare (Hospital District #1) for their operation of the KVH Family Medicine (Cle Elum Rural Health Clinic). In 2020, Kittitas Valley Healthcare paid the District $278,868 to lease the clinic building and in 2021 paid $284,626 to lease the clinic building. Kittitas Valley Healthcare operates an Urgent Care Clinic in Cle Elum seven days per week from 10 am to 10 pm. The District provides a subsidy to help offset the cost of operating the clinic. The subsidy was $187,466 in 2020 and $191,215 in 2021.[2]

Tax Revenues

The hospital district collects two distinct property tax levies to fund two different services.

Property Tax – EMS Levy

The district voters passed a permanent EMS levy not to exceed $0.25 per $1,000 of assessed value in 2016 (before that, the levy had to be approved periodically by voters). This is a regular levy (meaning it is subject to constitutional limits) in Washington and is modelled like the provisions of the city of Cle Elum's property tax, also a regular levy.

Property Tax – Regular Levy

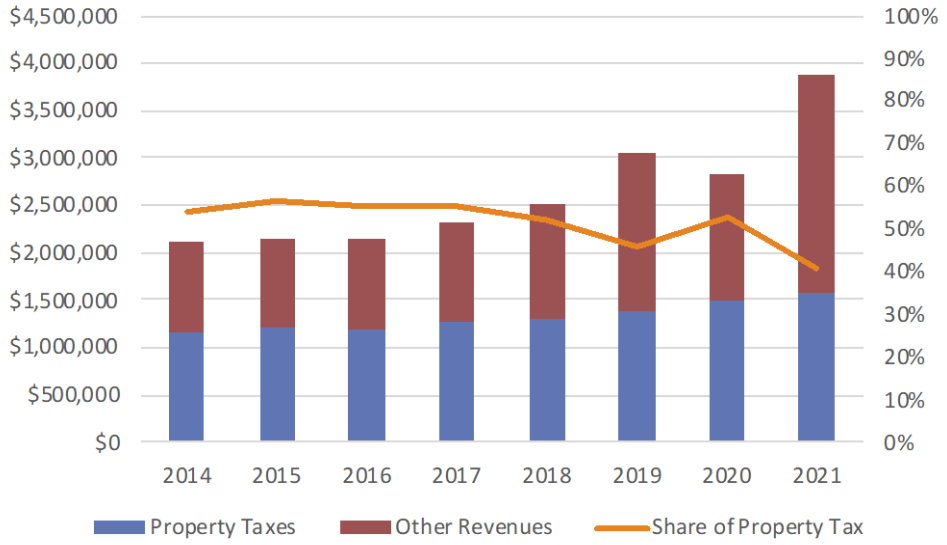
The district uses the regular levy of up $0.25 per $1,000 of assessed value. This is a regular levy (meaning it is subject to constitutional limits) in Washington and is modelled like the provisions of the city of Cle Elum's property tax, also a regular levy.

Other Revenues

Reoccurring revenues received by Hospital District #2 include patient/service fees and property taxes. The exhibit below presents a summary of the District's cumulative revenues received through their operating property tax levies (EMS and Hospital) and other revenue source. In 2021, patient service fees and other revenues accounted for about 59% of the District's total revenues. The analysis assumes that service fees would scale to meet additional costs beyond revenues provided by property tax revenues alone, as they have in the past. For example, if new hires are required to accommodate increased service needs, then revenues from services fees would theoretically increase too.

[2] Office of the Washington State Auditor. Audit Report on Financial Statements (November 2021).

Exhibit 6: Summary of Kittitas Hospital District #2 Revenues
Source: Washington State Auditor Financial Intelligence Tool, 2022.



Service Impacts

Medic One

The Public Services analysis in the SEIS Addendum estimates that 5.4 EMTs and 6.6 paramedics will be needed at development buildout of the Revised Proposal. These personnel would be needed to meet demand proportionate to estimated population growth at 47° N (including the assumed RV proxy population which is likely overly-conservative). The following assumptions are used to approximate the cost of a of these staff:

- An annual salary of $36,500 for an EMT and $54,380 for paramedics in 2022 is assumed based on the U.S. Bureau of Labor Statistics May 2021 State Occupational Employment and Wage Estimate for Washington State using the Eastern Washington Nonmetropolitan Area that includes Kittitas County (the average annual wage is used).
- A benefit multiplier of 38.1% is used based on the *Employer Costs for Employee Compensation for state and local government workers by occupational and industry group* as estimated by the U.S. Bureau of Labor Statistic's National Compensation Survey (May 2021 release).
- All costs are inflated to the year of incurrence at a rate of 3.0%.

Cle Elum Clinic

The Public Services analysis in the SEIS Addendum estimates an impact of 0.6 physicians, 4.8 APCs, and 3.6 RNs will be needed at development buildout of the Revised Proposal. These personnel are added to meet demand proportionate to population growth at 47° N. As noted previously, the population used to estimate impacts includes a proxy RV population factor which is likely overly-conservative. The following assumptions are used to approximate the cost of a of these staff:

- An annual salary of $280,360 for a physician and $124,590 for an APC, $85,090 for RN in 2022 is assumed based on the U.S. Bureau of Labor Statistics May 2021 State Occupational Employment and Wage Estimate for Washington State using the Eastern Washington Nonmetropolitan Area that includes Kittitas County (the average annual wage is used).
- A benefit multiplier of 38.1% is used based on the *Employer Costs for Employee Compensation for state and local government workers by occupational and industry group* as estimated by the U.S. Bureau of Labor Statistic's National Compensation Survey (May 2021 release).
- All costs are inflated to the year of incurrence at a rate of 3.0%.

Fiscal Impact

Medic One

The cost and revenue impacts of the Revised Proposal are summarized in the exhibits below. Medic One supports its services through a combination of property taxes and charges for its services. Results below show only the property tax component relative to increased personnel costs and, therefore, does not present a complete or accurate picture of future fiscal condition. Although costs are higher than property tax revenues in the analysis, Medic One also receives user service charges that make up a large proportion of its revenues.

The analysis assumes that patient service fees could scale to meet additional costs beyond revenues provided by property tax revenues. For example, if new hires are required to accommodate increased service needs, then revenues from services fees would increase as well per charges for service from the district. Again, this is a key assumption, but this analysis has no publicly available data from the District to rule out if there is a structural issue between its cost of service relative to the combination of fees and taxes it receives. However, the District has grown its beginning fund balances over time during a period where both property taxes continue to grow while also representing a smaller share of overall revenues. In 2014, for example, it had a beginning balance of $3,435,567 which had grown to $6,366,267 in 2021.[3] In summary, the analysis finds that all service impacts and any hypothetical shortfalls could be wholly offset by adjusting patient service fees.

Exhibit 7: Revised Proposal - Summary of Costs for EMS Medic One

Source: ECONorthwest calculation, 2022.

Costs	2023	2024	2025	2026	2027	2028	2029	2030
Personnel	$0	$184,000	$379,000	$542,000	$716,000	$780,000	$848,000	$874,000

Costs	2031	2032	2033	2034	2035	2036	2037
Personnel	$900,000	$927,000	$955,000	$983,000	$1,013,000	$1,043,000	$1,075,000

[3] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.

Exhibit 8: Revised Proposal - Summary of Local Tax Revenues for EMS Medic One

Source: ECONorthwest calculation, 2022.

Revenues	2023	2024	2025	2026	2027	2028	2029	2030
EMS Property Taxes	$0	$17,000	$34,000	$47,000	$59,000	$65,000	$70,000	$71,000

Revenues	2031	2032	2033	2034	2035	2036	2037
EMS Property Taxes	$73,000	$74,000	$74,000	$75,000	$76,000	$77,000	$77,000

Note: In 2021, patient service fees and other revenues accounted for about 59% of the District's total revenues.

Cle Elum Clinic

The cost and revenue impacts of the Revised Proposal are summarized in the exhibit below. Results below show only the property tax component of revenues relative to increased personnel costs and, therefore, present an incomplete picture of future fiscal conditions.

The Cle Elum Clinic is run by Kittitas Valley Healthcare (Hospital District #1) but supported in part by Hospital District 2 through their ownership of the facility. Although costs are higher than property tax revenues in the analysis, the clinic also receives user service charges that make up most of its revenue base. The analysis assumes that patient service fees could scale to meet additional costs beyond revenues provided by property tax revenues.

For example, if new hires are required to accommodate increased service needs, then revenues from services fees would increase as well per charges for service from the district. Kittitas Valley Healthcare states that its services are almost exclusively supported by revenue generated from patient services.[4] District #2 also receives property taxes and as well as payments made by Kittitas Valley Healthcare to District #2 for lease of the medical facility. Again, this is a key assumption and is based on information from Kittitas Valley Healthcare acknowledging that their services are supported by revenue from patient service charges. In summary, the analysis finds that all service impacts and any hypothetical shortfalls could be wholly offset by adjusting patient service fees.

Exhibit 9: Revised Proposal - Summary of Costs for Cle Elum Clinic

Source: ECONorthwest calculation, 2022.

Costs	2023	2024	2025	2026	2027	2028	2029	2030
Personnel	$0	$355,000	$731,000	$1,046,000	$1,380,000	$1,505,000	$1,636,000	$1,686,000

Costs	2031	2032	2033	2034	2035	2036	2037
Personnel	$1,736,000	$1,788,000	$1,842,000	$1,897,000	$1,954,000	$2,013,000	$2,073,000

[4] https://www.kvhealthcare.org/about-us/

Exhibit 10: Revised Proposal - Summary of Local Tax Revenues for Cle Elum Clinic

Source: ECONorthwest calculation, 2022.

Revenues	2023	2024	2025	2026	2027	2028	2029	2030
Regular Property Taxes	$0	$18,000	$37,000	$50,000	$64,000	$69,000	$75,000	$76,000

Revenues	2031	2032	2033	2034	2035	2036	2037
Regular Property Taxes	$78,000	$79,000	$80,000	$80,000	$81,000	$82,000	$83,000

Note: In 2021, patient service fees and other revenues accounted for about 59% of the District's total revenues.

Comparison Revised Proposal to SEIS Alternative 5 and SEIS Alternative 6

The SEIS fiscal analysis estimated that SEIS Alternative 5 and Alternative 6 would generate more in service costs than property tax revenues by 2037. However, District revenues come primarily from user fees rather than property taxes, so property tax revenues alone provide an incomplete picture of fiscal conditions. The SEIS noted that service fees have scaled to meet costs beyond property tax revenue in past years and that condition would likely continue in the future. Buildout of the Revised Proposal would occur in 2031; results to 2037 are provided to facilitate comparisons to SEIS Alternative 6.

6. Kittitas Hospital District #1

Hospital District #1 provides care to Kittitas County and surrounding areas. The public hospital district is governed by a five-member elected Board of Commissioners and is almost exclusively supported by revenue generated from patient services. The 2020/2021 SEIS did not evaluate fiscal impacts to Hospital District #1 because the 47° N property is not within the District's taxing district. Similarly, the 2002 Bullfrog Flats Master Site Plan EIS did not evaluate fiscal impacts to the District.

Revenues

47° N (and the city of Cle Elum) is not located within the district's boundary and taxing area; therefore, there is no property tax revenue that would accrue to the district from the project. However, the site is broadly within the district's service area (it's the closest regional hospital) and 47° N would result in additional demand for services from the district and cost impacts, as described below. Note that District 1 also operates the Cle Elum Clinic, which is discussed above.

District 1 generates almost all revenues from user fees and states that its services are almost exclusively supported by revenue generated from patient services.[5]. Its main reccurring revenues received include patient/service fees and other sources of funds including its property tax levy. In 2021, the district collected $5,061 in property taxes as part of its total revenue of $118,867,617 (property tax accounts for 0.004% of all revenues).

Service Impacts

The Public Services analysis in the SEIS Addendum estimates an impact of 0.9 physicians, 0.2 APCs, and 5.4 RNs will be needed at development buildout of the Revised Proposal at the Ellensburg Hospital. The Public Services analysis in the SEIS Addendum included a staffing impact analysis based on hypothetical ratios of staff to population assuming a district population of 50,000. These impacts are not evaluated in the Addendum or costed in the fiscal analysis for reasons described in the Public Services section.

Fiscal Impact

The analysis finds that tax revenues overall comprise a minor portion of District 1 total revenues and that all service impacts could be wholly supported by patient service fees.

[5] https://www.kvhealthcare.org/about-us/

7. Kittitas County 911 - KITTCOM

Revenues

KITTCOM is funded primarily by intergovernmental revenue as well as fees paid by emergency service subscribers (which varies by subscriber based on the dispatch service costs) and through monthly excise taxes levied on telephone lines ($0.70 per line: land, mobile, voice over internet protocol (VOIP)).

Line Charges

The analysis uses the following phone line charge assumptions:

- Telephone tax rate remains at $0.70 per line
- Lines per household is 2.0 and lines per employee is 0.2

Service Impacts

The Public Services analysis in the SEIS Addendum estimates an impact 0.8 dispatcher will be needed at development buildout of the Revised Proposal. These personnel are added to meet demand proportionate to population growth at 47° N. The following assumptions are used to approximate the cost of a of these staff:

- Total compensation for a dispatcher $133,280 based on a 2019 budget analysis of KITTCOM relating dispatch personnel compensation costs to the number of dispatcher (the 2019 figure has been adjusted for inflation).
- All costs are inflated to the year of incurrence at a rate of 3.0%.

Fiscal Impact

The exhibit below summarizes the cost impact of the Revised Proposal. Reoccurring revenues received by Kittitas County 9-1-1 predominately include intergovernmental revenues, fees paid by emergency service subscribers, and a monthly tax applied on telephone lines. Residents of 47° N are expected to pay similar levels of line fees per household as existing residents of the City (and the district as a whole). While projected new staffing costs exceed phone line revenues, the analysis is limited to line charge revenues and estimates of intergovernmental revenues and/or subscriber fees which historically have and could be restructured to cover additional funding needs. Line charge revenues alone, therefore, provide an incomplete picture of fiscal conditions.

Exhibit 11: Revised Proposal - Summary of Costs for KITTCOM

Source: ECONorthwest calculation, 2022.

Costs	2023	2024	2025	2026	2027	2028	2029	2030
Dispatch	$0	$11,000	$39,000	$69,000	$95,000	$111,000	$121,000	$131,000

Costs	2031	2032	2033	2034	2035	2036	2037
Dispatch	$135,000	$139,000	$143,000	$148,000	$152,000	$157,000	$161,000

Exhibit 12: Revised Proposal - Summary of Line Fees and Other Revenues for KITTCOM

Source: ECONorthwest calculation, 2022.

Revenues	2023	2024	2025	2026	2027	2028	2029	2030
Line Charge Revenues	$0	$3,000	$6,000	$9,000	$11,000	$12,000	$13,000	$13,000

Revenues	2031	2032	2033	2034	2035	2036	2037
Line Charge Revenues	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000

Comparison of Revised Proposal to SEIS Alternative 5 and SEIS Alternative 6

The SEIS fiscal analysis estimated that both Alternative 5) and Alternative 6 would generate more in service costs than line tax revenues by 2037. However, it was noted that subscriber fees could scale to meet costs beyond line fee revenue as has been the case historically for KITTCOM. The Revised Proposal reflects the same conclusion as SEIS Alternative 5 and SEIS Alternative 6 as summarized above.

8. Cle Elum-Roslyn School District

Tax Revenues

Property Tax

In 2019, maintenance and operations levies proposed by local school districts and approved by voters were replaced by enrichment levies as part of the state's McCleary resolution. Enrichment levies are capped at the lesser of $1.50 per $1,000 of assessed value or $2,500 per full-time equivalent student. For taxes due in 2020 and beyond, the levy cap for voter-approved enrichment levies has increased. Enrichment levies are capped at the lesser of two limits for districts with less than 40,000 full-time students (which would include Cle Elum-Roslyn School District):

- $2.50 per $1,000 of assessed value, or
- $2,500 per full-time equivalent student, adjusted by inflation for taxes due in 2021 and later.

Since the district's enrichment levy is lower than the $2.50 threshold, the levy is estimated on the $2,500 per full-time equivalent student basis (adjusted for inflation at 3% a year). For the analysis, households are transformed into students using the district student generation rate and the incremental levy impact is computed by the growth in students coming from 47° N.

Service Impacts

Teachers

The Public Services analysis in the SEIS Addendum estimates an impact of 15.8 teachers will be needed at development buildout of the Revised Proposal. These personnel are added to meet demand proportionate to population growth at 47° N. The following assumptions are used to approximate the cost of a of these staff:

- An annual salary of $75,440 for a teacher is assumed based on the U.S. Bureau of Labor Statistics May 2021 State Occupational Employment and Wage Estimate for Washington State using the Eastern Washington Nonmetropolitan Area that includes Kittitas County (the average annual wage is used).
- A benefit multiplier of 38.1% is used based on the *Employer Costs for Employee Compensation for state and local government workers by occupational and industry group* as estimated by the U.S. Bureau of Labor Statistic's National Compensation Survey (May 2021 release).
- All costs are inflated to the year of incurrence at a rate of 3.0%.

Buses

The Public Services analysis in the SEIS Addendum estimates an impact 3.9 to 5.2 new buses will be needed at development buildout of the Revised Proposal. It is assumed that the reasonable estimate for a new diesel bus is $150,000 per vehicle.

Fiscal Impact

The exhibit below summarizes the cost impact of the Revised Proposal. While costs exceed enrichment levy revenues, the School District will also receive intergovernmental revenues, the majority through state school funding support. This source accounts for over 75% of total District revenues. The analysis assumes that these sources of state and federal support would scale to meet these service costs. The impact on the school's main enrichment levy would be the same for every student generated within the development as it is for the existing district due to the changes in how local enrichment levies function after the McCleary resolution.

Exhibit 13: Revised Proposal - Summary of Costs for the School District

Source: ECONorthwest calculation, 2022.

Costs	2023	2024	2025	2026	2027	2028	2029	2030
Teachers	$0	$429,000	$885,000	$1,227,000	$1,589,000	$1,802,000	$2,026,000	$2,087,000

Costs	2031	2032	2033	2034	2035	2036	2037
Teachers	$2,149,000	$2,214,000	$2,280,000	$2,349,000	$2,419,000	$2,492,000	$2,566,000

Exhibit 14: Revised Proposal - Summary of Local Tax Revenues for the School District

Source: ECONorthwest calculation, 2022.

Revenues	2023	2024	2025	2026	2027	2028	2029	2030
Enrichment Property Taxes	$0	$157,000	$324,000	$449,000	$581,000	$659,000	$741,000	$763,000

Revenues	2031	2032	2033	2034	2035	2036	2037
Enrichment Property Taxes	$786,000	$810,000	$834,000	$859,000	$885,000	$911,000	$939,000

The cost of needed buses is estimated between $585,000 and $780,000. There is state funding for the purchase of school buses, but it typically does not cover the full cost of a school bus.

Comparison Revised Proposal to SEIS Alternative 5 and SEIS Alternative 6

The SEIS fiscal analysis estimated that both Alternative 5) and Alternative 6 would generate more service costs than local property tax revenues by 2037. The Revised Proposal would similarly generate greater costs than local revenues. However, the SEIS and this analysis note that intergovernmental funds have scaled to meet costs beyond local property tax revenue historically and are expected to do the same in the future.

9. Mitigation Discussion and Recommended Measures

This section identifies appropriate mitigation measures for the potential fiscal impacts identified in the previous discussion . Proposed measures are specific to mitigating the impacts of the Revised Proposal by Sun Communities. The Public Services analysis for the SEIS Addendum notes that the applicant is currently working with affected public service providers to execute mitigation agreements, where appropriate and to the extent possible, and to create a program to monitor actual revenues, and possibly expenses, for the provider. The program would, to the maximum extent possible, strive to time expenditures to the availability of revenues and strive to time capital expenditures to when the jurisdiction has sufficient capacity to issue bonds for the improvements and sufficient tax revenue to service the debt. Executed agreements would be included or referenced in a Development Agreement. The program could also rely on shortfall mitigation payments to address any identified adverse fiscal impacts identified through the monitoring program.

The cost analysis for affected jurisdictions is based on FTE estimates based on personnel-to-population ratios. For assigning costs and considering mitigation agreements, three factors should be considered:

1. Personnel-to-population ratios are a reasonable method to approximate staffing impacts but can overstate the true cost of delivering services. This is because they frame the need using averages as opposed to understanding the marginal approach to delivering services where governments benefit from economies of scale and the efficiencies that go with them. In this SEIS Addendum, this approach is reasonable as the analysis seeks to understand the potential outer bounds of potential impacts.
2. Population-based standards are commonly used and convenient formulas to use in the absence of adopted service standards. These personnel-to-population ratios used in the Public Service analysis are based on the population of households living in the area relative to the staffing in place. However, that staffing not only serves those living in the district but also those visiting the area. For example, the staffing for the police force for the city of Cle Elum is clearly driven by not only residents of the city but also the many visitors to the city's commercial areas and those passing through the City. Therefore, the use of 47° N household population in combination with the RV Resort visitors "proxy" population amplifies the effect of these visitors since they are likely "accounted" for in the personnel-to-permanent population ratios. In effect, therefore, the RV proxy population may involve double counting.
3. The use of the personnel-to-population ratios results in the computation of fractional FTEs relative to buildout at 47° N. While revenues can be added in a more linear fashion (i.e., there is a relationship between investment/valuation and taxes generated), costs can tend to be "lumpier" since it can be hard to hire 0.2 FTE for example and an agency may have to hire for a larger (or smaller) share of full-time employment. The timing and

extent of these more practical consideration will also determine when costs are incurred relative to the availability of revenues.

Measures to Mitigate Fiscal Impacts

This section organizes fiscal mitigation measures by taxing authority/entity. It should be noted that the original approval required execution of a mitigation agreement with each service provider.

City of Cle Elum

The pre-annexation agreement for the approved Trendwest UGA Master Site Plan (FEIS Alternative 5) identified several conditions to mitigate fiscal shortfalls and to ensure existing citizens and ratepayers would not suffer negative financial impacts because of the development. Conditions cited that Trendwest would: allow a Municipal Facilities and Services Expansion Plan to guide capital expansions; make fiscal shortfall mitigation payments; pay for the development's share of planning, water/wastewater treatment plant construction, and permit fees; and coordinate security forces with police and fire services. This analysis calculated net fiscal impacts for the city of Cle Elum. For the Revised Proposal, the analysis identifies:

- A cumulative net surplus in year 2037 of $2.9 million to cover police and fire costs.
- An additional cumulative surplus of $9.7 million in restricted revenues.

Based on this analysis, mitigation for fiscal impact to the City of Cle Elum is not anticipated to be necessary to maintain the fiscal balance of the underlying impacted enterprise.

The estimates provided as part of this analysis are based on the best information available but are not certain as an outcome. The economy is a very dynamic place and economic shocks (both positive and negative) are hard to forecast with any precision (e.g., timing, direction, magnitude, and duration). The actual performance of the city's fiscal situation will be highly influenced by these economic shocks as well as the measures undertaken by federal, state, and local policy makers.

An additional complicating element is understanding the city's underlying fiscal position absent growth at 47° N. For example, Washington State's tax policy favors land development for local jurisdictions by allowing for the taxation on construction activity and accounting for new construction add-on value to exceed the 1% limit on levy growth originally imposed by I-747. In this light, growth at 47° N and its estimated fiscal surplus helps subsidize other parts of the city enterprise or deal with underlying cost and revenue imbalances in the city. For example, growth at neighbor Suncadia and within the city have driven city revenues over the past decade. In 2011, city revenues totaled $2.4 million. By 2021, those revenues had grown to

$7.5 million. From a bottom-line perspective, its ending balance was $890,000 in 2011 and was $4.7 million in 2021.[6]

To reflect the uncertainty relating to predicting the future identified in the two prior paragraphs, it is recommended that a review of the assumptions used in the fiscal analysis be performed at year 5 of development, and appropriate updates to the analysis should be made at that time. If future mitigation should become necessary—consistent with typical municipal budgeting practices -- the city could impose new taxes or fees to balance its budget or seek to change levels of public services to meet available revenues. For instance, the city of Cle Elum does not currently impose all the funding mechanisms that cities rely on to fund services. For example, the city could consider implementing local option taxes (such as a levy lid lift that could be passed by voters) or the creation of business and occupation taxes. The city could also increase tax rates (such as their utility tax rates). Furthermore, future negotiations could consider the measures proposed in the previous pre-annexation agreement.

Kittitas Hospital District No. 2

Fiscal analysis for the hospital district found that projected costs for EMS and clinic services were greater than projected property tax revenues alone, with the Revised Proposal and all other SEIS alternatives. However, tax revenues do not provide a complete picture of fiscal conditions since the district would also receive patient/user service fees and other revenues which, in 2021, accounted for about 60% of the district's total revenues. For example, The District leases the clinic building to Kittitas Valley Healthcare (Hospital District #1) for their operation of the KVH Family Medicine (Cle Elum Rural Health Clinic) for which District #1 pays District #2 lease payments.

It is therefore difficult to assess the underlying fiscal situation of the district over time relative to the proposal since property taxes do not, and are not intended to, fully cover funding of services. This analysis assumes that new FTE would be added to meet service needs, and therefore, as service needs grow so too would non-property tax revenues. Again, this is a key assumption, but this analysis has no publicly available data from the District to rule out if there is a structural issue between its cost of service relative to the combination of fees and taxes it receives. However, the District has grown its beginning fund balances over time over during a period where both property taxes continue to grow while also being a smaller share of overall revenues. In 2014 it had a beginning balance of $3,435,567 which had grown to $6,366,267 in 2021.[7]

However, all jurisdictions that rely on the property tax are dealing with the structural limitations of this revenue source. The current EMS levy rate is $0.16, and the regular hospital rate is $0.17 per $1,000 in assessed value. The effects of the 1% limit factor mean that levy rate declines year over year as the rate of assessed value growth outpaces the rate of levy growth. Districts faced with this issue must contemplate levy lid lifts to raise the level of property tax

[6] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.

[7] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.

funding if they are to maintain the relative purchasing power of this revenue source. For example, in 2014 property taxes accounted for 54% of total revenues for the district. In 2021, that amount had shrunk to 41% so reliance on the property tax has been declining for some time within the district.[8]

The mitigation section for FEIS Alternative 5 cited several criteria for consideration in a final mitigation agreement. One such criteria was that the Hospital District would track property tax revenues and patient fees attributed to FEIS Alternative 5 and, should revenues not cover costs of service, Trendwest would make monthly mitigation payments to avoid fiscal shortfalls. Other criteria included capital cost considerations (e.g., capital expenses would be purchased with bonds, capital costs would be subject to Trendwest's monthly mitigation arrangement, and capital equipment would be funded by Trendwest). These criteria could inform future negotiations to mitigate a fiscal shortfall, if any.

Kittitas Hospital District No. 1

Fiscal analysis for the hospital district found that projected costs would not have any offsetting property taxes under the Revised Proposal since Cle Elum (and 47° N) is not within its taxing district. Like the situation for Hospital District #2, user fees are the primary basis for funding services. Users living in 47° N or visiting the RV resort would have the same financial arrangements (i.e., patient and user fees) as existing Cle Elum residents, or any resident anywhere, when they use the hospital district's services. It is not clear on what basis mitigation would be appropriate for a development that is outside of the district and taxing area and where patients would pay fees for the services provided. In fact, the district hardly relies on property tax revenues within its own taxing boundaries. In 2021, the district's levy accounted for 0.004% of its total revenues and patient fees represented approximately 94% of the District's revenues.[9]

Kittitas County 911

Projected revenues from the KITTCOM phone tax are less than projected costs for new FTE in the Revised Proposal. This is the current situation KITTCOM finds itself in more generally, in that the fixed fee nature of the rate combined with declining number of household lines places larger and larger pressure to control costs while relying on intergovernmental revenues or subscriber fees to balance the budget. Households within 47° N would contribute at the same level of per line charges as existing households within the district. It is reasonable to assume that intergovernmental revenues in the form of subscriber fees would scale up with growth in the city and county. Further, subscriber fees could reasonably be restructured to cover additional funding needs as underlying needs change. It is not clear how the net effect of these fees would be allocated to member jurisdictions since this analysis does not have access to the allocation formula and data.

[8] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.

[9] Office of the Washington State Auditor, Financial Intelligence Tool, 2022.

Cle Elum-Roslyn School District

The changes to enrichment levy funding from the McCleary resolution means that levy growth in the school district is a function of student enrollment growth. The result of this change on the fiscal impact means that local funding for operations is the same for students in the district as it would be for students in 47 ° N. While the analysis shows that cumulative costs derived from projected new teacher FTE are estimated to exceed projected local property tax revenues for operation of the Revised Proposal, the district receives additional intergovernmental revenues which are expected to contribute to overall student learning needs, mainly through state support for schools funded by the state property tax. Indeed, this is the underlying dynamic for local school funding in Washington State. For example, in the 2021-2022 budget year intergovernmental revenues and other non-property tax revenues account for nearly 82% of total district revenues.

With respect to buses, only partial state and federal funding is provided to replace school buses. Some school districts in the state have responded by requesting transportation levies or by using other general funds to purchase buses. The need for additional school buses from student growth at 47° N will likely need to be similarly accommodated. To the extent that there is other facility related issues, the School District's plans to develop an Early Childhood Learning Center in the future. This facility would help to address capacity issues in the district.

The mitigation agreement for FEIS Alternative 5 included dedication of a 25-acre site to the district; a survey would be used to understand development-related student enrollment (to determine an appropriate mitigation response); and a payment-matching system for portable classrooms and buses would be made by Trendwest until the development reaches a pre-agreed-to-assessed value ceiling. The 25-ac. site was subsequently dedicated to the district. The other factors could be considered in future negotiations to mitigate fiscal shortfalls as well.

Fiscal Monitoring Considerations

The Conditions of Approval for the Cle Elum UGA/Bullfrog Flats Master Site Plan includes the following provision:

> k. Provision shall be made for Developer's fiscal monitoring consultant to have access to detailed monthly local sales tax reports and other appropriate tax information to assist the City and Developer to assure that all taxes due to the City are properly reported and collected.

For this monitoring to take place, the fiscal monitoring consultant will need the following information:

- Property Taxes. The consultant will need information from the county assessor that detail new construction value and assessed value for all 47° N tax parcels.
- Sales Taxes. The city will have to work with Washington State Department of Revenue to request individual tax reports for businesses and households. If these data are not available to the fiscal monitoring consultant due to data privacy restrictions, the

consultant will have to work with publicly available retail sales data to apportion city receipts to 47° N.

- Utility Taxes. Due to the mix of utility providers, the consultant will have to work with publicly available utility tax data to apportion city receipts to 47° N.
- Real Estate Excise Taxes. The consultant will need information from the county assessor to summarize real estate transactions within 47° N.

These types of fiscal monitoring can be cumbersome and difficult to assess since precise information on nature of costs and revenues are not possible to collect or can be administratively burdensome to work through. An alternative arrangement for the need for fiscal monitoring could a negotiated agreement between the parties to address any fiscal concerns around the nature and timing of public service costs relative to the revenues that support them.

Appendix F

MITIGATION MEASURES AND SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

APPENDIX F

SUMMARY OF MITIGATION MEASURES & SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The following summary compiles all mitigation measures identified in the Final SEIS to address the significant adverse impacts of the SEIS Alternatives. The mitigation measures are updated and augmented in a few instances to reflect the updated analysis of the Revised Proposal that is contained in the SEIS Addendum. Mitigation measures that have been updated for the Revised Proposal are noted with underlined or strike-through text. The mitigation measures are organized into several categories, as described below.

- **Proposed Mitigation Measures (Included in the Project)** reflect several types of measures. There are measures that the Applicant has preliminary proposed; that are included or implicit in the revised Master Site Plan contained in the pre-application materials submitted to the city; that are based on measures included in the SEIS and adapted to reflect the Revise Proposal; and/or are above and beyond the "Required Mitigation Measures" described below. This category of measures also includes certain conditions of approval from the 2002 Bullfrog Flats Development Agreement, which were developed to mitigate the environmental impacts of the Bullfrog Flats Master Site Plan as identified in the 2002 Cle Elum UGA Final EIS and through the approval processes for the project. These conditions are summarized in the mitigation measures, some verbatim and others paraphrased for the sake of simplicity.

  Because substantial time has passed since the Development Agreement was executed, a lack of complete documentation, and changes in the proposal, the rationale or need for certain of the conditions or some specific requirements is not clear. Also, certain of the conditions no longer apply because they have been performed (e.g., certain properties have already been dedicated to the city). Therefore, only identified conditions of approval that clearly appear to pertain to the Revised Proposal, and which the Applicant has preliminarily agreed to include in, or are implicit in, the revised project, are listed in this summary; modifications that are considered appropriate to reflect the changes in the Revised Proposal and the updated analysis in the Addendum are also identified (underlined or strike-through). It should be noted that these conditions are not categorized as "included in the project" at this point because a formal Master Site Plan Amendment application and a proposed Development Agreement have not been submitted to the city as of this

writing. In addition, the City Council may decide to through the land use review process to add or delete individual conditions. However, it is assumed for purposes of the summary that Bullfrog Flats conditions of approval will likely become part of the proposal in the future. As such, the verb "would" is used in the SEIS Addendum to indicate a condition that is assumed to be relevant pursuant to the Addendum analysis and that the City could impose as a condition of approval.

- **Required Mitigation Measures** are measures required by code, laws, or local, state, and federal regulations and the word "would" is used to indicate that compliance is assumed.

- **Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)** are measures that are based on the conditions of approval contained in the 2002 Development Agreement but that that the SEPA consultant does not consider likely to apply to the Revised Proposal and will depend on changes to the adopted Development Agreement that may be proposed in conjunction with the major modification and new or updated Development Agreement. These measures are not included in the project at this point, as a formal Master Site Plan Amendment application has not been submitted to the City. As such, they are typically represented with the verb "should" in the Final SEIS and SEIS Addendum to indicate a condition recommended by the City.

- **Other Possible Mitigation Measures** are other measures identified by the SEIS team and the city that could be implemented to further reduce impacts and are represented with the verbs "should" or "could".

The mitigation measures listed below will serve as a basis for development conditions that the City may consider and impose in conjunction with approval of the 47° North Master Site Plan Amendment Revised Proposal and a new or updated Development Agreement.

Earth

Required Mitigation Measures

Structural Standards

- The Cle Elum Municipal Code includes performance standards for development in geologically hazardous areas (CEMC 18.01.070 (F)) that would be followed for development on the 47º North site. These standards include the following:
    - Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to the existing topography;

- Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;
- The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties; and
- Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer.

Erosion Hazards

- A Temporary Erosion and Sediment Control (TESC) and Stormwater Pollution Prevention Plan (SWPPP) would be developed for the project and erosion and sedimentation control Best Management Practices (BMPs) would be implemented during construction as described in the 2019 *Washington State Department of Ecology Manual for Eastern Washington* (2019 Ecology Manual). BMPs may include but are not limited to the following:
  - Use of stabilized construction entrances;
  - Stabilization of construction roads and parking areas;
  - Applying water to exposed soil surfaces to control dust;
  - Use of wheel washes for construction traffic leaving the site;
  - Use of sediment traps and inlet/outlet controls where applicable;
  - Use of perimeter silt fencing; and
  - Use of temporary cover measures such as sheet plastic, mulch, and hydroseed.

- During construction, monitoring of erosion and sediment control by a Certified Erosion and Sediment Control Lead would be required for the project by Ecology.

Landslide Hazards

- Foundation setbacks for buildings and other structures would comply with criteria established in Section 1808.7 of the 2015 *International Building Code* (IBC), including:
  - For foundations located adjacent to the top of steep (> 33.3%) slopes, the face of the foundations would be set back from the steep slope a distance equal to or greater than the lesser of 40 feet of H/3 where "H" is equal to the height of the steep slope; and
  - For structures located adjacent to the toe of a steep (> 33.3%) slopes, the face of the structures would be set back from the toe of the steep slope a distance equal to or greater than the lesser of 15 feet or H/2 where "H" is equal to the height of the steep slope.

- Placement of structural fill would be avoided on or adjacent to the top of steep (greater) than 40% slopes.

- Permanent cut or fill slopes would not exceed a maximum inclination of 50%.

- Infiltration facility setbacks from steep slopes would comply with requirements outlined in the 2019 Ecology Manual. Specifically, the 2019 Ecology Manual requires that infiltration ponds be set back from the top of a slope of 15% or steeper at a distance equal to or greater than the height of the slope. The 2019 Ecology Manual allows for lesser or greater setbacks where a comprehensive site assessment concludes that the alternate setback is justified based on the site conditions. Slopes in excess of 15% exist on the ~~adjacent 25-acre~~ commercial property ~~and on the municipal/community recreation center site~~. Siting of infiltration facilities in this area would consider the slope setback requirements of the 2019 Ecology Manual.

Other Possible Mitigation Measures

Coal Mine Hazards

- Although there is low risk for coal mine hazard impacts, mitigation of this risk could be achieved by using building methods and construction materials that would reduce the risk of structural damage, such as:
    - Reinforce concrete foundations supporting a flexible superstructure (e.g., wood framing or other flexible building materials);
    - Use flexible (asphalt) pavement for road construction; and
    - Use flexible pipes, couplings, and fittings for underground utilities.

Significant Unavoidable Adverse Impacts

Significant amounts of earthwork would be required for development of the SEIS Alternatives and the Revised Proposal, similar to other urban master plan projects, and are unavoidable. However, with implementation of the mitigation measures listed above, no significant unavoidable adverse earth-related impacts are anticipated.

Water Quantity & Quality

- Note: Proposed development under the revised Master Site Plan would not directly impact any on or off-site water resources (e.g., wetlands and streams). Therefore, no mitigation is warranted for direct impacts.

Bullfrog Flats Conditions of Approval (Included in the Project)

- Sufficient water rights are available from New Suncadia to supply water for proposed development of the 47° North site.~~ and the adjacent 25-acre property.~~ New Suncadia and Ecology signed an agreement in December 2015 regarding how they would use their water rights and their mitigation obligations, including putting water rights into Ecology's Trust Water Rights Program and transferring water rights

to the City of Cle Elum. The transfer of water rights to the City is pending as of this writing.

Required Mitigation Measures

- Temporary stormwater management measures would be implemented that would follow the BMPs and requirements of the Construction SWPPP and the currently active National Pollutant Discharge Elimination System (NPDES) Permit (No. WA0052361) for the project.

- A Master Drainage Plan would be prepared and implemented, consistent with the 2019 Ecology Manual.

- Stormwater Infiltration facilities would be sited to avoid increasing the potential for landslides in any steep slope or landslide hazard areas.

- Design-level exploration and infiltration testing would be performed for the proposed infiltration ponds to assess suitable infiltration rates for infiltration facility design, as described in the 2019 Ecology Manual.

Significant Unavoidable Adverse Impacts

Impacts on water quality or wetlands under the SEIS Alternatives and the Revised Proposal, if any, would be short term, with no significant broad, enduring, or cumulative effects. If inadvertent isolated and localized releases of turbid water or petroleum products does occur during construction, significant water quality impacts could result. However, with implementation of the proposed TESC plan and SWPPP, these impacts could be avoided.

Heavy metals, landscape chemicals, and fecal coliforms would increase in stormwater runoff with the proposed urban development, even after treatment by BMPs. With the proposed permanent water quality treatment facilities, no adverse impacts to water resources are anticipated.

No significant water supply impacts are expected because the water rights that are now owned by New Suncadia will be conveyed to the city; are adequate to provide water to development of both the Suncadia resort and the 47° North site; would mitigate consumptive use by induced off-site development caused by Suncadia development; would mitigate consumptive use resulting from development of the fallowed land formally irrigated; and would place water in Ecology's Trust Water Rights Program for instream flow purposes and for purchase for new development by third parties within certain portions of the rule area.

Proposed Mitigation Measures (Included in the Project)

- No direct impacts to wetlands or the Cle Elum River would occur. The riparian wetlands along the Cle Elum River would be retained within dedicated open space that would encompass their required buffers and the entire river corridor, as well as additional forest habitat. Isolated Wetlands 4, 5, and 6 and their buffers would be retained in an open space tract.

- Conservation easements that were granted for the Managed Open Space and River Corridor Open Space onsite by Trendwest to the Kittitas Conservation Trust would remain in effect with the proposed project.

- The proposed landscaping onsite would generally consist of natural, local, and drought tolerant plants, including hydroseed mixes that could include wildflowers, but not any plants considered to be noxious weeds – a Noxious Weed Plan would be prepared to ensure that such plants are not planted. Imported soil materials would also be weed-free. The use of native plant material could benefit wildlife.

Bullfrog Flats Conditions of Approval (Included in the Project)

- With respect to overall fish and wildlife habitat, the project would include and be bound by those provisions in the Cooperative Agreement between Trendwest (now New Suncadia), Washington State Department of Fish and Wildlife (WDFW), and the Yakama Nation that apply to potential cumulative impacts from the Suncadia resort and development of the 47° North ~~and adjacent 25-acre property~~. Mitigation actions by others could include the City of Cle Elum enforcing use and access restrictions in designated areas, especially within the Cle Elum River open space, to minimize disturbance to fish and wildlife during mating and breeding seasons.

Required Mitigation Measures

- The 47° North project would adhere to the City of Cle Elum critical areas ordinance and Shoreline Master Program regulations regarding avoidance and minimization of impacts, as well as buffer requirements and protection of fish and wildlife habitat conservation areas.

- Construction limits, including staging areas, would be clearly marked in the field prior to beginning construction activities.

- The limits of wetland buffer areas would be clearly marked on construction plans and in the field to prevent unauthorized damage to critical areas during construction.

- Construction staging areas would be located outside of wetland buffers within the RV resort area to minimize impacts to vegetation.

- Any wetland buffer areas temporarily disturbed for construction access and staging would be revegetated with a mixture of native plant species following completion of construction activities, pursuant to an approved mitigation plan.

- Vehicle re-fueling and maintenance activities would be avoided within wetland buffers, or within at least 100 feet of wetlands.

- Appropriate BMPs and TESC measures would be implemented in accordance with an approved SWPPP, consistent with standards of the 2019 Ecology Manual, including specific measures to prevent and control spills of pollutants, and to handle, control, and store potential contaminants and their potential to damage surface waters and fisheries resources.

- A permanent stormwater management system would be designed and installed consistent with the 2019 Ecology Manual and applicable City of Cle Elum development regulations in place at the time of permitting for project. Operation of this system would avoid and minimize the potential for impacts on surface waters and fisheries resources.

- As necessary, clean stormwater runoff would be directed to the wetlands' catchment area to retain the wetland hydrology.

Other Possible Mitigation Measures

- Where feasible, conservation easements could be conveyed to additional large forested open space areas across the site – beyond those associated with the Cle Elum River corridor – which would enable these areas to be managed for healthy forests and wildlife habitat in coordination with recreational uses.

- To address impacts of increased angler fishing pressure on fisheries resources and habitat, WDFW is expected to continue to manage the regional fishery. They would continue to monitor fishing in the Cle Elum and Yakima Rivers and evaluate local fish populations. If problems were identified, WDFW would likely implement selective gear rules in affected areas. If fish populations continued to decline, WDFW could apply catch and release regulations in additional areas, narrow the fishing season, or as a last resort enact closures.

- To mitigate impacts of increased fishing pressure on fisheries resources with proposed development, the Applicant could: 1) explore angler management options with the WDFW and Yakama Nation, such as increased angler education, dispersing angling

pressure to underused areas, and providing alternatives to traditional fishing opportunities; 2) implement creel surveys (coordinated with WDFW) to address issues directly related to angler fishing presence; and/or 3) implement fish population surveys (coordinated with WDFW to assess quantitative changes in discrete stream reaches).

- Hiking trails could be located outside the Cle Elum River corridor so that elk viewing would be possible without traversing the elk habitat. Elk viewing areas could be established.

- Bear-proof garbage receptacles, well-signed natural areas, informational signage about the risks associated with living near natural areas, well-marked common road crossings, well-marked speed limits, and environmental education and outreach could be implemented to help minimize human/wildlife conflicts.

- A potential measure could be included in the Land Stewardship Plan or in another agreement to develop a plan to manage retained open space areas to better facilitate elk, which could help reduce their impacts elsewhere.

Significant Unavoidable Adverse Impacts

No significant impacts to wetlands, aquatic, or fish habitat are expected. Development of the site under the SEIS Alternatives and the Revised Proposal would result in the following unavoidable adverse impacts:

- Removal of a substantial area of the existing native vegetation and soils and replacement by non-native communities or impervious surfaces; retained native vegetation communities among the various development areas would become primarily edge habitat;
- A reduction in the local populations of most native wildlife species in the area, and continuation of a shift in species composition to favor species more adapted to urban environments; those animals displaced from the site would likely perish; and
- An increase in disturbance of adjoining areas of native forest and riparian habitat and on adjacent lands as a result of increased human activity including vehicular traffic.

Such impacts are typical and unavoidable in the context of urban development.

No additional significant unavoidable adverse impacts to plants and animals, or wetlands would likely occur under the SEIS Alternatives and the Revised Proposal with implementation of the mitigation measures listed above.

Air Quality/Greenhouse Gas Emissions

Proposed Mitigation Measures (Included in the Project)

- Construction Emission Control: All contractors would be required to implement air quality control plans for construction activities. Air quality control plans would include BMPs to control fugitive dust and odors such as:
    - Use water sprays or other non-toxic dust control methods on unpaved roadways;
    - Minimize vehicle speed while traveling on unpaved surfaces;
    - Prevent track-out of mud onto public streets;
    - Cover soil piles when practicable; and
    - Minimize work during periods of high winds when practicable.

- The following mitigation measures would be used to minimize air quality and odors issues caused by construction equipment tailpipe emissions:
    - Maintain the engines of construction equipment according to manufacturers' specifications;
    - Minimize idling of equipment while the equipment is not in use; and
    - If there is heavy traffic during some periods of the day, schedule haul traffic during off-peak times (e.g., between 9:00 AM and 4:00 PM) when it would have the least effect on traffic and would minimize indirect increases in traffic-related emissions.

- Single family and some of the multi-family residences under ~~SEIS Alternative 6~~the Revised Proposal would consist of manufactured housing, which research has shown can result in reduced construction-related GHG emissions compared with stick-built houses.

- Wood-burning stoves would not be permitted in the proposed residences.

- Wood-fueled campfires would not be permitted in the RV resort area.

Required Mitigation Measures

- Construction and development would comply with applicable air quality regulations, including:
    - National Ambient Air Quality Standards (NAAQS);
    - State Ambient Air Quality Standards;
    - Ecology's Indoor Burning Smoke Reduction Zone regulatory framework;
    - State and City of Cle Elum outdoor burning regulations; and
    - State of Washington Greenhouse Gas laws.

Other Possible Mitigation Measures

- The Applicant should consider using energy efficient lighting in the project.

- The use of solar energy could be considered and analyzed further.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on regional or local air quality are anticipated due to construction activities with the SEIS Alternatives and the Revised Proposal. Temporary, localized dust and odor impacts could occur during construction. The regulations and measures identified above are anticipated to mitigate any potential adverse construction air quality impacts.

No significant unavoidable adverse operational impacts on regional or local air quality are anticipated with the SEIS Alternatives and the Revised Proposal. The 47º North site is located within an air quality attainment area for all criteria air pollutants and the project is not expected to pose issues related to air toxics.

Although no threshold of "significance" has been established by state law to determine GHG impacts, modeled GHG emissions related to the project in 2037 would be negligible relative to the forecasted total statewide annual GHG emissions.

Noise

Proposed Mitigation Measures (Included in the Project)

- A large portion of the site would be preserved in undeveloped, forested/vegetated open space. Forested/vegetated areas and buffers that would be retained and possibly enhanced along the site boundary would assist in reducing noise impacts on surrounding uses.

Bullfrog Flats Conditions of Approval (Included in the Project)

- Construction would be limited to 7:00 AM to 7:00 PM, Monday through Saturday. Sunday construction should be on an emergency basis only and would need to be approved by the city.

- All construction equipment would have adequate mufflers, intake silencers, and engine enclosures to minimize construction equipment noise.

- Any stationary equipment that generates noise would be located away from sensitive receivers, including residential uses, the school property, the cemetery, and open space areas.

- Equipment servicing and maintenance times would be unrestricted. The city may review and approve case-by-case exceptions to this condition if justified to comply with Washington State Department of Natural Resources industrial restrictions.

Required Mitigation Measures

- Construction and operation of the project would be generally consistent with numerous Cle Elum Municipal Code requirements related to noise, including Chapter 2.48.130, Chapter 8.12.020, Chapter 10.20, Chapter 10.24.020, and Chapter 17.51.010. The CEMC, however, is focused primarily on nuisances and does not address or provide numerical thresholds for construction, transportation, or operational noise. As such, Washington State noise regulations would apply where the CEMC has not established noise thresholds.

- Consistent with the Cle Elum Municipal Code, the proposed RV resort would be required to submit a management plan, including rules governing park quiet hours, as part of the Conditional Use Permit process or Development Agreement.

- Roof equipment in the commercial development could require noise baffling, if necessary, to meet state noise standards. This condition will be reviewed and any baffling requirements imposed as part of the building permit review for the commercial buildings.

Other Possible Mitigation Measures

- Construction noise could be reduced by using enclosures or walls to surround noisy stationary equipment, substituting quieter equipment or construction methods, and minimizing time of operation. To reduce construction noise at nearby receiver locations, the following mitigation measures could be incorporated into construction plans and contractor specifications:
  - Erect portable noise barriers around loud stationary equipment located near sensitive receivers;
  - Turn off idling construction equipment;
  - Require contractors to rigorously maintain all equipment; and
  - Train construction crews to avoid unnecessarily loud actions (e.g., dropping bundles of rebar onto the ground or dragging steel plates across pavement) near noise-sensitive areas.

Significant Unavoidable Adverse Impacts

Noise levels would increase in the study area due to short-term clearing/grading, demolition and construction noise, and long-term traffic and human noise under the SEIS Alternatives and the Revised Proposal. The noise from the proposed residential, commercial, and

parks/recreational uses is expected to be minor; with implementation of the mitigation measures listed above, no significant impacts are expected.

Land Use

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres (58% of the site) should be retained in open space, including critical areas such as the Cle Elum River, wetlands, and steep slopes.~~ A total of approximately 553 acres of open space (62% of the site) would be part of the project, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way. Existing easements are in place to protect the River Corridor Open Space and Managed Open Space in the western portion of the site. These easements would be retained by New Suncadia or transferred to the Applicant (Sun Communities).

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

- A minimum of 10 acres would be set aside and dedicated to the City for future expansion of the Laurel Hill Memorial Cemetery.

- Natural open space buffers at least 100 feet wide would be maintained along Bullfrog Road. In addition, undeveloped, forested open space would be preserved onsite within the northeastern quadrant of the Bullfrog/I-90 Interchange.

Required Mitigation Measures

- Mitigation measures identified in numerous sections of the SEIS and Addendum would also minimize land use impacts from construction activities, consistent with City regulations (see DSEIS, FEIS, and Addendum sections on Earth, Air Quality/GHG Emissions, Noise, and Transportation).

- The proposed uses and land use standards would be consistent with the City of Cle Elum Comprehensive Plan and zoning for the site). This conclusion would be verified based on submittal of the 47° North Master Site Plan application and consistency analysis contained in a staff report for the proposal.

- Development of the commercial center would maintain the 50-foot-wide platted buffer adjacent to the SR 903 right of way. ~~would be maintained with possible commercial development on the adjacent 25-acre property.~~

Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)

- Note: The Bullfrog Flats approval required conveyance of a useable area of 7.5 acres to the City of Cle Elum, or another public or non-profit entity approved by the City, for development of a minimum of 50 affordable housing units. The 50 housing units were not counted towards the 1,334-unit cap for the Bullfrog Flats project. The parcel or parcels were required to be identified and conveyed prior to approval of the 250th residential housing unit. The Revised Proposal includes development and dispersal of 50 affordable housing units within the project in lieu of dedication of land. The existing condition would be deleted or modified.

- Note: A current development condition applicable to the Bullfrog Flats site only permits small-scale retail uses that would serve the convenience needs of residents and employees to be included on the commercial site. Retail uses would be limited to 10% of the floor area of the commercial development, and no individual retail use would contain over 5,000 sq. ft. Primary entrance to the retail uses would not be allowed from SR 903 or Bullfrog Road. The approved Bullfrog Flats project also includes 75 acres/950,000 sq. ft. of business park uses. The Revised Proposal includes an approximate 150,000-square foot commercial center (retail, restaurant and office uses) on a 25-acre site with vehicle access from SR 903, and no business park uses. Approval would require modification or elimination of the current limitations.

Other Possible Mitigation Measures

- Internal buffers/screening could be provided onsite between single and multi-family residential development (MF-1, SF-4, SF-5, and SF-6) and the powerline easement where a recreational trail is proposed.

Significant Unavoidable Adverse Impacts

The conversion of the 47° North site from undeveloped forest/vegetation to a mixed-use master planned community under the SEIS Alternatives and the Revised Proposal would represent a significant change in the existing land use of the site. Such change would be unavoidable if the proposal is implemented. The change would be consistent with the City of Cle Elum land use and zoning classifications for the site and is not per se an adverse impact to land use or land use patterns. The site is located within a city/UGA and is considered appropriate for urban development. The proposal would represent a continuation of the existing trend of intensifying development in the city and adjacent area. With implementation of identified mitigation measures, no significant adverse land use impacts are expected. It is acknowledged, however, that some residents may consider the proposed development to be significant and adverse because of its size, location, or other factors.

Proposed Mitigation Measures (Included in the Project)

- ~~Approximately 477 acres of the site would be preserved as open space, including natural open space, Managed Open Space, River Corridor Opens Space, wetlands and their buffers, and power line easements~~. A total of approximately 553 acres of open space, including undeveloped open space (including community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the amended Master Site Plan.

- Development areas onsite would be arranged based, in part, on existing topographic features, as reflected in the preliminary Master Site Plan. Combined with existing, retained vegetation, site planning would block views of most elements of the project from most public off-site locations, and/or reduce the perceived visibility or scale of the overall project for viewers at ground level from locations where vegetation or topography does not.

- Proposed development would be consistent with architectural design and materials guidelines that would be developed by the Applicant for residential and other structures, and specifically tailored for the 47° North project site to ensure an overall consistent visual quality. Building materials would include muted colors and textures that are intended to blend into the existing natural setting and would be comprised primarily of wood and stone.

- Low-pressure sodium lights and full-cutoff shielding would be used on outdoor light fixtures.

- Residential area light fixtures would not be mounted higher than 30 feet.

- Unnecessary lighting of building facades would be avoided.

- Landscaping would be provided throughout the site and would be designed to create transitions and buffers between various land uses on and adjacent to the site, where necessary.

- Landscaping with native plants would help to connect the site visually and aesthetically to the surrounding area.

Bullfrog Flats Conditions of Approval (Included in the Project)

- Natural open space buffers at least 100 feet wide along Bullfrog Road would be maintained to screen or diffuse views to the interior of the site from this roadway. In addition, undeveloped, forested open space would be preserved onsite within the northeast quadrant of the Bullfrog/I-90 Interchange.

- Standards/recommendations for roadway lighting intensity consistent with the Illuminating Engineering Society of North America would be adopted.

- Lighting designs would be implemented in accordance with the International Dark Sky Association's Zone E1 Standards. These standards are recommended for use in "areas with intrinsically dark landscapes." Examples are national parks, areas of outstanding natural beauty, areas surrounding major astronomical observatories, or residential areas where inhabitants have expressed a strong desire that all light trespass be strictly limited."

Required Mitigation Measures

- The 50-foot-wide platted buffer adjacent to the SR 903 right-of-way would be maintained in conjunction with proposed commercial development ~~on the adjacent 25-acre property~~. As feasible, and accounting for the need for signage, entry visibility, and similar design considerations, the existing forested vegetation in this area could be retained to partially screen the development and help maintain a natural, forested entry to the City of Cle Elum.

Other Possible Mitigation Measures

- The vegetation in the perimeter buffer should be maintained and replaced if, when, and where necessary in response to natural forces, selective thinning, and fire-wising activities.

Significant Unavoidable Adverse Impacts

Proposed development on the 47° North site under the SEIS Alternatives and the Revised Proposal would significantly and unavoidably change the visual character of a portion of the site, from undeveloped to developed and urban in character. Some might consider this change to be an adverse impact. However, based on the analysis, the nature and extent of change would not be visible, or would be only partially visible, from most public off-site locations. The site would be visible to the greatest extent from higher elevation vantage points.

Development of the 47° North site under the SEIS Alternatives and the Revised Proposal would result in additional ambient light from accumulated buildings and landscape lighting. This would contribute to existing skyglow effects created by Cle Elum, South Cle Elum,

Roslyn, Suncadia, and I-90. However, the increase in skyglow would be mitigated through implementation of International Dark Sky Association lighting designs. With implementation of the mitigation measures listed above, no significant adverse aesthetic/light and glare/skyglow impacts are expected.

Housing, Population, & Employment

Proposed Mitigation Measures (Included in the Project)

- ~~The estimated monthly mortgage payment for the proposed single family housing could be affordable to city residents, based on 60% of the city's and county's 2018 Median Household Income (MHI) and dedication of 30% or less of a household's monthly gross income to housing and utilities. This affordable housing would be located onsite throughout the proposed residential development.~~ Note: Fifty (50) affordable housing units would be integrated into the multi-family portion of the development. These affordable housing units would be developed and maintained by Sun Communities, but it is assumed that they would be managed by a public or non-profit entity approved by the city.

Bullfrog Flats Conditions of Approval (Included in the Project)

- ~~Access, water, and sewer would be constructed, consistent with development standards, up to the affordable housing parcel boundaries, as with every other parcel in the Master Site Plan.~~ Note: The Revised Proposal includes provision of affordable units by the Applicant in lieu of dedication of a site for future development of those units by others; the acreage shown in SEIS Alternatives 5 and 6 as being dedicated to the city for affordable housing development would be retained as undeveloped open space. The existing requirement would be duplicative of the proposal, therefore, and would be deleted or modified depending on the City Council's action on the Revised Proposal. It is also noted that the adopted Bullfrog Flats Development Agreement makes the city responsible for providing sewer and water to the affordable units; the Addendum identifies and evaluates the incremental demand for utilities associated with those units so impacts can be mitigated by the appropriate party.

- ~~Sun Communities, as successor to New Suncadia, would be given the option in a new or updated Development Agreement to assist in the selection process for potential owners/developers of the affordable housing parcel.~~ This condition is no longer relevant since the affordable housing would be integrated into the master plan's residential area and not located on a separate site.

- A minimum of 150 residential dwelling units, not including the 50 possible affordable housing units, would remain rental units and a covenant would be recorded on the

property to ensure this condition continues for 20 years. Note: This requirement would be met by the Revised Proposal. All proposed 180 multi-family housing units would be leased/rented; some of the single family housing would be leased/rented as well. A covenant may or may not be recorded to ensure this condition.

Required Mitigation Measures

- A housing policy in the 2019 City Comprehensive Plan (H-1.9) requires that affordable housing be provided in projects with more than 20 units. The Revised Proposal would exceed this requirement by providing 50 affordable housing units in the multi-family area onsite.

Bullfrog Flats Conditions of Approval (Not Included in the Project)

- ~~A useable area of 7.5 acres is required to be conveyed to the City of Cle Elum, or another public or non-profit entity approved by the city.~~ Note: Under the Revised Proposal, a separate area for affordable housing would not be conveyed to the city because this housing would be developed by the Applicant and integrated within the multi-family residential area onsite.

- The existing supply of affordable housing in Upper Kittitas County should periodically be monitored and inventoried, and as necessary advocated for, to help ensure that a continuous supply of housing is affordable for those earning the wages paid at the Suncadia resort. Note: This requirement does not appear to be necessary for the Revised Proposal given the reduced scale of housing and employment compared to the approved Bullfrog Flats project.

- The existing labor pool should be actively recruited, hired, and contracted with to minimize in-migration employment and associated housing impacts. Note: This condition may not be relevant to 47º North since construction labor demand would be considerably less than for Bullfrog Flats due to the inclusion of manufactured housing and its construction offsite.

Significant Unavoidable Adverse Impacts

Development of the 47° North site under the SEIS Alternatives and the Revised Proposal would increase housing demand, permanent population, and employment in the city. The amount of planned growth could be considered significant, and it is an unavoidable consequence of developing the Master Site Plan. In and of itself, however, growth is not necessarily an adverse impact if it has been properly planned for, including providing for adequate housing, infrastructure, and services (see DSEIS, FEIS, and Addendum Public Services, Transportation, and Utilities for information on the capacity of infrastructure and services to accommodate the SEIS Alternatives and the Revised Proposal, and mitigation measures to address any significant impacts). It is recognized, however, that some people

may consider any additional growth, and/or the particular types of development, to be an adverse impact.

Historic & Cultural Resources

Proposed Mitigation Measures (Included in the Project)

- ~~When the 25-acre property contemplated for future commercial use is proposed to be developed, a field investigation of the property should be conducted~~.

- The Applicant has voluntarily committed to pursue a Memorandum of Understanding (MOU) with the Yakama Nation regarding the protection of Cultural Resources on the 47º North project site. The Cultural Resources analyses in the SEIS and Addendum do not identify any direct impacts to resources located on the project site. In addition, the defined open space corridor adjacent to the Yakima River is subject to a pre-existing formal agreement that protects cultural and environmental resources within the defined open space. Notwithstanding these conclusions, the Applicant understands and appreciates that the Yakama Nation defines "cultural resources" more broadly than archaeological artifacts, and that this broader definition encompasses the larger context of historical activities and environmental conditions, and potential future indirect and cumulative effects on soils, water, fish and wildlife from development. The Applicant, therefore, agrees to pursue an MOU with the Yakama Nation that will address the potential to monitor construction activity proximate to culturally sensitive areas of the site, will consider protocols to ensure ongoing protection of the site's environmental resources, and any other issues of mutual concern to the parties.

Required Mitigation Measures

- Consultation with Department of Archaeology and Historic Preservation (DAHP) and Confederated Tribes and Bands of the Yakama Nation (Yakama Nation) would continue.

- Compliance with all state regulations (e.g., RCW 27.44, RCW 27.53, SEPA) related to cultural resources would continue. This includes State law regarding the need for an Archaeological Site Alteration Permit from DAHP for any disturbance to archaeological sites with objects that pre-date the historic era (i.e., precontact archaeological sites) or disturbance to historic archaeological resources that are eligible for or listed in the NRHP. Alterations to a site can include adding fill, building on, removing trees, using heavy equipment on, compacting, or other activities that could change or potentially impact the site, as well as archaeological excavations.

- An inadvertent discovery plan would be adopted for the project and made available onsite during construction.

- Onsite monitoring by a professional archaeologist or cultural resources specialist would take place during all ground disturbing activities with potential to intersect Holocene deposits, which were observed up to 8.5 feet below ground surface, including clearing, grubbing, grading, and construction excavations.

- Construction personnel would be trained on the identification of archaeological resources.

- In the event that ground disturbing or other activities result in the inadvertent discovery of archaeological deposits, work would be halted in the immediate area and contact made with DAHP and Yakama Nation CRP. Work would be halted until such time as further investigation and appropriate consultation is concluded. See Final SEIS Appendix B for details on protocols for inadvertent discoveries.

- In the unlikely event of the inadvertent discovery of human remains, work would be immediately halted in the area, the discovery covered and secured against further disturbance, and contact made with law enforcement personnel, consistent with the provisions set forth in RCW 27.44.055 and RCW 68.60.055. See Final SEIS Appendix B for details on protocols for inadvertent discoveries.

Significant Unavoidable Adverse Impacts

With implementation of the mitigation measures listed above, no significant unavoidable adverse impacts on historic and cultural resources are expected with construction and operation of the SEIS Alternatives and the Revised Proposal.

Parks & Recreation

Proposed Mitigation Measures (Included in the Project)

- ~~A total of approximately 477 acres of open space, including the Natural, Managed, and River Corridor Open Space areas, perimeter buffers, wetlands and their buffers, and on-site power easements, should be included in the project~~. A total of approximately 553 acres of open space, including undeveloped open space (such as community/ recreation open space, stormwater open space, and steep slope areas and their buffers), wetlands and their buffers, and the powerline right-of-way, would be included in the project.

- ~~Three public trail parks totaling 1.5 acres and two Community Trail Parks totaling 1.0 acres should be provided.~~ A Trail Head Park totaling 6.0 acres, public trail parks totaling 2.0 acres, and private parks/pocket parks totaling 1.0 acres would be provided.

- ~~An approximate 6-acre adventure center open to residents and the public should be provided.~~

- ~~Two private recreational amenity centers totaling 11 acres should be provided, one in the RV resort and the other in the residential area.~~ Private recreational amenity centers totaling 11 acres would be provided in the RV resort and residential area.

- A 627-site RV resort, including recreational facilities, would be provided.

- An approximate five-mile trail system and one mile of sidewalks would be provided and would connect on-site development and link to off-site trails in several locations.

Bullfrog Flats Conditions of Approval (Included in the Project)

  - The Applicant would support the City's efforts to obtain the necessary right-of-way or easement to construct an off-site connection from the 47° North site to the existing Coal Mines Trail and would contribute to the cost of the materials to construct the off-site trail connection.

  - A 12-acre parcel would be dedicated to the city for future construction of a municipal (community) recreation center. This requirement has been satisfied. The municipal recreation center site and funding have already been dedicated to the city and the site is not part of the site of the Revised Proposal.

Required Mitigation Measures

- The proposed recreational uses would be generally consistent with the City of Cle Elum Parks and Recreation Plan and would meet or exceed the Plan's LOS goals/targets for active parks, open space, trails/tracks/connections, and associated facilities. No further mitigation is required.

- The specific locations and sizes of parks would be identified in the application and on the Master Site Plan in accordance with Parks and Recreation Targets/Goals in the City's Comprehensive Plan.

Significant Unavoidable Adverse Impacts

An increase in demand for park and recreational services and facilities would be an unavoidable impact of population growth associated with the SEIS Alternatives and the Revised Proposal. With implementation of the mitigation measures listed above, no significant unavoidable adverse impacts to parks and recreational resources are expected.

Transportation

An updated Transportation analysis was performed for the Revised Proposal to identify changes in background conditions since the SEIS and to reflect changes in the proposal. The

timing of some required improvements has changed but the extent of non-compliant intersections has not changed. Note that this sub-section incorporates substantial information from the Transportation report and accompanying section of the Addendum to facilitate review and decision making.

Table 1 identifies potential mitigation measures at the 11 study intersections that are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour conditions in 2025, 2031, or 2037 due to 'Baseline' conditions or the Revised Proposal project traffic. These are the same intersections that were forecast to operate at non-compliant levels with full buildout of SEIS Alternative 6 in the same years and peak period.

As in the Final SEIS, **Table 1** also identifies two different approaches to calculating pro-rata shares to fund the identified mitigating improvements. Method A (Solely Developer Responsibility) and Method B (Shared City/Developer Responsibility) are both presented. The alternative methodologies, which reflect different principles of engineering practice and SEPA policy, are discussed in greater detail in **Appendix C**. The pro-rata shares identified in **Table 1** have been updated to reflect the updated 'Baseline' traffic volumes at the six study intersections on Bullfrog Road, the updated trip generation of the Revised Proposal, and incorporation of the commercial parcel into the project.

As described in the Final SEIS, the specific form of mitigation, the pro-rata share cost of the mitigation, and the timing of the improvements will be evaluated and discussed by the Applicant, the city, and affected agencies and jurisdictions, including WSDOT, Kittitas County, and the City of Roslyn. The selected mitigation improvement for each affected intersection, pro-rata share methodology, and timing of the mitigation will be incorporated into conditions of approval and a new or updated Development Agreement between the Applicant and the City of Cle Elum. Improvement needs and mitigation will also be addressed in subsequent updates to the appropriate jurisdiction's transportation plans and capital improvement programs.

Table 1
SUMMARY OF MITIGATION MEASURES AND PRELIMINARY ESTIMATED PRO-RATA SHARE – REVISED PROPOSAL

Off-Site Study Intersection	Estimated Year Improvement Required (Forecast LOS)	Potential Improvement to Mitigate Weekday PM Peak Hour LOS Deficiency [1]	Estimated Pro-Rata Share			
			METHOD A [2]		METHOD B [2]	
			Background Share [3]	47° North Share (Revised Proposal)	Background Share [3]	47° North Share (Revised Proposal)
IMPROVEMENTS NEEDED FOR '"BASELINE"'/BACKGROUND CONDITIONS						
#2 – Bullfrog Road / I-90 WB Ramps [5, 6]	2037 (LOS D)	Compact Roundabout	n/a	n/a	82.9%	17.1%
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903)	2025 (LOS E)	Restrict Northbound and Southbound Left-Turns	68.7%	31.3%	68.7%	31.3%
#11 – Douglas Munro Blvd / W 1st Street	2025 (LOS E)	Signalization[9]	94.4%	5.6%	94.4%	5.6%
#12 – N Pine St / W 1st Street	2025 (LOS D)	Compact Roundabout	95.5%	4.5%	95.5%	4.5%
#13 – N Stafford Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout [10]	74.7%	25.3%	74.7%	25.3%
IMPROVEMENTS NEEDED FOR CONDITIONS WITH REVISED PROPOSAL [4]						
By Year 2025:						
#7 – Denny Ave / W 2nd Street (SR 903) [7]	2025 (LOS D)	Restrict Northbound Left/ Southbound-Left Turns	n/a	100%	64.1%	33.9%
#9 – N Pine Street / W 2nd Street (SR 903)	2025 (LOS F)	Compact Roundabout	n/a	100%	69.9%	30.1%
#15 – N Oakes Ave / W 2nd Street (SR 903)	2025 (LOS E)	Compact Roundabout	n/a	100%	78.4%	21.6%
By Year 2031:						
#1 – Bullfrog Road / I-90 EB Ramps	2031 (LOS F)	Compact Roundabout	n/a	100%	77.2%	22.8%
#3 – Bullfrog Road / Tumble Creek Dr [6]	2031 (LOS F)	Refuge/merge lane on Bullfrog Rd	n/a	100%	78.0%	22.0%
#21 – Pennsylvania Ave / 1st Street (SR 903)	2031 (LOS E)	All-Way Stop	n/a	100%	84.9%	15.1%
By Year 2037: [5]						
N/A[8]	--	--	--	--	--	--

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; LOS results with mitigation are included in **Table 3.7-6**. WSDOT preference is a roundabout which is assumed unless identified otherwise.
[2] Estimated pro-rata share for 47° North is preliminary and will be adjusted based on a future Monitoring Program. The pro-rata share for Method A would be the full responsibility of 47° North for any improvements needed with the Revised Proposal. The pro-rata share for Method B would be shared between the background traffic and the Revised Proposal project traffic.
[3] Share of future traffic volumes associated with 'Baseline'/background traffic growth, excluding Revised Proposal.
[4] Mitigation not triggered by 'Baseline' conditions but triggered by traffic generated by Revised Proposal.
[5] The Revised Proposal is anticipated to be built out by 2031. Thus, the pro-rata share for Method A would not be applicable for intersection #2 which is estimated to be non-compliant in 2037 under the 'Baseline' scenario.
[6] Non-compliant by Year 2037 with SEIS Alternative 6 in the *Final SEIS*.
[7] Reported as non-compliant by Year 2031 with SEIS Alternative 6 in the *Final SEIS*.
[8] No additional intersections would operate at non-compliant levels of service by 2037 with the Revised Proposal.
[9] The City has plans to install a traffic signal at intersection #11.
[10] The City has plans to install a compact roundabout at intersection #13.

To assist in identifying the type of appropriate improvements for study intersections that require mitigation and are within WSDOT's jurisdiction (i.e., SR 903 and Bullfrog Road at I-90 interchange), Intersection Control Evaluations (ICE) have been performed and technical reports have been submitted to WSDOT. Criteria addressed in the ICE documents include LOS operations, safety, right-of-way acquisition, engineering criteria and feasibility, and context for sustainable design. WSDOT has stated its preference for construction of compact roundabouts rather than traffic signals on SR 903.

Mitigation Measures for 'Baseline' Conditions

As shown in **Table 1**, five study intersections are anticipated to operate at a non-compliant LOS under future weekday summer PM peak hour 'Baseline' conditions (without the Revised Proposal). The City of Cle Elum has recently received grant funding to install a full traffic signal at study intersection #11 (Douglas Munro Boulevard /W 1st Street) and a compact roundabout at intersection #13 (N Stafford Avenue / W 2nd Street (SR 903)). However, no improvements are currently identified at the other three study intersections by the City of Cle Elum or WSDOT.

Potential improvements to mitigate non-compliant LOS at the other three study intersections under future weekday summer PM peak hour 'Baseline' conditions are identified in **Table 1** and include a compact (single-lane) roundabout or left-turn restrictions.

For the five intersections where improvements would be needed based on forecast 'Baseline' conditions, the 47° North project would contribute a pro-rata share towards intersection improvements because some additional traffic would be added by the project even though it would not trigger the improvement.

Mitigation Measures for Revised Proposal

As shown in **Table 1**, six study intersections are anticipated to operate at a non-compliant LOS due to the Revised Proposal in either 2025, 2031, or 2037 during the summer weekday PM peak hour in addition to those that are non-compliant in the Baseline (without project) condition.

Potential improvements to mitigate non-compliant LOS at the six study intersections under future weekday summer PM peak hour conditions with the Revised Proposal are identified in **Table 1** and include a compact (single-lane) roundabout, all-way stop control, roadway widening to add refuge/merge lanes, or left-turn restrictions.

The 47° North project would complete the intersection improvements or contribute a pro-rata share.

Mitigation Measures Identified in the SEIS Addendum vs in the Final SEIS

The Final SEIS identified the same 11 off-site study intersections included in **Table 1** that are forecast to operate at non-compliant LOS in future years 2025, 2031, or 2037 without or with full buildout of 47° North during the weekday summer PM peak hour.

The key differences between **Table 1** and the Final SEIS are:

- #2 – Bullfrog Road / I-90 WB Ramps is anticipated to operate at a non-compliant LOS under future 2037 'Baseline' conditions instead of with SEIS Alternative 6 conditions.
- #3 – Bullfrog Road / Tumble Creek Drive is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2025 instead of 2031.
- #7 – Denny Avenue / W 2nd Street (SR 903) is anticipated to operate at a non-compliant LOS under Revised Proposal conditions in 2031 instead of 2037.

Intersection LOS with Mitigation

To test the effectiveness of identified improvements, intersection LOS was evaluated with implementation of potential improvements identified in the updated analysis. These improvements would mitigate the 11 study intersections and two site access intersections that are anticipated to operate at non-compliant LOS under future weekday summer PM peak hour conditions. LOS analysis results for weekday, Friday, and Sunday summer PM peak hour conditions in 2031 with the Revised Proposal are summarized in **Table 2**.

As shown in **Table 2**, the potential improvements identified at the 11 off-site study intersections and two site access intersections are expected to improve conditions to compliant LOS at all intersections during the weekday and Friday summer PM peak hours. During the Sunday summer PM peak hour, the potential improvements are expected to improve conditions to compliant levels of service at the majority of intersections, with the following exceptions:

- #7 – Denny Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #8 – Ranger Station Road / Miller Avenue / W 2nd Street (SR 903): with northbound and southbound left-turn restrictions, the off-site intersection is anticipated to operate at LOS D under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #9 – N Pine Street / W 2nd Street (SR 903): as a compact roundabout, the off-site intersection is anticipated to operate at LOS E under the Revised Proposal in 2031 during the Sunday summer PM peak hour.
- #30 – SR 903 / Main Access Road: as a compact roundabout, the site access intersection is anticipated to operate at LOS F under the Revised Proposal in 2031 during the Sunday summer PM peak hour.

Table 2
FUTURE YEAR INTERSECTION LOS SUMMARY WITH MITIGATION – REVISED PROPOSAL

Location	Potential Improvement to Mitigate Weekday LOS Deficiency [1]	Weekday PM Peak Hour				Friday PM Peak Hour				Sunday PM Peak Hour			
		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation		Mitigation Trigger		2031 With Project Mitigation	
		Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]	Year	Condition	LOS[2]	Delay[2]
Off-Site Study Intersection:													
#1 – Bullfrog Road / I-90 EB Ramps [6]	Compact Roundabout	2031	Project	A	9.6	2025	Project	B	11.7	2037	Project	A	9.1
#2 – Bullfrog Road / I-90 WB Ramps [5, 6, 7]	Compact Roundabout	2037	'Baseline'	A	5.4	2031	'Baseline'	A	8.6	2037	Project	A	5.2
#3 – Bullfrog Road / Tumble Creek Dr [7]	Refuge/merge lane on Bullfrog Rd	2031	Project	C	20.1	2037	Project	C	18.6	2031	Project	D	34.5
#7 – Denny Ave / W 2nd Street (SR 903) [6, 8]	Restrict Northbound Left/ Southbound-Left Turns	2025	Project	C	16.1	2025	Project	C	18.7	2025	Project	**D**	**28.5**
#8 – Ranger Sta Rd / Miller Ave / W 2nd St (SR 903) [6]	Restrict Northbound Left/ Southbound-Left Turns	2025	'Baseline'	C	18.8	2025	'Baseline'	C	22.5	2025	'Baseline'	**D**	**26.2**
#9 – N Pine Street / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	7.7	2025	Project	B	11.5	2025	'Baseline'	**E**	**56.6**
#11 – Douglas Munro Blvd / W 1st Street	Signalization[3]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#12 – N Pine St / W 1st Street	Compact Roundabout	2025	'Baseline'	A	7.4	2025	'Baseline'	A	8.1	2025	'Baseline'	A	7.6
#13 – N Stafford Ave / W 2nd Street (SR 903) [6]	Compact Roundabout [4]	2025	'Baseline'	--	--	--	--	--	--	--	--	--	--
#15 – N Oakes Ave / W 2nd Street (SR 903) [6]	Compact Roundabout	2025	Project	A	3.7	2025	Project	A	3.9	2025	'Baseline'	A	5.9
#21 – Pennsylvania Ave / 1st Street (SR 903) [6]	All-Way Stop	2031	Project	C	20.5	2031	Project	C	22.5	2031	Project	B	14.5
Site Access:													
#28 – Bullfrog Road / RV Access Road	Compact Roundabout	2031	Project	A	10.0	2031	Project	C	19.6	2025	Project	D	31.8
#30 – SR 903 / Main Access Road	Compact Roundabout	2025	Project	B	17.3	2025	Project	C	32.8	2025	Project	**F**	**>100**

Source: TENW, 2023.

[1] Improvement needed to mitigate non-compliant LOS during weekday PM peak hour; WSDOT preference is a roundabout which is assumed unless identified otherwise; DASHES indicate LOS was not evaluated because improvements are funded and planned by the City.

[2] LOS = Level of Service. Delay = average control delay expressed in seconds per vehicle. Bold indicates does not meet LOS standard.

[3] The City has plans to install a traffic signal at intersection #11.

[4] The City has plans to install a compact roundabout at intersection #13.

Site Access Mitigation Measures

The Revised Proposal would include new on-site roadways and intersections at its two access points with Bullfrog Road and its single access onto SR 903 (public roads). All on-site roads would be private and would be constructed and maintained by 47º North. The facilities would be constructed to City of Cle Elum standards, or standards that may be included in a new or updated Development Agreement. The Revised Proposal would also ensure that design of the new on-site roadways meets minimum requirements for emergency vehicle access and school bus access.

Based on the results of the weekday PM peak hour LOS analysis documented in Table 3.6-2 in **Appendix C** and the forecast LOS with proposed mitigation at the site access documented in **Table 2**, the traffic control at the new 47° North site access points on Bullfrog Road and SR 903 is proposed as follows:

- **#28 – Bullfrog Road / RV Access Road:** Proposed mitigation is a compact (single-lane) roundabout. (Note that this intersection was reported to operate at a compliant level of service in the Final SEIS, thus this is a new mitigation measure.)
- **#29 – Bullfrog Road / Main Access Road:** is anticipated to operate at complaint LOS during the weekday summer PM peak hour in 2025 and 2031 with the Revised Proposal as a side street stop-controlled intersection with the Main Access Road being stop-controlled.
- **#30 - SR 903 / Main Access Road:** Proposed mitigation is a compact (single-lane) roundabout.

Required Mitigation Measures

- Roadway design would conform with applicable requirements for vehicular access, including roadway width, adequate turning radius, fire hydrant access, provisions for vehicle back up, and weight bearing capacity.

- A secondary access would be provided when more than 30 single- or multi-family units are built, in accordance with the International Fire Code (IFC).

Other Possible Mitigation Measures

Traffic Monitoring Program

- The 47° North development should prepare and implement a traffic monitoring program as part of a new or updated Development Agreement. It is expected that the traffic monitoring program would be similar in format and function to the previously established program documented in the 2002 Development Agreement (Condition 92). The monitoring program would be coordinated with the city, in cooperation with Kittitas County and WSDOT, and would have the following objectives:
    A. Document traffic volumes at key locations (roadways and/or intersections) in the local transportation network that would be impacted by traffic generated by the 47° North development;

B. Separate traffic volumes at key locations by background traffic, 47° North development traffic, and traffic associated with development of the commercial property; and,
C. Help establish or confirm the timing, location, and nature of required transportation improvements and consider the pro-rata share calculations.

The specific details of the traffic monitoring program, including the number of phases of monitoring, appropriate timing of phases of monitoring (i.e., at defined development years or relative to percent or number of units constructed), time periods to be counted, key locations to be counted, and reporting requirements will be coordinated with the city as part of the new or updated Development Agreement.

Construction Management Plan

- The 47° North development should prepare a Construction Management Plan prior to beginning construction to minimize construction traffic impacts. Truck routes and haul route agreements for construction-related traffic should be established in coordination with the City of Cle Elum, Kittitas County, and WSDOT, as necessary. Additionally, provisions should be made in the new or updated Development Agreement between the Applicant and the City for restoration of road surfaces damaged by construction traffic, if any.

Trail System & Sidewalks

- Based on preliminary plans, the 47° North development would provide an approximately 6-mile network of trails and sidewalks throughout the site, including: hike/bike, equestrian, and golf cart paths. The trails would connect to on-site development, as well as to existing off-site trails. Sidewalks would also be provided along one side of the on-site road connecting SR 903 and Bullfrog Road for non-motorized circulation.

Significant Unavoidable Adverse Impacts

Proposed development under the SEIS Alternatives and the Revised Proposal would increase traffic volumes and congestion on area roadways (e.g., in the city, county, and on state facilities such as SR 903, SR 907, and I-90); this is an unavoidable effect of urban development. The LOS analysis indicates that several of the studied intersections would exceed LOS standards during the PM summer peak hours in the future analysis years with the additional traffic generated by the SEIS Alternatives and the Revised Proposal; some of these intersections would also exceed the LOS standards without the project due to continued growth in background traffic. The mitigation measures listed above would offset or reduce the significant adverse impacts under the SEIS Alternatives and the Revised Proposal.

Public Services

Proposed Mitigation Measures (Included in the Project)

- All the non-residential buildings would include sprinkler systems in case of fire. Fire hydrants would be provided throughout the residential areas.

- Traditional wood campfires would not be allowed within the RV resort.

Bullfrog Flats Conditions of Approval (Included in the Project)

- Mitigation measures for each public service provider would include execution of a separate mitigation agreement, where feasible, and a program to monitor actual calls for service, actual revenues and expenses, for affected providers. The program would, to the maximum extent possible, strive to time expenditures to when revenues are available and strive to time capital expenditures to when the jurisdiction has sufficient capacity to issue bonds for the improvements and sufficient tax revenue to service the debt. The program would also rely on shortfall mitigation payments to address any identified fiscal impacts, where applicable.

- Monitoring would track the number of service calls to affected providers at reasonable intervals to allow comparisons of actual and estimated calls and impacts. Any mitigation requirements would be adjusted accordingly to reflect actual impacts. Outreach and coordination between the Applicant and affected service providers is underway and is anticipated to result in mitigation agreements that will address impacts that are attributable to the Revised Proposal. Executed agreements will be included in a new or updated Development Agreement, if available.

- Site development would follow the Land Stewardship Plan (LSP) that is used for Suncadia, which includes provisions for fire-wising (e.g., thinning small trees, cutting limbs, raking debris and other fuel-reduction techniques to help prevent fires) during operation of the project. The LSP would be reviewed and updated, as necessary.

- Any emergency vehicle access, other than the public right of way would be coordinated with the City of Cle Elum Fire Marshall.

Required Mitigation Measures

- Worker safety measures would be implemented consistent with Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA).

- A comprehensive construction plan would be developed. This plan would include, in part, a Fire and Life Safety plan, which would be consistent with the City of Cle Elum's adopted building code requirements for construction, a snow management plan,

designated emergency haul routes and access areas, and provisions for fencing and signing the construction site.

- Roadway design would conform with applicable requirements for vehicular access, including roadway width, adequate turning radius, fire hydrant access, provisions for vehicle back up, and weight bearing capacity to provide adequate emergency access to site.

- A secondary access would be provided when more than 30 single- or multi-family units are built, in accordance with the International Fire Code (IFC) to provide emergency access to the site.

Approved Bullfrog Flats Conditions of Approval (Not Included in the Project)

- Washington State Department of Natural Resources (WDNR) Industrial Precautions should apply to all equipment and clearing and grading until hydrants are operational to provide fire prevention.

Other Possible Mitigation Measures

- An on-site security presence could be provided during the initial construction phase of the project.

- As an interim measure, the Applicant could emphasize and encourage membership in the volunteer fire department among its residents and employees while the department is transitioning to full-time staff.

- Community education regarding domestic and recreation fire protection measures could be provided to help reduce the potential for wildfires.

Significant Unavoidable Adverse Impacts

Development under the SEIS Alternatives and the Revised Proposal would generate additional demand for public services primarily as a result of new population and visitors to the site; this increase in demand is unavoidable. Increased demand in itself, however, is not necessarily an adverse impact, if it is planned for and addressed. To the extent that resulting requirements for additional staff, equipment, and facilities are addressed through increased revenues to affected agencies, and through implementation of committed and recommended mitigation measures listed above, no significant impacts are expected. Also see the DSEIS, FSEIS, and SEIS Addendum Fiscal analyses.

Utilities

Proposed Mitigation Measures (Included in the Project)

- Recycling within the 47° North development would be encouraged.

Approved Bullfrog Flats Conditions of Approval (Included in the Project)

Water & Sewer

- Draft Water Use Standards would be updated as part of the Development Standards for the proposed development. The standards would be required under the project Covenants, Conditions, & Restrictions (CC&Rs).

- Water use and conservation policies would be contained in the CC&Rs for the project, including low-flow fixtures, limitations on landscaping, and other water-conservation measures, as coordinated with the City of Cle Elum.

- Limitations would be set on the area allowed for irrigation for each type of residential unit.

- Irrigation efficiency would be promoted through educating and recommending the use of drought-tolerant landscaping to the residential and commercial property owners.

- The Applicant would be responsible for the costs to design and construct all water, sewer, and stormwater facilities onsite.

- In accordance with the City of Cle Elum's adopted water policy for the UGA, the city will initially issue certificates of water availability for the project based on the water use rate set forth in the city's 2015 Comprehensive Water Plan. The Washington State DOH design criteria requires a minimum of three years of historical consumption data be used in establishing ERU average demand.

Solid Waste

- A Construction C&D recycling program would be developed that would require contractor participation and would be approved by Kittitas County Solid Waste Department prior to the start of construction.

Required Mitigation Measures

Water & Sewer

- The Applicant would contribute a pro-rata share to construct the improvements to the city's water system required to serve the project, including: a filter train in the water treatment plant, a finished water pump in Pressure Zone 3, and a reservoir in Pressure Zone 3.

  Projected water demand would be translated into actual consumption as the phases of development are constructed. The 2001 Water Supply System Project Development

Agreement between the City of Cle Elum and Trendwest (now New Suncadia) established "trigger" points when improvements would become necessary, including production thresholds for specified duration, or when a specified number of new connections are reached. Similar "trigger" points would be established for the three system components identified above.

To confirm proportionate share responsibility, a usage monitoring/metering plan would be implemented that would adjust allocation on an actual demand basis. Monitoring/ metering would be necessary to determine when the capacity improvements would be triggered.

Solid Waste

- The Applicant would handle all construction debris, separate re-cyclable materials, and otherwise handle all its solid waste and household hazardous waste consistent with the requirement for such handling in the Kittitas SWMP.

- ~~The Applicant would contribute a pro-rata share to construct improvements to the solid waste transfer station, consistent with the Kittitas County Solid Waste Management Plan (SWMP) Amendment for the Trendwest (now New Suncadia) Master Plan Resort and UGA (November 2000). The Applicant would handle all construction debris, separate re-cyclable materials, and otherwise handle all of its solid waste and household hazardous waste consistent with the requirement for such handling in the Kittitas SWMP. The same requirements would apply to the adjacent commercial development property, based on pro-rata share.~~ Kittitas County Solid Waste will be consulted to determine the basis for any mitigation requirement and whether the 47° North development is responsible to mitigate impacts, and for its proportional contribution to improvements to the Cle Elum Transfer Station and the Ryegrass Landfill. Kittitas County supports its solid waste program through tipping fees (91%) and grants; project-based mitigation may not be applicable.

Significant Unavoidable Adverse Impacts

Consumption of water and generation of solid waste are unavoidable impacts of population growth and development. Potential significant adverse impacts to water and solid waste service would be avoided through the mitigation measures identified above. No significant unavoidable adverse impacts to wastewater facilities are expected with development under the SEIS Alternatives and the Revised Proposal.

Fiscal & Economic Conditions

Economic Impacts

The nature of the impacts identified for the Revised Proposal would be similar to those identified for SEIS Alternative: increases in employment opportunities, increases in potential personal income, lower unemployment rates, diversity in the workforce, and added new business commerce. Impacts would be positive, and mitigation is not warranted.

Fiscal Impacts

This section presents fiscal mitigation measures by taxing authority/entity to address the findings for the Revised Proposal. The updated Fiscal analysis did not conclude that mitigation measures would definitely be required for reasons discussed below. However, "Other Possible Mitigation Measures" have been identified to reflect uncertainties about the future that are inherent in any fiscal analysis. Note that this sub-section incorporates substantial information and discussion from the updated Fiscal report and the Public Services section of the Addendum; while this goes beyond mitigation measures, it is intended to provide a more complete picture of fiscal conditions and to facilitate review and decision making.

City of Cle Elum

The updated fiscal analysis focused on a calculation of net fiscal impacts of the Revised Proposal on the City of Cle Elum. Similar to SEIS Alternative 6, the analysis identified a fiscal surplus in 2037 with the Revised Proposal. For the Revised Proposal, the analysis identifies:

- A cumulative net surplus in year 2037 of $2.9 million to cover police and fire costs; and,
- An additional cumulative surplus of $9.7 million in restricted revenues.

- Based on this analysis, mitigation for fiscal impacts of the Revised Proposal is not anticipated to be necessary to maintain the city's fiscal solvency. However, these conclusions are projections based on assumptions, estimates and modeling of tax rates, estimates of public service demands, development conditions, and the performance of economic systems, and future monitoring is therefore recommended. Should future mitigation become necessary, the city should — consistent with typical municipal budgeting practices — consider imposing new taxes or fees to balance its budget or seek to change levels of public services to meet available revenues, or a combination of both approaches.

Other Service Purveyors

- While costs to serve 47° North could exceed tax revenues for the other public service purveyors considered in the analysis– including Hospital District No. 2, Hospital District No. 1, KITTCOM, and Cle Elum – Roslyn School District – mitigation is not certain to be

warranted. The updated Fiscal analysis only includes tax revenues, which provide only a portion of total revenues for the service purveyors and excludes other funding sources such as charges for service or intergovernmental revenues; these non-tax sources comprise a major source of revenues for the affected service providers.

Kittitas Hospital District No. 2

- Projected costs for Hospital District No. 2 would exceed property tax revenues alone. However, the District would also receive patient service fees, which were not included in the analysis. The analysis assumed that New Full Time Equivalent (FTE) employees could be added to meet service needs, and, therefore, as service needs grow, so too would patient service fees.

- Mitigation for FEIS Alternative 5 cited several criteria for consideration in a final mitigation agreement. It was noted that a future mitigation agreement should consider a fiscal monitoring program.

- The Hospital District could track property tax revenues and patient fees attributed the Revised Proposal and, should revenues not cover costs of service (over a certain period of time), a monthly mitigation payment could be made to the Hospital District to avoid fiscal shortfalls. A monitoring program by the Hospital District could inform future negotiations to mitigate a fiscal shortfall of the Revised Proposal, if any.

Kittitas Hospital District No. 1

- Projected costs for Hospital District No. 1 would not have any offsetting property taxes under the Revised Proposal since Cle Elum (and 47° North) is not within its taxing district. Like the situation for Hospital District No. 2, user fees are the primary basis for funding services. It is not clear on what basis mitigation would be appropriate for a development that is outside of the district taxing area and where patients would pay fees for the services provided.

KITTCOM

- Projected costs from the KITTCOM phone tax exceeded projected revenues for the Revised Proposal. Households within 47° North would contribute at the same level of per line charges as existing households within the district. It is reasonable to assume that intergovernmental revenues would scale up with growth in the city/county. Further, subscriber fees could reasonably be restructured to cover additional funding needs as underlying needs change.

Cle Elum - Roslyn School District

- Cumulative costs derived from projected new teacher FTE would exceed projected property tax revenues for operations under the Revised Proposal. However, the district would receive additional intergovernmental revenues which are expected to offset fiscal shortfalls, mainly through state support for schools funded by the state property tax.

- With respect to buses, only partial state and federal funding is provided to replace school buses. Some school districts in the state have responded by requesting transportation levies or by using other general funds to purchase buses. The need for additional school buses from student growth at 47° North will likely need to be similarly accommodated. To the extent that there are other facility related issues, the School District plans to develop an Early Childhood Learning Center in the future. This facility would help to address capacity issues in the district.

Other Possible Mitigation Measures

City of Cle Elum

- Implementation of a periodic fiscal monitoring program (e.g., in two to five-year increments) should also be considered following buildout in view of the uncertainties in the fiscal analysis. Fiscal monitoring could reasonably occur during buildout as well; however, revenues may lag behind costs resulting in an incomplete picture of the impact. Fiscal monitoring could be particularly helpful as costs and revenues associated with the Revised Proposal could impact the city's overall fiscal situation. Additionally, the Addendum assumes the city's Fire Department will move to full time employment and away from its current model of service. Furthermore, future negotiations should consider the measures proposed in the Approved Bullfrog Flats Development Agreement. That agreement identified several conditions to mitigate fiscal shortfalls and to ensure existing citizens and ratepayers would not suffer negative financial impacts as a result of the development. Conditions cited that Trendwest (now New Suncadia) would: allow a Municipal Facilities and Services Expansion Plan to guide capital expansions; make fiscal shortfall mitigation payments; pay for the development's share of planning, water/wastewater treatment plant construction, and permit fees; and coordinate security forces with police and fire services (note that the water/wastewater treatment plant has since been built).

- The fiscal monitoring consultant will need the following information to assure that all taxes due to the city are properly reported and collected:
    - **Property Taxes**. The consultant will need information from the county assessor that detail new construction value and assessed value for all 47° North tax parcels.
    - **Sales Taxes.** The city will have to work with the Washington State Department of Revenue to request individual tax reports for businesses and households. If these data are not available to the fiscal monitoring consultant due to data privacy restrictions, the consultant will have to work with publicly available retail sales data to apportion city receipts to 47° North.
    - **Utility Taxes.** Due to the mix of utility providers, the consultant will have to work with publicly available utility tax data to apportion city receipts to 47° North.
    - **Real Estate Excise Taxes.** The consultant will need information from the county assessor to summarize real estate transactions within 47° North.

Other Service Purveyors

- The Applicant should, and has committed to, pursue mitigation agreements with the affected service providers to address fiscal impacts, if any, resulting from increased service demands attributable to the Revised Proposal.

- Similar to existing agreements between Trendwest (now New Suncadia) and the School District (e.g., the December 2001 Letter to the District from Trendwest and the January 2003 School Mitigation Agreement between Trendwest and the School District), a School Mitigation Agreement could be executed between the Applicant and the district that would:
    - Reimburse the district for the costs of starting up and maintaining a system to account for student enrollment related to the 47° North project;
    - Contribute to the costs of portables attributable to the project; and
    - Contribute to the costs of buses attributable to the project.

Significant Unavoidable Adverse Impacts

No significant unavoidable adverse economic impacts are expected under the SEIS Alternatives and the Revised Proposal. Economic impacts would generally be positive.

No significant unavoidable adverse fiscal impacts are expected. A fiscal impact can be defined as adverse in any situation where costs exceed revenues, and the extent of any fiscal shortfall (deficit) will determine the significance of the impact. However, adverse fiscal impacts can be mitigated and are not unavoidable. If ongoing fiscal monitoring to determine appropriate mitigation measures are pursued, then no significant adverse fiscal impacts are anticipated to be unavoidable. Taxing jurisdictions should continue to conduct typical, budget-balancing exercises and use their taxing powers, along with charges for service where applicable, to ensure their fiscal solvency. Mitigation agreements with affected jurisdictions could be implemented, where warranted and feasible, as a condition of project approval to address any specific and/or general fiscal impact concerns that may occur. Therefore, no significant unavoidable adverse impacts are expected.