

MEMORANDUM

DATE: December 6, 2024
TO: City of Cle Elum
FROM: Chandler Waldal
TENW
SUBJECT: Limited Scope Traffic Study
Whole Health Pharmacy Cle Elum
TENW Project No. 2024-341



This memorandum summarizes the limited scope traffic study for the *Whole Health Pharmacy Cle Elum* tenant improvement project located at 200 E First Street in Cle Elum, WA. This memo includes a project description, existing roadway conditions, trip generation estimates, and an assessment of the proposed drive-through.

Project Description

The proposed *Whole Health Pharmacy Cle Elum* tenant improvement project includes occupancy of approximately 3,000 square feet (SF) of space located in a portion of the currently unoccupied “Maverick’s” building on the southeast corner of N Harris Ave and E 1st Street in Cle Elum, WA. The proposed tenant improvement project includes a new Whole Health pharmacy with a drive-through window that would be accessed off of N Harris Ave via the existing alleyway between E 1st Street and E Railroad Ave. Based on information provided by Whole Health, *Whole Health Pharmacy Cle Elum* would staff 6 employees and be open on Weekdays from 9:00 AM to 6:00 PM and on Saturdays from 10:00 AM to 3:00 PM. The pharmacy would be open to both walk-in and vehicle drive-through customers. A vicinity map showing the location of the site and the surrounding area is included in **Attachment A**.

Whole Health currently owns an approximately 2,200 SF pharmacy with a drive-through window located at 800 S Pear Street in Ellensburg, WA. Based on information provided by Whole Health, operations at the proposed Cle Elum pharmacy are anticipated to be similar to their existing pharmacy in Ellensburg.



Roadway Network

Table 1 describes the existing characteristics of the streets that would be used as primary routes to and from the site. Roadway characteristics are described in terms of orientation, arterial classification, posted parking, and sidewalks. The relationship of these roadways to the project site is shown in Attachment A.

Table 1
Existing Roadway Network Summary

Roadway	Orientation	Classification ¹	Number of Lanes	Street Parking	Sidewalks
E 1 st Street (SR 903)	E/W	Major Collector	3	None	Both Sides
E Railroad Ave	E/W	Local Road	2	Yes	Intermittent on North Side
N Harris Ave	N/S	Local Road	2	Yes	Both Sides
N Wright Ave	N/S	Local Road	2	Yes	Both Sides

1. Source: City of Cle Elum 2019-2037 Comprehensive Plan, 2019.

Non-Motorized Transportation Facilities

Non-motorized transportation facilities in the project site vicinity include sidewalks on both sides of E 1st Street, N Harris Ave, and N Wright Ave. Marked pedestrian crossings exist on all four (4) legs of the E 1st Street/N Harris Ave and E 1st Street/N Wright Ave intersections.

Trip Generation

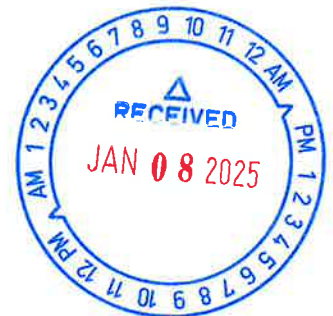
Trip generation estimates for the proposed *Whole Health Pharmacy Cle Elum* project were based on methodology documented in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition for Land Use Code (LUC) 881 (Pharmacy/Drugstore with Drive-Through Window).

The trip generation estimates account for pass-by trip reductions for the proposed pharmacy use. Pass-by trips are made by vehicles that are already on the adjacent streets and make intermediate stops at certain types of land uses while enroute to a primary destination (i.e., on the way from work to home).

The resulting new weekday daily, AM peak hour, and PM peak hour trip generation estimates for the proposed project are summarized in Table 2. The detailed trip generation estimates are included in Attachment B.

Table 2
Trip Generation Summary

Weekday Time Period	New Trips Generated		
	In	Out	Total
Daily	83	83	166
AM Peak Hour	3	3	6
PM Peak Hour	8	8	16





Drive-Through Queuing Analysis

A drive-through queuing analysis was also conducted for the proposed pharmacy drive-through lane including a summary of the drive-through lane storage capacity and an estimate of 95th-percentile queues based on service time information provided by Whole Health at their existing pharmacy in Ellensburg.

Drive-Through Operations and Storage

The proposed *Whole Health Pharmacy Cle Elum* project includes one (1) drive-through lane with approximately sixty (60) total feet of queuing storage (2-3 vehicles) from the pick-up window to N Harris Ave.

Drive-Through Queue Analysis

A drive-through queuing analysis was conducted to estimate future queuing in the drive-through lane with the proposed *Whole Health Pharmacy Cle Elum* project. The queue analysis was based on standard queue theory equations that relate the rate of vehicle arrivals to the rate of vehicle departures (service time), which are both based on a Poisson distribution (M/M/s queue regime).

Queue analysis is based on the fact that a queue will form when vehicles arrive at a faster rate than they can be served. The key inputs in the model are:

- (1) the arrival rate of vehicles during the peak hour
- (2) the service rate of the drive-through

The use of the Poisson distribution assumes arrival times are independent of each other and that the arrival time of one vehicle has no impact on the arrival time of the next vehicle, which is a reasonable assumption at a pharmacy drive-through window where vehicle arrival rates fluctuate throughout the peak hour. The model also assumes that departure rates can vary (i.e. some customers take longer at the pick-up window).

To estimate future queues in the proposed 60-foot drive-through lane, the queuing formula based on the M/M/s queuing regime was used. The M/M/s queuing regime assumes random (exponentially distributed) arrivals and departures and uses average arrival and departure rates.

Arrival Rate

The arrival rate at the drive-through was based on the forecasted future AM and PM peak hour project trip generation and information provided by Whole Health related to drive-through usage. Based on data provided by Whole Health at their existing pharmacy in Ellensburg, approximately 50 percent of arriving customers are estimated to utilize the drive-through (the other 50 percent are expected to walk-in). During the weekday AM peak hour, six (6) vehicles (gross entering project trip generation) are estimated to enter the *Whole Health Pharmacy Cle Elum* site. Assuming 50 percent of the vehicles would use the drive-through, this would result in about three (3) vehicles in the drive-through lane. During the weekday PM peak hour, fifteen (15) vehicles (gross entering project trip generation) are estimated to enter the *Whole Health Pharmacy Cle Elum* site. Assuming 50 percent of the vehicles would use the drive-through, this would result in about eight (8) vehicles in the drive-through lane.

Departure Rate

The average service (departure) rate was based on information provided by Whole Health. Whole Health expects it to take less than 60 seconds per vehicle at the pick-up window based on data from their existing operation in Cle Elum. It should be noted that the average service time does not include queue "move-up" time, or the time it takes for the next vehicle in line to move forward. With the assumption of 5 seconds for "move-up" time, the average service rate would be conservatively estimated at 65 seconds (60 seconds



per vehicle for ordering + 5 seconds move-up time) at the pick-up window. It should be noted that the pharmacy drive-through is intended for prescription pick-ups and quick transactions only. Whole Health does not allow their customers to wait at the pick-up window for their prescription to be ready. Instead, Whole Health requires the customer to park and wait for a staff member to bring their prescription out.

Drive-Through Queue Estimate

Queues were calculated at the pick-up window based on the estimated drive-through volumes during the weekday AM and PM peak hour and the average service (departure) rate as provided by Whole Health. Based on 3 entering vehicles utilizing the drive-through during the AM peak hour, 8 entering vehicles utilizing the drive-through during the PM peak hour, a service rate of 65 seconds per vehicle, and one (1) service window, a 95th percentile queue of less than one (1) vehicle during the AM peak hour and 1 vehicle during the PM peak hour is estimated at the pick-up window. The 95th percentile queues during the weekday peak hours would be accommodated within the drive-through lane storage provided (approximately 60-feet (2-3 vehicles) measured from the pick-up window to N Harris Ave). The detailed queue calculations are shown in **Attachment C**.

Drive-Through Queue Impacts to Alley

Based on the 95th percentile queues above, it is anticipated that there will be minimal impact to the existing alley and to passenger/emergency/delivery vehicles that use the alley to access the adjacent businesses. Additionally, the queues resulting from the *Whole Health Pharmacy Cle Elum* drive-through are not anticipated to block access to the existing alleyway. It should be further noted that the owner of the *Whole Health Pharmacy Cle Elum* site also owns the gravel lot south of the site, on the opposite side of the alleyway. In the rare occurrence that the pharmacy drive-through has queued vehicles blocking vehicular access to the alleyway, Whole Health employees could direct customers to wait in the gravel lot until the queue has cleared.

Conclusion

Based on the results of this limited scope traffic study, the existing alley is anticipated to accommodate the drive-through queues resulting from the proposed project. Therefore, no project-specific site access or off-site transportation improvements are proposed.

Please contact me at (760) 994-7376 or chandler@tenw.com with any questions.

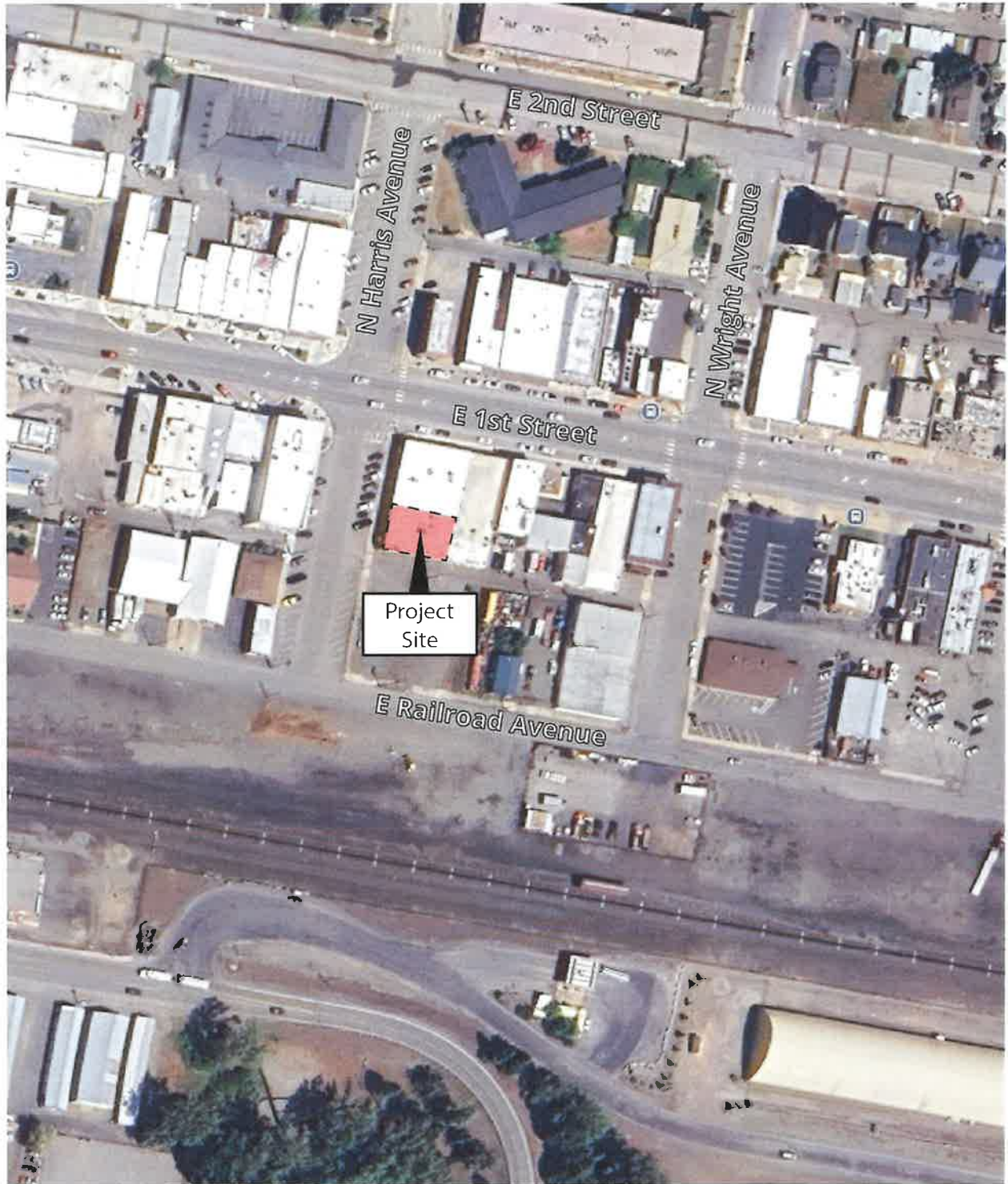
Attachments





ATTACHMENT A

Vicinity Map



Attachment A: Project Site Vicinity





ATTACHMENT B
Trip Generation Calculations



**Whole Health Pharmacy (Cle Elum, WA)
Weekday Trip Generation Summary**

Land Use	Size ¹	ITE LUC ²	Trip Rate ²	Directional Distribution		Trips Generated		
				In	Out	In	Out	Total
DAILY								
<i>Proposed Use:</i>								
Pharmacy/Drugstore with Drive-Through Window	3,000 GFA	881	108.40	50%	50%	162	163	325
Pass-By Trips ³	49%					-79	-80	-159
Net New Daily Trips =						83	83	166
AM PEAK HOUR								
<i>Proposed Use:</i>								
Pharmacy/Drugstore with Drive-Through Window	3,000 GFA	881	3.74	52%	48%	6	5	11
Pass-By Trips ³	49%					-3	-2	-5
Net New AM Peak Hour Trips =						3	3	6
PM PEAK HOUR								
<i>Proposed Use:</i>								
Pharmacy/Drugstore with Drive-Through Window	3,000 GFA	881	10.25	50%	50%	15	16	31
Pass-By Trips ³	49%					-7	-8	-15
Net New PM Peak Hour Trips =						8	8	16

Notes:

1. GFA = Gross Floor Area.
2. Based on Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition.
3. Pass-By trips determined based on methodology included in the Appendices of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition, 2021.





ATTACHMENT C
Drive-Through Queue Analysis



Whole Health Pharmacy Cle Elum
 Weekday AM Peak Hour Queue Estimate
 M/M/s Queuing Model

Entering Vehicles **6**
 % Drive-Through **50%**

Order Point

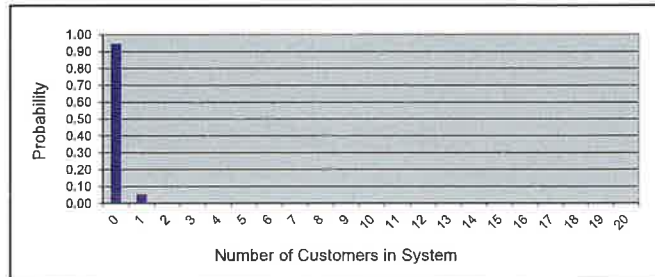
Arrival Rate (λ) **3 veh/hr**
 0.0008 veh/sec
 Departure Rate (μ) **65.0 sec**
 0.0154 veh/sec

Inputs:
 $\lambda = 0.0008$
 $\mu = 0.0154$
 $s = 1$

Outputs:
 $\rho = 0.05417$
L = 0.1 veh
 $L_q = 0.0 veh$
 $W = 68.72247$
 $W_q = 3.72247$

n	P_n	Prob <= n Vehicles	Vehicles (n)
0	0.94583333	94.6%	0
1	0.05123264	99.7%	1
2	0.00277510	100.0%	2
3	0.00015032	100.0%	3
4	0.00000814	100.0%	4
5	0.00000044	100.0%	5
6	0.00000002	100.0%	6
7	0.00000000	100.0%	7
8	0.00000000	100.0%	8
9	0.00000000	100.0%	9
10	0.00000000	100.0%	10
11	0.00000000	100.0%	11
12	0.00000000	100.0%	12
13	0.00000000	100.0%	13
14	0.00000000	100.0%	14
15	0.00000000	100.0%	15
16	0.00000000	100.0%	16
17	0.00000000	100.0%	17
18	0.00000000	100.0%	18
19	0.00000000	100.0%	19
20	0.00000000	100.0%	20

Legend:
 λ = mean arrival rate
 μ = mean service rate
 s = # of servers
 ρ = traffic intensity
L = expected number of customers in system
 L_q = expected number of customers in the queue
 W = expected waiting time of customer in system
 W_q = expected waiting time of customer in queue
 P_0 = probability of 0 cars in the system
 P_n = probability of n cars in the system





Whole Health Pharmacy Cle Elum
 Weekday PM Peak Hour Queue Estimate
 M/M/s Queuing Model

Entering Vehicles 15
 % Drive-Through 50%

Order Point

Arrival Rate (λ)
 8 veh/hr
 0.0022 veh/sec

Departure Rate (μ)
 65.0 sec
 0.0154 veh/sec

Inputs:
 $\lambda = 0.0022$
 $\mu = 0.0154$
 $s = 1$

Outputs:
 $\rho = 0.14444$
L = 0.2 veh
 $L_q = 0.0$ veh
 $W = 75.97403$
 $W_q = 10.97403$

Probability Calcs:		Prob <= n Vehicles	Vehicles (n)
n	P_n		
0	0.85555556	85.6%	0
1	0.12358025	97.9%	1
2	0.01785048	99.7%	2
3	0.00257840	100.0%	3
4	0.00037244	100.0%	4
5	0.00005380	100.0%	5
6	0.00000777	100.0%	6
7	0.00000112	100.0%	7
8	0.00000016	100.0%	8
9	0.00000002	100.0%	9
10	0.00000000	100.0%	10
11	0.00000000	100.0%	11
12	0.00000000	100.0%	12
13	0.00000000	100.0%	13
14	0.00000000	100.0%	14
15	0.00000000	100.0%	15
16	0.00000000	100.0%	16
17	0.00000000	100.0%	17
18	0.00000000	100.0%	18
19	0.00000000	100.0%	19
20	0.00000000	100.0%	20

Legend:
 λ = mean arrival rate
 μ = mean service rate
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 P_n = probability of n cars in the system

