

February 7, 2022

City Council  
Pullman, WA

RE: 530 E. Main Street, former Oasis Café property

Dear City Council members,

We are under contract to purchase the land and vacant building at 530 E. Main Street in Pullman, the former site of the Oasis Café. Our desire is to redevelop this property for a new ground-up Starbucks Coffee location. The proposed structure is approximately 936 square feet in size with a “Y-style” double drive thru as well as pedestrian and mobile-order pickup window with patio area.

In a January 2022 pre-application meeting with various members of the city staff and planning department, we learned that there is a small rectangular portion of property in the rear parking area that is a remnant from an old alley that was vacated by the city in March, 2013. The city’s planning department has prepared a drawing showing the remnant portion highlighted in blue, which is attached here and labeled as Exhibit A.

As you’ll note, this portion of city-owned land is underneath a contemplated drive-thru lane for the future Starbucks. We are interested in purchasing this remnant portion of land from the city so that we can make it part of the overall parcel and utilize it for this purpose. Our understanding is that the City went through a similar process with the adjoining property to the east (owned by Kolde Properties, LLC) and sold that portion of the vacated alley to Kolde Properties. Our desire would be to structure a similar transaction where we could pay the city appraised value for the remnant piece of land and have fee simple ownership. A long-term ground lease of this property could also be considered, but the remnant property size is so small at approximately 700 square feet, that we believe a sale may make the most sense in this situation.

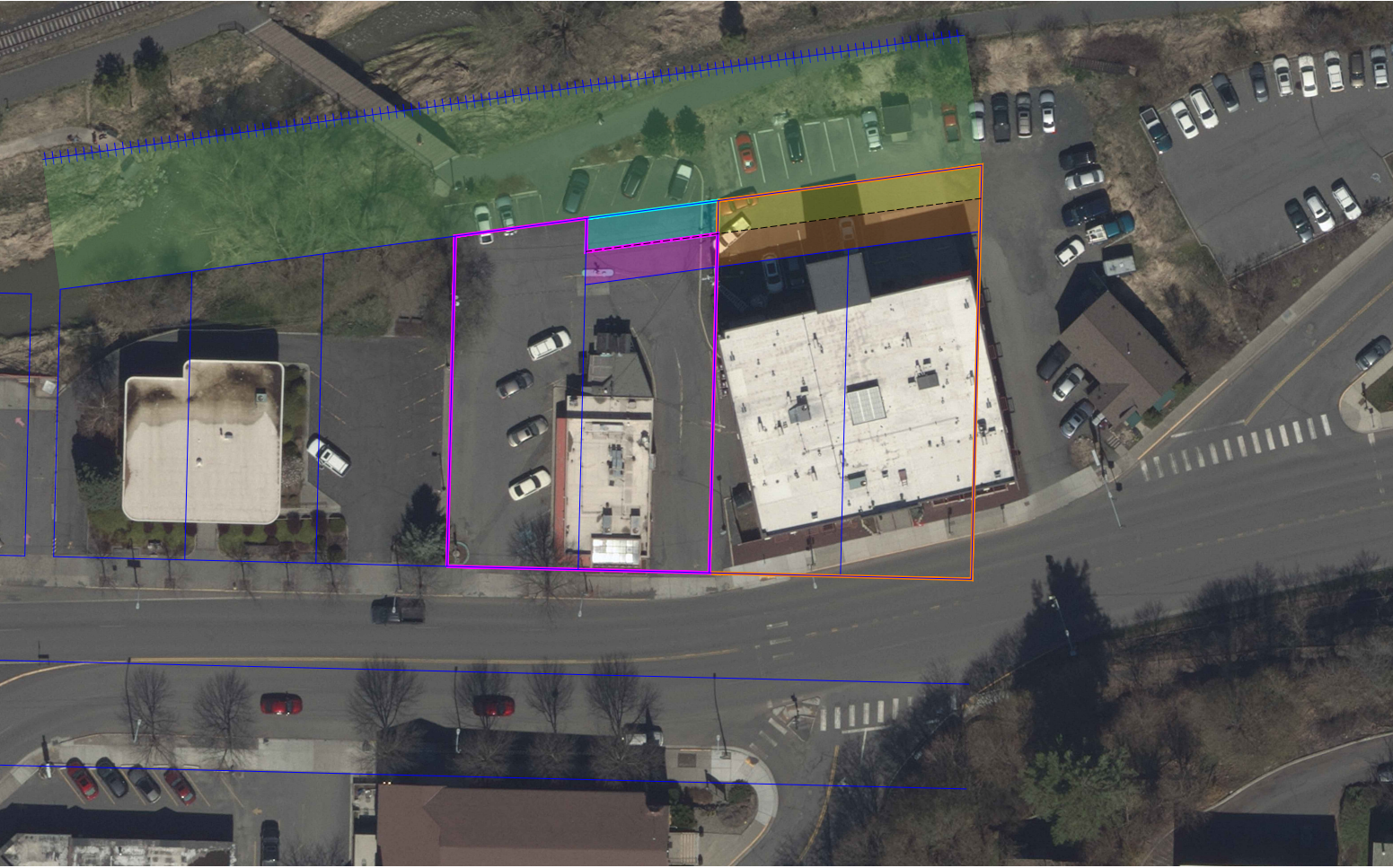
We are excited to be working in Pullman and anticipate a successful project here that will replace an old building with a new, high-quality structure with a first-class tenant. We have designed the site to accommodate a large queue of vehicles in double drive-thru lanes in an effort to meet the needs of Starbucks and keep vehicles moving in and out of the site without any backup on to Main Street. Included with this letter is a proposed site plan layout (attached here and labeled as Exhibit B) as well as a traffic impact study that was suggested in our pre-application meeting as a way to investigate the drive-thru lane’s impact on Main Street traffic.

We look forward to having an opportunity to discuss this project and proposed land acquisition with the Council further on the February 15, 2022 meeting.

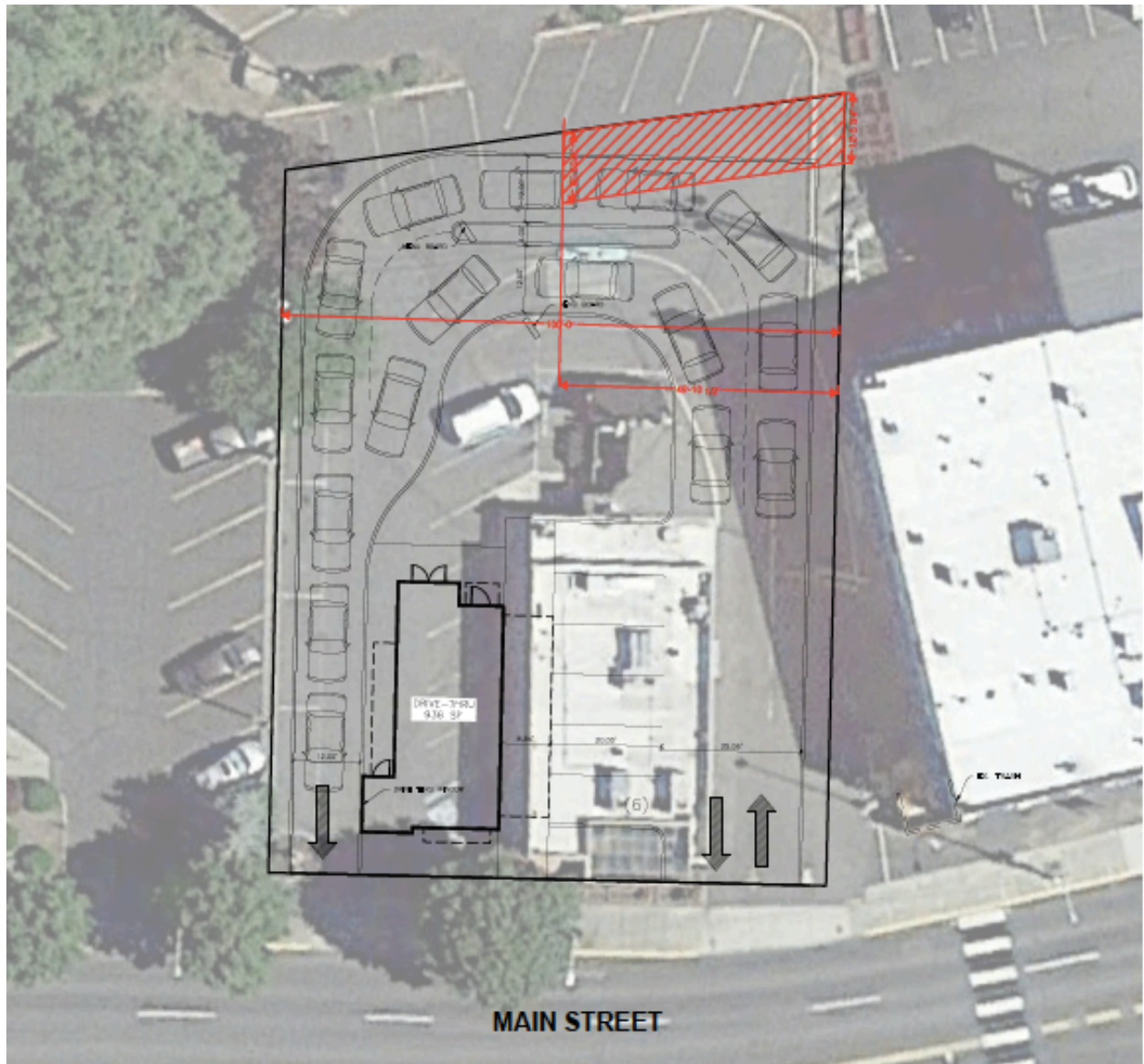
Respectfully,

Jace Bankhead  
Forza Development, LLC  
Salt Lake City UT  
(801) 787-8137  
[jacebankhead@gmail.com](mailto:jacebankhead@gmail.com)

**Exhibit A**  
(Remnant property in blue highlight)

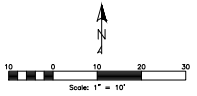
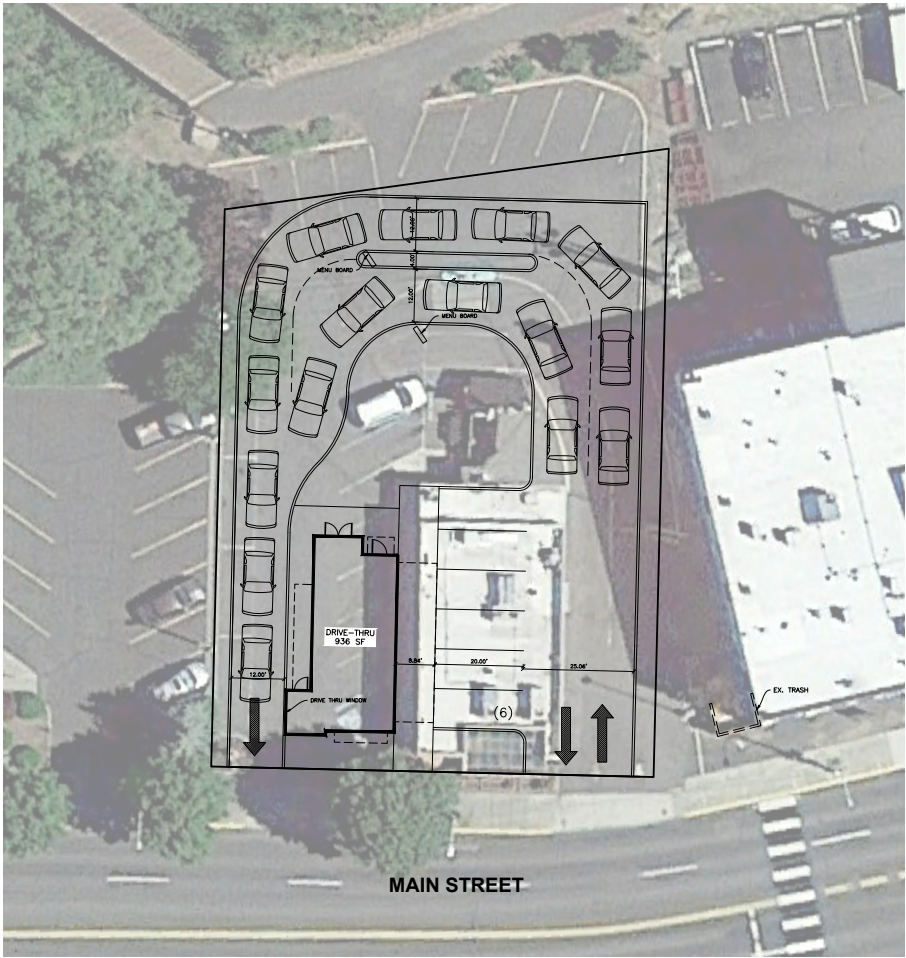


**Exhibit A**  
**Continued**  
(Remnant property crosshatched in red)





# Exhibit B Proposed Site Plan



**HUNT ENGINEERING, LLC**  
Professional Engineers  
Montana, Idaho, Utah, Washington  
C. 801.864.1724  
cshunt@huntec-engineering.com

**Pullman Property**  
530 East Main Street  
Pullman, WA

**Concept Site Plan**

Revision	Date

**PROJECT INFO:**  
 Engineer: T. HUNT  
 Drafter: T. HUNT  
 Start Date: 11/29/2021  
 Name: Pullman Property

<b>SHEET</b>	<b>1</b>
<b>1</b>	<b>1</b>
<b>SHEETS</b>	

# Starbucks | Pullman, WA

## Traffic Impact Study

Prepared for:

Brent Malili  
Forza Development Company  
2180 South 1300 East  
Salt Lake City, UT 84106  
801.918.5128



Prepared by:

Hunt Engineering, LLC  
6619 Willow Creek Rd.  
Mountain Green, UT 84050  
801.664.4724  
Thomas Hunt, PE

February 4, 2022



February 4, 2022

City of Pullman, Washington  
190 SE Crestview St.  
Pullman, WA 99163  
(509) 338/3230

***RE: Starbucks – Pullman, WA – Traffic Impact Study***

At the request of the City of Pullman, we are submitting to you this report of the traffic impact study for the proposed commercial development located at 530 East and Main Street in Pullman, WA. This parcel is currently occupied with an 1,800 square foot restaurant. It is proposed that this restaurant be demolished and replaced with a 999 sf Starbucks coffee shop with a drive-thru window. A traffic study was performed on Main Street and the surrounding intersections of Paradise St and Spring St. to determine the impact the development would have on the existing roadway and traffic patterns. The other particular topic of study is to determine the stacking/queue lengths that may be observed to make sure there will be no spill-over onto Main Street.

To perform this report, manual traffic counts were obtained on multiple days during the AM and PM peak hours in December 2021 and January 2022. Based on this information, an analysis for how the existing intersections currently function versus the proposed development conditions was completed. This analysis shows that the proposed development does not negatively impact the overall Level of Service at the intersection and should be permitted.

It is my professional opinion that upon completion of this project, it will not significantly alter the existing traffic patterns, and should be permitted per the traffic data and improvements contained within this report.

If you have any questions, or we can be of further assistance, please let us know.

Sincerely,



Thomas Hunt, P.E.  
Principal Engineer  
Hunt Engineering, LLC  
6619 Willow Creek Road  
Mountain Green, UT 84050  
thomas.hunt@hunt-engineering.com



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530 East Main Street | Pullman, WA

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530 East Main Street | Pullman, WA

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## **Executive Summary**

Starbucks is proposing a development that is planning to open in late 2022 located at 530 East Main Street in Pullman, WA. The purpose of this study is to assess the existing traffic flow and distribution, forecast the additional traffic generated from the development on opening day for Starbucks (2022) to determine the projected Level of Service to determine the impact this development would have on the existing traffic flow and what mitigations may be needed.

## **Key Findings**

- **Existing 2022 Traffic conditions:**
  - The existing Main Street/SE Paradise St intersection is operating at a Level of Service A in the AM & PM Peak with no stops or queues.
  - The existing Main Street/Spring St intersection is operating at a Level of Service B in the AM & PM Peak.
- **Proposed Starbucks 2022 conditions:** The Starbucks generates 89 AM trips and 43 PM trips during the peak hours.
  - The Starbucks has little to no impact on the Level of Service at either intersection or at the access.
  - The stacking/queue length for the Starbucks is sufficient in length to prevent vehicles from backing up onto Main Street.



## **Introduction and Summary**

This report presents the findings of the Traffic Impact Study (TIS) performed for the proposed Starbucks at this location. The study areas are:

- Main Street / SE Paradise St (Unsignalized – Free Flow)
- Main Street / Spring St (Signalized)
- Main Street/ Access (One-way stop controlled)

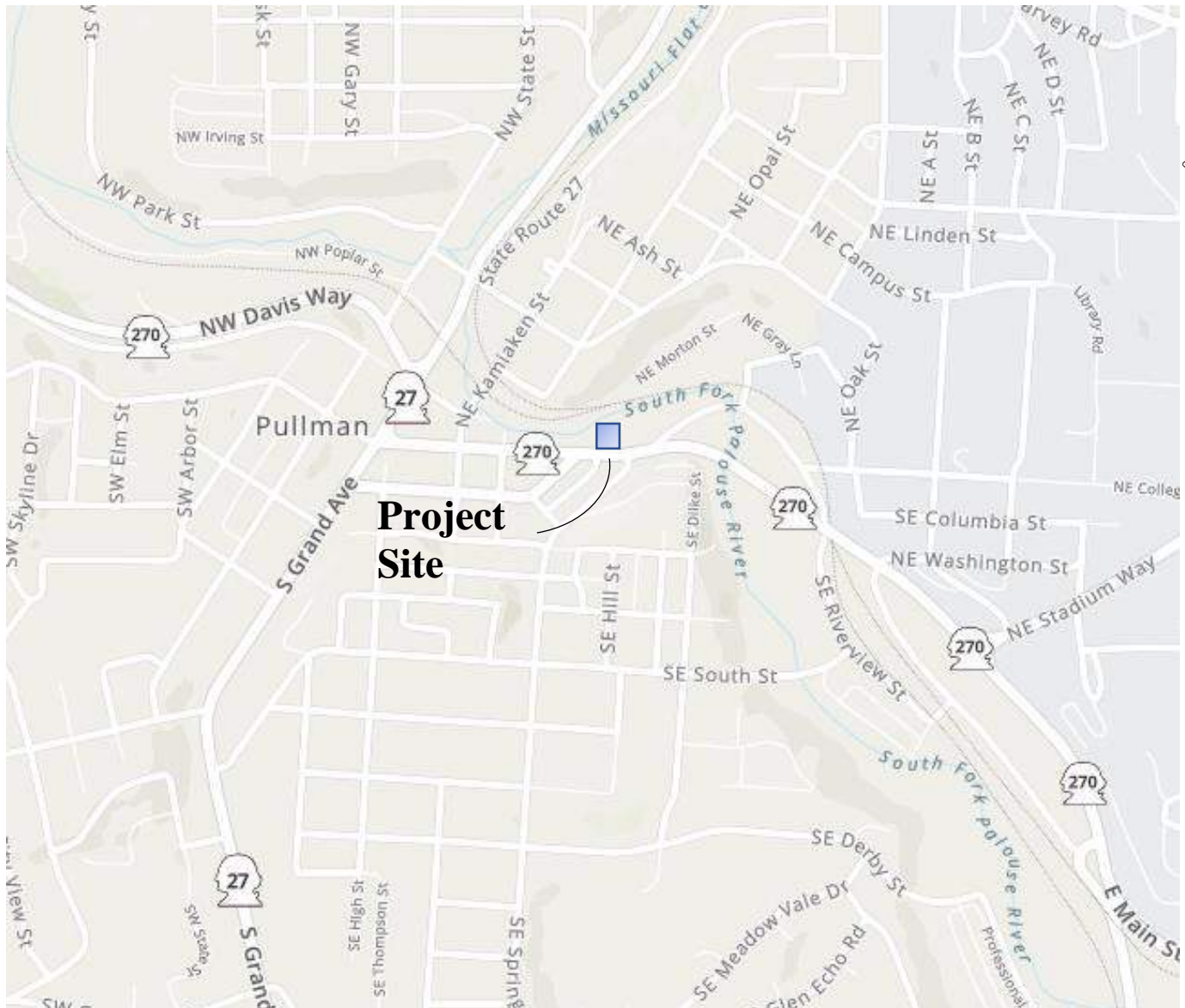
This report addresses the impacts based on Level of Service (LOS) values calculated by delay per vehicles.

## **Proposed Development**

The proposed development is located at 530 East Main Street in Pullman, WA. This project location is shown in Figure #1. This land is currently occupied with a sit-down restaurant, and it is proposed that a Starbucks be built at this location.

## Figure #1 Vicinity Map

### 530 East Main Street



## **Study Area Conditions**

**Main Street & SE Paradise St:** This is a 3-way non-signalized intersection that splits from a 2 direction (east of paradise st) to one-direction (west of paradise st) as Paradise St is also a one-direction roadway.

Both roadways have a speed limit of 25 mph.

**Main Street & Spring St:** This is an odd-angled and odd gaped 4-way signalized intersection. Main Street has 2 lanes of traffic in each direction, while Spring St consists of one lane.

Both roadways have a speed limit of 25 mph.

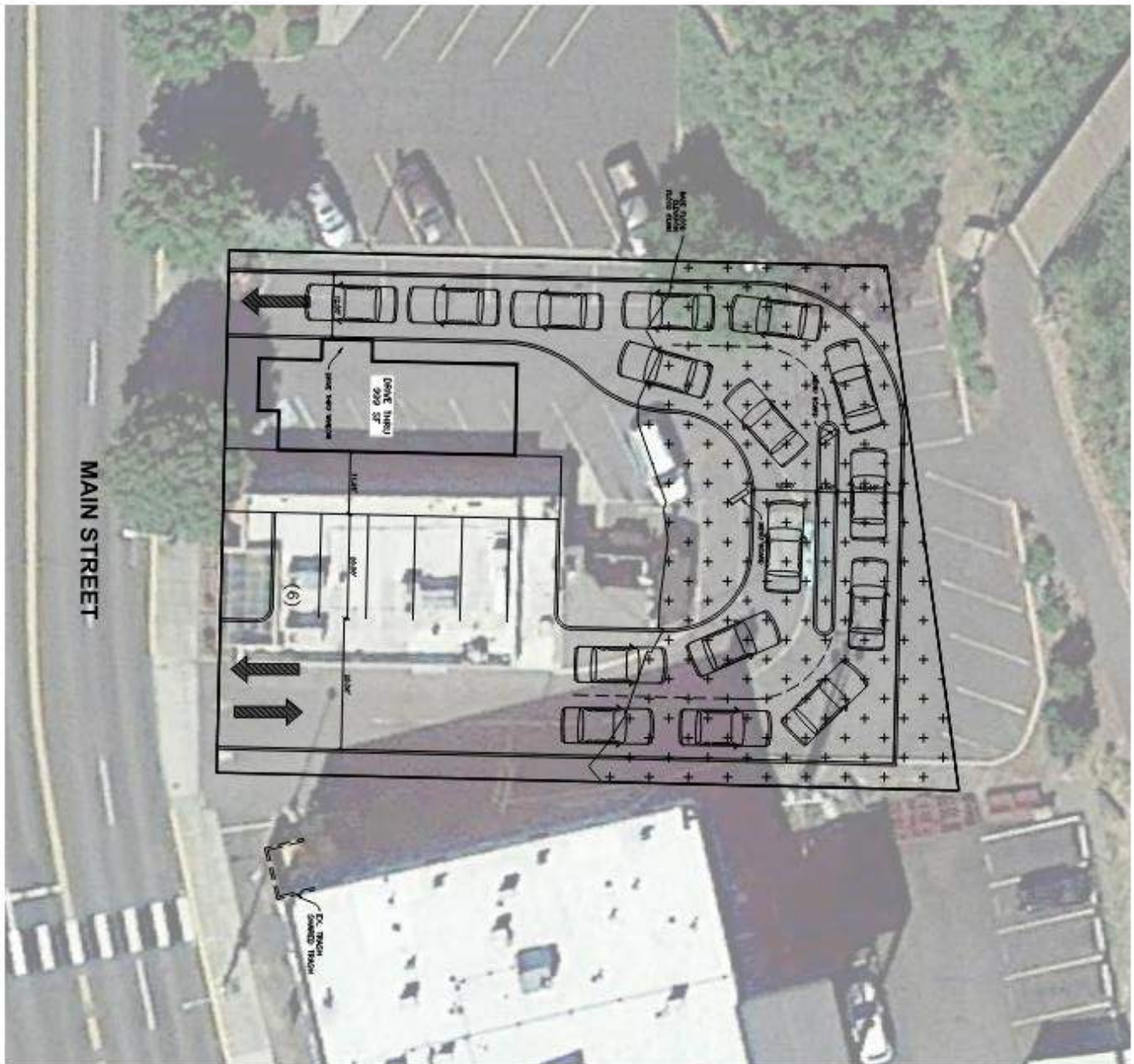
**Main Street/Access:** The access on Main Street into the site will remain close to how it is currently constructed, except the western curb cut will be an “exit only” as it discharges the traffic from the drive-thru lane.

See Figure #2 for the layout of the roadways and the proposed access location.

## **Existing Traffic Volumes**

Both AM and PM Peak hours were observed on 4 different days in December 2021 and January 2022. The highest observed traffic counts during those peak hours were used during this study. The existing traffic volumes assisted in determining the existing LOS and studying future impact. The count data and existing turning movement counts are included in Figure 3 below.

Figure #2



## Analysis of Existing Conditions

### Level of Service Analysis

For this traffic impact study, the LOS was determined by calculating the average delay time per vehicle in seconds using Synchro 11. Each LOS is associated with a designated range of delay times in seconds per vehicle. Table 1 (below) is used to determine the LOS for a signalized intersection based on the delay in seconds per vehicle. Table 2 (below) is used to determine the LOS for an unsignalized intersection based on the delay in seconds per vehicle. According to the Highway Capacity Manual, most facilities are designed for a service flow rate at LOS D or better to ensure acceptable operating conditions to users.

**Table 1 - Signalized Intersections Level of Service**

<i>LOS</i>	<i>Intersection Delay per Vehicle (sec/veh)</i>	<i>General Description</i>
<b>A</b>	<b>≤ 10</b>	<b>Free Flow</b>
<b>B</b>	<b>&gt; 10 - 20</b>	<b>Stable Flow (slight delays)</b>
<b>C</b>	<b>&gt; 20 - 35</b>	<b>Stable Flow (acceptable delays)</b>
<b>D</b>	<b>&gt; 35 - 55</b>	<b>Approaching unstable (tolerable delay)</b>
<b>E</b>	<b>&gt; 55 - 80</b>	<b>Unstable Flow (intolerable delay)</b>
<b>F</b>	<b>&gt; 80</b>	<b>Forced Flow (congested and failure)</b>

Source: Highway Capacity Manual (HCM) 2010.

**Table 2 - Unsignalized Intersections Level of Service**

<i>LOS</i>	<i>Intersection Delay per Vehicle (sec/veh)</i>	<i>General Description</i>
<b>A</b>	<b>≤ 10</b>	<b>Free Flow</b>
<b>B</b>	<b>&gt; 10 - 15</b>	<b>Stable Flow (slight delays)</b>
<b>C</b>	<b>&gt; 15 - 25</b>	<b>Stable Flow (acceptable delays)</b>
<b>D</b>	<b>&gt; 25 - 35</b>	<b>Approaching unstable (tolerable delay)</b>
<b>E</b>	<b>&gt; 35 - 50</b>	<b>Unstable Flow (intolerable delay)</b>
<b>F</b>	<b>&gt; 50</b>	<b>Forced Flow (congested and failure)</b>

Source: Highway Capacity Manual (HCM) 2010.

### Study Area Level of Service

The existing intersection was analyzed using Synchro 11. The results, indicating the current level of service, are shown in Table 3 and the appendix.









**Table 3 – Existing Level of Service for Study Area**

<i>Studied Intersection</i>	<i>AM Peak Hour</i>		<i>PM Peak Hours</i>	
	<i>Delay (sec/veh)</i>	<i>LOS</i>	<i>Delay (sec/veh)</i>	<i>LOS</i>
<b>Main Street &amp; SE Paradise St</b>	-	<i>A</i>	-	<i>A</i>
<b>Main Street &amp; Spring St</b>	<i>11.6</i>	<i>B</i>	<i>12.0</i>	<i>B</i>

Source: Delay times and LOS determined using Synchro 11.

### Summary of Existing Conditions

Based upon the existing traffic conditions in both the AM and PM peak hours, the overall Level of Service operates at an acceptable Level of Service. Main Street and Paradise St intersection is in free flowing conditions with no stopping, resulting in a Level of Service A.

## Projected Traffic w/ Starbucks

### Trip Generation

The number of new trips generated for the proposed development was determined using trip generation figures obtained from ITE Trip Generation Manual 10<sup>th</sup> Edition.

It is proposed that the development will consist of a 999 square foot Coffee/Donut Shop with a drive-thru. The number of new trips generated for the proposed development was determined using trip generation figures obtained from ITE Trip Generation Manual 10<sup>th</sup> Edition. The calculations for this can be found in the Appendix. These results can be seen in Table 4 below. For additional information and calculations see the Appendix.

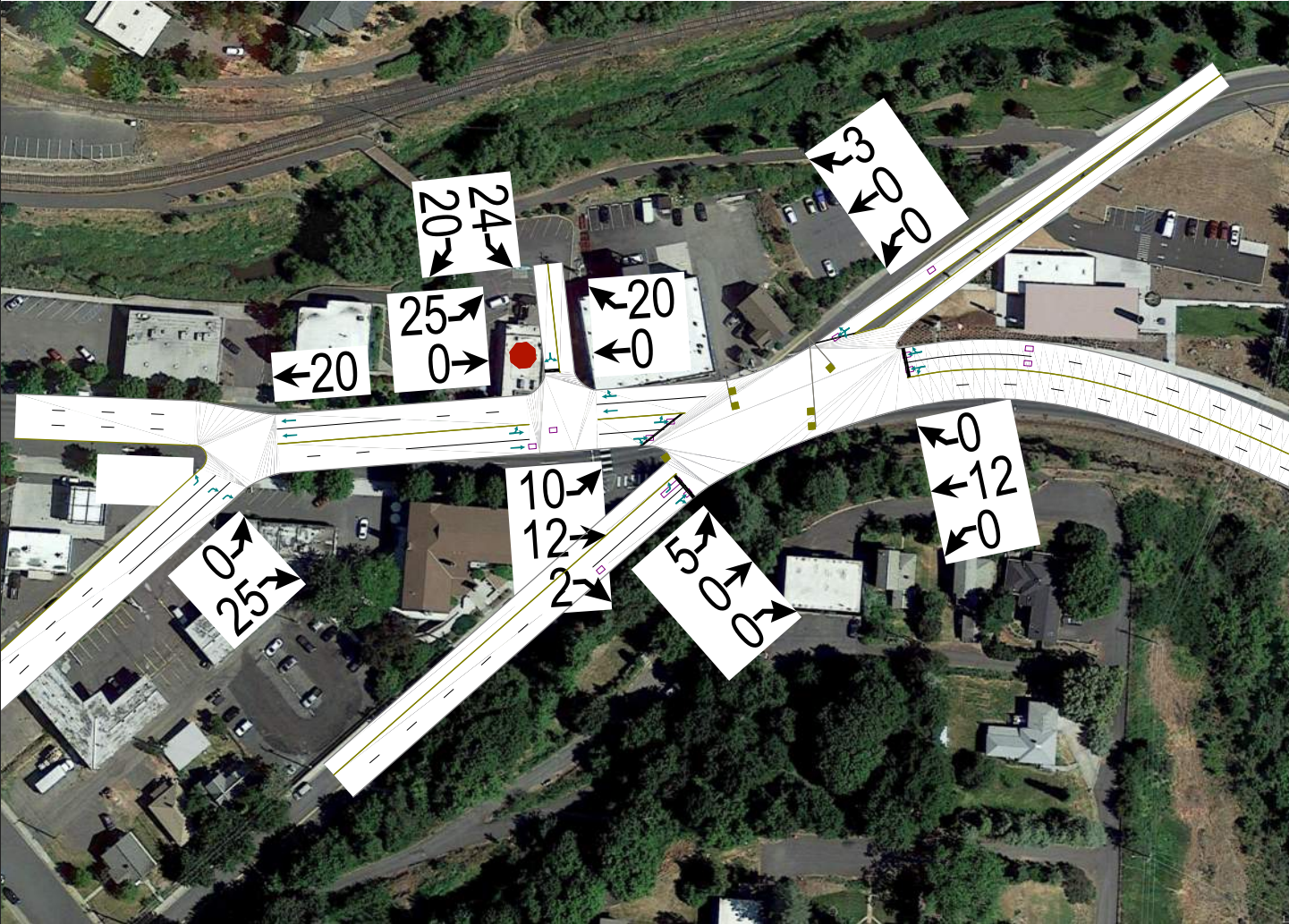
**Table 4 – Project Trip Generation**

<i>Land Use</i>	<i>Weekday Trips Entering</i>	<i>Weekday Trips Exiting</i>	<i>AM Trips Entering</i>	<i>AM Trips Exiting</i>	<i>PM Trips Entering</i>	<i>PM Trips Exiting</i>
<i>Starbucks</i>	410	410	45	44	22	21

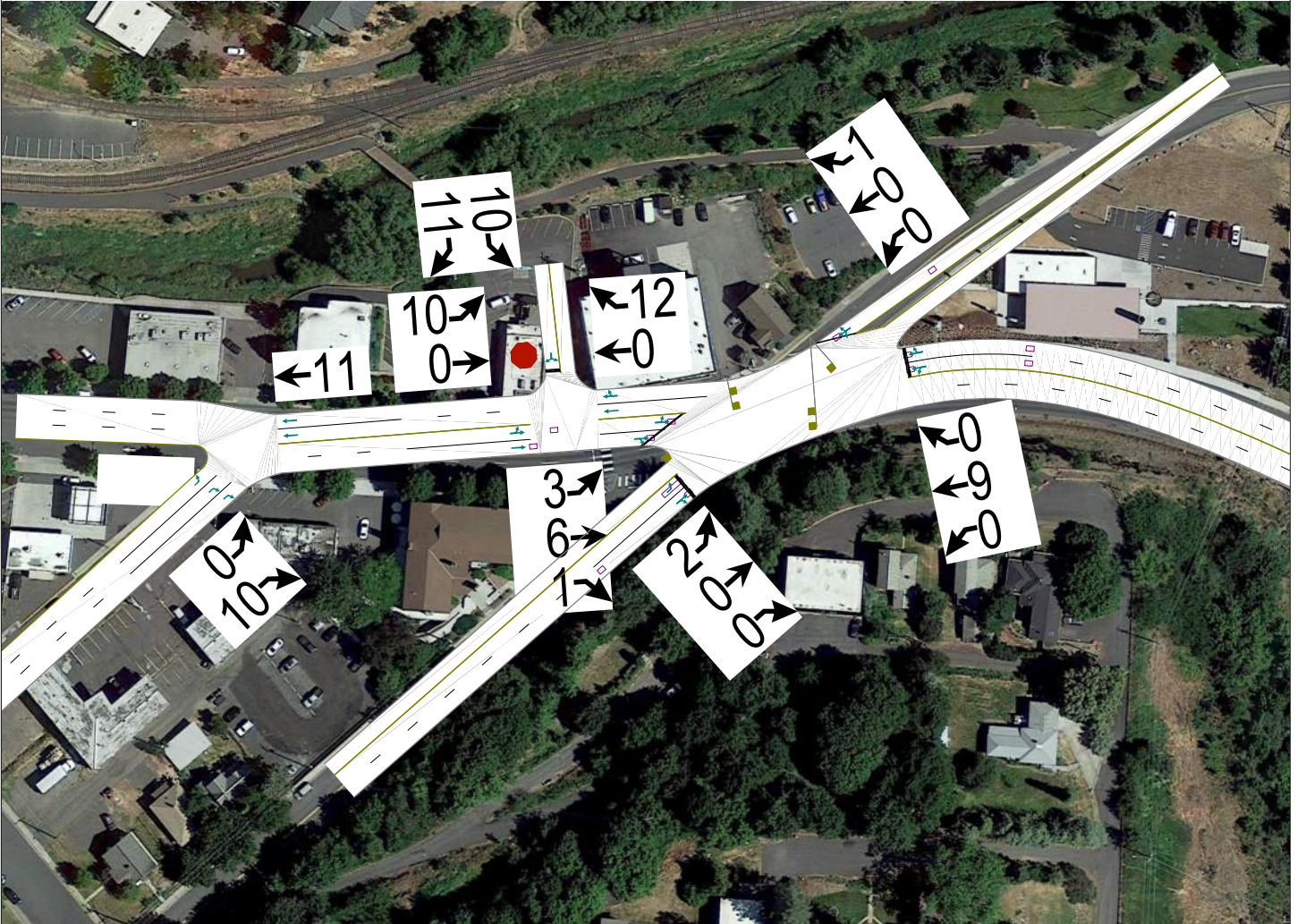
The new trips estimated to be generated from the proposed development was distributed onto the roadway network based on the proposed site access locations, existing turning movements, existing traffic patterns, and proximity to major roadways. The estimated trip generation distribution is shown in Figure 4 below.

The projected new trips were added to the existing 2022 background traffic to represent opening day of this project. The projected combined vehicle movements are shown in Figure 5 below.

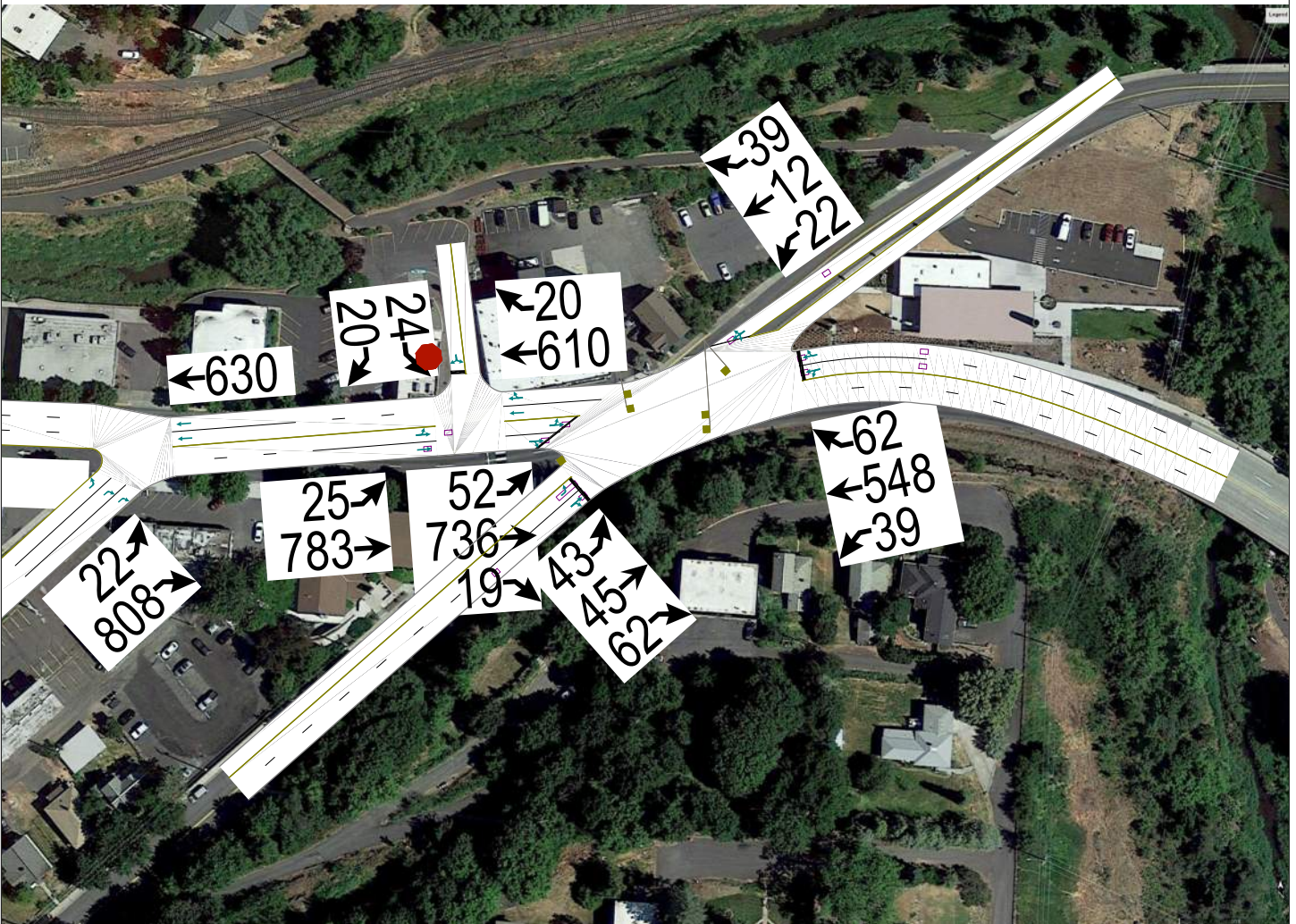




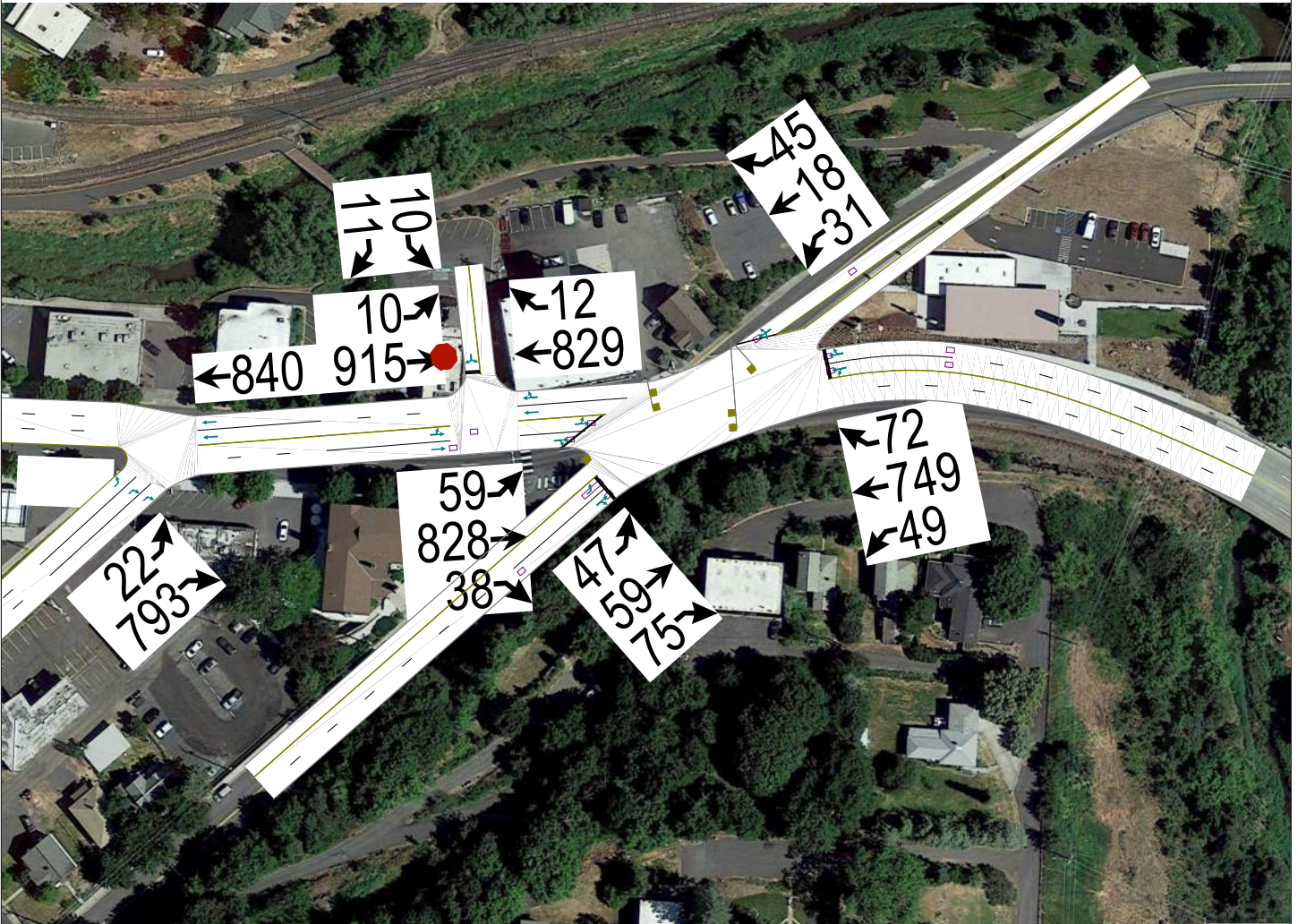












## Results – w/Starbucks in 2022

Based on current conditions, combined with the projected traffic flows from the proposed development at full build out, we have prepared a study of the studied intersection and new accesses. The results of the study are shown in Table 5.

**Table 5 – Existing and Proposed Level of Service for Study Area (2022 w/Starbucks)**

<i>Peak Hour</i>	<i>Studied Intersection</i>	<i>Existing</i>		<i>Proposed</i>	
		<i>Delay (sec/veh)</i>	<i>LOS</i>	<i>Delay (sec/veh)</i>	<i>LOS</i>
<i>AM Peak</i>	<b>Main Street &amp; SE Paradise St</b>	-	<i>A</i>	-	<i>A</i>
	<b>Main Street &amp; Spring St</b>	<i>11.6</i>	<i>B</i>	<i>11.6</i>	<i>B</i>
	<b>Access/Main Street</b>	-	-	<i>0.7</i>	<i>A</i>
<i>PM Peak</i>	<b>Main Street &amp; SE Paradise St</b>	-	<i>A</i>	-	<i>A</i>
	<b>Main Street &amp; Spring St</b>	<i>12.0</i>	<i>B</i>	<i>12.1</i>	<i>A</i>
	<b>Access/Main Street</b>	-	-	<i>0.3</i>	<i>A</i>

Source: Delay times and LOS determined using Synchro 11.

### Summary of Proposed Conditions

Based upon the existing traffic conditions and the minor amount of additional traffic being added from this development in both the AM and PM peak hours, the overall Level of Service in all locations remain the same.

### Drive-Thru Stacking

Starbucks has collected queuing/stacking data across their stores and has determined that for areas like Pullman and the 999 sf store, they estimate that during their AM peak hour, the maximum stacking will be 14 vehicles and during the PM peak hour the maximum stacking will be roughly 8 vehicles.

In addition to the expected queue rate from Starbucks, the below analysis was performed based upon their anticipated service rates.

The ordering station queue is the driving factor that determines whether or not vehicles will be backed up onto Main Street. A queueing analysis was performed assuming the queue at the ordering stations follows a single-channel queuing model with Poisson arrivals and exponential service-times (M/M/1 model).

The average queue length and arrival rate were used to calculate the existing service rate of the ordering stations. This was accomplished using the following equation, applicable for M/M/1 queues.

$$\text{Average number of vehicles in the system} = \frac{\lambda}{\mu - \lambda}$$

where  $\lambda$  is the arrival rate and  $\mu$  is the service rate.

The equation was rearranged to solve for  $\mu$ . In this equation, the average number of vehicles in the system refers to the number of vehicles in the queue and in service. The "queue length" recorded as a part of the data collection includes vehicles being served and vehicles in the queue, and is therefore equivalent to the number of vehicles in the system.

Analysis was performed to calculate how often the existing queue will reach a length that will block circulation or reach Maple Avenue. This was accomplished using the following equation, applicable for M/M/1 queues:

$$\text{Probability of more than } k \text{ units in the system} = \left(\frac{\lambda}{\mu}\right)^{k+1}$$

The results of the analysis are included in Table 6 below.

**Table 6 – Proposed anticipated Service Rates and Queue Lengths**

<i>Proposed Service Rates and Queue Lengths</i>		
	<i>Weekday AM</i>	<i>Weekday PM</i>
<b>Peak Hour Arrival Rate, (veh/hr)</b>	<b>45</b>	<b>22</b>
<b>Peak Hour Average Queue Length (number of vehicles in service and queue)</b>	<b>14</b>	<b>8</b>
<b>Calculated Service Rate (veh/hr)</b>	<b>57.86</b>	<b>26.75</b>
<b>Service Time (sec/veh)</b>	<b>62.22</b>	<b>134.58</b>
<b>Probability of more than 16 vehicles in the system</b>	<b>13.9%</b>	<b>4.4%</b>
<b>Probability of more than 22 vehicles in the system</b>	<b>3.1%</b>	<b>1.1%</b>

This shows that the probability of more than 16 vehicles being in queue during the AM peak hour is 13.9% and during the PM peak hour is 4.4%.

While it would block the parking stalls at the store, the site plan can accommodate up to 22 vehicles before it would back onto Main Street. This analysis shows that the probability of that would be 3.1% or less.

See Figure #6 below that shows the amount of stacking at this site.



Figure #6



## **Conclusions & Recommendations**

Our principal findings from our traffic impact analysis have determined that during the peak hours, all intersections and accesses intersections will operate at an acceptable Level of Service with no off-site improvements being required.

The queueing/stacking analysis also shows that there is a less than a 3.1% chance that the stacking will back up on Main Street during the AM peak hours.

Therefore, it is our professional opinion that this project will not significantly alter the existing traffic patterns at any of the intersections and should be permitted per the traffic data contained within this report.

## **Appendix**

## Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: Starbucks | Pullman, WA

Open Date: 2/7/2022

Analysis Date: 2/7/2022

ITE	Land Use	Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic				Weekday AM Peak Hour of Generator			
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
937	DONUTSHOP-DRIVE 1 1 1000 Sq. Ft. GFA		410	410	820		45	44	89		22	21	43		48	50	98
Unadjusted Volume			410	410	820		45	44	89		22	21	43		48	50	98
Internal Capture Trips			0	0	0		0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			410	410	820		45	44	89		22	21	43		48	50	98


















Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent


















Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Generator Internal Capture = 0 Percent

\* - Custom rate used for selected time period.


















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	42	724	17	39	536	62	38	45	62	22	12	36
Future Volume (veh/h)	42	724	17	39	536	62	38	45	62	22	12	36
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	46	787	18	42	583	67	41	49	67	24	13	39
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	117	1858	42	126	1640	185	516	219	299	179	110	242
Arrive On Green	0.58	0.58	0.58	0.58	0.58	0.58	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	116	3196	72	130	2822	319	1347	714	976	392	358	791
Grp Volume(v), veh/h	429	0	422	348	0	344	41	0	116	76	0	0
Grp Sat Flow(s),veh/h/ln	1701	0	1682	1633	0	1639	1347	0	1690	1541	0	0
Q Serve(g_s), s	0.0	0.0	11.2	0.0	0.0	8.9	0.0	0.0	4.1	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.0	0.0	11.2	7.7	0.0	8.9	1.3	0.0	4.1	2.6	0.0	0.0
Prop In Lane	0.11		0.04	0.12		0.19	1.00		0.58	0.32		0.51
Lane Grp Cap(c), veh/h	1039	0	978	999	0	953	516	0	518	531	0	0
V/C Ratio(X)	0.41	0.00	0.43	0.35	0.00	0.36	0.08	0.00	0.22	0.14	0.00	0.00
Avail Cap(c_a), veh/h	1039	0	978	999	0	953	516	0	518	531	0	0
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	0.00
Uniform Delay (d), s/veh	9.1	0.0	9.4	8.6	0.0	8.9	19.7	0.0	20.7	20.1	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.4	1.0	0.0	1.1	0.3	0.0	1.0	0.6	0.0	0.0
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	5.5	0.0	5.5	4.1	0.0	4.3	0.7	0.0	2.0	1.3	0.0	0.0
LnGrp Delay(d),s/veh	10.3	0.0	10.7	9.6	0.0	9.9	20.0	0.0	21.7	20.7	0.0	0.0
LnGrp LOS	B		B	A		A	C		C	C		
Approach Vol, veh/h		851			692			157			76	
Approach Delay, s/veh		10.5			9.8			21.2			20.7	
Approach LOS		B			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		29.0		51.0		29.0		51.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		24.5		46.5		24.5		46.5				
Max Q Clear Time (g_c+I1), s		6.1		13.2		4.6		10.9				
Green Ext Time (p_c), s		0.7		6.5		0.3		5.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.6								
HCM 2010 LOS				B								




















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	52	736	19	39	548	62	43	45	62	22	12	39
Future Volume (veh/h)	52	736	19	39	548	62	43	45	62	22	12	39
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	57	800	21	42	596	67	47	49	67	24	13	42
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	1841	47	126	1681	186	499	210	287	167	104	241
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	150	3101	80	128	2831	313	1343	714	976	370	354	822
Grp Volume(v), veh/h	437	0	441	354	0	351	47	0	116	79	0	0
Grp Sat Flow(s),veh/h/ln	1650	0	1681	1632	0	1640	1343	0	1690	1545	0	0
Q Serve(g_s), s	0.0	0.0	11.6	0.0	0.0	8.9	0.0	0.0	4.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	11.6	7.6	0.0	8.9	1.5	0.0	4.2	2.7	0.0	0.0
Prop In Lane	0.13		0.05	0.12		0.19	1.00		0.58	0.30		0.53
Lane Grp Cap(c), veh/h	1031	0	998	1019	0	974	499	0	497	513	0	0
V/C Ratio(X)	0.42	0.00	0.44	0.35	0.00	0.36	0.09	0.00	0.23	0.15	0.00	0.00
Avail Cap(c_a), veh/h	1031	0	998	1019	0	974	499	0	497	513	0	0
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	0.00
Uniform Delay (d), s/veh	8.6	0.0	9.0	8.1	0.0	8.4	20.5	0.0	21.4	20.9	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	1.4	0.9	0.0	1.0	0.4	0.0	1.1	0.6	0.0	0.0
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	5.5	0.0	5.7	4.1	0.0	4.3	0.8	0.0	2.1	1.4	0.0	0.0
LnGrp Delay(d),s/veh	9.9	0.0	10.4	9.1	0.0	9.4	20.9	0.0	22.5	21.6	0.0	0.0
LnGrp LOS	A		B	A		A	C		C	C		
Approach Vol, veh/h		878			705			163			79	
Approach Delay, s/veh		10.1			9.3			22.0			21.6	
Approach LOS		B			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.0		52.0		28.0		52.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		23.5		47.5		23.5		47.5				
Max Q Clear Time (g_c+I1), s		6.2		13.6		4.7		10.9				
Green Ext Time (p_c), s		0.7		6.9		0.3		5.4				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				11.6								
HCM 2010 LOS				B								



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	25	783	610	20	24	20
Future Volume (Veh/h)	25	783	610	20	24	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	851	663	22	26	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			157			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	685				1154	342
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	449				965	72
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				88	98
cM capacity (veh/h)	1005				223	886
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	311	567	442	243	48	
Volume Left	27	0	0	0	26	
Volume Right	0	0	0	22	22	
cSH	1005	1700	1700	1700	339	
Volume to Capacity	0.03	0.33	0.26	0.14	0.14	
Queue Length 95th (ft)	2	0	0	0	12	
Control Delay (s)	1.0	0.0	0.0	0.0	17.4	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		17.4	
Approach LOS					C	
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			49.7%		ICU Level of Service	A
Analysis Period (min)			15			

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	56	822	37	49	748	72	45	59	75	31	18	44
Future Volume (veh/h)	56	822	37	49	748	72	45	59	75	31	18	44
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	61	893	40	53	813	78	49	64	82	34	20	48
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	1817	80	122	1741	164	464	209	268	166	107	190
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	135	2998	132	118	2872	270	1328	743	952	377	382	674
Grp Volume(v), veh/h	487	0	507	468	0	476	49	0	146	102	0	0
Grp Sat Flow(s),veh/h/ln	1593	0	1672	1613	0	1647	1328	0	1695	1432	0	0
Q Serve(g_s), s	0.0	0.0	13.7	0.0	0.0	12.8	0.0	0.0	5.4	0.1	0.0	0.0
Cycle Q Clear(g_c), s	11.1	0.0	13.7	10.6	0.0	12.8	2.2	0.0	5.4	5.5	0.0	0.0
Prop In Lane	0.13		0.08	0.11		0.16	1.00		0.56	0.33		0.47
Lane Grp Cap(c), veh/h	1016	0	1014	1028	0	999	464	0	477	463	0	0
V/C Ratio(X)	0.48	0.00	0.50	0.46	0.00	0.48	0.11	0.00	0.31	0.22	0.00	0.00
Avail Cap(c_a), veh/h	1016	0	1014	1028	0	999	464	0	477	463	0	0
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	0.00
Uniform Delay (d), s/veh	8.4	0.0	8.9	8.3	0.0	8.7	21.4	0.0	22.6	22.0	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	1.8	1.5	0.0	1.6	0.5	0.0	1.7	1.1	0.0	0.0
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	6.1	0.0	6.7	5.8	0.0	6.1	0.9	0.0	2.7	1.9	0.0	0.0
LnGrp Delay(d),s/veh	10.0	0.0	10.7	9.7	0.0	10.3	21.9	0.0	24.3	23.1	0.0	0.0
LnGrp LOS	B		B	A		B	C		C	C		
Approach Vol, veh/h		994			944			195			102	
Approach Delay, s/veh		10.3			10.0			23.7			23.1	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.0		53.0		27.0		53.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		22.5		48.5		22.5		48.5				
Max Q Clear Time (g_c+I1), s		7.4		15.7		7.5		14.8				
Green Ext Time (p_c), s		0.8		8.4		0.4		7.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				12.0								
HCM 2010 LOS				B								

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	59	828	38	49	749	72	47	59	75	31	18	45
Future Volume (veh/h)	59	828	38	49	749	72	47	59	75	31	18	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	64	900	41	53	814	78	51	64	82	34	20	49
Adj No. of Lanes	0	2	0	0	2	0	1	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	1881	85	125	1819	171	415	194	249	147	96	172
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	149	2945	132	126	2848	268	1326	743	952	360	366	659
Grp Volume(v), veh/h	487	0	518	466	0	479	51	0	146	103	0	0
Grp Sat Flow(s),veh/h/ln	1554	0	1672	1594	0	1648	1326	0	1695	1386	0	0
Q Serve(g_s), s	0.2	0.0	14.6	0.0	0.0	13.3	0.0	0.0	6.3	0.4	0.0	0.0
Cycle Q Clear(g_c), s	13.5	0.0	14.6	10.8	0.0	13.3	3.0	0.0	6.3	6.7	0.0	0.0
Prop In Lane	0.13		0.08	0.11		0.16	1.00		0.56	0.33		0.48
Lane Grp Cap(c), veh/h	1038	0	1068	1063	0	1053	415	0	443	415	0	0
V/C Ratio(X)	0.47	0.00	0.48	0.44	0.00	0.46	0.12	0.00	0.33	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1038	0	1068	1063	0	1053	415	0	443	415	0	0
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	0.00
Uniform Delay (d), s/veh	7.9	0.0	8.5	7.8	0.0	8.3	25.7	0.0	26.9	26.3	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	1.6	1.3	0.0	1.4	0.6	0.0	2.0	1.4	0.0	0.0
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	6.3	0.0	7.1	6.0	0.0	6.4	1.0	0.0	3.2	2.3	0.0	0.0
LnGrp Delay(d),s/veh	9.5	0.0	10.1	9.1	0.0	9.7	26.3	0.0	28.9	27.7	0.0	0.0
LnGrp LOS	A		B	A		A	C		C	C		
Approach Vol, veh/h	1005				945			197			103	
Approach Delay, s/veh	9.8				9.4			28.2			27.7	
Approach LOS	A				A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	28.0		62.0		28.0		62.0					
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5					
Max Green Setting (Gmax), s	23.5		57.5		23.5		57.5					
Max Q Clear Time (g_c+I1), s	8.3		16.6		8.7		15.3					
Green Ext Time (p_c), s	0.8		8.9		0.4		8.2					
Intersection Summary												
HCM 2010 Ctrl Delay	12.1											
HCM 2010 LOS	B											



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	10	915	829	12	10	11
Future Volume (Veh/h)	10	915	829	12	10	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	995	901	13	11	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			166			
pX, platoon unblocked	0.87				0.87	0.87
vC, conflicting volume	914				1427	457
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612				1199	88
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	99
cM capacity (veh/h)	841				153	832
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	343	663	601	313	23	
Volume Left	11	0	0	0	11	
Volume Right	0	0	0	13	12	
cSH	841	1700	1700	1700	267	
Volume to Capacity	0.01	0.39	0.35	0.18	0.09	
Queue Length 95th (ft)	1	0	0	0	7	
Control Delay (s)	0.4	0.0	0.0	0.0	19.7	
Lane LOS	A				C	
Approach Delay (s)	0.2		0.0		19.7	
Approach LOS					C	
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization			42.3%		ICU Level of Service	A
Analysis Period (min)			15			





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