



SAFEWAY ARLINGTON
TRAFFIC IMPACT ANALYSIS

Arlington, WA



03/17/2022

Prepared for: Amanda Martin
PM Design
19401 40th Avenue West, Suite 420
Lynwood, WA 98036

March 2022

SAFEWAY ARLINGTON
TRAFFIC IMPACT ANALYSIS

TABLE OF CONTENTS

1. Introduction.....	3
2. Project Description	3
3. Existing Conditions	5
4. Future Traffic Demand.....	10
5. Conclusions and Mitigation.....	17

Appendix

LIST OF TABLES

1. Existing PM Peak Hour Level of Service	9
2. Project Trip Generation	10
3. Forecast 2025 PM Peak Hour Level of Service	16

LIST OF FIGURES

1. Vicinity Map & Roadway System	3
2. Site Plan	4
3. Existing PM Peak Hour Volumes.....	7
4. Existing PM Peak Hour Pedestrian Volumes.....	8
5A. Primary PM Peak Hour Trip Distribution & Assignment.....	12
5B. Pass-By PM Peak Hour Trip Distribution & Assignment.....	13
6. Forecast 2025 PM Peak Hour Background Volumes	14
7. Forecast 2025 PM Peak Hour Volumes with Project	15

SAFEWAY ARLINGTON TRAFFIC IMPACT ANALYSIS

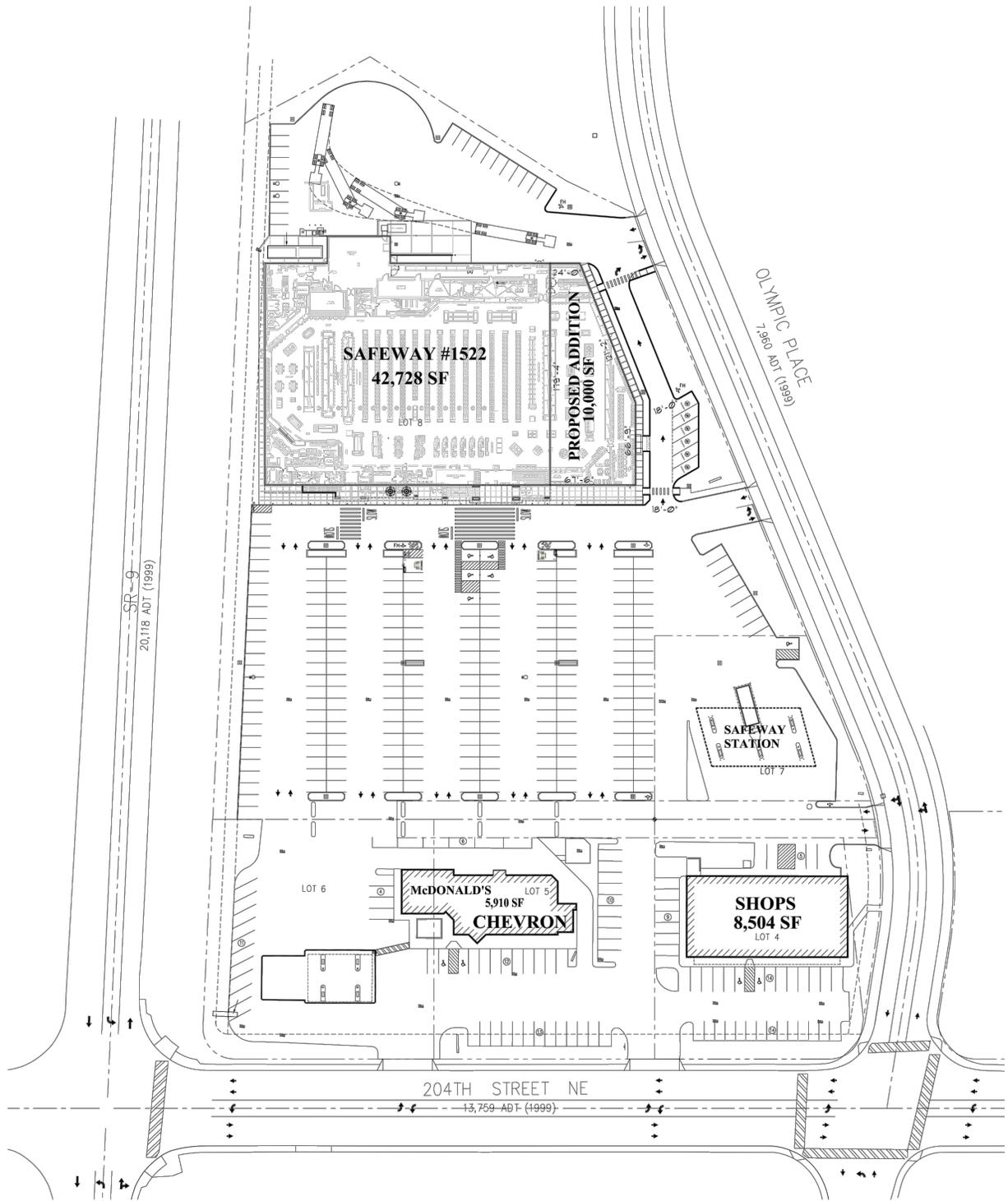
1. INTRODUCTION

The main goals of this study focus on the analysis of existing roadway conditions and forecasts of newly generated project traffic. The first task includes the review of general roadway information on the adjacent street system, baseline vehicular volumes, and entering sight distance data. Forecasts of future traffic and dispersion patterns on the street system are then determined using established trip generation and distribution techniques. As a final step, appropriate conclusions and mitigation measures are defined.

2. PROJECT DESCRIPTION

The Safeway Arlington project proposes to construct a 10,000 square foot addition and parking updates to an existing 42,728 square foot Safeway facility located in the city of Arlington. The subject site encompasses 4.82-acres within tax parcel #: 00847300000800. The subject site is bordered to the east by Olympic Place NE and is located north of 204th Street NE. Access to the facility is proposed to continue via three existing driveways extending west from Olympic Place NE and two driveways extending north from 204th Street NE. Figure 1 shows the site location and roadway map while Figure 2 shows the site plan and access configuration for the project.





HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

SAFEWAY ARLINGTON

SITE PLAN
FIGURE 2

3. EXISTING CONDITIONS

3.1 Existing Roadway Characteristics

Adjacent streets to the site are listed and described below:

SR-9: is a north-south, 2- to 3-lane state route bordering the subject site to the west. Travel lanes are approximately 11- to 12-feet in width and additional turn-lanes are provided at major intersections. With the exception of pedestrian crossing infrastructure at 204th Street NE, non-motorist facilities are not present. Paved shoulders varying in width are provided along either side of the roadway. The posted speed limit in the subject site vicinity is 45- to 55-mph.

204th Street NE: is an east-west, 2- to 4-lane arterial located south of the subject site. Travel lanes are approximately 11- to 13-feet in width with turn-lanes provided at major intersections. A raised center median island is provided just south of the subject site along the roadway. Paved shoulders and protected bus pull-outs are provided southeast of the subject site. Curb, gutter and sidewalk are generally provided south and southwest of the development. The posted speed limit in the subject site vicinity is 20- to 35-mph.

Olympic Place NE: is a north-south, two-lane local roadway bordering the subject site to the east. Travel lanes are approximately 11- to 19-feet in width. Curb, gutter and detached sidewalk are provided along either side of the roadway. The posted speed limit is 25-mph.

3.2 Roadway Improvement Projects

A review of the proposed City of Arlington Public Works Projects indicates that projects are currently planned in the vicinity. Summaries of the identified projects are provided below:

204th and 74th Ave – Intersection: This project intends to revise the roadway from a three way intersection to a four way intersection, install a traffic signal, construct protected bus pull-outs and install ADA compliant pedestrian crossing improvements. Construction is anticipated to occur in 2022 and the total estimated cost is approximately \$1,053,345.

74th Avenue Trail Project : The AVR Trail currently has a northern termination point adjacent 74th Avenue NE approximately 2,000 feet south of 204th Street NE. This project intends to extend the 12-foot wide trail northerly to 204th Street NE. Construction is anticipated to occur in 2023 and the total estimated cost is to be determined.

3.3 Existing Peak Hour Volumes

Field data was collected in February of 2022 to determine baseline vehicular volumes near the proposed development. Traffic counts were performed at the following outlying intersections and site accesses, which are anticipated to receive the bulk of project traffic.

- SR-9 & 204th St NE
- W Site Access & 204th St NE
- E Site Access & 204th St NE
- Olympic PI NE & 204th St NE
- Olympic PI NE & S Access/Driveway
- Olympic PI NE & Mid Access
- Olympic PI NE & N Access

Traffic counts were administered between the weekday peak period of 4:00 PM - 6:00 PM. The one hour reflecting highest overall roadway volumes (peak hour) was then derived from each count. Existing PM peak hour volumes are illustrated in Figure 3 on the following page. Full-count sheets have been included in the appendix.

3.4 Non-Motorist Traffic

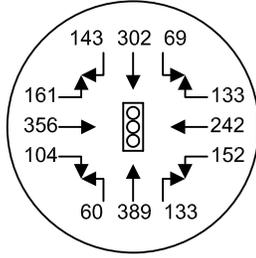
Observations for pedestrian and bicycle activity were made at the study and access intersections during routine peak hour counts. During the PM peak hour, no notable bicyclist activity was observed. PM peak hour pedestrian volumes observed at the study and access intersections are illustrated in Figure 4. Sidewalk segments, marked crosswalks, rapid flashing beacons and low travel speeds are generally present south and east of the subject site along 204th Street NE and Olympic Place NE, encouraging safe and accessible non-motorist transport.

3.5 Transit Service

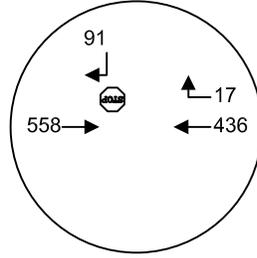
A review of the Island Transit regional bus schedule indicates that transit is readily available in the vicinity of the project via Routes 220 and 230. The nearest stops servicing these Routes are provided at the study intersection of 204th Street NE & Olympic Place Ne. Route 220 – Arlington to Smokey Point provides service from the Smokey Point Transit Center to Broadway & Gilman. Weekday service is provided from 6:44 AM – 7:50 PM with approximately 60-minute headways. Saturday service is provided from 6:09 AM – 8:02 PM with approximately 60-minute headways. Sunday service is provided from 7:15 AM – 8:10 PM with approximately 60-minute headways. Route 230 – Darrington to Smokey Point provides service from the Smokey Point Transit Center in Arlington to Darrington Street & Givens Avenue in Darrington. One eastbound and one westbound service is provided during both the morning and evening on weekdays. No weekend service is provided. Refer to the Community Transit regional bus schedule for further information on bus schedules and locations.



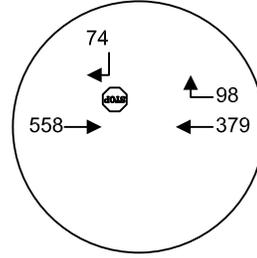
① SR-9 & 204TH ST NE



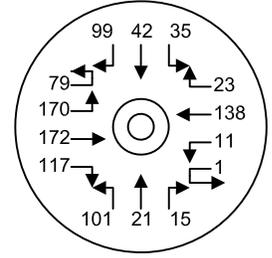
② W ACCESS & 204TH ST NE



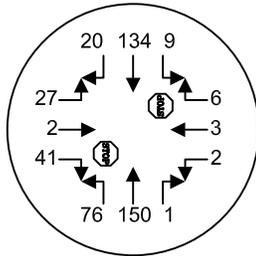
③ E ACCESS & 204TH ST NE



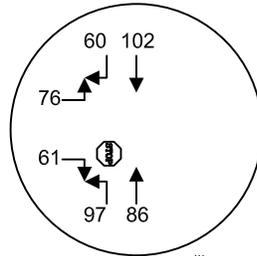
④ OLYMPIC PL NE & 204TH ST NE



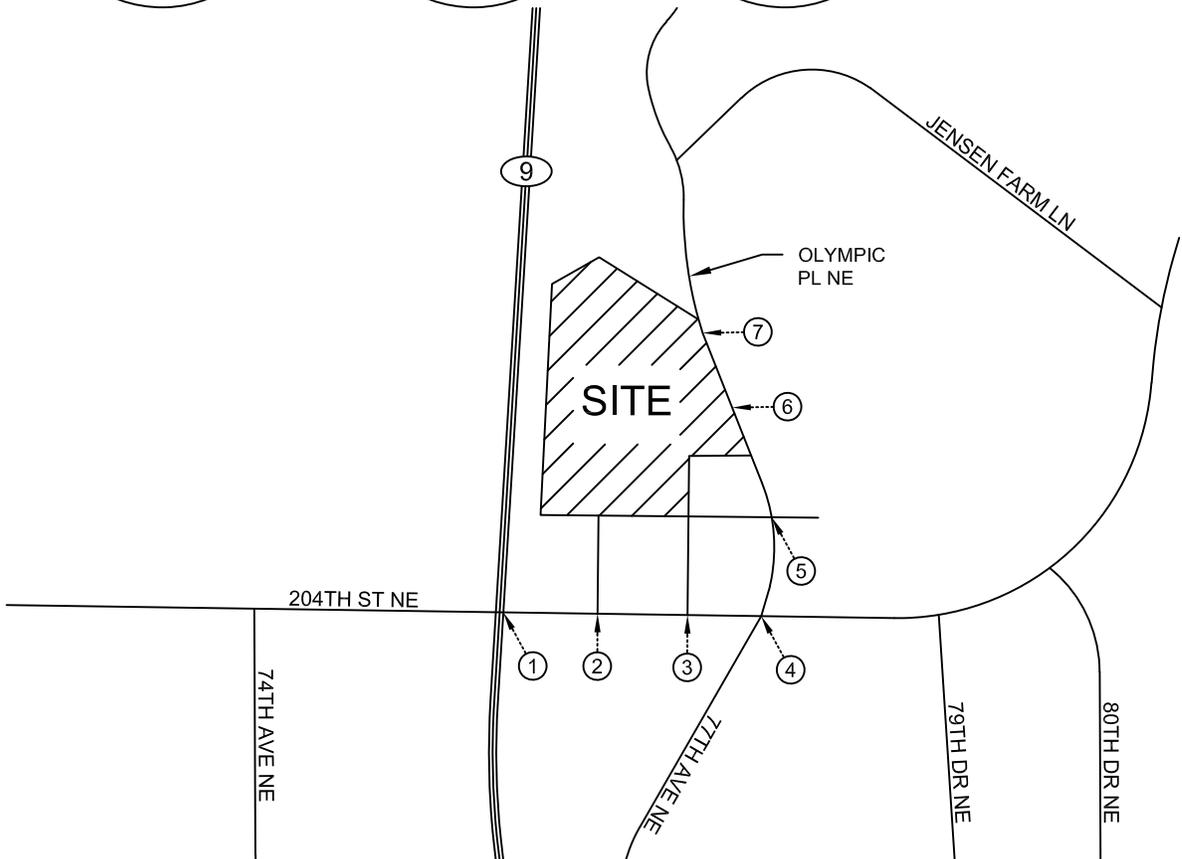
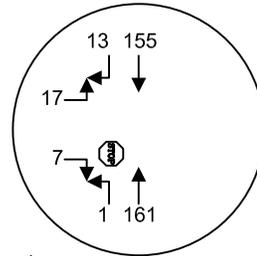
⑤ OLYMPIC PL NE & S ACCESS



⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS

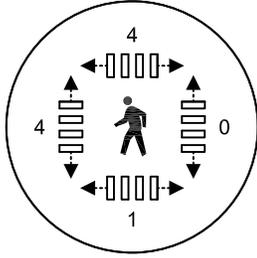


HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

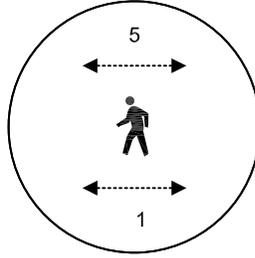
SAFeway ARLINGTON
EXISTING PM PEAK HOUR VOLUMES
FIGURE 3



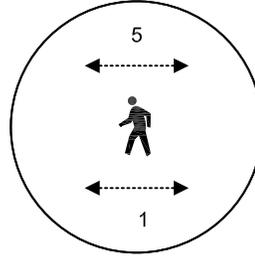
① SR-9 & 204TH ST NE



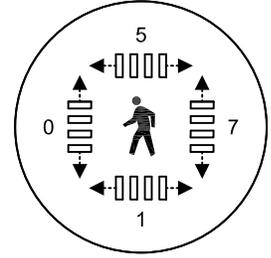
② W ACCESS & 204TH ST NE



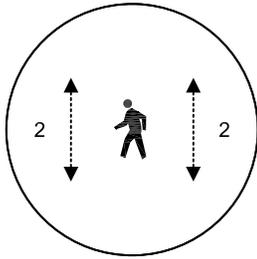
③ E ACCESS & 204TH ST NE



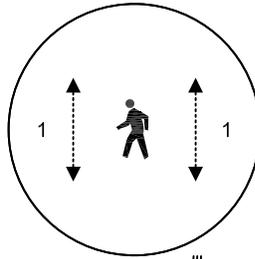
④ OLYMPIC PL NE & 204TH ST NE



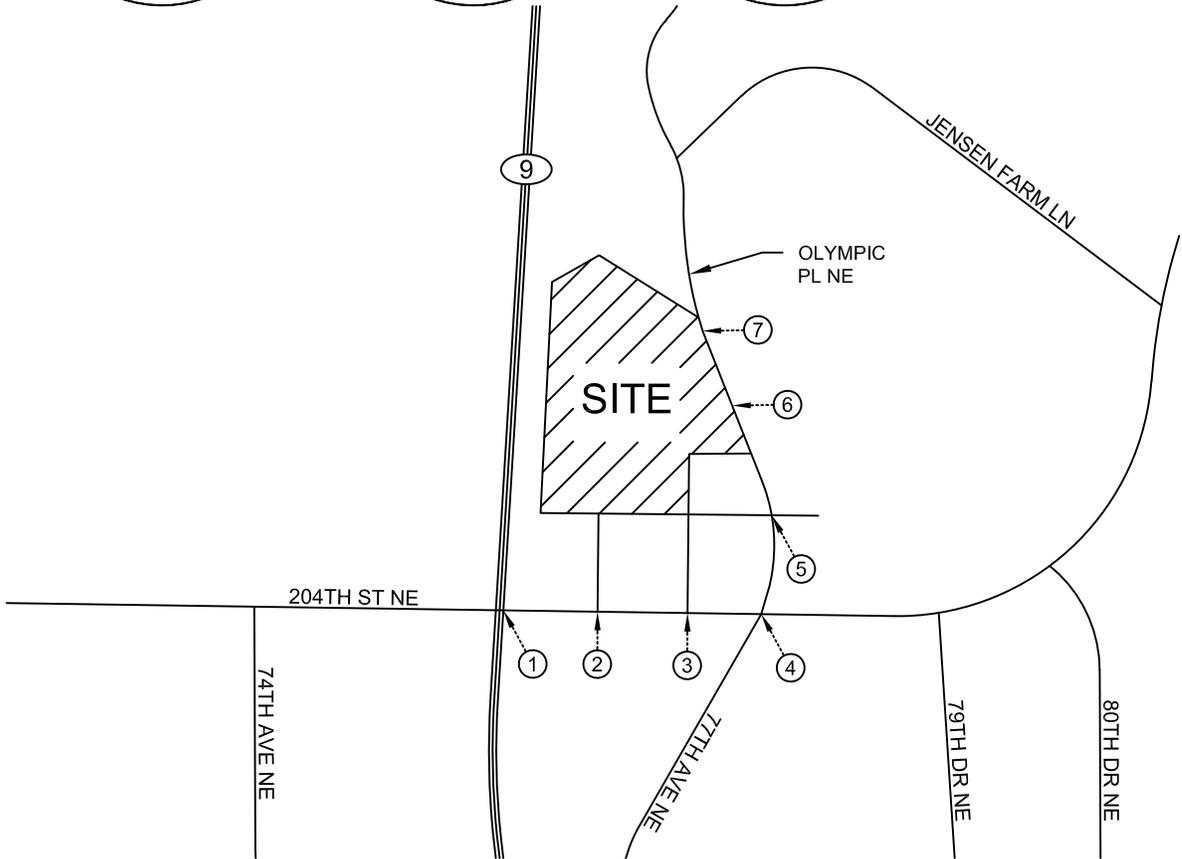
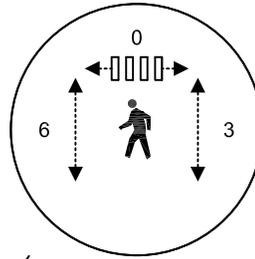
⑤ OLYMPIC PL NE & S ACCESS



⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS



HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

SAFEWAY ARLINGTON
EXISTING PM PEAK HOUR PEDESTRIAN VOLUMES
FIGURE 4

3.6 Existing Level of Service

Peak hour delays were determined through the use of the *Highway Capacity Manual* 6th Edition. Capacity analysis is used to determine level of service (LOS) which is an established measure of congestion for transportation facilities. The range¹ for intersection level of service is LOS A to LOS F with the former indicating the best operating conditions with low control delays and the latter indicating saturated conditions with heavy control delays. Detailed descriptions of intersection LOS are given in the *2016 Highway Capacity Manual*. Level of service calculations were made through the use of the *Synchro 11* and *SIDRA Intersection 9.0* analysis programs. Delays presented represent overall weighted average delays for roundabouts and signalized intersections. Two-way stop-controlled intersections are reported for the highest delay's approach. Table 1 below summarizes baseline PM peak hour LOS delays for the outlying study intersection.

Table 1: Existing PM Peak Hour Level of Service
Delays given in seconds per vehicle

Intersection	Control	Critical Movement	LOS	Delay
SR-9 & 204th St NE	Signal	Overall	C	28.3
W Site Access & 204th St NE	Stop	SB	B	10.6
E Site Access & 204th St NE	Stop	SB	B	12.0
Olympic PI NE & 204th St NE	RAB	Overall	A	8.2
Olympic PI NE & S Access/Dwy	Stop	EB	B	11.6
Olympic PI NE & Mid Access	Stop	EB	B	12.1
Olympic PI NE & N Access	Stop	EB	B	10.5

As illustrated in Table 1, the outlying study intersections and project accesses are shown to operate with LOS C or better conditions during the critical PM peak hour. No deficiencies are identified during the baseline PM peak hour.

¹ *Signalized Intersections - Level of Service*

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Stop Controlled Intersections – Level of Service

Level of Service	Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Highway Capacity Manual, 6th Edition

4. FUTURE TRAFFIC DEMAND

4.1 Trip Generation

Trip generation is used to determine the magnitude of project impacts on the surrounding street system. This is usually denoted by the quantity or specific number of new trips that enter and exit a project during a designated time period, such as a specific peak hour (AM or PM) or an entire day. Data presented in this report was taken from the Institute of Transportation Engineer's publication *Trip Generation*, 11th Edition. The designated land use for this project is defined as Supermarket – LUC 850. Table 2 below summarizes the estimated project trip generation using ITE average rates to determine trips ends with square footage as the input variable. Included are the average weekday daily traffic (AWDT) and the AM and PM peak hours. Refer to the appendix for trip generation output.

Table 2: Project Trip Generation

Land Use	Size	AWDT	AM Peak-Hour Trips			PM Peak-Hour Trips		
			In	Out	Total	In	Out	Total
Supermarket (LUC 850)	10,000 sf	938	17	12	29	45	45	90
<i>Internal Link Reduction</i>		-113	-3	-1	-4	-5	-5	-10
Total Driveway Trips		825	14	11	25	40	40	80
Pass-By ²		-198	-3	-3	-6	-10	-9	-19
Total New Primary Trips		627	11	8	19	30	31	61

A trip reduction in the form of internal capture was accounted for given the diverse land uses in close proximity within the shopping center in which the Safeway facility is encompassed. Internal trips occur within a development from complementary uses (e.g., gas station to restaurant, supermarket to restaurant, etc.) and do not result in new trips added to the adjacent roadway. Internal capture rates have been estimated using the *NCHRP 8-51 Internal Trip Capture Estimation Tool* which indicated approximately 13 percent and 11 percent rates for the respective AM and PM peak hours. The daily internal capture was then averaged for a 12 percent estimate. See appendix for further details.

Also considered are pass-by trips, or motorists already passing by the site who decide to make an intermediate stop before proceeding to their primary destination. Approximately 24% of all trips associated with supermarkets are considered as pass-by based on ITE

² Institute of Transportation Engineers, Pass-By Data and Rate Tables/2021 Pass-By Tables for ITETripGen Appendices – PM Rate for LUC 850: 24%.

data. These trips are not considered as new trips but will impact the site's access points. Based on Table 2, total driveway trips are estimated with 80 movements in the PM peak hour (61 primary; 18 pass-by).

4.2 Trip Distribution Pattern

Trip distribution describes the anticipated travel routes for inbound and outbound project traffic relative to the adjacent street system. Primary trips generated by the project are expected to follow the general pattern shown in Figure 4A for the PM peak hour of travel. Illustrated in Figure 4B are pass-by trips at all project driveways. Percentages are primarily based on the anticipated service catchment of the Safeway facility. Therefore, trips were primarily distributed to local residential areas within the city of Arlington. It should be noted that another Safeway is located within the city, approximately 3.25 southwest of the subject site on 172nd Street NE. As such, the service area of the proposed development is anticipated to be located predominantly north of approximately 188th Street NE.

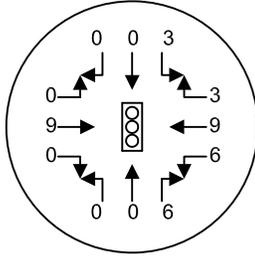
New development in the city of Arlington is subject to potential traffic mitigation measures through an interlocal agreement (ILA) with Snohomish County. Therefore, a comprehensive trip distribution effort was performed for the proposed 10,000 square foot Safeway addition whereby trip dissemination was illustrated out to approximately three peak hour trips. Figures A and B, attached in the appendix, illustrate development-generated directional AM and PM peak hour trips, respectively. Also identified are road sections with planned improvements in the project area, as outlined in the County's *Transportation Needs Report, Appendix D*. As illustrated in the figures, no road improvements are impacted by three or more development-generated directional PM peak hour trips. As such, the proportionate share amount to Snohomish County is calculated to be zero. All associated ILA worksheets have been attached in the appendix.

4.3 Peak Hour Volumes With and Without the Project

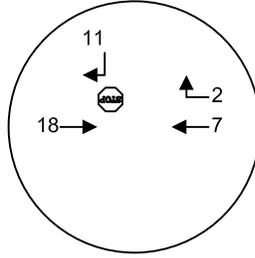
A 3-year horizon of 2025 was used for future traffic delay analysis based on anticipated year of completion and full occupancy. Forecast 2025 background traffic volumes were derived by applying a 2.0 percent compound annual growth rate to the existing PM peak hour volumes shown in Figure 3. This growth rate was derived from historic ADT Volumes recorded on SR-9 in the vicinity of the subject site. Records from 2010 to 2015 at PTR Location P21 indicate a compound annual growth rate of less than 2.0 percent. Figures 5 and 6 show forecast 2025 PM peak hour volumes without and with project-generated traffic, respectively.



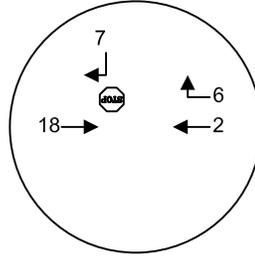
① SR-9 & 204TH ST NE



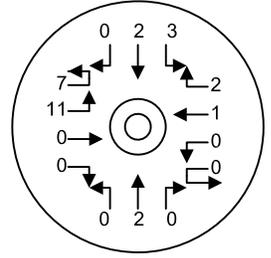
② W ACCESS & 204TH ST NE



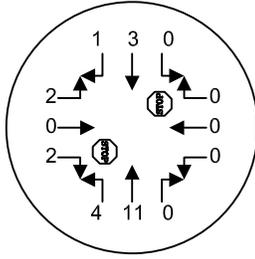
③ E ACCESS & 204TH ST NE



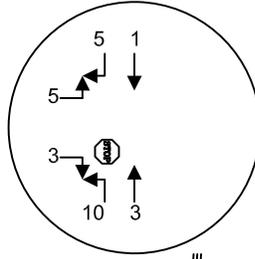
④ OLYMPIC PL NE & 204TH ST NE



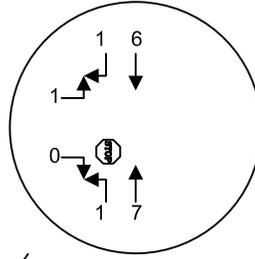
⑤ OLYMPIC PL NE & S ACCESS



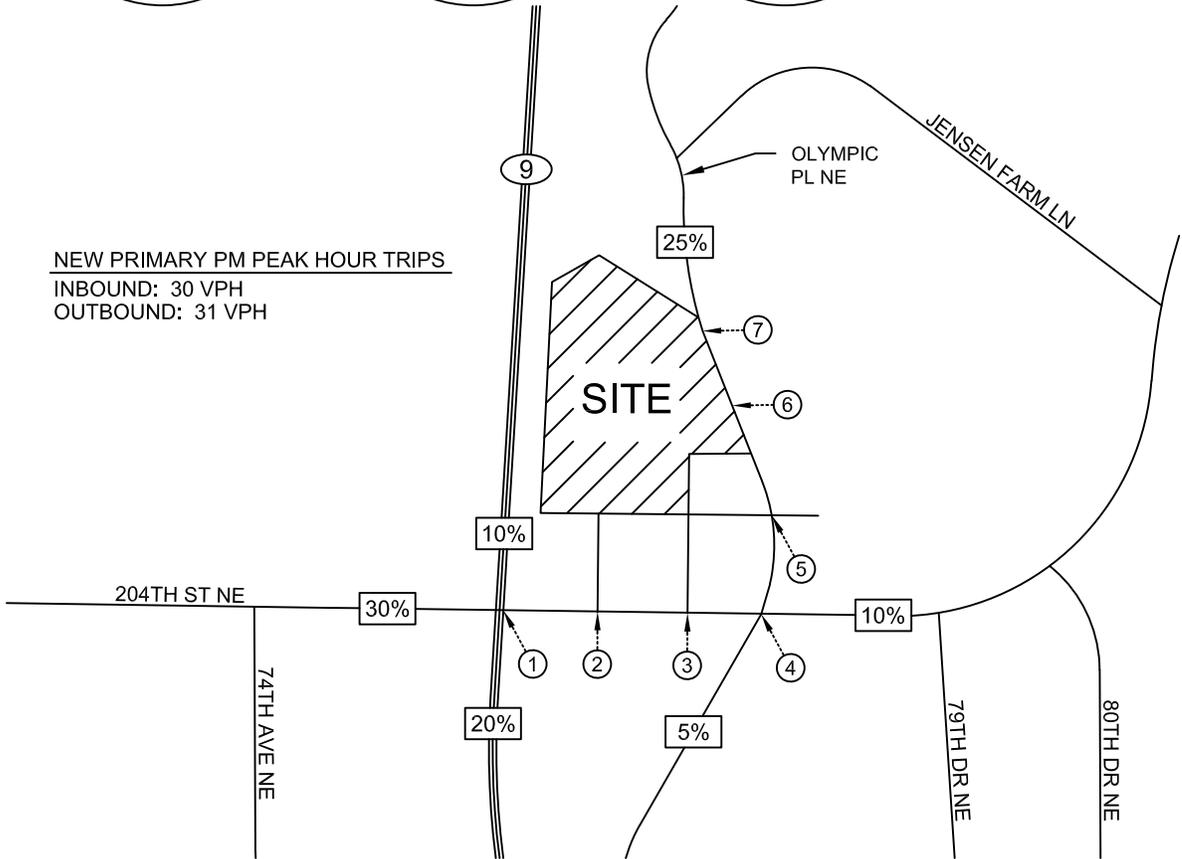
⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS



NEW PRIMARY PM PEAK HOUR TRIPS
 INBOUND: 30 VPH
 OUTBOUND: 31 VPH

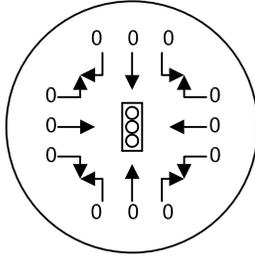


HEATH & ASSOCIATES
 TRAFFIC AND CIVIL ENGINEERING

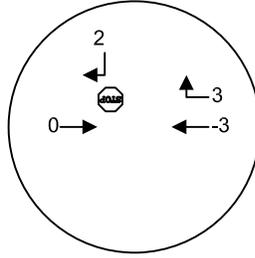
SAFEWAY ARLINGTON
 PRIMARY PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
 FIGURE 5A



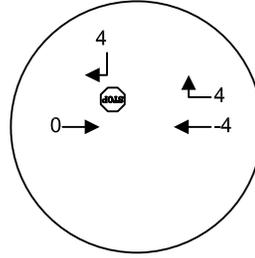
① SR-9 & 204TH ST NE



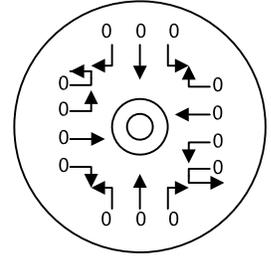
② W ACCESS & 204TH ST NE



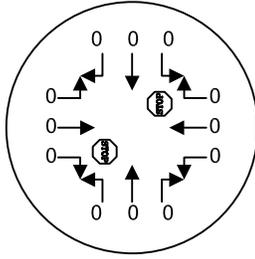
③ E ACCESS & 204TH ST NE



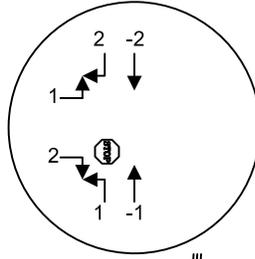
④ OLYMPIC PL NE & 204TH ST NE



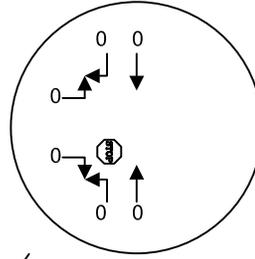
⑤ OLYMPIC PL NE & S ACCESS



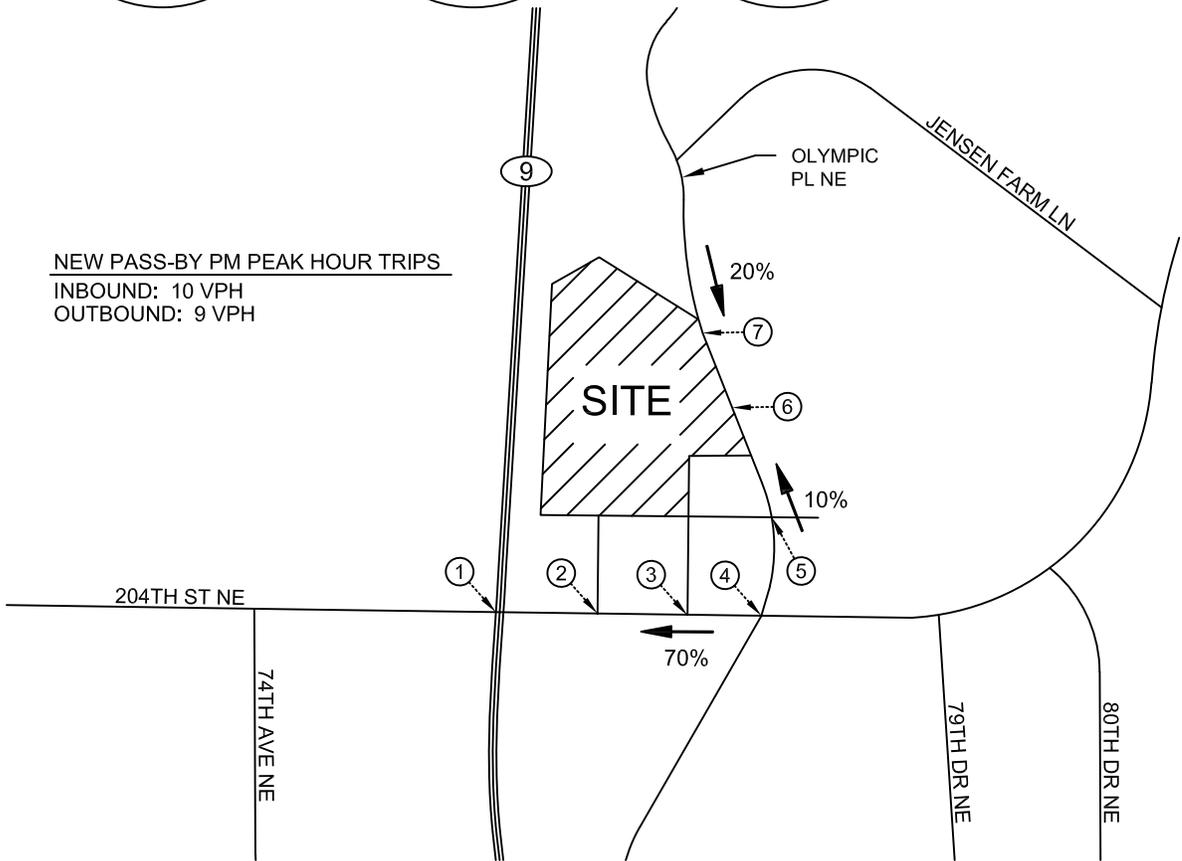
⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS



NEW PASS-BY PM PEAK HOUR TRIPS
INBOUND: 10 VPH
OUTBOUND: 9 VPH

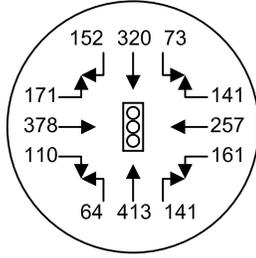


HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

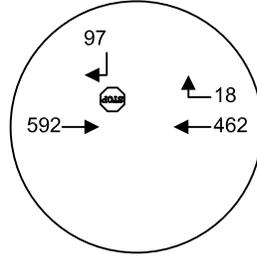
SAFEWAY ARLINGTON
PASS-BY PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 5B



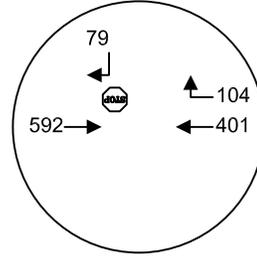
① SR-9 & 204TH ST NE



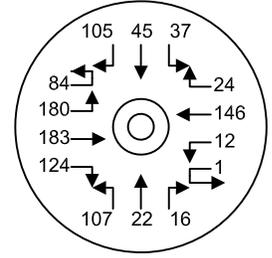
② W ACCESS & 204TH ST NE



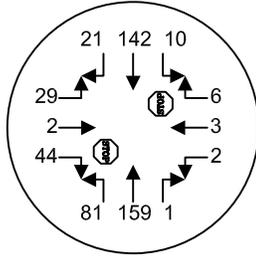
③ E ACCESS & 204TH ST NE



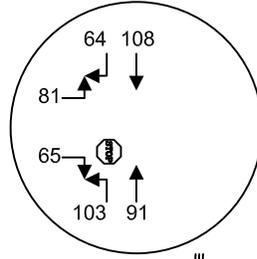
④ OLYMPIC PL NE & 204TH ST NE



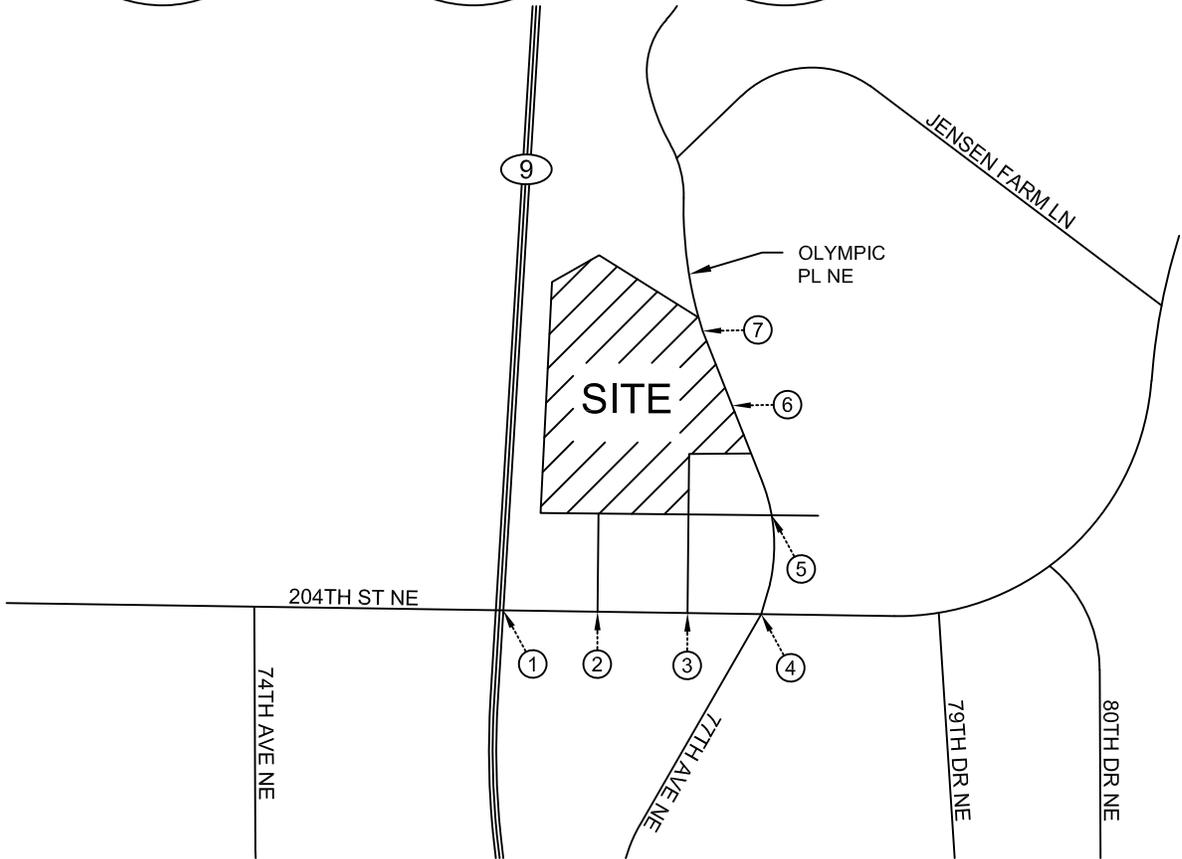
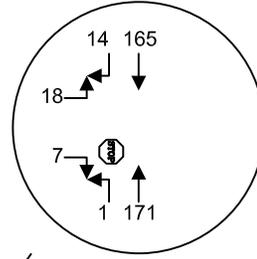
⑤ OLYMPIC PL NE & S ACCESS



⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS

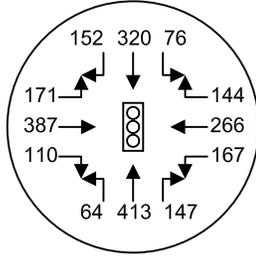


HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

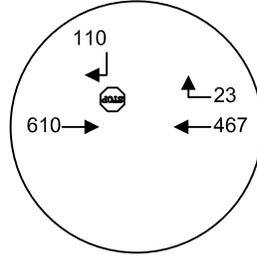
SAFEWAY ARLINGTON
FORECAST 2025 PM PEAK HOUR BACKGROUND VOLUMES
FIGURE 6



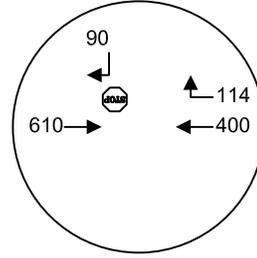
① SR-9 & 204TH ST NE



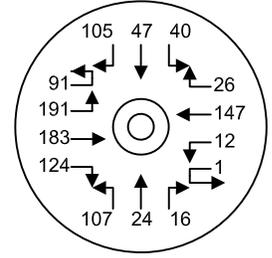
② W ACCESS & 204TH ST NE



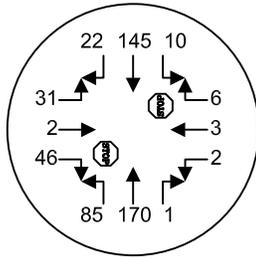
③ E ACCESS & 204TH ST NE



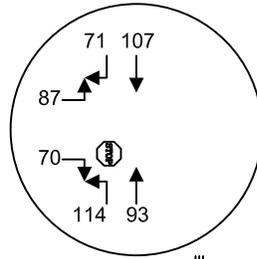
④ OLYMPIC PL NE & 204TH ST NE



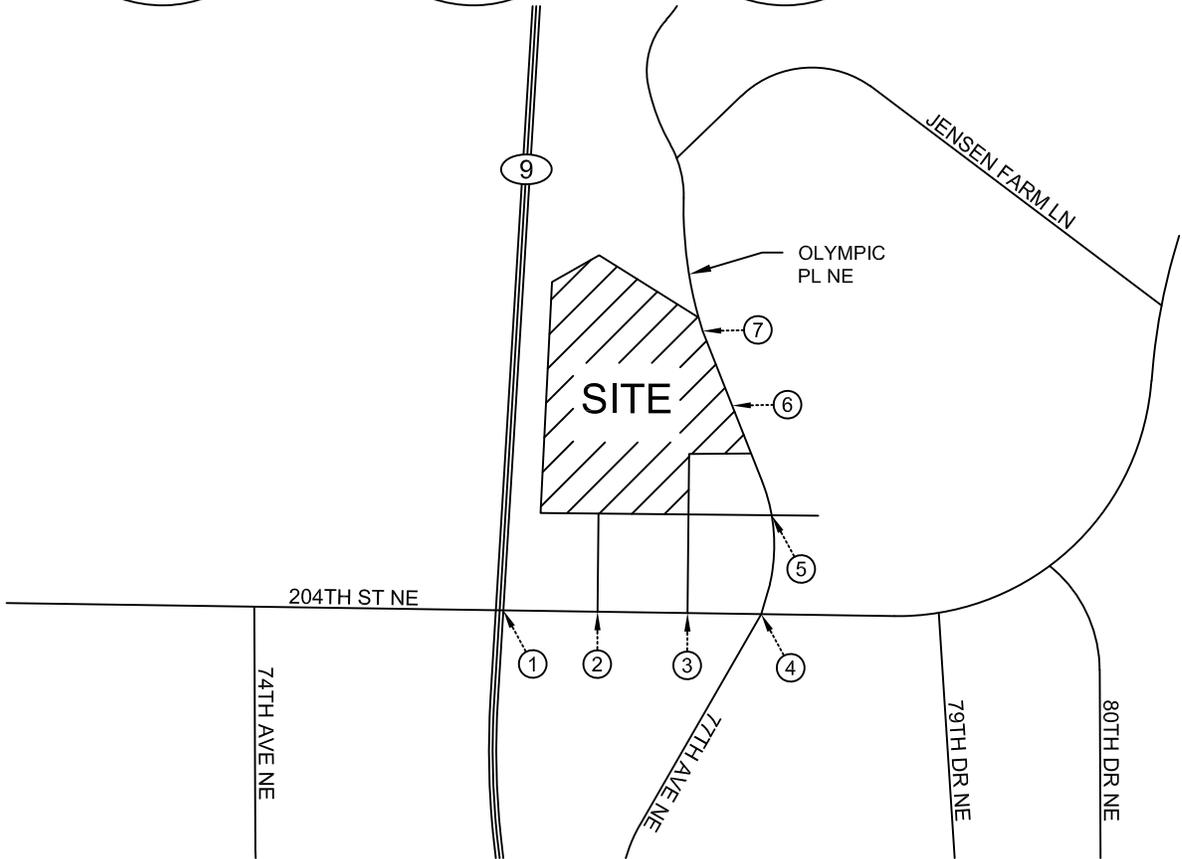
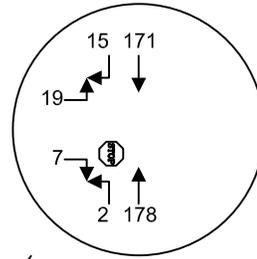
⑤ OLYMPIC PL NE & S ACCESS



⑥ OLYMPIC PL NE & MID ACCESS



⑦ OLYMPIC PL NE & N ACCESS



HEATH & ASSOCIATES
TRAFFIC AND CIVIL ENGINEERING

SAFEWAY ARLINGTON
FORECAST 2025 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 7

4.4 Future Level of Service

Level of service analyses were made of the PM peak hour conditions at the study intersections under the three-year horizon. Delays for the key intersections and accesses without and with traffic associated with the Safeway Arlington addition are summarized below.

Table 3: Forecast 2025 PM Peak Hour Level of Service

Delays given in seconds per vehicle

Intersection	Control	Crit. Mvmt	<i>Without Project</i>		<i>With Project</i>	
			LOS	Delay	LOS	Delay
SR-9 & 204th St NE	Signal	Overall	C	31.5	C	32.9
W Site Access & 204th St NE	Stop	SB	B	10.8	B	11.0
E Site Access & 204th St NE	Stop	SB	B	12.4	B	12.6
Olympic PI NE & 204th St NE	RAB	Overall	A	8.3	A	8.5
Olympic PI NE & S Access/Dwy	Stop	EB	B	11.9	B	12.2
Olympic PI NE & Mid Access	Stop	EB	B	12.5	B	13.0
Olympic PI NE & N Access	Stop	EB	B	10.7	B	10.9

As illustrated in Table 3, the outlying study intersections and project accesses are shown to continue to operate with LOS C or better conditions during the PM peak hour without and with project-generated traffic. No operational deficiencies are identified as a result of the proposed development. Moreover, all projected queues are shown to be minor with typically one to two cars waiting to depart the site. The several access points serving the site in conjunction with the right-turn only driveways along 204th Street NE results in minimal wait times and queues at each ingress/egress point.

4.5 Turn Lane Warrant Analysis

Left turn lanes are a means of providing necessary storage space for left turning vehicles at intersections. For this impact study, procedures described by the WSDOT Design Manual Exhibit 1310-7a were used to ascertain left-turn lane storage requirements at the three access intersections off Olympic Place NE as illustrated in Figure 6. Requirements are based on a function of vehicular volumes, number of left-turning vehicles from the major roadway and posted speed limits. Based on forecast 2025 PM peak hour volumes with project traffic, left turn lanes *would not be warranted* at any of the project Olympic Place NE project accesses. Refer to the appendix for the warrant nomograph.

5. CONCLUSIONS AND MITIGATION

The Safeway Arlington project proposes to construct a 10,000 square foot addition and parking updates to an existing 42,728 square foot Safeway facility located in the city of Arlington. The addition is situated within 4.82-acre tax parcel #: 00847300000800, bordered to the east by Olympic Place NE and is located north of 204th Street NE. Access is to continue as currently configured via two driveways extending north from 204th Street E and three driveways extending west from Olympic Place NE. See Figure 2 for a conceptual site plan.

Existing LOS at all outlying study intersections and project accesses indicated LOS C or better conditions during the critical PM peak hour of travel. According to ITE data, the proposed addition could result in approximately 19 new primary AM peak hour trips and 61 PM peak hour trips. A three-year horizon of 2025 was evaluated with and without the proposed 10,000 square foot Safeway addition at several outlying study intersections and at all existing project accesses. Forecast conditions at all outlying study intersection and project accesses were shown to continue to operate with LOS C or better conditions both without and with the proposed project. Based on forecast 2025 PM peak hour volumes with project traffic, left turn lanes *would not be warranted* at any of the project accesses on Olympic Place NE. Overall, no operational deficiencies are identified as a result of the proposed development.

Based on the findings of this report the following mitigation is proposed for the Safeway Arlington facility:

1. Pay Traffic Impact Fees (TIF) as required by the city of Arlington and/or supplemental interlocal agreements. Exact fees would be calculated and assessed by the City upon review of the traffic study.

No other mitigation is identified at this time.

SAFEWAY ARLINGTON
TRAFFIC IMPACT ANALYSIS

APPENDIX

INTERSECTION COUNT SHEETS

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851g
Site Code : 00004851
Start Date : 2/16/2022
Page No : 1

Groups Printed- Passenger + - Heavy

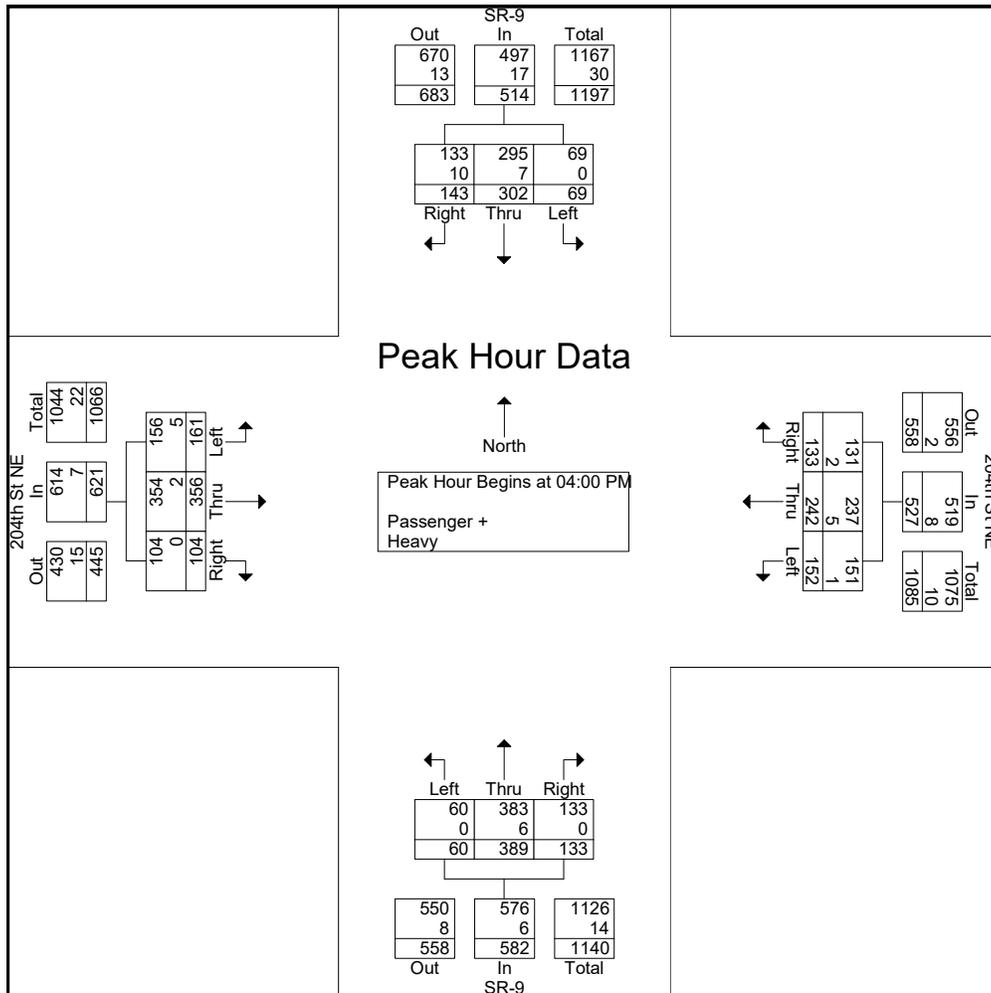
Start Time	SR-9 Southbound				204th St NE Westbound				SR-9 Northbound				204th St NE Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	25	78	20	123	37	58	42	137	37	110	11	158	25	90	44	159	577
04:15 PM	53	65	21	139	27	64	37	128	48	108	21	177	26	58	39	123	567
04:30 PM	33	78	11	122	37	65	31	133	26	84	13	123	32	109	42	183	561
04:45 PM	32	81	17	130	32	55	42	129	22	87	15	124	21	99	36	156	539
Total	143	302	69	514	133	242	152	527	133	389	60	582	104	356	161	621	2244
05:00 PM	35	67	15	117	28	32	39	99	41	94	12	147	19	67	49	135	498
05:15 PM	23	59	28	110	28	52	34	114	27	79	12	118	22	72	17	111	453
05:30 PM	27	60	16	103	34	41	24	99	27	61	13	101	30	68	25	123	426
05:45 PM	34	53	7	94	27	53	33	113	35	54	11	100	33	77	33	143	450
Total	119	239	66	424	117	178	130	425	130	288	48	466	104	284	124	512	1827
Grand Total	262	541	135	938	250	420	282	952	263	677	108	1048	208	640	285	1133	4071
Apprch %	27.9	57.7	14.4		26.3	44.1	29.6		25.1	64.6	10.3		18.4	56.5	25.2		
Total %	6.4	13.3	3.3	23	6.1	10.3	6.9	23.4	6.5	16.6	2.7	25.7	5.1	15.7	7	27.8	
Passenger +	250	531	135	916	247	410	281	938	263	665	107	1035	207	634	277	1118	4007
% Passenger +	95.4	98.2	100	97.7	98.8	97.6	99.6	98.5	100	98.2	99.1	98.8	99.5	99.1	97.2	98.7	98.4
Heavy	12	10	0	22	3	10	1	14	0	12	1	13	1	6	8	15	64
% Heavy	4.6	1.8	0	2.3	1.2	2.4	0.4	1.5	0	1.8	0.9	1.2	0.5	0.9	2.8	1.3	1.6

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851g
Site Code : 00004851
Start Date : 2/16/2022
Page No : 2

Start Time	SR-9 Southbound				204th St NE Westbound				SR-9 Northbound				204th St NE Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	25	78	20	123	37	58	42	137	37	110	11	158	25	90	44	159	577
04:15 PM	53	65	21	139	27	64	37	128	48	108	21	177	26	58	39	123	567
04:30 PM	33	78	11	122	37	65	31	133	26	84	13	123	32	109	42	183	561
04:45 PM	32	81	17	130	32	55	42	129	22	87	15	124	21	99	36	156	539
Total Volume	143	302	69	514	133	242	152	527	133	389	60	582	104	356	161	621	2244
% App. Total	27.8	58.8	13.4		25.2	45.9	28.8		22.9	66.8	10.3		16.7	57.3	25.9		
PHF	.675	.932	.821	.924	.899	.931	.905	.962	.693	.884	.714	.822	.813	.817	.915	.848	.972
Passenger +	133	295	69	497	131	237	151	519	133	383	60	576	104	354	156	614	2206
% Passenger +	93.0	97.7	100	96.7	98.5	97.9	99.3	98.5	100	98.5	100	99.0	100	99.4	96.9	98.9	98.3
Heavy	10	7	0	17	2	5	1	8	0	6	0	6	0	2	5	7	38
% Heavy	7.0	2.3	0	3.3	1.5	2.1	0.7	1.5	0	1.5	0	1.0	0	0.6	3.1	1.1	1.7



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851b
Site Code : 00004851
Start Date : 2/17/2022
Page No : 1

Groups Printed- Passenger + - Heavy

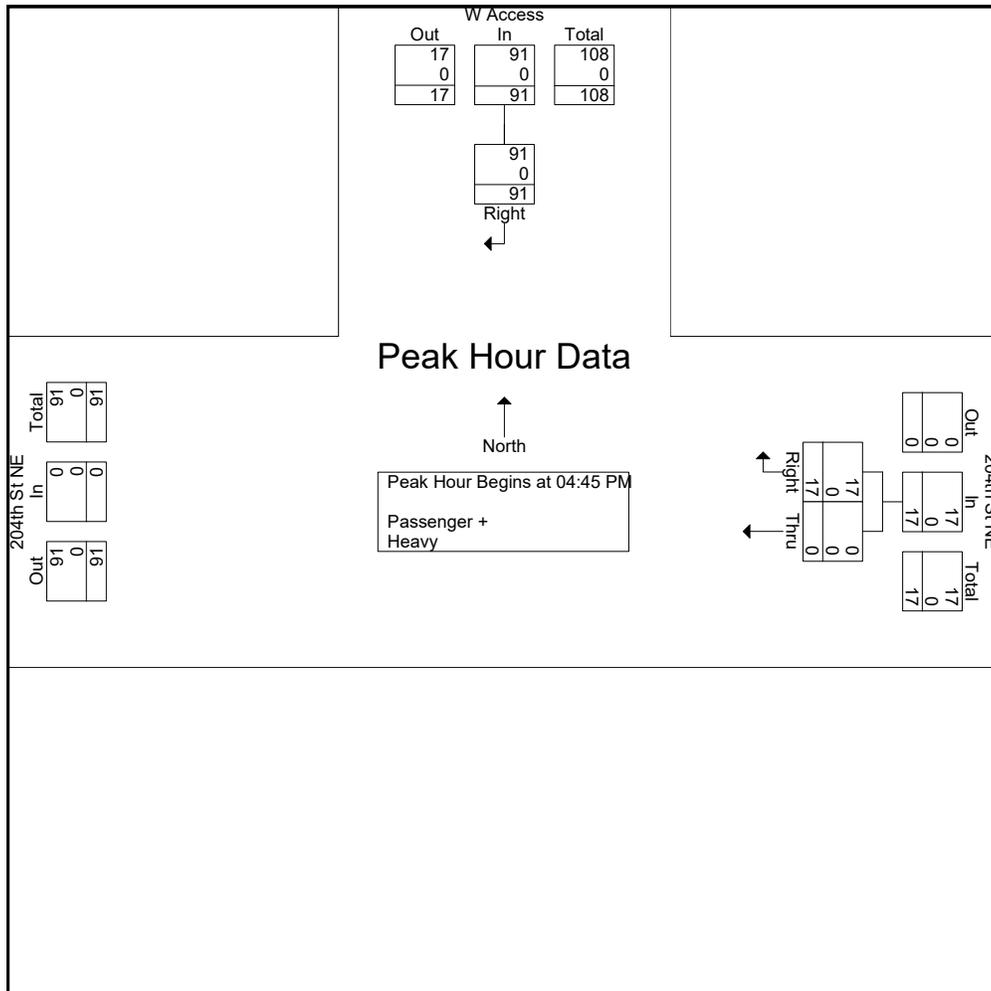
Start Time	W Access Southbound		204th St NE Westbound			Int. Total
	Right	App. Total	Right	Thru	App. Total	
04:00 PM	29	29	6	0	6	35
04:15 PM	14	14	2	0	2	16
04:30 PM	19	19	5	0	5	24
04:45 PM	25	25	5	0	5	30
Total	87	87	18	0	18	105
05:00 PM	22	22	6	0	6	28
05:15 PM	16	16	1	0	1	17
05:30 PM	28	28	5	0	5	33
05:45 PM	28	28	2	0	2	30
Total	94	94	14	0	14	108
Grand Total	181	181	32	0	32	213
Apprch %	100		100	0		
Total %	85	85	15	0	15	
Passenger +	181	181	32	0	32	213
% Passenger +	100	100	100	0	100	100
Heavy	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851b
Site Code : 00004851
Start Date : 2/17/2022
Page No : 2

Start Time	W Access Southbound		204th St NE Westbound			Int. Total
	Right	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1						
Peak Hour for Entire Intersection Begins at 04:45 PM						
04:45 PM	25	25	5	0	5	30
05:00 PM	22	22	6	0	6	28
05:15 PM	16	16	1	0	1	17
05:30 PM	28	28	5	0	5	33
Total Volume	91	91	17	0	17	108
% App. Total	100	100	100	0	100	100
PHF	.813	.813	.708	.000	.708	.818
Passenger +	91	91	17	0	17	108
% Passenger +	100	100	100	0	100	100
Heavy	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851a
Site Code : 00004851
Start Date : 2/17/2022
Page No : 1

Groups Printed- Passenger + - Heavy

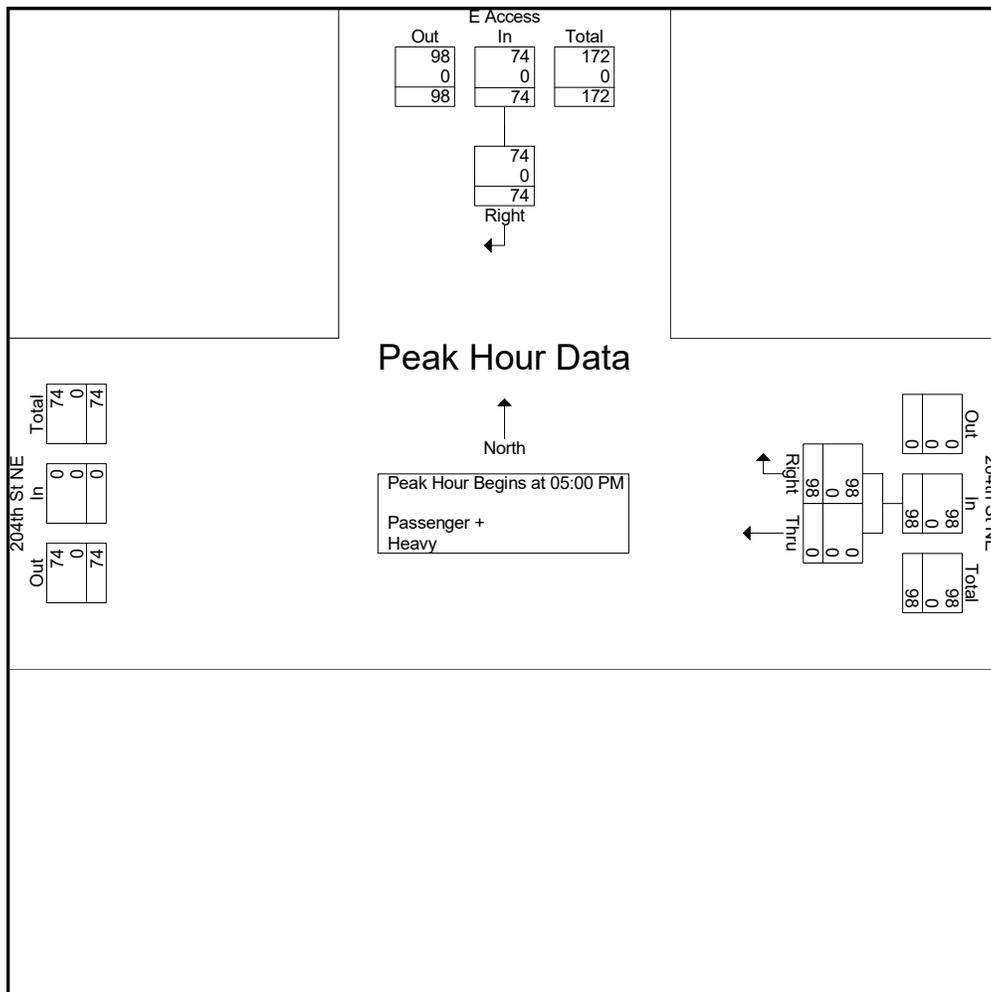
Start Time	E Access Southbound		204th St NE Westbound			Int. Total
	Right	App. Total	Right	Thru	App. Total	
04:00 PM	21	21	13	0	13	34
04:15 PM	17	17	23	0	23	40
04:30 PM	23	23	23	0	23	46
04:45 PM	19	19	17	0	17	36
Total	80	80	76	0	76	156
05:00 PM	17	17	19	0	19	36
05:15 PM	20	20	29	0	29	49
05:30 PM	16	16	24	0	24	40
05:45 PM	21	21	26	0	26	47
Total	74	74	98	0	98	172
Grand Total	154	154	174	0	174	328
Aprch %	100		100	0		
Total %	47	47	53	0	53	
Passenger +	154	154	174	0	174	328
% Passenger +	100	100	100	0	100	100
Heavy	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851a
Site Code : 00004851
Start Date : 2/17/2022
Page No : 2

Start Time	E Access Southbound		204th St NE Westbound			Int. Total
	Right	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1						
Peak Hour for Entire Intersection Begins at 05:00 PM						
05:00 PM	17	17	19	0	19	36
05:15 PM	20	20	29	0	29	49
05:30 PM	16	16	24	0	24	40
05:45 PM	21	21	26	0	26	47
Total Volume	74	74	98	0	98	172
% App. Total	100		100	0		
PHF	.881	.881	.845	.000	.845	.878
Passenger +	74	74	98	0	98	172
% Passenger +	100	100	100	0	100	100
Heavy	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851f
Site Code : 00004851
Start Date : 2/16/2022
Page No : 1

Groups Printed- Passenger + - Heavy

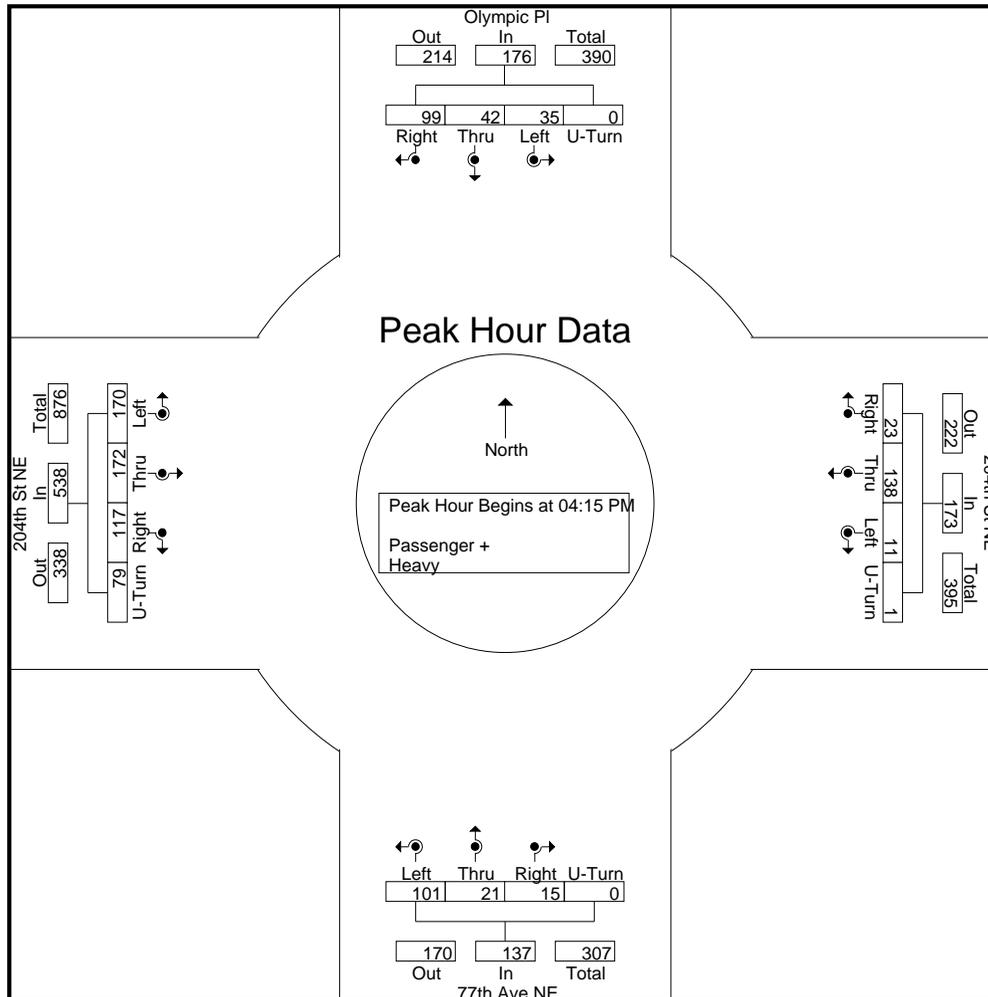
Start Time	Olympic PI Southbound					204th St NE Westbound					77th Ave NE Northbound					204th St NE Eastbound					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:00 PM	17	10	6	0	33	5	42	3	0	50	3	5	14	0	22	28	35	42	19	124	229
04:15 PM	33	12	9	0	54	5	38	1	0	44	3	5	32	0	40	27	35	46	26	134	272
04:30 PM	25	10	11	0	46	9	42	0	0	51	4	7	25	0	36	40	42	41	18	141	274
04:45 PM	28	8	7	0	43	5	28	4	1	38	4	5	22	0	31	29	47	38	20	134	246
Total	103	40	33	0	176	24	150	8	1	183	14	22	93	0	129	124	159	167	83	533	1021
05:00 PM	13	12	8	0	33	4	30	6	0	40	4	4	22	0	30	21	48	45	15	129	232
05:15 PM	16	14	10	0	40	8	38	2	0	48	3	12	25	0	40	25	35	51	16	127	255
05:30 PM	25	12	6	0	43	6	24	3	0	33	6	9	17	0	32	16	31	34	23	104	212
05:45 PM	25	12	10	0	47	1	23	5	0	29	6	8	15	0	29	20	35	33	24	112	217
Total	79	50	34	0	163	19	115	16	0	150	19	33	79	0	131	82	149	163	78	472	916
Grand Total	182	90	67	0	339	43	265	24	1	333	33	55	172	0	260	206	308	330	161	1005	1937
Apprch %	53.7	26.5	19.8	0		12.9	79.6	7.2	0.3		12.7	21.2	66.2	0		20.5	30.6	32.8	16		
Total %	9.4	4.6	3.5	0	17.5	2.2	13.7	1.2	0.1	17.2	1.7	2.8	8.9	0	13.4	10.6	15.9	17	8.3	51.9	
Passenger +	179	90	67	0	336	43	255	24	1	323	33	55	172	0	260	206	303	329	161	999	1918
% Passenger +	98.4	100	100	0	99.1	100	96.2	100	100	97	100	100	100	0	100	100	98.4	99.7	100	99.4	99
Heavy	3	0	0	0	3	0	10	0	0	10	0	0	0	0	0	0	5	1	0	6	19
% Heavy	1.6	0	0	0	0.9	0	3.8	0	0	3	0	0	0	0	0	0	1.6	0.3	0	0.6	1

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851f
Site Code : 00004851
Start Date : 2/16/2022
Page No : 2

Start Time	Olympic PI Southbound					204th St NE Westbound					77th Ave NE Northbound					204th St NE Eastbound					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	33	12	9	0	54	5	38	1	0	44	3	5	32	0	40	27	35	46	26	134	272
04:30 PM	25	10	11	0	46	9	42	0	0	51	4	7	25	0	36	40	42	41	18	141	274
04:45 PM	28	8	7	0	43	5	28	4	1	38	4	5	22	0	31	29	47	38	20	134	246
05:00 PM	13	12	8	0	33	4	30	6	0	40	4	4	22	0	30	21	48	45	15	129	232
Total Volume	99	42	35	0	176	23	138	11	1	173	15	21	101	0	137	117	172	170	79	538	1024
% App. Total	56.2	23.9	19.9	0		13.3	79.8	6.4	0.6		10.9	15.3	73.7	0		21.7	32	31.6	14.7		
PHF	.750	.875	.795	.000	.815	.639	.821	.458	.250	.848	.938	.750	.789	.000	.856	.731	.896	.924	.760	.954	.934



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851e
Site Code : 00004851
Start Date : 2/16/2022
Page No : 1

Groups Printed- Passenger + - Heavy

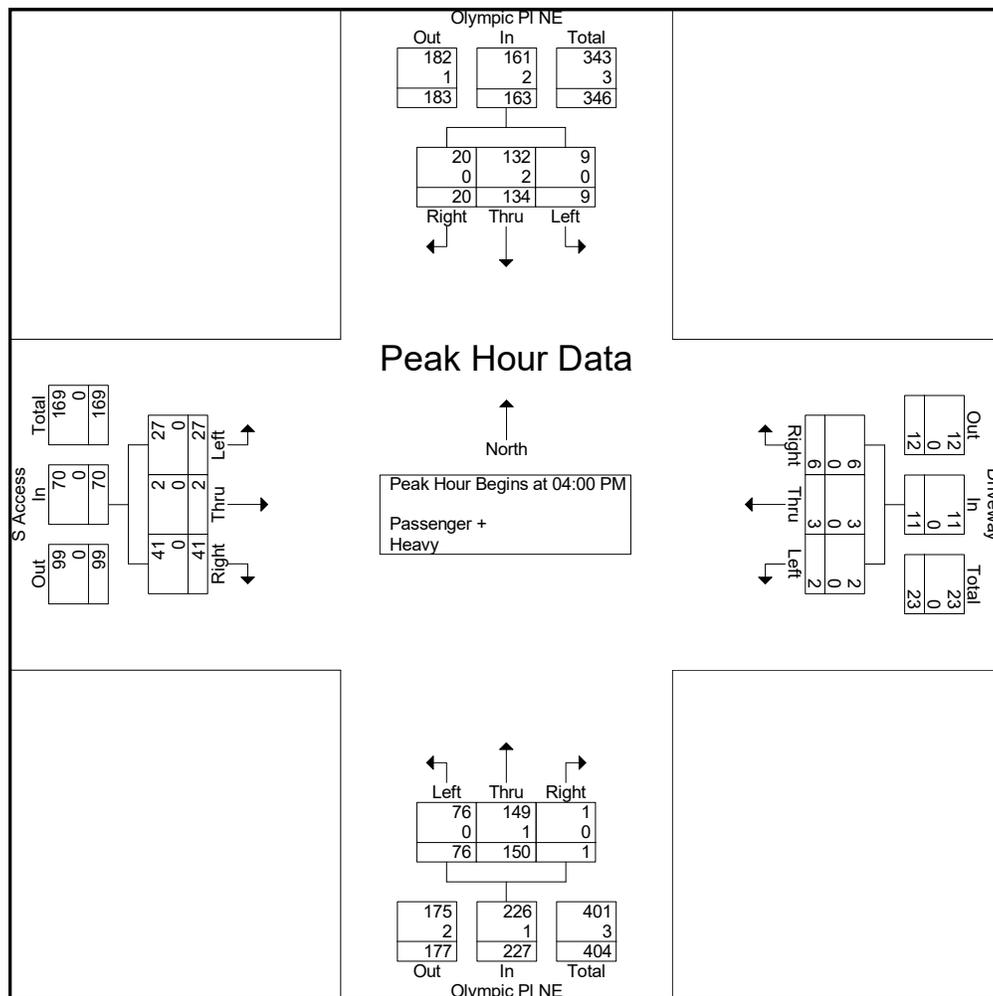
Start Time	Olympic PI NE Southbound				Driveway Westbound				Olympic PI NE Northbound				S Access Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	4	29	1	34	3	0	1	4	1	30	28	59	8	1	4	13	110
04:15 PM	4	38	0	42	1	0	0	1	0	40	18	58	10	0	8	18	119
04:30 PM	5	39	5	49	1	1	0	2	0	47	14	61	10	1	6	17	129
04:45 PM	7	28	3	38	1	2	1	4	0	33	16	49	13	0	9	22	113
Total	20	134	9	163	6	3	2	11	1	150	76	227	41	2	27	70	471
05:00 PM	4	25	2	31	0	0	0	0	0	41	13	54	10	1	7	18	103
05:15 PM	7	31	0	38	2	1	0	3	3	45	21	69	9	0	5	14	124
05:30 PM	3	27	2	32	1	2	1	4	2	34	11	47	12	1	5	18	101
05:45 PM	3	34	1	38	1	1	1	3	0	33	16	49	12	0	6	18	108
Total	17	117	5	139	4	4	2	10	5	153	61	219	43	2	23	68	436
Grand Total	37	251	14	302	10	7	4	21	6	303	137	446	84	4	50	138	907
Apprch %	12.3	83.1	4.6		47.6	33.3	19		1.3	67.9	30.7		60.9	2.9	36.2		
Total %	4.1	27.7	1.5	33.3	1.1	0.8	0.4	2.3	0.7	33.4	15.1	49.2	9.3	0.4	5.5	15.2	
Passenger +	37	247	14	298	10	7	4	21	6	302	137	445	84	4	50	138	902
% Passenger +	100	98.4	100	98.7	100	100	100	100	100	99.7	100	99.8	100	100	100	100	99.4
Heavy	0	4	0	4	0	0	0	0	0	1	0	1	0	0	0	0	5
% Heavy	0	1.6	0	1.3	0	0	0	0	0	0.3	0	0.2	0	0	0	0	0.6

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851e
Site Code : 00004851
Start Date : 2/16/2022
Page No : 2

Start Time	Olympic PI NE Southbound				Driveway Westbound				Olympic PI NE Northbound				S Access Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	4	29	1	34	3	0	1	4	1	30	28	59	8	1	4	13	110
04:15 PM	4	38	0	42	1	0	0	1	0	40	18	58	10	0	8	18	119
04:30 PM	5	39	5	49	1	1	0	2	0	47	14	61	10	1	6	17	129
04:45 PM	7	28	3	38	1	2	1	4	0	33	16	49	13	0	9	22	113
Total Volume	20	134	9	163	6	3	2	11	1	150	76	227	41	2	27	70	471
% App. Total	12.3	82.2	5.5		54.5	27.3	18.2		0.4	66.1	33.5		58.6	2.9	38.6		
PHF	.714	.859	.450	.832	.500	.375	.500	.688	.250	.798	.679	.930	.788	.500	.750	.795	.913
Passenger +	20	132	9	161	6	3	2	11	1	149	76	226	41	2	27	70	468
% Passenger +	100	98.5	100	98.8	100	100	100	100	100	99.3	100	99.6	100	100	100	100	99.4
Heavy	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
% Heavy	0	1.5	0	1.2	0	0	0	0	0	0.7	0	0.4	0	0	0	0	0.6



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851d
Site Code : 00004851
Start Date : 2/16/2022
Page No : 1

Groups Printed- Passenger + - Heavy

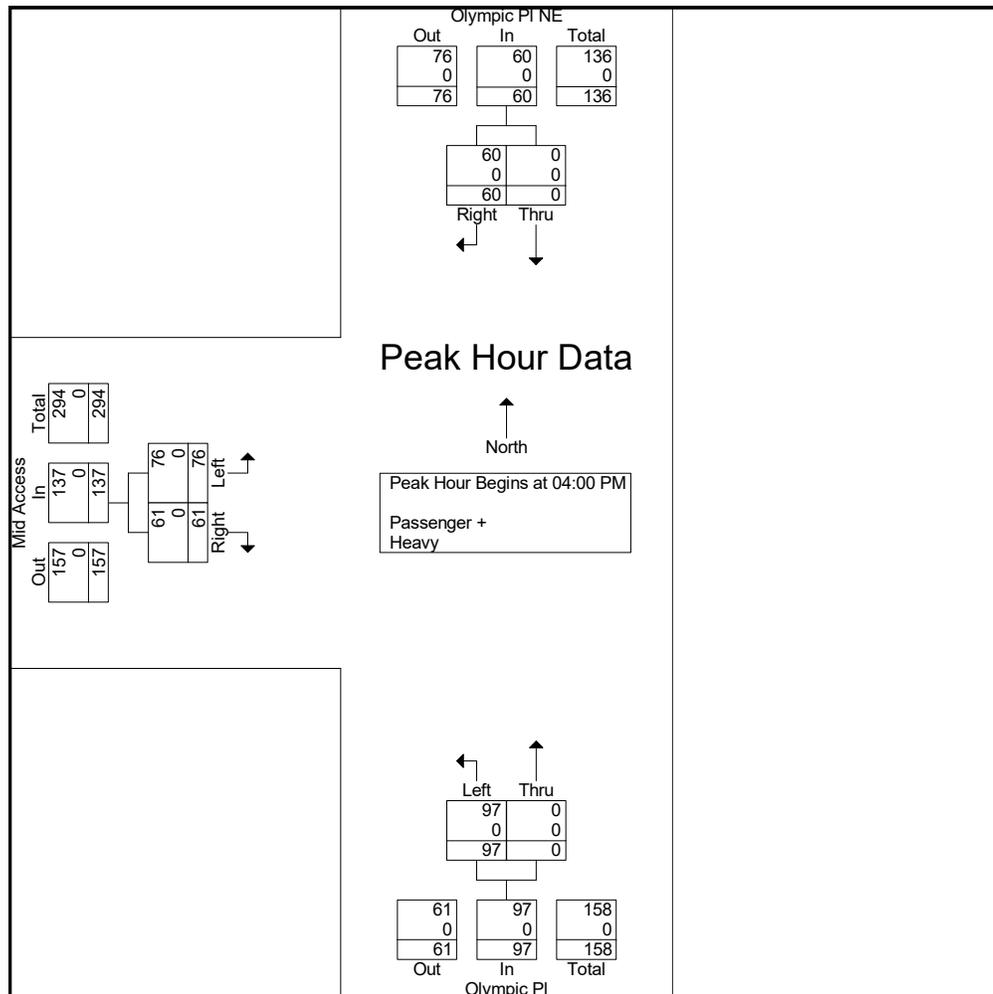
Start Time	Olympic PI NE Southbound			Olympic PI Northbound			Mid Access Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
04:00 PM	17	0	17	0	21	21	14	25	39	77
04:15 PM	14	0	14	0	25	25	15	19	34	73
04:30 PM	12	0	12	0	27	27	18	13	31	70
04:45 PM	17	0	17	0	24	24	14	19	33	74
Total	60	0	60	0	97	97	61	76	137	294
05:00 PM	17	0	17	0	26	26	9	15	24	67
05:15 PM	12	0	12	0	30	30	11	13	24	66
05:30 PM	21	0	21	0	23	23	13	18	31	75
05:45 PM	13	0	13	0	15	15	11	21	32	60
Total	63	0	63	0	94	94	44	67	111	268
Grand Total	123	0	123	0	191	191	105	143	248	562
Apprch %	100	0		0	100		42.3	57.7		
Total %	21.9	0	21.9	0	34	34	18.7	25.4	44.1	
Passenger +	123	0	123	0	191	191	105	143	248	562
% Passenger +	100	0	100	0	100	100	100	100	100	100
Heavy	0	0	0	0	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0	0	0	0	0

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851d
Site Code : 00004851
Start Date : 2/16/2022
Page No : 2

Start Time	Olympic PI NE Southbound			Olympic PI Northbound			Mid Access Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	17	0	17	0	21	21	14	25	39	77
04:15 PM	14	0	14	0	25	25	15	19	34	73
04:30 PM	12	0	12	0	27	27	18	13	31	70
04:45 PM	17	0	17	0	24	24	14	19	33	74
Total Volume	60	0	60	0	97	97	61	76	137	294
% App. Total	100	0		0	100		44.5	55.5		
PHF	.882	.000	.882	.000	.898	.898	.847	.760	.878	.955
Passenger +	60	0	60	0	97	97	61	76	137	294
% Passenger +	100	0	100	0	100	100	100	100	100	100
Heavy	0	0	0	0	0	0	0	0	0	0
% Heavy	0	0	0	0	0	0	0	0	0	0



Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851c
Site Code : 00004851
Start Date : 2/16/2022
Page No : 1

Groups Printed- Passenger + - Heavy

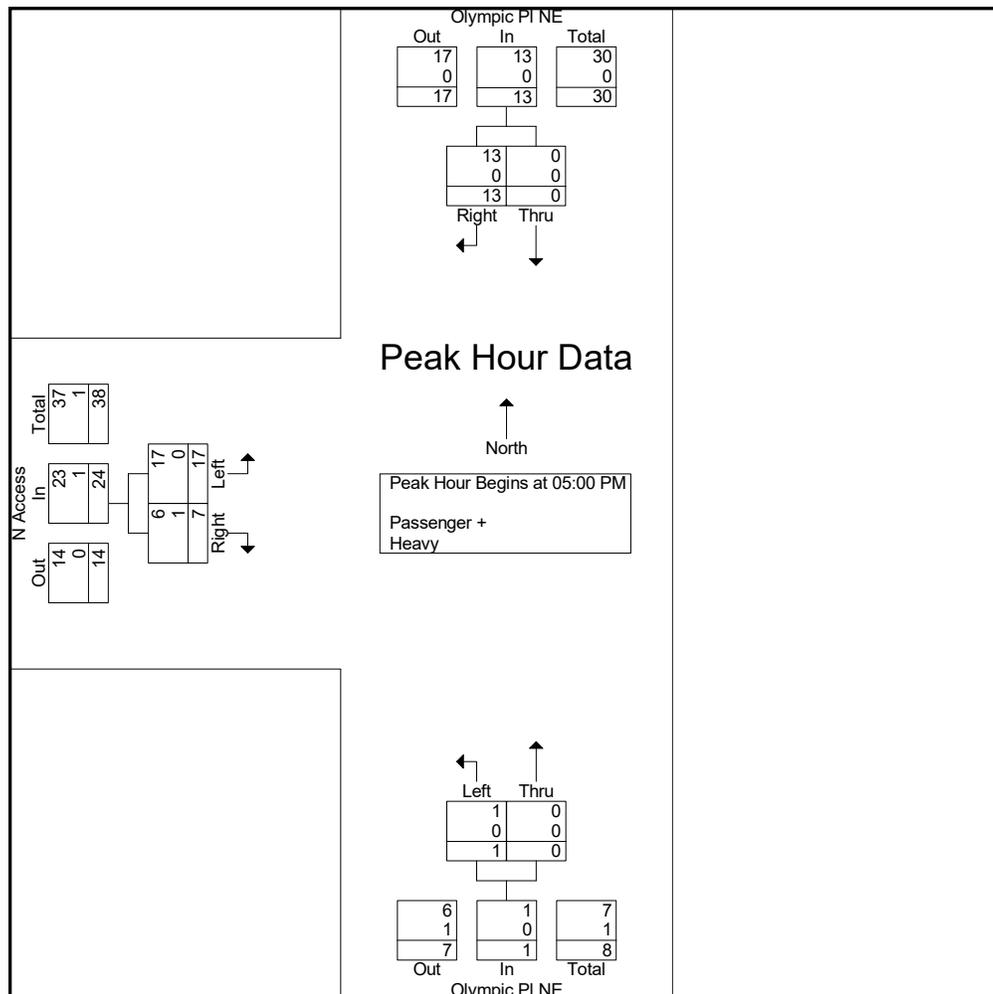
Start Time	Olympic PI NE Southbound			Olympic PI NE Northbound			N Access Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
04:00 PM	2	0	2	0	0	0	0	5	5	7
04:15 PM	3	0	3	0	1	1	3	4	7	11
04:30 PM	0	0	0	0	1	1	1	4	5	6
04:45 PM	5	0	5	0	0	0	1	3	4	9
Total	10	0	10	0	2	2	5	16	21	33
05:00 PM	4	0	4	0	0	0	0	2	2	6
05:15 PM	2	0	2	0	1	1	3	5	8	11
05:30 PM	2	0	2	0	0	0	1	5	6	8
05:45 PM	5	0	5	0	0	0	3	5	8	13
Total	13	0	13	0	1	1	7	17	24	38
Grand Total	23	0	23	0	3	3	12	33	45	71
Apprch %	100	0		0	100		26.7	73.3		
Total %	32.4	0	32.4	0	4.2	4.2	16.9	46.5	63.4	
Passenger +	23	0	23	0	2	2	11	33	44	69
% Passenger +	100	0	100	0	66.7	66.7	91.7	100	97.8	97.2
Heavy	0	0	0	0	1	1	1	0	1	2
% Heavy	0	0	0	0	33.3	33.3	8.3	0	2.2	2.8

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4851c
Site Code : 00004851
Start Date : 2/16/2022
Page No : 2

Start Time	Olympic PI NE Southbound			Olympic PI NE Northbound			N Access Eastbound			Int. Total
	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	4	0	4	0	0	0	0	2	2	6
05:15 PM	2	0	2	0	1	1	3	5	8	11
05:30 PM	2	0	2	0	0	0	1	5	6	8
05:45 PM	5	0	5	0	0	0	3	5	8	13
Total Volume	13	0	13	0	1	1	7	17	24	38
% App. Total	100	0		0	100		29.2	70.8		
PHF	.650	.000	.650	.000	.250	.250	.583	.850	.750	.731
Passenger +	13	0	13	0	1	1	6	17	23	37
% Passenger +	100	0	100	0	100	100	85.7	100	95.8	97.4
Heavy	0	0	0	0	0	0	1	0	1	1
% Heavy	0	0	0	0	0	0	14.3	0	4.2	2.6



APPENDIX

HISTORIC WSDOT ADT VOLUMES

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
 T R I P S S Y S T E M
 ANNUAL TRAFFIC REPORT

STATE ROUTE	STATE ROUTE MILEPOST	LOCATION	FUNCT COUPL	CLASS	TRUCK PERCENTAGES			AVERAGE DAILY TRAFFIC VOLUME				
					SNGL	DBL	TRIPLE	TOTAL	2008 UNITS	2009 UNITS	2010 UNITS	2011 UNITS
009	017.49	AFTER JCT SR 92		1					16000	18000*	17000*	17000
009	019.26	BEFORE JCT SR 528		1					17000	17000*	17000*	17000
009	019.26	AFTER JCT SR 528		1					13000	14000*	13000*	13000
009	026.05	BEFORE JCT SR 531*172ND ST NE		1					9900	10000*	11000*	10000*
009	026.05	AFTER JCT SR 531*172ND ST NE		1					9800	10000*	11000*	10000*
009	028.75	AT PTR LOCATION P21		1	07	02		09	11000*	11000*	11000*	11000+
009	029.46	BEFORE JCT SR 530*DIVISION ST		1					11000	11000*	11000	11000*
009	029.46	AFTER JCT SR 530*DIVISION ST		1					14000	16000*	16000	15000*
009	029.57	AFTER JCT SR 530		1					7600	8300*	8400	8000*
009	031.77	BEFORE JCT 254TH ST NE		3					4400	5000*	5100	4800*
009	032.98	AT PTR LOCATION R083		3	09	03		12	1900*	2000*	2000*	1900+
009	035.18	AFTER JCT FINN SETTLEMENT RD		3					990	1000*	1100	1000*
009	040.03	BEFORE JCT SR 534		3					1200	1300*	1300	1200*
009	040.03	AFTER JCT SR 534		3					1200	1400*	1400	1300*
009	044.32	AFTER JCT LAKE CAVANAUGH RD		3					1400	1600*	1600	1500*
009	046.78	BEFORE JCT LAKEVIEW BLVD		2					2400	3200*	3200	3000
009	047.50	AFTER JCT W BIG LAKE BLVD		2					4900	5200	5200	5100*
009	049.78	AFTER JCT SR 538		2					5700	5800	5800	5600*
009	053.26	AFTER JCT FRANCIS*OLD DAY CRK RDS		3					10000	10000	11000	9800*
009	055.75	AFTER JCT W STATE ST		2								5100*
009	057.17	AFTER JCT SR 20		2					9000*	9400	9500	9500*
009	057.43	AFTER JCT JOHN LINER*MCGARIGLE RDS		2					7000	7300	7300	7300*
009	058.41	AFTER JCT BASSETT RD		2					4200	4400	4500	4500*
009	060.98	AFTER JCT FRUITDALE RD		3					2800	3000	3000	3200*
009	072.46	AFTER JCT MOSQUITO LAKE RD		3					2000	2100	2100	2300*
009	079.40	BEFORE JCT SR 542 WYE CONN		3					3400	3500	3500	3800*
009	084.01	AFTER JCT SR 542		3					3900	4000	4100	4100*
009	085.10	AFTER JCT SIPER RD*LIND RD		3					1900*	1900	2000	2000

* BASED ON ACTUAL COUNT
 + SOURCE OF TRUCK PERCENTAGES

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
 TRIP SYSTEM
 ANNUAL TRAFFIC REPORT

STATE ROUTE	STATE ROUTE MILEPOST	LOCATION	FUNCT COUPL	CLASS	TRUCK PERCENTAGES SNGL DBL TRIPLE TOTAL			AVERAGE DAILY TRAFFIC VOLUME				
								2013 UNITS	2014 UNITS	2015 UNITS	2016 UNITS	
009	003.76	AFTER JCT 180TH ST SE		1					26000*	27000		
009	006.97	BEFORE JCT SR 96-LOWELL LARIMER RD		1				22000*	22000	25000*	27000	
009	006.97	AFTER JCT SR 96-LOWELL LARIMER RD		1				22000*	22000	25000*	27000	
009	009.41	BEFORE RAMP SECOND ST		1				24000*	24000	26000*	28000*	
009	009.56	AT SECOND ST BRIDGE		1							20000*	
009	009.86	AFTER RAMP SECOND ST		1				19000*	19000	21000	22000*	
009	010.96	AFTER JCT OLD SR 2-BICKFORD AVE		1				18000*	19000	19000	19000*	
009	012.14	BEFORE RAMP SR 2 EB		1				21000	21000	22000	24000*	
009	012.33	AFTER JCT NEW BUNK FOSS RD		1				16000*	17000	17000	20000*	
009	013.80	AFTER JCT S LAKE STEVENS RD WYE CON		1				18000*	19000	19000	21000*	
009	015.76	BEFORE JCT SR 204*VERNON RD		1				18000	18000	19000	20000*	
009	015.77	AFTER JCT SR 204 WYE CONN		1				32000	33000	34000	34000*	
009	015.99	AFTER VERNON RD		1							36000*	
009	017.49	BEFORE JCT SR 92		1				27000	27000	28000	29000*	
009	017.49	AFTER JCT SR 92		1				20000	22000	21000	21000*	
009	019.26	BEFORE JCT SR 528		1				19000*	21000*	20000	23000*	
009	019.26	AFTER JCT SR 528		1				14000*	16000	15000	18000*	
009	023.51	BEFORE JCT 132ND ST NE		1				9900*	9800	9400	13000*	
009	026.05	AFTER JCT SR 531*172ND ST NE		1				9800*	9600	9300	10000*	
009	028.75	AT PTR LOCATION P21		1	04	01	05	12000*	12000*	12000*	12000+	
009	029.46	AFTER JCT SR 530*DIVISION ST		1				16000	16000	16000*	17000	
009	029.57	AFTER JCT SR 530		1				8200	8300	8200*	8600	
009	032.98	AT PTR LOCATION R083		3	05	03	01	08	2000*	2000*	2000*	2100+
009	035.18	AFTER JCT FINN SETTLEMENT RD		3					1100	1100	1100*	1200
009	040.03	BEFORE JCT SR 534		3					1300	1500*	1500	1600
009	040.03	AFTER JCT SR 534		3					1400	1500*	1500	1600
009	044.32	AFTER JCT LAKE CAVANAUGH RD		3					1600	1900*	1800	2000
009	046.78	BEFORE JCT LAKEVIEW BLVD		2					3100	3000*	3000	3300

* BASED ON ACTUAL COUNT
 + SOURCE OF TRUCK PERCENTAGES

APPENDIX

ITE PASS-BY DATA
LUC 850 – SUPERMARKET

Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual , 11th Edition

Land Use Code	850								
Land Use	Supermarket								
Setting	General Urban/Suburban								
Time Period	Weekday PM Peak Period								
# Data Sites	43								
Average Pass-By Rate	24%								
Pass-By Characteristics for Individual Sites									
	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Daily Volume	Source
GFA (000)					Primary (%)	Diverted (%)	Total (%)		
15.16	Florida	1993	161	23	51	26	77	—	33
31	Nebraska	1990	—	19	36	45	81	48700	31
31	Nebraska	1990	—	28	40	32	72	23500	31
31	Florida	1993	440	35	—	—	65	—	30
34	Nebraska	1990	—	44	29	27	56	15200	31
50	Kansas	1998	33	9	70	21	91	—	31
55	Nebraska	1990	—	27	35	38	73	27200	31
65	Nebraska	1990	—	25	25	50	75	44700	31
66	Nebraska	1990	—	23	30	47	77	63000	31
66	Oregon	2010	382	18	47	35	82	—	27
67	Washington	2010	—	25	40	35	75	—	27
70	Nebraska	1990	—	26	30	44	74	34300	31
71.717	Oregon	2001	—	31	51	18	69	—	18
72	Oregon	2001	827	31	51	18	69	—	18
74.63	Oregon	2001	—	33	40	27	67	—	18
75	Oregon	2001	786	33	40	27	67	—	18
79	Washington	2001	884	34	39	27	66	—	18
79	Oregon	2001	637	13	52	35	87	—	18
79	California	2002	547	15	64	21	85	—	18
79	California	2002	798	20	58	22	80	—	18
79.097	California	2002	—	15	64	21	85	—	18
79.097	Oregon	2001	—	13	52	35	87	—	18
79.324	California	2002	—	20	58	22	80	—	18
79.336	Washington	2001	—	34	39	27	66	—	18
79.771	Nevada	2002	—	38	44	18	62	—	18
80	Nevada	2002	478	38	44	18	62	—	18
80	California	2002	617	12	68	20	88	—	18
80	California	2002	538	25	52	23	75	—	18
80.147	California	2002	—	12	68	20	88	—	18
80.147	California	2002	—	25	52	23	75	—	18
81	New York	1997	—	31	46	23	69	—	26
87.4	New York	1997	—	32	55	13	68	—	26
88	California	2010	497	15	49	36	85	—	27
89.8	New York	1997	—	38	47	15	62	—	26
93	Washington	2010	440	21	41	38	79	—	27
94	Oregon	2002	536	7	45	48	93	—	27
95	California	2010	—	16	56	28	84	—	27
96	California	2010	—	19	48	33	81	—	27
96	California	2010	—	15	64	21	85	—	27
99	California	2010	—	17	54	29	83	—	27
104	California	2010	—	18	55	27	82	—	27
105.3	New York	1997	—	33	48	19	67	—	26
123.5	New York	1997	—	26	44	30	74	—	26

APPENDIX

NCHRP 8-51 INTERNAL TRIP CAPTURE
ESTIMATION SPREADSHEETS

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Safeway Arlington	Organization:	Heath & Associates
Project Location:	Arlington	Performed By:	AV
Scenario Description:	Full Buildout	Date:	3/16/2022
Analysis Year:	2025	Checked By:	
Analysis Period:	AM Street Peak Hour	Date:	

Table 1-A: 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	822, 850, 944	60,508; 16	SF; VFP	333.4	182.1	151.3
Restaurant	934	4,250	SF	189.8	96.8	93
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
Total				523.2	278.9	244.3

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: 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		20	0	0	0
Restaurant	0	13		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	523	279	244
Internal Capture Percentage	13%	12%	14%
External Vehicle-Trips ³	457	246	211
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	7%	13%
Restaurant	21%	14%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Safeway Arlington
Analysis Period:	AM Street Peak Hour

Land Use	Table 7-A (D): Entering Trips			Table 7-A (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	182.1	182	1.00	151.3	151
Restaurant	1.00	96.8	97	1.00	93	93
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	44		20	0	21	0
Restaurant	29	13		0	4	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		58	22	0	0	0
Retail	0		49	0	0	0
Restaurant	0	15		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	31	19	0		0
Hotel	0	7	6	0	0	

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	13	169	182	169	0	0
Restaurant	20	77	97	77	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

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	20	131	151	131	0	0
Restaurant	13	80	93	80	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
²Person-Trips
³Total 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.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Safeway Arlington	Organization:	Heath & Associates
Project Location:	Arlington	Performed By:	AV
Scenario Description:	Full Buildout	Date:	3/16/2022
Analysis Year:	2025	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	822, 850, 944	60,508; 16	SF; VFP	744.8	372.4	372.4
Restaurant	934	4,250	SF	140.4	73	67.4
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses ²				0		
Total				885.2	445.4	439.8

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						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
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						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
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		21	0	0	0
Restaurant	0	27		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	884	445	439
Internal Capture Percentage	11%	11%	11%
External Vehicle-Trips ³	788	397	391
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	7%	6%
Restaurant	29%	40%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Safeway Arlington
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	372.4	372	1.00	372.4	372
Restaurant	1.00	73	73	1.00	67.4	67
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
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	7		108	15	97	19
Restaurant	2	27		5	12	5
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
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		30	1	0	0	0
Retail	0		21	0	0	0
Restaurant	0	186		0	0	0
Cinema/Entertainment	0	15	2		0	0
Residential	0	37	10	0		0
Hotel	0	7	4	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	27	345	372	345	0	0
Restaurant	21	52	73	52	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	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	21	351	372	351	0	0
Restaurant	27	40	67	40	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total 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.

APPENDIX

ITE TRIP GENERATION SPREADSHEETS

Entire Shopping Center - Trip Generation Summary

Average Weekday Daily										
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Full Build-Out	Strip Retail Plaza	#822	1,000 sq. ft.	8.23	54.45	50%	50%	224.1	224.1	448.1
	Safeway	#850	1,000 sq. ft.	52.28	93.84	50%	50%	2453.0	2453.0	4906.0
	Gas Pumps	#944	VFP	16	172.01	50%	50%	1376.1	1376.1	2752.2
	McDonalds	#934	1,000 sq. ft.	4.25	467.48	50%	50%	993.4	993.4	1986.8
								10093.0		

Retail **4053.1 4053.1 8106.2**
 Restaurant **993.4 993.4 1986.8**

Weekday AM Peak Hour										
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Full Build-Out	Strip Retail Plaza	#822	1,000 sq. ft.	8.23	2.36	60%	40%	11.7	7.8	19.4
	Safeway	#850	1,000 sq. ft.	52.28	2.86	59%	41%	88.2	61.3	149.5
	Gas Pumps	#944	VFP	16	10.28	50%	50%	82.2	82.2	164.5
	McDonalds	#934	1,000 sq. ft.	4.25	44.64	51%	49%	96.8	93.0	189.7
								278.9 244.3 523.1		

Retail **182.1 151.3 333.4**
 Restaurant **96.8 93.0 189.7**

Weekday PM Peak Hour										
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Full Build-Out	Strip Retail Plaza	#822	1,000 sq. ft.	8.23	6.59	50%	50%	27.1	27.1	54.2
	Safeway	#850	1,000 sq. ft.	52.28	8.95	50%	50%	234.0	234.0	467.9
	Gas Pumps	#944	VFP	16	13.91	50%	50%	111.3	111.3	222.6
	McDonalds	#934	1,000 sq. ft.	4.25	33.03	52%	48%	73.0	67.4	140.4
								445.3 439.7 885.1		

Retail **372.4 372.4 744.7**
 Restaurant **73.0 67.4 140.4**

Sources:
 Institute of Transportation Engineers, *Trip Generation Manual*, 11th Edition, (2021).

Safeway Arlington - 10k Addition - Trip Generation Summary

Average Weekday Daily																	
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips			Internal Capture		Pass-by Trips		Primary Trips		
						In	Out	In	Out	Total	%	Total	%	Total	In	Out	Total
Safeway	Supermarket	#850	1,000 sq. ft.	10	93.84	50%	50%	469.2	469.2	938.4	12%	112.6	24%	198.2	313.8	313.8	627.6

Weekday AM Peak Hour																	
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips			Internal Capture		Pass-by Trips		Primary Trips		
						In	Out	In	Out	Total	%	Total	%	Total	In	Out	Total
Safeway	Supermarket	#850	1,000 sq. ft.	10	2.86	59%	41%	16.9	11.7	28.6	13%	3.7	24%	6.0	11.2	7.8	18.9

Weekday PM Peak Hour																	
Development	Land Use	LUC	Variable	Value	Rate	Distribution		Total Trips			Internal Capture		Pass-by Trips		Primary Trips		
						In	Out	In	Out	Total	%	Total	%	Total	In	Out	Total
Safeway	Supermarket	#850	1,000 sq. ft.	10	8.95	50%	50%	44.8	44.8	89.5	11%	9.8	24%	19.1	30.3	30.3	60.5

Sources:

Institute of Transportation Engineers, *Trip Generation Manual*, 11th Edition, (2021).

Internal capture rates were derived via the NCHRP 8-51 Internal Capture Trip Estimation Tool

Pass-by Percentages for LUC 850 were derived from Institute of Transportation Engineers, Pass-By Data and Rate Tables/2021 Pass-By Tables for ITETripGen Appendices – PM Rate for LUC 850: 24%.

APPENDIX

LEVEL OF SERVICE

HCM 6th Signalized Intersection Summary
1: SR-9 & 204th St NE

Existing PM Peak Hour
03/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	161	356	104	152	242	133	60	389	133	69	302	143
Future Volume (veh/h)	161	356	104	152	242	133	60	389	133	69	302	143
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	1856	1885	1885	1885	1870	1870	1885	1870	1885	1885	1870	1796
Adj Flow Rate, veh/h	166	367	107	157	249	137	62	401	137	71	311	147
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	1	1	1	2	2	1	2	1	1	2	7
Cap, veh/h	210	462	391	201	444	377	86	476	163	93	676	550
Arrive On Green	0.12	0.24	0.24	0.11	0.24	0.24	0.05	0.36	0.36	0.05	0.36	0.36
Sat Flow, veh/h	1767	1885	1598	1795	1870	1585	1795	1333	455	1795	1870	1522
Grp Volume(v), veh/h	166	367	107	157	249	137	62	0	538	71	311	147
Grp Sat Flow(s),veh/h/ln	1767	1885	1598	1795	1870	1585	1795	0	1788	1795	1870	1522
Q Serve(g_s), s	7.0	14.0	4.2	6.5	9.0	5.5	2.6	0.0	21.3	3.0	9.8	5.2
Cycle Q Clear(g_c), s	7.0	14.0	4.2	6.5	9.0	5.5	2.6	0.0	21.3	3.0	9.8	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	210	462	391	201	444	377	86	0	639	93	676	550
V/C Ratio(X)	0.79	0.80	0.27	0.78	0.56	0.36	0.72	0.00	0.84	0.77	0.46	0.27
Avail Cap(c_a), veh/h	637	1214	1029	614	1170	992	301	0	1659	348	1784	1452
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	27.2	23.5	33.2	25.8	24.4	36.1	0.0	22.7	36.0	18.8	17.4
Incr Delay (d2), s/veh	6.5	3.2	0.4	6.5	1.1	0.6	10.9	0.0	3.1	12.3	0.5	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	3.3	6.4	1.6	3.1	4.0	2.1	1.4	0.0	8.9	1.6	4.1	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	30.4	23.9	39.7	26.9	25.0	47.0	0.0	25.8	48.2	19.3	17.6
LnGrp LOS	D	C	C	D	C	C	D	A	C	D	B	B
Approach Vol, veh/h		640			543			600			529	
Approach Delay, s/veh		31.6			30.1			28.0			22.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	32.0	13.1	23.3	8.2	32.3	13.7	22.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	14.9	71.3	26.3	49.5	12.9	73.3	27.7	48.1				
Max Q Clear Time (g_c+I1), s	5.0	23.3	8.5	16.0	4.6	11.8	9.0	11.0				
Green Ext Time (p_c), s	0.1	4.2	0.4	2.8	0.1	2.6	0.4	2.0				
Intersection Summary												
HCM 6th Ctrl Delay				28.3								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Vol, veh/h	0	558	436	17	0	91
Future Vol, veh/h	0	558	436	17	0	91
Conflicting Peds, #/hr	0	0	0	0	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	82	92	92	82	82	82
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	607	474	21	0	111

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	755
HCM Lane V/C Ratio	-	-	-	0.147
HCM Control Delay (s)	-	-	-	10.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.5

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	558	379	98	0	74
Future Vol, veh/h	0	558	379	98	0	74
Conflicting Peds, #/hr	0	0	0	0	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	88	92	92	88	88	88
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	607	412	111	0	84

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	597
HCM Lane V/C Ratio	-	-	-	0.141
HCM Control Delay (s)	-	-	-	12
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.5

MOVEMENT SUMMARY

Site: 101 [204th Street NE & Olympic Place (Site Folder: General)]

Existing PM Peak Hour

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 77th Avenue NE														
3u	U	1	1.0	1	1.0	0.179	14.5	LOS B	1.0	26.1	0.63	0.75	0.63	34.1
3	L2	101	1.0	109	1.0	0.179	12.4	LOS B	1.0	26.1	0.63	0.75	0.63	33.5
8	T1	21	1.0	23	1.0	0.179	7.5	LOS A	1.0	26.1	0.63	0.75	0.63	33.6
18	R2	15	1.0	16	1.0	0.179	7.3	LOS A	1.0	26.1	0.63	0.75	0.63	32.8
Approach		138	1.0	148	1.0	0.179	11.1	LOS B	1.0	26.1	0.63	0.75	0.63	33.4
East: 204th Street NE														
1u	U	1	1.0	1	1.0	0.211	13.9	LOS B	1.2	30.7	0.58	0.65	0.58	35.7
1	L2	11	1.0	12	1.0	0.211	11.8	LOS B	1.2	30.7	0.58	0.65	0.58	35.1
6	T1	138	4.0	148	4.0	0.211	7.1	LOS A	1.2	30.7	0.58	0.65	0.58	35.1
16	R2	23	1.0	25	1.0	0.211	6.7	LOS A	1.2	30.7	0.58	0.65	0.58	34.3
Approach		173	3.4	186	3.4	0.211	7.4	LOS A	1.2	30.7	0.58	0.65	0.58	35.0
North: Olympic Place														
7u	U	1	1.0	1	1.0	0.202	13.7	LOS B	1.1	28.6	0.54	0.66	0.54	35.8
7	L2	35	1.0	38	1.0	0.202	11.5	LOS B	1.1	28.6	0.54	0.66	0.54	35.2
4	T1	42	1.0	45	1.0	0.202	6.6	LOS A	1.1	28.6	0.54	0.66	0.54	35.3
14	R2	99	1.0	106	1.0	0.202	6.4	LOS A	1.1	28.6	0.54	0.66	0.54	34.4
Approach		177	1.0	190	1.0	0.202	7.5	LOS A	1.1	28.6	0.54	0.66	0.54	34.8
West: 204th Street NE														
5u	U	79	1.0	85	1.0	0.495	12.3	LOS B	4.1	104.5	0.43	0.58	0.43	35.3
5	L2	170	1.0	183	1.0	0.495	10.2	LOS B	4.1	104.5	0.43	0.58	0.43	34.7
2	T1	172	2.0	185	2.0	0.495	5.4	LOS A	4.1	104.5	0.43	0.58	0.43	34.8
12	R2	117	1.0	126	1.0	0.495	5.1	LOS A	4.1	104.5	0.43	0.58	0.43	34.0
Approach		538	1.3	578	1.3	0.495	7.9	LOS A	4.1	104.5	0.43	0.58	0.43	34.7
All Vehicles		1026	1.6	1103	1.6	0.495	8.2	LOS A	4.1	104.5	0.50	0.63	0.50	34.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

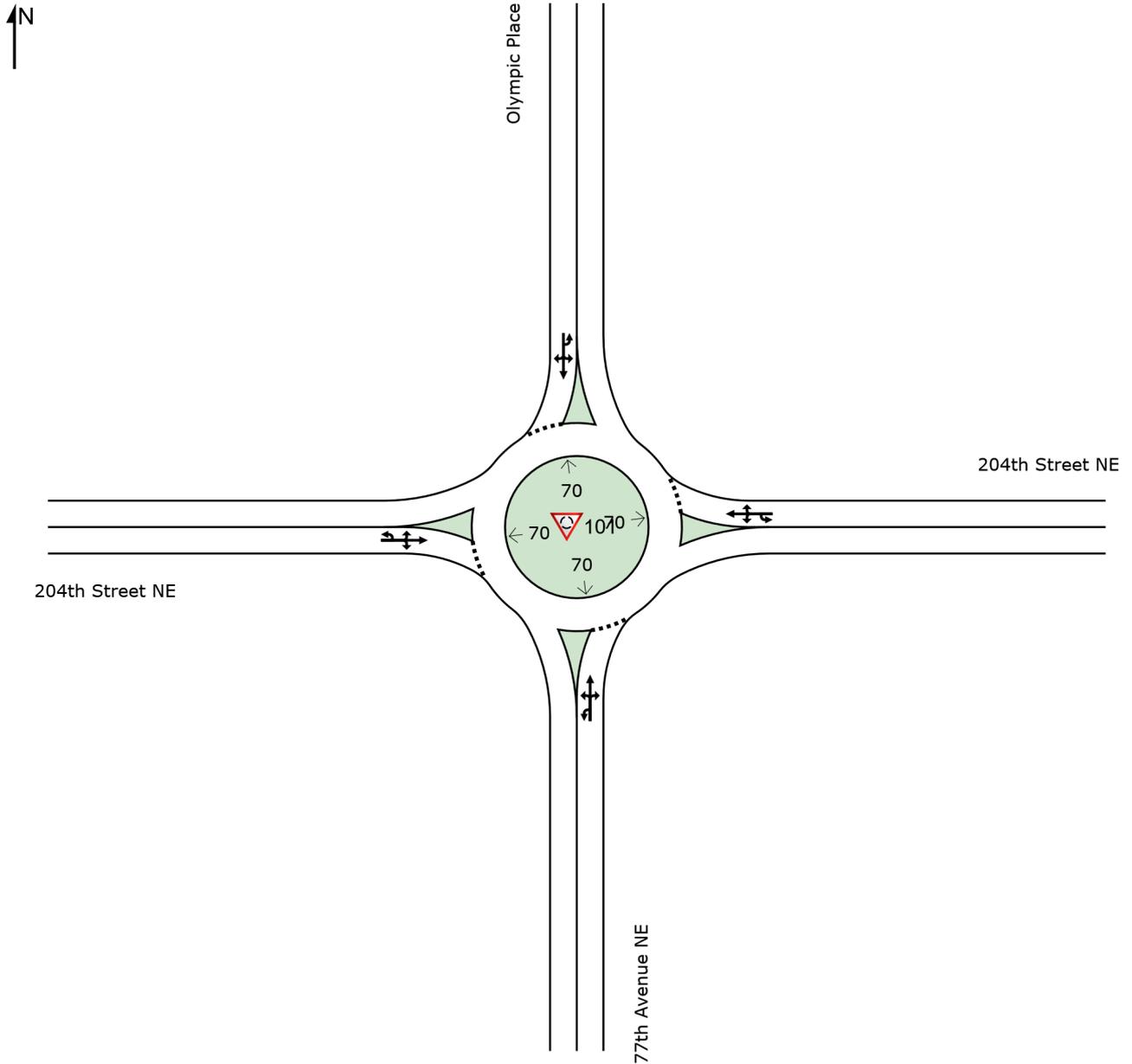
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [204th Street NE & Olympic Place (Site Folder: General)]

Existing PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Thursday, March 17, 2022 9:00:47 AM
Project: Not Saved

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	27	2	41	2	3	6	76	150	1	9	134	20
Future Vol, veh/h	27	2	41	2	3	6	76	150	1	9	134	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									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	2	1
Mvmt Flow	30	2	45	2	3	7	84	165	1	10	147	22

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	517	512	158	536	523	166	169	0	0	166	0	0
Stage 1	178	178	-	334	334	-	-	-	-	-	-	-
Stage 2	339	334	-	202	189	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	470	467	890	457	460	881	1415	-	-	1418	-	-
Stage 1	826	754	-	682	645	-	-	-	-	-	-	-
Stage 2	678	645	-	802	746	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	438	433	890	408	427	881	1415	-	-	1418	-	-
Mov Cap-2 Maneuver	438	433	-	408	427	-	-	-	-	-	-	-
Stage 1	772	748	-	638	603	-	-	-	-	-	-	-
Stage 2	626	603	-	753	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	11.3	2.6	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1415	-	-	623	587	1418	-
HCM Lane V/C Ratio	0.059	-	-	0.123	0.021	0.007	-
HCM Control Delay (s)	7.7	0	-	11.6	11.3	7.6	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.1	0	-

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	76	61	97	86	102	60
Future Vol, veh/h	76	61	97	86	102	60
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	96	96	96	91	91	96
Heavy Vehicles, %	1	1	1	1	2	1
Mvmt Flow	79	64	101	95	112	63

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	441	144	175	0	-	0
Stage 1	144	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	576	906	1407	-	-	-
Stage 1	886	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	532	906	1407	-	-	-
Mov Cap-2 Maneuver	532	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	756	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	652	-	-
HCM Lane V/C Ratio	0.072	-	0.219	-	-
HCM Control Delay (s)	7.8	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.8	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Vol, veh/h	17	7	1	161	155	13
Future Vol, veh/h	17	7	1	161	155	13
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	73	73	73	91	91	73
Heavy Vehicles, %	1	14	1	1	2	1
Mvmt Flow	23	10	1	177	170	18

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	358	179	188	0	-	0
Stage 1	179	-	-	-	-	-
Stage 2	179	-	-	-	-	-
Critical Hdwy	6.41	6.34	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.426	2.209	-	-	-
Pot Cap-1 Maneuver	642	834	1392	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	641	834	1392	-	-	-
Mov Cap-2 Maneuver	641	-	-	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1392	-	687	-	-
HCM Lane V/C Ratio	0.001	-	0.048	-	-
HCM Control Delay (s)	7.6	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 6th Signalized Intersection Summary
1: SR-9 & 204th St NE

Forecast 2025 PM Peak Hour Without Project
03/15/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	378	110	161	257	141	64	413	141	73	320	152
Future Volume (veh/h)	171	378	110	161	257	141	64	413	141	73	320	152
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	1856	1885	1885	1885	1870	1870	1885	1870	1885	1885	1870	1796
Adj Flow Rate, veh/h	176	390	113	166	265	145	66	426	145	75	330	157
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	1	1	1	2	2	1	2	1	1	2	7
Cap, veh/h	218	475	403	207	457	387	86	495	168	98	706	574
Arrive On Green	0.12	0.25	0.25	0.12	0.24	0.24	0.05	0.37	0.37	0.05	0.38	0.38
Sat Flow, veh/h	1767	1885	1598	1795	1870	1585	1795	1334	454	1795	1870	1522
Grp Volume(v), veh/h	176	390	113	166	265	145	66	0	571	75	330	157
Grp Sat Flow(s),veh/h/ln	1767	1885	1598	1795	1870	1585	1795	0	1789	1795	1870	1522
Q Serve(g_s), s	8.4	16.9	4.9	7.8	10.8	6.6	3.2	0.0	25.6	3.6	11.6	6.2
Cycle Q Clear(g_c), s	8.4	16.9	4.9	7.8	10.8	6.6	3.2	0.0	25.6	3.6	11.6	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	218	475	403	207	457	387	86	0	663	98	706	574
V/C Ratio(X)	0.81	0.82	0.28	0.80	0.58	0.37	0.77	0.00	0.86	0.77	0.47	0.27
Avail Cap(c_a), veh/h	594	1074	911	506	965	818	275	0	1534	279	1609	1309
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.1	30.6	26.1	37.5	28.9	27.3	40.9	0.0	25.3	40.5	20.4	18.8
Incr Delay (d2), s/veh	6.9	3.6	0.4	7.1	1.2	0.6	13.2	0.0	3.4	11.7	0.5	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	4.0	7.9	1.9	3.8	4.9	2.5	1.7	0.0	10.9	1.9	5.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.0	34.2	26.5	44.5	30.1	27.9	54.1	0.0	28.7	52.2	20.9	19.0
LnGrp LOS	D	C	C	D	C	C	D	A	C	D	C	B
Approach Vol, veh/h		679			576			637			562	
Approach Delay, s/veh		35.5			33.7			31.3			24.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.2	36.7	14.5	26.4	8.7	37.3	15.2	25.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	13.5	74.5	24.5	49.5	13.3	74.7	29.2	44.8				
Max Q Clear Time (g_c+I1), s	5.6	27.6	9.8	18.9	5.2	13.6	10.4	12.8				
Green Ext Time (p_c), s	0.1	4.6	0.4	3.0	0.1	2.8	0.4	2.1				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Vol, veh/h	0	592	462	18	0	97
Future Vol, veh/h	0	592	462	18	0	97
Conflicting Peds, #/hr	0	0	0	0	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	82	92	92	82	82	82
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	643	502	22	0	118

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	- 262
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	- 6.92
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	- 3.31
Pot Cap-1 Maneuver	0	-	-	-	0 740
Stage 1	0	-	-	-	0 -
Stage 2	0	-	-	-	0 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	- 740
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	740
HCM Lane V/C Ratio	-	-	-	0.16
HCM Control Delay (s)	-	-	-	10.8
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.6

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	592	401	104	0	79
Future Vol, veh/h	0	592	401	104	0	79
Conflicting Peds, #/hr	0	0	0	0	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	88	92	92	88	88	88
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	643	436	118	0	90

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	495
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.21
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.309
Pot Cap-1 Maneuver	0	-	-	-	577
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	577
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	577
HCM Lane V/C Ratio	-	-	-	0.156
HCM Control Delay (s)	-	-	-	12.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.5

MOVEMENT SUMMARY

Site: 101 [204th Street NE & Olympic Place - (Site Folder: General)]

Forecast 2025 PM Peak Hour Background
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 77th Avenue NE														
3u	U	1	1.0	1	1.0	0.195	14.8	LOS B	1.2	29.1	0.66	0.77	0.66	33.9
3	L2	107	1.0	115	1.0	0.195	12.6	LOS B	1.2	29.1	0.66	0.77	0.66	33.4
8	T1	22	1.0	24	1.0	0.195	7.8	LOS A	1.2	29.1	0.66	0.77	0.66	33.4
18	R2	16	1.0	17	1.0	0.195	7.6	LOS A	1.2	29.1	0.66	0.77	0.66	32.7
Approach		146	1.0	157	1.0	0.195	11.4	LOS B	1.2	29.1	0.66	0.77	0.66	33.3
East: 204th Street NE														
1u	U	1	1.0	1	1.0	0.229	14.2	LOS B	1.3	33.8	0.60	0.67	0.60	35.7
1	L2	12	1.0	13	1.0	0.229	12.0	LOS B	1.3	33.8	0.60	0.67	0.60	35.0
6	T1	146	4.0	157	4.0	0.229	7.3	LOS A	1.3	33.8	0.60	0.67	0.60	35.0
16	R2	24	1.0	26	1.0	0.229	6.9	LOS A	1.3	33.8	0.60	0.67	0.60	34.3
Approach		183	3.4	197	3.4	0.229	7.6	LOS A	1.3	33.8	0.60	0.67	0.60	34.9
North: Olympic Place														
7u	U	1	1.0	1	1.0	0.219	13.8	LOS B	1.2	31.5	0.56	0.67	0.56	35.7
7	L2	37	1.0	40	1.0	0.219	11.7	LOS B	1.2	31.5	0.56	0.67	0.56	35.1
4	T1	45	1.0	48	1.0	0.219	6.8	LOS A	1.2	31.5	0.56	0.67	0.56	35.2
14	R2	105	1.0	113	1.0	0.219	6.6	LOS A	1.2	31.5	0.56	0.67	0.56	34.3
Approach		188	1.0	202	1.0	0.219	7.7	LOS A	1.2	31.5	0.56	0.67	0.56	34.7
West: 204th Street NE														
5u	U	84	1.0	90	1.0	0.529	12.5	LOS B	4.6	117.1	0.46	0.58	0.46	35.3
5	L2	180	1.0	194	1.0	0.529	10.3	LOS B	4.6	117.1	0.46	0.58	0.46	34.6
2	T1	183	2.0	197	2.0	0.529	5.5	LOS A	4.6	117.1	0.46	0.58	0.46	34.7
12	R2	124	1.0	133	1.0	0.529	5.2	LOS A	4.6	117.1	0.46	0.58	0.46	33.9
Approach		571	1.3	614	1.3	0.529	8.0	LOS A	4.6	117.1	0.46	0.58	0.46	34.6
All Vehicles		1088	1.6	1170	1.6	0.529	8.3	LOS A	4.6	117.1	0.53	0.64	0.53	34.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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	29	2	44	2	3	6	81	159	1	10	142	21
Future Vol, veh/h	29	2	44	2	3	6	81	159	1	10	142	21
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									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	2	1
Mvmt Flow	32	2	48	2	3	7	89	175	1	11	156	23

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	549	544	168	569	555	176	179	0	0	176	0	0
Stage 1	190	190	-	354	354	-	-	-	-	-	-	-
Stage 2	359	354	-	215	201	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	448	448	879	434	441	870	1403	-	-	1406	-	-
Stage 1	814	745	-	665	632	-	-	-	-	-	-	-
Stage 2	661	632	-	790	737	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	415	413	879	384	407	870	1403	-	-	1406	-	-
Mov Cap-2 Maneuver	415	413	-	384	407	-	-	-	-	-	-	-
Stage 1	757	738	-	618	588	-	-	-	-	-	-	-
Stage 2	607	588	-	738	730	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.9		11.5		2.6		0.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	601	565	1406	-	-
HCM Lane V/C Ratio	0.063	-	-	0.137	0.021	0.008	-	-
HCM Control Delay (s)	7.7	0	-	11.9	11.5	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.1	0	-	-

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	81	65	103	91	108	64
Future Vol, veh/h	81	65	103	91	108	64
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	96	96	96	91	91	96
Heavy Vehicles, %	1	1	1	1	2	1
Mvmt Flow	84	68	107	100	119	67

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	467	153	186	0	0
Stage 1	153	-	-	-	-
Stage 2	314	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-
Pot Cap-1 Maneuver	556	896	1395	-	-
Stage 1	877	-	-	-	-
Stage 2	743	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	511	896	1395	-	-
Mov Cap-2 Maneuver	511	-	-	-	-
Stage 1	806	-	-	-	-
Stage 2	743	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1395	-	632	-	-
HCM Lane V/C Ratio	0.077	-	0.241	-	-
HCM Control Delay (s)	7.8	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	18	7	1	171	165	14
Future Vol, veh/h	18	7	1	171	165	14
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	73	73	73	91	91	73
Heavy Vehicles, %	1	14	1	1	2	1
Mvmt Flow	25	10	1	188	181	19

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	381	191	200	0	0
Stage 1	191	-	-	-	-
Stage 2	190	-	-	-	-
Critical Hdwy	6.41	6.34	4.11	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.426	2.209	-	-
Pot Cap-1 Maneuver	623	821	1378	-	-
Stage 1	844	-	-	-	-
Stage 2	845	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	622	821	1378	-	-
Mov Cap-2 Maneuver	622	-	-	-	-
Stage 1	843	-	-	-	-
Stage 2	845	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1378	-	667	-	-
HCM Lane V/C Ratio	0.001	-	0.051	-	-
HCM Control Delay (s)	7.6	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 6th Signalized Intersection Summary
1: SR-9 & 204th St NE

Forecast 2025 PM Peak Hour With Project
03/16/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	387	110	167	266	144	64	413	147	76	320	152
Future Volume (veh/h)	171	387	110	167	266	144	64	413	147	76	320	152
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	1856	1885	1885	1885	1870	1870	1885	1870	1885	1885	1870	1796
Adj Flow Rate, veh/h	176	399	113	172	274	148	66	426	152	78	330	157
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	3	1	1	1	2	2	1	2	1	1	2	7
Cap, veh/h	216	481	407	212	469	397	86	491	175	102	714	581
Arrive On Green	0.12	0.26	0.26	0.12	0.25	0.25	0.05	0.37	0.37	0.06	0.38	0.38
Sat Flow, veh/h	1767	1885	1598	1795	1870	1585	1795	1316	470	1795	1870	1522
Grp Volume(v), veh/h	176	399	113	172	274	148	66	0	578	78	330	157
Grp Sat Flow(s),veh/h/ln	1767	1885	1598	1795	1870	1585	1795	0	1786	1795	1870	1522
Q Serve(g_s), s	8.9	18.2	5.2	8.5	11.7	7.0	3.3	0.0	27.4	3.9	12.1	6.5
Cycle Q Clear(g_c), s	8.9	18.2	5.2	8.5	11.7	7.0	3.3	0.0	27.4	3.9	12.1	6.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	216	481	407	212	469	397	86	0	666	102	714	581
V/C Ratio(X)	0.81	0.83	0.28	0.81	0.58	0.37	0.77	0.00	0.87	0.77	0.46	0.27
Avail Cap(c_a), veh/h	566	1023	867	502	939	796	262	0	1439	266	1511	1230
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	32.1	27.2	39.2	30.0	28.2	42.9	0.0	26.5	42.4	21.2	19.4
Incr Delay (d2), s/veh	7.2	3.8	0.4	7.3	1.2	0.6	13.2	0.0	3.6	11.4	0.5	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	4.2	8.6	2.0	4.1	5.3	2.7	1.8	0.0	11.8	2.0	5.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.3	35.9	27.6	46.5	31.1	28.8	56.1	0.0	30.1	53.8	21.6	19.7
LnGrp LOS	D	D	C	D	C	C	E	A	C	D	C	B
Approach Vol, veh/h		688			594			644			565	
Approach Delay, s/veh		37.2			35.0			32.8			25.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.7	38.5	15.3	27.8	8.9	39.3	15.7	27.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	13.5	73.5	25.5	49.5	13.3	73.7	29.2	45.8				
Max Q Clear Time (g_c+I1), s	5.9	29.4	10.5	20.2	5.3	14.1	10.9	13.7				
Green Ext Time (p_c), s	0.1	4.6	0.4	3.0	0.1	2.8	0.4	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			32.9									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Vol, veh/h	0	610	467	23	0	110
Future Vol, veh/h	0	610	467	23	0	110
Conflicting Peds, #/hr	0	0	0	0	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	82	92	92	82	82	82
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	663	508	28	0	134

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	-	0	-	0	268
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	6.92
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.31
Pot Cap-1 Maneuver	0	-	-	-	733
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	733
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	733
HCM Lane V/C Ratio	-	-	-	0.183
HCM Control Delay (s)	-	-	-	11
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.7

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑			↑
Traffic Vol, veh/h	0	610	400	114	0	90
Future Vol, veh/h	0	610	400	114	0	90
Conflicting Peds, #/hr	0	0	0	0	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	88	92	92	88	88	88
Heavy Vehicles, %	1	1	2	1	1	1
Mvmt Flow	0	663	435	130	0	102

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	-
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	-
Pot Cap-1 Maneuver	0	-	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	573
HCM Lane V/C Ratio	-	-	-	0.178
HCM Control Delay (s)	-	-	-	12.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.6

MOVEMENT SUMMARY

Site: 101 [204th Street NE & Olympic Place - (Site Folder: General)]

Forecast 2025 PM Peak Hour with Project
 Site Category: (None)
 Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: 77th Avenue NE														
3u	U	1	1.0	1	1.0	0.204	15.0	LOS B	1.2	30.6	0.67	0.78	0.67	33.9
3	L2	107	1.0	115	1.0	0.204	12.8	LOS B	1.2	30.6	0.67	0.78	0.67	33.3
8	T1	24	1.0	26	1.0	0.204	8.0	LOS A	1.2	30.6	0.67	0.78	0.67	33.4
18	R2	16	1.0	17	1.0	0.204	7.8	LOS A	1.2	30.6	0.67	0.78	0.67	32.6
Approach		148	1.0	159	1.0	0.204	11.5	LOS B	1.2	30.6	0.67	0.78	0.67	33.2
East: 204th Street NE														
1u	U	1	1.0	1	1.0	0.238	14.3	LOS B	1.4	35.5	0.62	0.69	0.62	35.6
1	L2	12	1.0	13	1.0	0.238	12.2	LOS B	1.4	35.5	0.62	0.69	0.62	35.0
6	T1	147	4.0	158	4.0	0.238	7.5	LOS A	1.4	35.5	0.62	0.69	0.62	35.0
16	R2	26	1.0	28	1.0	0.238	7.1	LOS A	1.4	35.5	0.62	0.69	0.62	34.2
Approach		186	3.4	200	3.4	0.238	7.8	LOS A	1.4	35.5	0.62	0.69	0.62	34.9
North: Olympic Place														
7u	U	1	1.0	1	1.0	0.227	13.9	LOS B	1.3	32.8	0.57	0.68	0.57	35.7
7	L2	40	1.0	43	1.0	0.227	11.8	LOS B	1.3	32.8	0.57	0.68	0.57	35.0
4	T1	47	1.0	51	1.0	0.227	6.9	LOS A	1.3	32.8	0.57	0.68	0.57	35.1
14	R2	105	1.0	113	1.0	0.227	6.7	LOS A	1.3	32.8	0.57	0.68	0.57	34.3
Approach		193	1.0	208	1.0	0.227	7.8	LOS A	1.3	32.8	0.57	0.68	0.57	34.6
West: 204th Street NE														
5u	U	91	1.0	98	1.0	0.549	12.5	LOS B	4.9	124.7	0.49	0.59	0.49	35.2
5	L2	191	1.0	205	1.0	0.549	10.4	LOS B	4.9	124.7	0.49	0.59	0.49	34.5
2	T1	183	2.0	197	2.0	0.549	5.6	LOS A	4.9	124.7	0.49	0.59	0.49	34.6
12	R2	124	1.0	133	1.0	0.549	5.3	LOS A	4.9	124.7	0.49	0.59	0.49	33.8
Approach		589	1.3	633	1.3	0.549	8.2	LOS A	4.9	124.7	0.49	0.59	0.49	34.5
All Vehicles		1116	1.6	1200	1.6	0.549	8.5	LOS A	4.9	124.7	0.55	0.65	0.55	34.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: HCM Queue Formula.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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	31	2	46	2	3	6	85	170	1	10	145	22
Future Vol, veh/h	31	2	46	2	3	6	85	170	1	10	145	22
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									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	2	1
Mvmt Flow	34	2	51	2	3	7	93	187	1	11	159	24

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	572	567	171	594	579	188	183	0	0	188	0	0
Stage 1	193	193	-	374	374	-	-	-	-	-	-	-
Stage 2	379	374	-	220	205	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	432	434	875	418	428	857	1398	-	-	1392	-	-
Stage 1	811	743	-	649	619	-	-	-	-	-	-	-
Stage 2	645	619	-	785	734	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	399	398	875	367	393	857	1398	-	-	1392	-	-
Mov Cap-2 Maneuver	399	398	-	367	393	-	-	-	-	-	-	-
Stage 1	751	736	-	601	573	-	-	-	-	-	-	-
Stage 2	589	573	-	731	727	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	11.7	2.6	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1398	-	-	584	548	1392	-
HCM Lane V/C Ratio	0.067	-	-	0.149	0.022	0.008	-
HCM Control Delay (s)	7.8	0	-	12.2	11.7	7.6	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.1	0	-

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	87	70	114	93	107	71
Future Vol, veh/h	87	70	114	93	107	71
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	96	96	96	91	91	96
Heavy Vehicles, %	1	1	1	1	2	1
Mvmt Flow	91	73	119	102	118	74

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	495	155	192	0	0
Stage 1	155	-	-	-	-
Stage 2	340	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-
Pot Cap-1 Maneuver	536	893	1388	-	-
Stage 1	876	-	-	-	-
Stage 2	723	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	487	893	1388	-	-
Mov Cap-2 Maneuver	487	-	-	-	-
Stage 1	796	-	-	-	-
Stage 2	723	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	4.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1388	-	611	-	-
HCM Lane V/C Ratio	0.086	-	0.268	-	-
HCM Control Delay (s)	7.8	0	13	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.3	-	1.1	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	7	2	178	171	15
Future Vol, veh/h	19	7	2	178	171	15
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	73	73	73	91	91	73
Heavy Vehicles, %	1	14	1	1	2	1
Mvmt Flow	26	10	3	196	188	21

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	401	199	209	0	-	0
Stage 1	199	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.41	6.34	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.426	2.209	-	-	-
Pot Cap-1 Maneuver	607	812	1368	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	834	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	606	812	1368	-	-	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	834	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1368	-	650	-	-
HCM Lane V/C Ratio	0.002	-	0.055	-	-
HCM Control Delay (s)	7.6	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

APPENDIX

WSDOT LEFT-TURN WARRANT NOMOGRAPHS

Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized

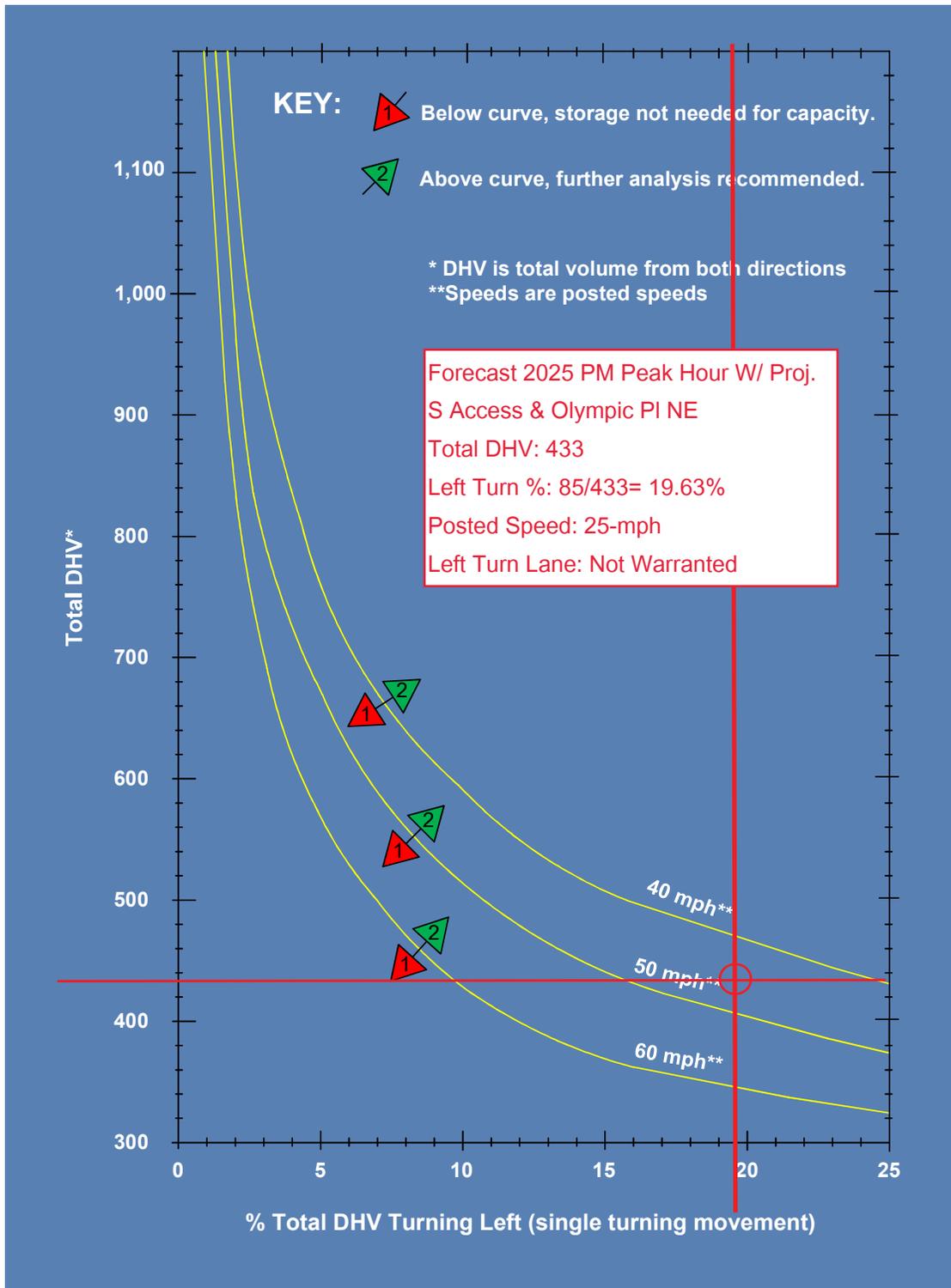


Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized

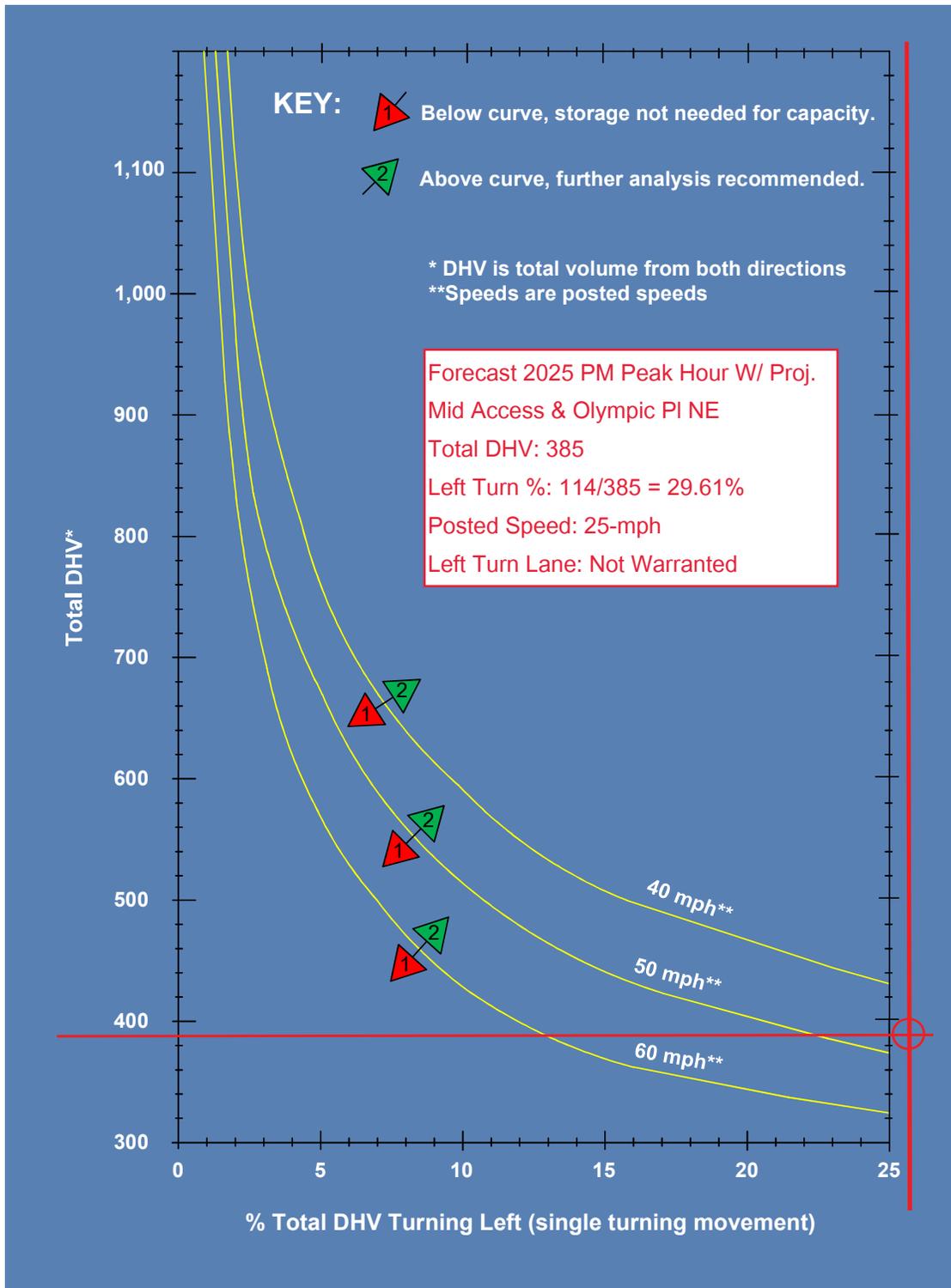
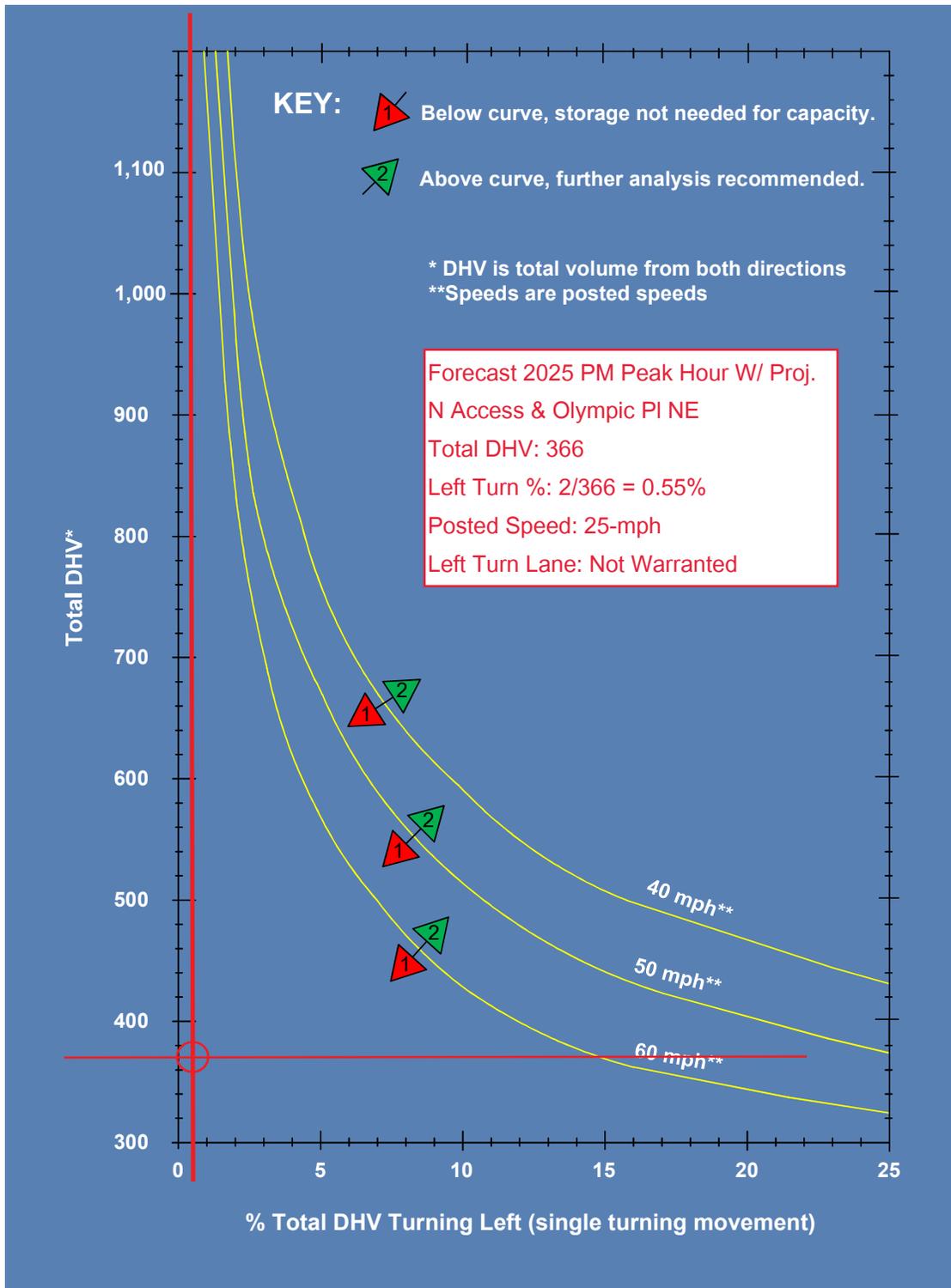


Exhibit 1310-7a Left-Turn Storage Guidelines: Two-Lane, Unsignalized



APPENDIX

INTERLOCAL TRIP DISTRIBUTION & ASSIGNMENT



**PRIMARY
AM PEAK HOUR TRIPS**
INBOUND: 11 VPH
OUTBOUND: 8 VPH





**PRIMARY
PM PEAK HOUR TRIPS**
INBOUND: 30 VPH
OUTBOUND: 31 VPH



APPENDIX

SNOHOMISH COUNTY INTERLOCAL AGREEMENT
TRAFFIC WORKSHEET

**Snohomish County Traffic Worksheet and Traffic Study Requirements
for Developments in the City of Arlington**

Snohomish County government, through an interlocal agreement (ILA) with the City of Arlington, may request traffic mitigation measures from any new development in the city that impacts roads in the unincorporated county. The City will impose the requested mitigation to the extent that the City determines that the mitigation is reasonably related to the impacts of the development. To determine the impacts, and to determine reasonable mitigation measures, the City of Arlington requires a traffic study from any development in the city that may have impacts on county roads. This ‘traffic study’ may be as simple as completing sections one and two of the county traffic worksheet below, or having a professional traffic engineer conduct a formal traffic study consistent with the requirements in section three below.

- If a development generates less than ten peak-hour trips and the applicant chooses Option A for mitigation payment (standard payment by percent of county impact fee), then the applicant will generally only have to fill out the first two sections of this traffic worksheet and complete a mitigation offer (see section four).
- However, if a development generates more than ten peak-hour trips, or if the applicant chooses Option B for mitigation payment (comprehensive impact analysis), then the applicant will have to fill out the first section of this worksheet, complete a separate traffic study consistent with the requirements in section three, and complete a mitigation offer (see Section Four).
- Applicants should submit all documents *to the City* as part of their initial submittal.
- Traffic study requirements for impacts on county roads are based on the County’s traffic mitigation ordinance (Chapter 30.66B) and the city/county ILA. At the end of this document find references to the county contacts and county web site (sources for many of the documents related to traffic mitigation).
- Following review of the documents submitted, the County may request supplemental information and analysis as necessary to determine the impacts of the development in accordance with the city/county ILA. The City will require the proposed development to submit the supplemental information and analysis to the extent that the City determines that it is necessary to determine the impacts of the development.

Section One (1) Worksheet General Information

1. Name of Proposed Development Safeway Arlington Addition
 City Development File Number (if known) _____
2. Name, Address and Phone Number of Applicant Amanda Martin
19401 40th Ave W, Suite 420, Lynwood, WA 98036
425-967-8409
3. Development Site Address 20500 Olympic Pl, Arlington WA 98223
4. Is it a residential or commercial development? Commercial
5. Description of Development (size and specific type) 10,000 sq. ft. addition to an existing 42,728
sq. ft. Safeway facility
6. How many new vehicle trips are expected to be generated by the proposed development? (For many common types of developments this information can be provided by the city or the county. For more complex developments trip generation may have to be determined under section three below)
19 AM Peak Hour 61 PM Peak Hour 627 Average Daily Trips (ADT)
7. Proportionate Share Impact Mitigation: All applicants have two options in determining the amount of their traffic mitigation payment:
 For determining the amount based on a percentage of the county fee go to section two.
 X For determining the amount based on a comprehensive traffic study go to section three.

3(b) Trip Generation and AM and PM Peak Hour Trip Distribution and Assignment

Calculate AM, PM and Daily trip generation consistent with the ITE Trip Generation Handbook and Snohomish County Public Works Rule 4220. Determine the trip distribution and assignments consistent with the County’s document titled “Format for Trip Distributions”(available at County web site, see below).

- Within the developments transportation service area (TSA) the distributions will be carried out to each key intersection at which the approach or departure volumes on any leg have three (3) or more peak hour trips. Get the most current list of key intersections on the web site described below. Trips should be distributed onto the road system as it is expected to be in six years.
- The distribution should be a schematic map showing the broad distributions of trips in terms of percentages on different roads. Show all City boundaries.
- The assignment should be a schematic map with the impacted key intersections identified by ID# and turning movements for each shown in separate diagrams on the same page or on different pages. The assignment should also be presented in tabular form listing each intersection by intersection ID#, and the number of trips at each movement.

3(c) Additional Analysis for Developments Generating More Than Fifty (50) Peak Hour Trips

For large developments (i.e., those generating more than 50 peak-hour trips), the County may request mitigation for impacts on the level of service of County roads, documented safety locations (the County calls such locations “inadequate road conditions” or “IRCs”), and access or circulation. The traffic study requirements below are intended to disclose impacts. Based on this information the County may request through the City that the applicant provide additional information showing possible mitigation measures. If any off-site improvements were needed for mitigation the County would work with the applicant to determine requirements for right-of-way, construction plans, right-of-way use permits, construction/maintenance bonds, and other issues.

Impacts on Level of Service (LOS) of County Arterials

Contact Snohomish County Public Works for the most current list of arterial units in arrears and critical arterial units. Identify any arterial units in arrears or critical arterial units impacted by three or more directional peak-hour trips.

Impacts on Inadequate Road Conditions

Contact Snohomish County Public Works for a list of the current IRCs. Identify any IRCs impacted by three or more peak-hour trips. Note: Unlike LOS impacts in which at least three or more peak hour trips have to be added in one direction to require disclosure (e.g., 3 westbound), for IRCs, any three peak hour trips added to IRC locations are considered an impact for which disclosure is necessary (e.g., 2 westbound plus 1 eastbound).

Impacts on Access or Circulation

The County may request improvements to existing roads to provide safe and efficient access and/or circulation. In some instances, the County may request provisions for future County roads identified in the Comprehensive Plan or in Small Area Transportation Studies. If so, the County will request specific additional information through the City.

Section Four (4) Traffic Mitigation Offer to Snohomish County

The applicant should complete a traffic mitigation offer to Snohomish County that summarizes the mitigation identified in the county traffic worksheet and any additional traffic study. This will facilitate timely review of the development and processing of the application. The form to use for the mitigation offer is titled “Traffic Mitigation Offer to Snohomish County.” This form is typically provided to all applicants along with this traffic study checklist. In addition, copies are available from the county contacts or the Snohomish County web site shown below.

Additional Information

County Web Site

Snohomish County Public Works has a web site with many documents related to traffic studies and mitigation requirements for developers. From the Snohomish County Home Page go to:

Departments/Public Works/Divisions/TES/ProgramPlanning/3066B

County Contacts

- Deb Werdal, Snohomish County DPW Traffic, 3000 Rockefeller M/S 607, Everett WA 98201, (425) 388-3184, debra.werdal@co.snohomish.wa.us
- Maria Schmidt, Snohomish County DPW Traffic, 3000 Rockefeller M/S 607, Everett WA 98201, (425) 388-3099, maria.schmidt@co.snohomish.wa.us

APPENDIX

TRAFFIC MITIGATION OFFER
TO SNOHOMISH COUNTY

Traffic Mitigation Offer to Snohomish County

The applicant completes part one and submits it to the city with a completed county traffic worksheet. The city completes part two and sends it to the county. The county completes part three and sends it back to the city.

Part One to be completed by Applicant

<p>Basic Development Information</p> <p>Name of City in which development is located Arlington</p> <p>Name of Proposed Development Safeway Arlington</p> <p>City Project File Number (if known)</p> <p>Name of Applicant Amanda Martin</p> <p>Address of Applicant 19401 40th Ave W, Suite 420, Lynwood, WA 98036</p>																													
<p>Proportionate Share Calculation: Choose Option A or B</p> <p><input type="checkbox"/> Option A: Based on a percentage of the County's adopted impact fee (Attach traffic worksheet.)</p> <p>1. The applicable percentage of the County's fee: _____ %</p> <p>2. Net New Average Daily Traffic: _____ ADT</p> <p>3. The adopted County impact fee for this development: _____ \$/ADT</p> <p>4. Total Proportionate Share Amount: \$ _____</p> <p><input checked="" type="checkbox"/> Option B: Based on a comprehensive traffic study (Attach traffic worksheet and traffic study)</p> <p> <input checked="" type="checkbox"/> No road improvements are impacted. Hence, proportionate share amount is zero.</p> <p> _____ The following road improvements are impacted. The calculation of proportionate shares is summarized below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">List by Names/Description the Impacted County Projects (attach other pages if necessary)</th> <th style="width: 10%;">County Project ID#</th> <th style="width: 15%;">PHTs Impacting Project</th> <th style="width: 15%;">Capacity Cost per PHT</th> <th style="width: 20%;">Proportionate Share Obligation per Impacted Project</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="4">4. Total Proportionate Share Amount (sum of obligations for each impacted project)</td> <td>\$ _____</td> </tr> </tbody> </table>					List by Names/Description the Impacted County Projects (attach other pages if necessary)	County Project ID#	PHTs Impacting Project	Capacity Cost per PHT	Proportionate Share Obligation per Impacted Project	1.					2.					3.					4. Total Proportionate Share Amount (sum of obligations for each impacted project)				\$ _____
List by Names/Description the Impacted County Projects (attach other pages if necessary)	County Project ID#	PHTs Impacting Project	Capacity Cost per PHT	Proportionate Share Obligation per Impacted Project																									
1.																													
2.																													
3.																													
4. Total Proportionate Share Amount (sum of obligations for each impacted project)				\$ _____																									
<p><input checked="" type="checkbox"/> Trip Distribution and Assignment if Required</p> <p>If required, attach AM and PM peak-hour trip distribution and assignment. (Attach traffic worksheet showing whether or not it is required and traffic study).</p>																													
<p><input checked="" type="checkbox"/> Mitigation of Other Impacts if Required for Developments Generating More than 50 Peak-Hour Trips</p> <p>Mitigation of Impacts on Level of Service</p> <p> <input checked="" type="checkbox"/> No impact or not applicable _____ Mitigation as described in attached traffic study.</p> <p>Mitigation of Impacts on Inadequate Road Conditions</p> <p> _____ No impact or not applicable _____ Mitigation as described in attached traffic study.</p> <p>Mitigation for Impacts on Access or Circulation</p> <p> _____ No impact or not applicable _____ Mitigation as described in attached traffic study.</p>																													
<p><input type="checkbox"/> Written Offer</p> <p>The Applicant hereby voluntarily agrees to pay the total proportionate share amount shown above for impacts of the proposed development on the capacity of Snohomish County roads and provide mitigation of all other impacts as indicated above and described in attached documents.</p> <p>BY: _____ Date _____</p> <p>Signature by Authorized Official of Applicant or Authorized Representative</p> <p>Print Name and Title _____</p> <p><i>Instructions to Applicant.</i> Submit this offer, a completed county traffic worksheet, and any other attachments to the city with your initial application or send directly to Deb Werdal, Snohomish Co. DPW Traffic, 3000 Rockefeller M/S 607, Everett WA 98201.</p>																													

Part Two: To be completed by the City

Receipt of Written Offer and Attachments by City and Routing to County

Name of Proposed Development
City Project File Number
Date Received
City Staffer Assigned to Project
Address
Phone

Instructions to City. Send this offer and all attachments to Deb Werdal, Snohomish Co. DPW Traffic Operations, 3000 Rockefeller M/S 607, Everett WA 98201. Send copy to staffer shown above.

BY: _____
Date _____
Initialed by City Staffer _____ Print Name and Title _____

Part Three: To be completed by Snohomish County

Receipt of Offer and Attachments by Snohomish County and Routing Back to City

Name of Proposed Development
City Project File Number
Received by: _____
Date _____
Initialed by County Staffer _____ Print Name and Title _____

Snohomish County Mitigation Request to City

Snohomish County has reviewed the traffic study worksheet and mitigation offer submitted by the applicant and has determined as follows:

Snohomish County requests that the City impose the mitigation offered above as a condition of approval for the Development. Snohomish County agrees to accept changes in the mitigation payment amount shown above resulting from TDM or lot-yield adjustments approved by the City.

Snohomish County requests that the City require additional supplemental information to adequately evaluate the proposed development's impacts. The information requested is shown in the notes below.

BY: _____
Date _____
Signature by Authorized County Staffer _____ Print Name and Title _____

Routing Back to City

Instructions to County Send this offer and all attachments to the City Staffer shown in Part Two above.

Sent by: _____
Date _____
Initialed by City Staffer _____ Print Name and Title _____

Notes