

Memorandum

To: Jack Varozza, P.E., QSD/P
Senior Engineer, City of Roseville

From: Stephen Dillon, P.E.
Matt Weir, P.E.

Re: *Traffic Evaluation*
Freedom Point Dutch Bros
Roseville, California

Date: December 5, 2023

The purpose of this memorandum is to document the transportation analysis completed for the Dutch Bros store proposed to be located near the Freedom Way intersection with Washington Boulevard in Roseville, California (the “proposed project” or “project”). This memorandum evaluates the weekday AM and PM peak-hours under Existing plus Project conditions.

Project Understanding

Kimley-Horn understands that a Dutch Bros store is proposed as Lot 9/Parcel 3A of Parcel 49/Freedom Point within the North Central Roseville Specific Plan (NCRSP). The site is located along Freedom Way, just east of Washington Boulevard (**Exhibit 1**). The project proposes to construct an approximately 950-square foot (sf) restaurant/coffee kiosk with drive-through¹ (**Exhibit 2**). The project is understood to replace 12,000-sf of Medical Office land use and reduce the amount of previously proposed Medical Office land use on the adjacent Lot 9/Parcel 3B from 12,000-sf to 8,000-sf. Access to the project site would be provided via a driveway extending from Freedom Way to the project site, a segment of which has already been constructed. The analysis completed was based on the following primary assumptions:

- This analysis includes data previously compiled as part of a trip generation study in a manner consistent with the *Trip Generation Manual, 11th Edition*, published by the Institute of Transportation Engineers (ITE) to develop a unique trip rate for local Dutch Bros application². Similarly, this analysis includes data previously compiled as part of a drive-through queuing evaluation for local Dutch Bros application³.

Based on this information, a “Short-Term Traffic Impact Study⁴” has been prepared, as supplemented by additional Scope of Services aspects you have specifically noted. The primary purposes of this analysis are to evaluate the proposed project’s access points, anticipated on-site operations, and localized traffic conditions to ensure safe and efficient operations.

Data Collection

We collected the following data from the City to aid in the completion of this evaluation:

- Weekday, AM (6-9) and PM (4-7) peak-period intersection turning movement traffic volumes from the City’s Intelligent Transportation System (ITS) for three (3) weekdays (Tuesday, Wednesday, and Thursday) from May 16-18, 2022, at the Washington Boulevard intersection

¹ NCRSP – Parcel 49 Dutch Bros & Building T Modified Preliminary Site Plan – West, TSD Engineering, Inc., August 21, 2023.

² Douglas Boulevard Coffee Kiosk Traffic Evaluation, Kimley-Horn, July 19, 2018.

³ Blue Oaks Shopping Center Traffic Evaluation, Kimley-Horn, October 10, 2022.

⁴ Section 4 Traffic Impact Studies, City of Roseville Design Standards, City of Roseville, January 2023.

with Freedom Way. As the City’s ITS systems are in the process of being upgraded, recent turning movements from 2023 were not available at the intersection for use in this study. In order to most closely replicate baseline conditions, available turning movements from Spring 2022 were utilized.

- Existing signal timing parameters for the Washington Boulevard intersection with Freedom Way.

Using the above data, Kimley-Horn developed a weekday, AM and PM peak-hour intersection analysis (delay and queuing) using Synchro®/Sidra® traffic analysis software as appropriate. The volumes used for the analysis were the average of the three weekday counts (from May 16-18, 2022) noted above.

Data collected from previous traffic evaluations involving Dutch Bros stores^{2,3} was utilized to establish weekday, AM and PM peak-period trip generation rates and queueing conditions contained in this evaluation.

Assessment of Proposed Project

Trip Generation

As previously mentioned, the number of trips anticipated to be generated by the proposed project was derived using client specific data collected as part of a prior study², which was consistent with the methodology contained in the *Trip Generation Manual, 11th Edition*, published by ITE. The unique local trip generation rate utilized “per thousand square feet” for the independent variable. As the data previously collected was limited to the AM peak-hour, the PM peak-hour project trip generation was developed via a ratio dividing the PM Adjacent Street peak-hour rate (38.99) by the AM Adjacent Street peak-hour rate (85.88) from ITE Land Use 937 (Coffee/Donut Shop with Drive-Through). This ratio was then multiplied against the AM peak-hour previously developed from local site data to develop the PM peak-hour. Land Use 937 (Coffee/Donut Shop with Drive-Through Window) was used to calculate the ratio as it provides rates based on the “per thousand square feet” independent variable while Land Use 938 (Coffee/Donut Shop with Drive-Through Window and No Indoor Seating) only provides “drive-through lanes” as an independent variable. The anticipated trip generation characteristics for the proposed project are depicted in **Table 1**.

Table 1 – Proposed Project Trip Generation

Land Use (ITE Code)	Size (KSF)	AM Peak-Hour				PM Peak-Hour					
		Total Trips	In		Out		Total Trips	In		Out	
			%	Trips	%	Trips		%	Trips	%	Trips
Proposed Land Uses											
<i>Lot 9/Parcel 3A</i>											
Dutch Bros Coffee ¹	0.95	316	50%	158	50%	158	143	50%	72	50%	71
<i>Lot 9/Parcel 3B</i>											
Medical Office Building (720)	8	25	79%	20	21%	5	29	30%	9	70%	20
Subtotal (Driveway) Trips:		341		178		163	172		81		91
<i>Dutch Bros Coffee Pass-by (89%)²</i>		-281		-140		-141	-127		-63		-64
Net New (External) Trips:		60		38		22	45		18		27
Original Land Uses											
<i>Lot 9 Parcel 3A/Parcel 3B</i>											
Medical Office Building (720)	24	67	79%	53	21%	14	95	30%	29	70%	66
Net New (External) Trips:		67		53		14	95		29		66
Net New Difference (Proposed - Original):		-7		-15		8	-50		-11		-39

KSF = 1,000-square feet

Sources: ¹Trip Generation based on data collected for Douglas Boulevard Coffee Kiosk Traffic Evaluation, July 19, 2018

²Pass-by reduction is per ITE 11th Edition, Land Use 938

As shown in **Table 1**, the revised project is anticipated to generate 60 and 45 net new external trips during the AM and PM peak-hours, respectively. It is also anticipated to attract 281 and 127 Pass-by trips during the AM and PM peak-hours, respectively. Pass-by trips are trips going into the project that are already present on the roadway network adjacent to the project site and are, therefore, not included in the number of net new external trips (but are considered driveway trips). The increased number of project-related Pass-by trips also introduces a different dynamic to the Freedom Way and Pride Way roundabout, primarily by notably increasing the number of northbound left movements at the intersection. While the number of net new External trips produced by the Proposed project is less than the original land uses, the Proposed development results in a significantly higher number of driveway trips.

Project Trip Distribution and Assignment

The project trips were distributed and assigned to the adjacent transportation networks based on existing traffic patterns and engineering judgement (see **Exhibit 3**).

Evaluation Parameters and Study Facilities

A peak-hour intersection operations analysis (delay and queuing) was conducted for the weekday, AM and PM peak-hours for the following scenarios:

- A. Existing plus Project Conditions

The peak-hour operations analysis was completed for the following intersections:

1. Washington Boulevard @ Freedom Way (signalized)
2. Freedom Way @ Pride Way/Shared Driveway (roundabout)

Peak-hour operations analyses were determined for the signalized intersection (Intersection #1) during the weekday AM and PM peak-hours for the scenario listed above. Operations were determined using methods defined in the *Highway Capacity Manual* (using Synchro® traffic analysis software). Queuing for the unsignalized roundabout (Intersection #2) during the weekday AM and PM peak-hours was determined using Sidra® traffic analysis software. **Exhibit 4** details the study intersection’s geometry and the weekday AM and PM peak-hour volumes with the addition of the project (Existing plus Project Conditions). City ITS traffic count data sheets are provided in **Attachment A**.

Access Evaluation

As previously noted, the purpose of this analysis was to evaluate the proposed project’s access points and adjacent primary intersection to quantify the amount of vehicular delay and queuing that is anticipated to result with the addition of the project.

Signalized Intersection Delay

Synchro® traffic analysis software was used to quantify the vehicular delay at the signalized study intersection. **Table 2** summarizes anticipated delay with the addition of the project (Existing plus Project Conditions). All technical analysis worksheets are provided in **Attachment B**.

Table 2 – Signalized Intersection Delay

ID	Intersection	Control	Peak Hour	Existing plus Project
				Delay (sec)
1	Washington Blvd @ Freedom Way	Signal	AM	49.9
			PM	36.7

Notes: **Bold** represents unacceptable operations.

A closer examination of the technical analysis worksheets for the signalized intersection (provided in **Attachment B**) reveals that the eastbound right-turn experiences the highest levels of delay. The proposed project would not result in additional trips on this movement at the intersection.

Intersection Queuing

Synchro® traffic analysis software was used to quantify queuing at the signalized study intersection (Intersection #1). Sidra® traffic analysis software was used to quantify queuing at the unsignalized roundabout (Intersection #2). **Table 3** summarizes select movements' queuing at both study intersections. All technical analysis worksheets are provided in **Attachment B**.

Table 3 – Intersection Queuing

Intersection / Analysis Scenario	Movement	Available Storage (ft)	95th % Queue (ft)	
			AM Peak-Hour	PM Peak-Hour
#1 Washington Blvd @ Freedom Way	WBL			
	Existing plus Project	210	125	95
	WBR			
	Existing plus Project	225	5	30
	SBL			
	Existing plus Project	235	195	175
#2 Freedom Way @ Pride Way/Driveway	NBR			
	Existing plus Project	255	35	65
	NBLTR			
	Existing plus Project	190	20	20
	EBLT			
	Existing plus Project	250	20	30
EBR				
	Existing plus Project	260	20	15

Notes: For approaches with dual lanes, the longest queue length is reported.

The queuing results presented in **Table 3** show that all queues at signalized Intersection #1 are projected to be contained within their provided storage pockets. **Table 3** also shows that queuing at the northbound and eastbound approaches to the roundabout at Intersection #2 remains clear of adjacent intersections and driveways.

Internal Circulation Review

Dutch Bros drive-through queuing data collected as part of a prior effort³ was used to evaluate the project's proposed drive-through capacity. This evaluation assumes that drivers will utilize both available drive-through lanes evenly under typical operations.

Table 4 presents summary information of the drive-through queuing data and available capacity. As shown in **Table 4**, the observed maximum drive-through queue is contained within the project's proposed drive-through capacity of 23 vehicles. Should drive-through queues extend beyond the available capacity, the site configuration offers flexibility to restrict parking lot access from the proposed medical office building and provide room for an additional three queuing vehicles. Queuing vehicles for the Dutch Bros are not anticipated to extend beyond the immediate drive-through vicinity and interfere with the adjacent medical office parking or Pride Way.

Table 4 – Maximum Observed Drive-Through Vehicle Queues

Restaurant (Location)	Maximum Observed Vehicle Queue				Project Restaurant Drive-Through Capacity ¹
	7/23/2022	7/27/2022	7/30/2022	Overall Max	
Dutch Bros (715 Sunrise Avenue)	19	16	18	19	23

¹Modified Preliminary Site Plan, TSD Engineering, Inc., August 21, 2023

The maximum vehicle queues observed from 2022 data for the Sunrise Avenue Dutch Bros location are consistent with historical vehicle queues in 2020 at additional local Dutch Bros locations⁵.

In order to ensure orderly interaction between egressing drive-through vehicles and vehicles utilizing the existing park and ride facility, it is recommended that a stop sign and appropriate pavement markings be included on the drive-through approach to the internal circulation roadway at the park and ride.

The number and mixture of parking spaces provided on the site plan for both the Dutch Bros and medical office building are consistent with the current City code requirements⁶ for both development types.

Minimum Required Throat Depth (MRTD)

The MRTD was calculated for the primary unsignalized site access driveway location along south Pride Way (see **Exhibit 1**). **Table 5** summarizes the findings of the MRTD evaluation based on the City’s guidelines⁴.

Table 5 – MRTD for Site Access Driveway

ID	Driveway	Peak Hour	Approach Volume	ConflVol (Left)	ConflVol (Right)	LT Out	Minimum Required Throat Depth (MRTD)	Available Storage
3	Parcel 3A/3B Driveway @ Pride Way	AM	177	39	23	177	100	90
		PM	99	199	120	99	75	

The proposed available throat depth for the driveway (Intersection #3) is observed to be approximately 90-feet, as measured from back of walk to nearest parking stall along the southern edge of curb. As shown in **Table 5**, the MRTD during the AM and PM peak-hours for the driveway is calculated to be 100-feet. As the calculated MRTD does not exceed the available storage by more than one vehicle length (20-feet), the throat depth provided is deemed sufficient to accommodate the anticipated site operations.

Emergency Vehicle and Refuse Service Access

The site plan (**Exhibit 2**) was qualitatively reviewed for emergency vehicle and refuse service access. The project site appears to include adequate access to buildings to accommodate emergency vehicles. Adequate access and circulation are provided for refuse services to access the onsite refuse locations depicted in **Exhibit 2**.

⁵ Fairway Drive Coffee Kiosk Traffic Evaluation, Kimley-Horn, January 20, 2021.

⁶ [Chapter 19.26 Off-Street Parking and Loading](#), Municipal Code, City of Roseville, August 2023.

Conclusions

The following are the primary conclusions based on the analyses discussed herein:

- *The addition of project trips using the Washington Boulevard intersection with Freedom Way (Intersection #1) will not adversely affect the delay or queueing* – the reported delay and queueing at Intersection #1 with the addition of the project is not expected to result in discernable deteriorations in operations. All queueing on project-related movements is contained within the existing storage provided at the intersection.
- *The addition of project trips using the Freedom Way intersection with Pride Way (Intersection #2) will not adversely affect the queueing* – the addition of project trips to the eastbound and northbound legs of Intersection #2 does not result in extended queueing conditions which would obstruct adjacent intersections and driveways.
- *The maximum observed local Dutch Bros vehicle queue is contained within the provided project drive-through lane* – as sufficient capacity is being provided to contain the maximum reported queue from local Dutch Bros data, any occurrence of a drive-through queue extending beyond the provided drive-through capacity is expected to be an infrequent occurrence and of short duration. Queueing vehicles exceeding the provided drive-through capacity will be contained within the project site and are not anticipated to interfere with operations of the proximate medical office parking lot.
- *The site plan provides adequate MRTD for egressing vehicles* – the current site plan provides adequate throat depth to accommodate the MRTD for the combination of on-site egressing traffic and background volumes along Pride Way.

Attachments

Exhibit 1 – Project Vicinity Map

Exhibit 2 – Proposed Site Plan

Exhibit 3 – Project Trip Distribution and Assignment

Exhibit 4 – Existing plus Project Peak-Hour Volumes, Traffic Control, and Lane Geometry

Attachment A – Traffic Count Data Sheets

Attachment B – Analysis Worksheets

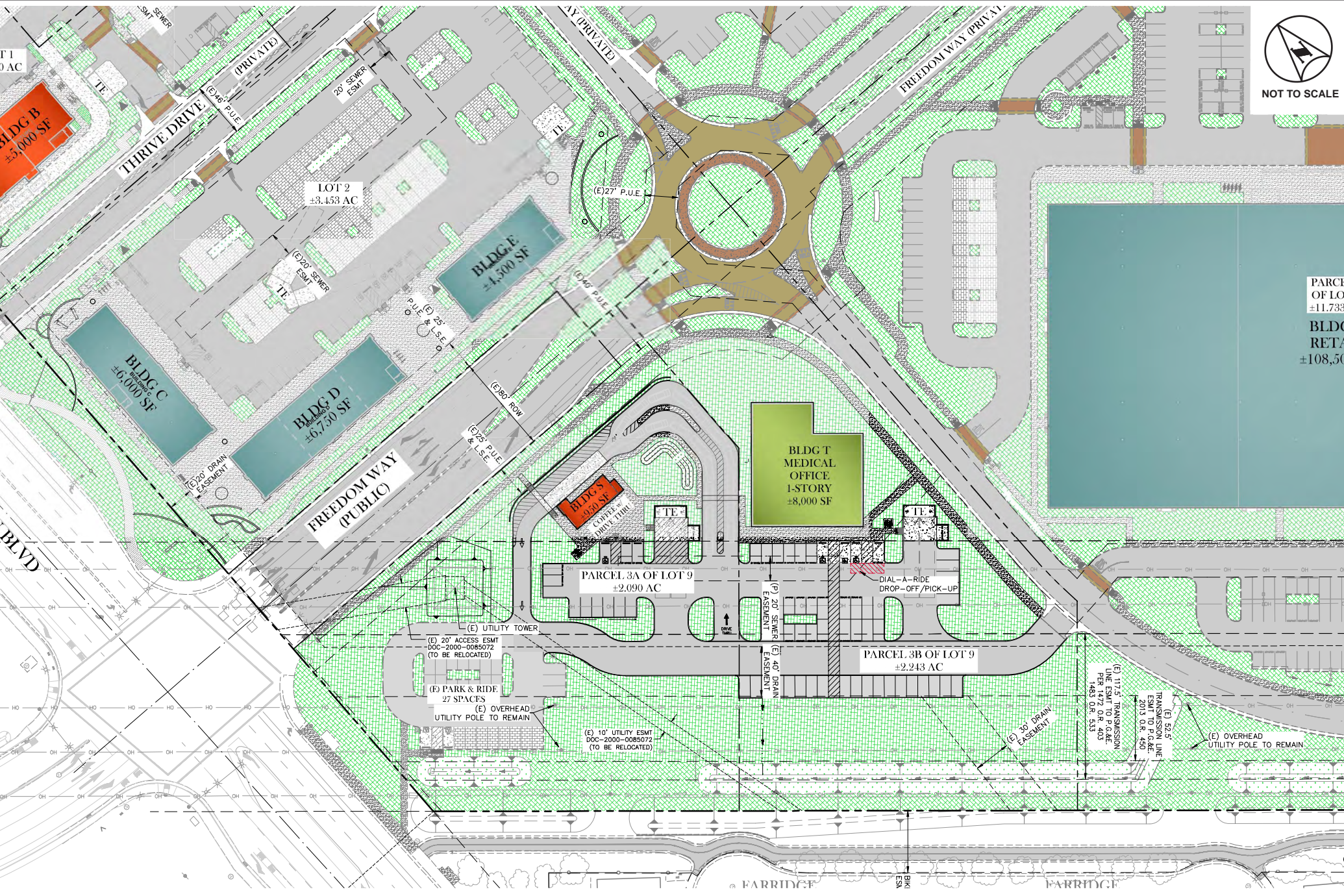


NOT TO SCALE



LEGEND	
	Project Location
	Study Intersection
	Proposed Project Driveways

Freedom Point Dutch Bros

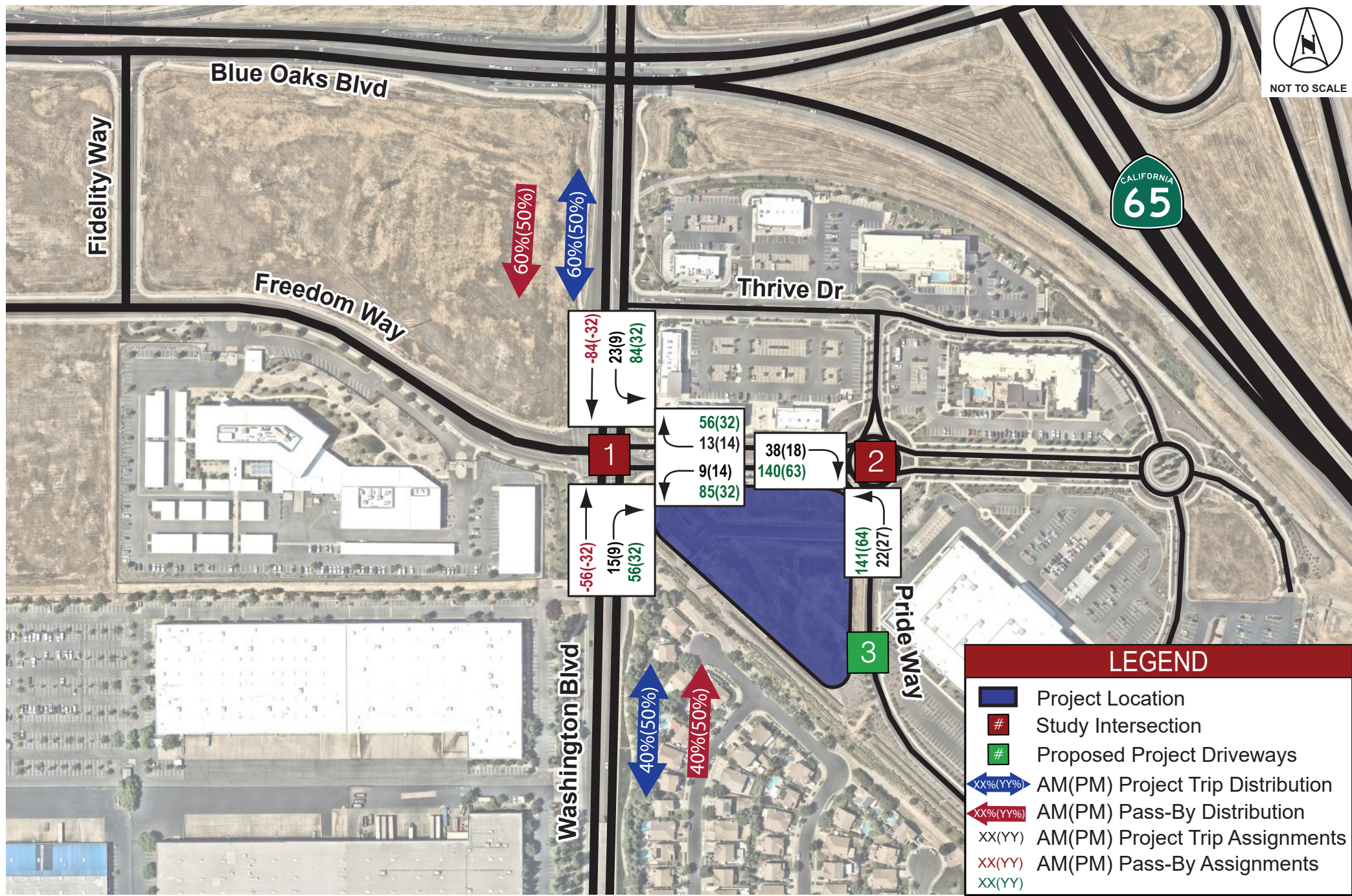


PARCEL OF LOT 9 ±11.733
 BLDG RETAIL ±108,500

Site Plan Date: 08/21/2023

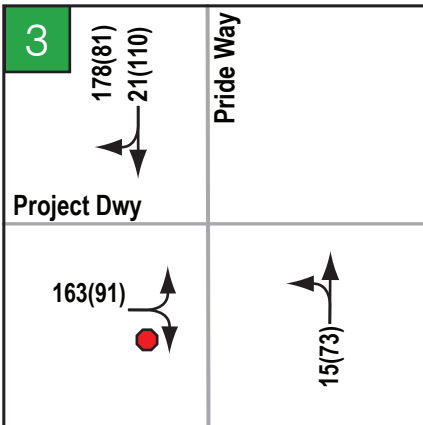
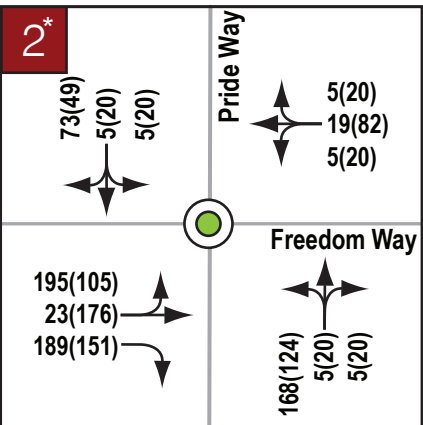
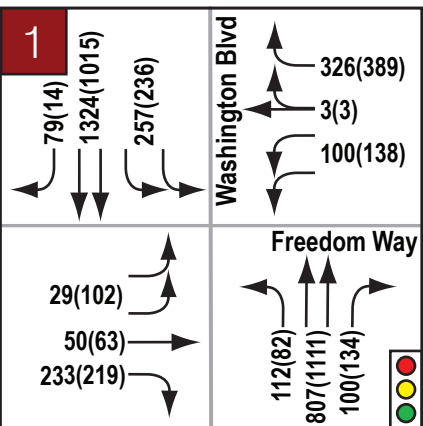


NOT TO SCALE



LEGEND

- Project Location
- # Study Intersection
- # Proposed Project Driveways
- ↔ AM(PM) Project Trip Distribution
- ↔ AM(PM) Pass-By Distribution
- XX(YY) AM(PM) Project Trip Assignments
- XX(YY) AM(PM) Pass-By Assignments



LEGEND	
	Project Location
	Study Intersection
	Proposed Project Driveways
xx(xx)	AM(PM) Peak-Hour Traffic Volumes
	Signalized Control
	Stop Control
	Roundabout Control

*Intersection #2 volumes developed using relevant Intersection #1 TMC, project trip assignment, and engineering judgment.

Attachment A

Traffic Count Data Sheets

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
16/05/23 00:00-00:15	1	18	0	19	1	9	1	11	1	0	2	3	6	0	8	14	47
16/05/23 00:15-00:30	1	5	0	6	0	4	0	4	0	0	1	1	0	0	0	0	11
16/05/23 00:30-00:45	0	5	1	6	1	7	0	8	0	0	1	1	0	0	0	0	15
16/05/23 00:45-01:00	2	22	2	26	4	14	0	18	2	0	2	4	0	0	0	0	48
16/05/23 01:00-01:15	0	8	1	9	3	7	0	10	0	1	1	2	1	0	2	3	24
16/05/23 01:15-01:30	0	5	0	5	2	1	0	3	1	0	0	1	1	0	2	3	12
16/05/23 01:30-01:45	3	18	0	21	0	15	0	15	0	3	3	6	0	0	0	0	42
16/05/23 01:45-02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16/05/23 02:00-02:15	0	5	0	5	0	3	0	3	0	0	1	1	0	0	0	0	9
16/05/23 02:15-02:30	0	5	0	5	0	2	0	2	0	0	0	0	0	0	0	0	7
16/05/23 02:30-02:45	0	8	0	8	2	2	0	4	0	0	0	0	0	0	0	0	12
16/05/23 02:45-03:00	0	5	0	5	0	5	0	5	0	0	0	0	0	0	0	0	10
16/05/23 03:00-03:15	0	6	0	6	2	2	0	4	0	0	0	0	0	0	0	0	10
16/05/23 03:15-03:30	0	4	0	4	1	2	0	3	2	0	1	3	0	0	0	0	10
16/05/23 03:30-03:45	0	2	0	2	0	5	2	7	0	1	3	4	0	0	0	0	13
16/05/23 03:45-04:00	1	6	0	7	0	3	5	8	1	0	0	1	0	0	0	0	16
16/05/23 04:00-	0	9	0	9	0	13	6	19	1	0	1	2	0	0	1	1	31

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
04:15																	
16/05/23 04:15-04:30	2	6	0	8	1	9	3	13	1	0	0	1	0	0	0	0	22
16/05/23 04:30-04:45	0	14	0	14	6	26	2	34	0	2	4	6	0	0	4	4	58
16/05/23 04:45-05:00	2	12	0	14	0	18	0	18	0	0	0	0	0	0	0	0	32
16/05/23 05:00-05:15	2	10	0	12	2	42	2	46	0	0	0	0	0	0	0	0	58
16/05/23 05:15-05:30	1	13	1	15	4	25	1	30	2	2	2	6	0	0	1	1	52
16/05/23 05:30-05:45	2	23	2	27	4	45	0	49	1	0	0	1	2	0	0	2	79
16/05/23 05:45-06:00	10	44	4	58	10	134	8	152	4	4	4	12	4	0	0	4	226
16/05/23 06:00-06:15	4	68	0	72	14	164	6	184	0	2	6	8	4	0	0	4	268
16/05/23 06:15-06:30	5	36	2	43	17	70	4	91	1	3	1	5	5	0	1	6	145
16/05/23 06:30-06:45	24	94	4	122	26	144	10	180	2	2	4	8	6	0	2	8	318
16/05/23 06:45-07:00	5	45	2	52	19	103	6	128	1	1	3	5	5	0	2	7	192
16/05/23 07:00-07:15	10	90	6	106	18	145	8	171	4	4	7	15	5	0	0	5	297
16/05/23 07:15-07:30	11	85	4	100	13	134	10	157	3	4	8	15	4	0	10	14	286
16/05/23 07:30-07:45	19	98	2	119	18	204	9	231	3	5	16	24	3	0	2	5	379
16/05/23 07:45-08:00	12	134	6	152	17	208	12	237	2	9	33	44	8	0	9	17	450
16/05/23 08:00-08:15	50	376	10	436	36	492	28	556	6	14	96	116	18	1	3	22	1130

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
16/05/23 08:15-08:30	46	244	6	296	62	430	26	518	14	28	120	162	14	2	8	24	1000
16/05/23 08:30-08:45	36	218	6	260	64	470	34	568	4	12	70	86	16	1	11	28	942
16/05/23 08:45-09:00	17	106	4	127	26	188	8	222	7	17	26	50	8	0	6	14	413
16/05/23 09:00-09:15	14	102	7	123	27	193	13	233	3	6	16	25	10	1	7	18	399
16/05/23 09:15-09:30	9	80	8	97	30	132	10	172	8	2	20	30	2	0	6	8	307
16/05/23 09:30-09:45	33	306	33	372	60	417	21	498	24	15	51	90	18	2	28	48	1008
16/05/23 09:45-10:00	16	192	20	228	50	224	16	290	34	16	48	98	4	0	4	8	624
16/05/23 10:00-10:15	11	106	8	125	37	122	9	168	5	5	24	34	10	1	8	19	346
16/05/23 10:15-10:30	10	92	8	110	34	109	4	147	9	8	18	35	7	0	4	11	303
16/05/23 10:30-10:45	5	108	8	121	27	118	6	151	11	7	20	38	11	1	6	18	328
16/05/23 10:45-11:00	3	109	10	122	32	131	1	164	13	7	23	43	12	0	4	16	345
16/05/23 11:00-11:15	12	113	14	139	34	121	4	159	13	10	10	33	6	0	9	15	346
16/05/23 11:15-11:30	36	345	9	390	108	396	3	507	51	39	72	162	27	1	47	75	1134
16/05/23 11:30-11:45	9	126	15	150	42	129	2	173	21	13	22	56	10	1	18	29	408
16/05/23 11:45-12:00	10	102	9	121	63	116	5	184	18	14	29	61	13	1	10	24	390
16/05/23 12:00-12:15	10	136	8	154	42	118	4	164	19	13	30	62	6	2	17	25	405
16/05/23 12:15-	12	138	15	165	53	119	4	176	24	10	28	62	7	1	16	24	427

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
12:30																	
16/05/23 12:30-12:45	8	129	11	148	32	149	1	182	23	14	33	70	17	2	15	34	434
16/05/23 12:45-13:00	19	122	11	152	40	123	7	170	19	9	26	54	13	2	10	25	401
16/05/23 13:00-13:15	19	134	9	162	34	148	8	190	15	10	19	44	12	2	21	35	431
16/05/23 13:15-13:30	14	117	13	144	36	156	6	198	26	14	16	56	11	1	24	36	434
16/05/23 13:30-13:45	10	112	10	132	27	114	4	145	13	7	18	38	15	1	25	41	356
16/05/23 13:45-14:00	13	165	10	188	39	125	11	175	13	4	26	43	10	1	19	30	436
16/05/23 14:00-14:15	11	123	5	139	38	147	6	191	10	9	29	48	9	1	18	28	406
16/05/23 14:15-14:30	13	152	14	179	24	137	4	165	12	11	28	51	11	1	17	29	424
16/05/23 14:30-14:45	19	175	13	207	25	134	5	164	12	9	31	52	5	0	12	17	440
16/05/23 14:45-15:00	15	570	21	606	69	408	6	483	36	18	114	168	27	2	64	93	1350
16/05/23 15:00-15:15	7	155	19	181	41	195	2	238	10	11	19	40	7	1	14	22	481
16/05/23 15:15-15:30	14	204	6	224	20	198	1	219	14	5	33	52	13	0	15	28	523
16/05/23 15:30-15:45	17	195	6	218	24	175	5	204	10	4	16	30	5	1	19	25	477
16/05/23 15:45-16:00	9	213	7	229	34	196	6	236	19	6	34	59	9	0	22	31	555
16/05/23 16:00-16:15	15	185	17	217	33	224	1	258	18	8	35	61	18	0	6	24	560
16/05/23 16:15-16:30	11	203	16	230	30	221	2	253	18	9	48	75	12	0	20	32	590

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
16/05/23 16:30-16:45	14	224	17	255	37	213	1	251	10	11	44	65	3	0	13	16	587
16/05/23 16:45-17:00	18	193	32	243	37	173	2	212	22	16	52	90	18	1	18	37	582
16/05/23 17:00-17:15	11	187	14	212	44	209	1	254	20	12	44	76	12	0	15	27	569
16/05/23 17:15-17:30	8	247	17	272	34	159	0	193	29	21	45	95	14	0	21	35	595
16/05/23 17:30-17:45	9	206	23	238	40	202	4	246	20	7	31	58	10	0	18	28	570
16/05/23 17:45-18:00	11	227	31	269	41	154	4	199	18	5	36	59	10	1	19	30	557
16/05/23 18:00-18:15	21	196	25	242	58	171	2	231	10	8	17	35	15	1	26	42	550
16/05/23 18:15-18:30	9	172	30	211	47	140	2	189	15	9	19	43	12	1	18	31	474
16/05/23 18:30-18:45	4	156	12	172	35	140	1	176	7	3	11	21	14	0	23	37	406
16/05/23 18:45-19:00	6	154	25	185	45	144	2	191	9	12	14	35	13	0	14	27	438
16/05/23 19:00-19:15	9	160	15	184	40	102	1	143	6	5	3	14	9	0	19	28	369
16/05/23 19:15-19:30	9	414	66	489	153	261	6	420	36	18	24	78	36	2	82	120	1107
16/05/23 19:30-19:45	7	101	13	121	32	91	0	123	8	2	7	17	13	0	33	46	307
16/05/23 19:45-20:00	8	115	10	133	33	81	0	114	4	5	7	16	13	0	48	61	324
16/05/23 20:00-20:15	6	224	28	258	102	122	2	226	6	12	18	36	8	1	45	54	574
16/05/23 20:15-20:30	6	214	30	250	68	124	4	196	14	12	16	42	24	1	79	104	592
16/05/23 20:30-	5	114	8	127	30	68	1	99	4	3	3	10	11	0	23	34	270

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
20:45																	
16/05/23 20:45-21:00	5	100	8	113	20	63	0	83	2	2	8	12	7	0	29	36	244
16/05/23 21:00-21:15	4	80	9	93	29	66	1	96	1	1	2	4	8	0	21	29	222
16/05/23 21:15-21:30	10	158	16	184	46	86	2	134	10	14	14	38	20	1	77	98	454
16/05/23 21:30-21:45	0	65	6	71	17	37	0	54	3	2	3	8	10	0	25	35	168
16/05/23 21:45-22:00	1	52	6	59	15	34	1	50	3	3	0	6	7	0	24	31	146
16/05/23 22:00-22:15	0	49	1	50	10	41	0	51	1	0	0	1	12	0	25	37	139
16/05/23 22:15-22:30	4	88	2	94	6	68	0	74	2	2	10	14	8	1	43	52	234
16/05/23 22:30-22:45	4	76	8	88	2	54	0	56	0	0	2	2	8	1	47	56	202
16/05/23 22:45-23:00	2	44	0	46	20	40	0	60	2	4	8	14	14	0	42	56	176
16/05/23 23:00-23:15	2	21	3	26	4	19	0	23	0	0	0	0	4	0	22	26	75
16/05/23 23:15-23:30	0	15	2	17	1	12	0	13	1	0	2	3	11	0	31	42	75
16/05/23 23:30-23:45	2	23	1	26	0	14	0	14	0	0	4	4	4	0	16	20	64
16/05/23 23:45-00:00	1	21	1	23	4	8	0	12	0	0	0	0	10	0	9	19	54
17/05/23 00:00-00:15	1	20	0	21	2	9	1	12	1	0	0	1	7	0	6	13	47
17/05/23 00:15-00:30	0	13	0	13	0	12	0	12	1	0	2	3	5	0	4	9	37
17/05/23 00:30-00:45	0	42	3	45	3	39	0	42	0	0	0	0	3	1	11	15	102

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
17/05/23 00:45-01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/05/23 01:00-01:15	0	12	0	12	2	10	0	12	1	0	0	1	2	0	3	5	30
17/05/23 01:15-01:30	0	4	0	4	2	4	0	6	0	0	1	1	0	0	1	1	12
17/05/23 01:30-01:45	0	5	0	5	1	2	0	3	1	0	0	1	0	0	2	2	11
17/05/23 01:45-02:00	2	1	0	3	0	3	0	3	1	0	0	1	0	0	0	0	7
17/05/23 02:00-02:15	0	3	0	3	1	2	0	3	0	0	1	1	0	0	0	0	7
17/05/23 02:15-02:30	0	4	0	4	0	4	0	4	1	2	0	3	0	0	0	0	11
17/05/23 02:30-02:45	0	3	0	3	2	4	0	6	0	0	0	0	1	0	0	1	10
17/05/23 02:45-03:00	0	6	0	6	2	4	0	6	0	2	2	4	0	0	0	0	16
17/05/23 03:00-03:15	0	3	0	3	0	3	0	3	0	1	1	2	0	0	0	0	8
17/05/23 03:15-03:30	0	0	1	1	1	2	0	3	0	0	0	0	0	0	0	0	4
17/05/23 03:30-03:45	0	3	0	3	0	3	1	4	0	0	1	1	0	0	0	0	8
17/05/23 03:45-04:00	1	6	0	7	0	4	7	11	0	0	0	0	0	0	0	0	18
17/05/23 04:00-04:15	0	6	0	6	2	14	12	28	0	0	0	0	0	0	0	0	34
17/05/23 04:15-04:30	4	12	2	18	2	22	4	28	0	2	2	4	0	0	0	0	50
17/05/23 04:30-04:45	0	22	0	22	8	22	0	30	0	0	2	2	4	0	4	8	62
17/05/23 04:45-	2	10	1	13	0	22	0	22	0	0	1	1	1	0	2	3	39

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
05:00																	
17/05/23 05:00-05:15	1	15	1	17	1	35	1	37	0	2	2	4	0	0	0	0	58
17/05/23 05:15-05:30	2	15	1	18	6	28	1	35	1	0	1	2	2	0	0	2	57
17/05/23 05:30-05:45	2	60	0	62	4	88	0	92	0	0	2	2	0	0	0	0	156
17/05/23 05:45-06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/05/23 06:00-06:15	4	33	0	37	7	92	2	101	1	4	5	10	0	0	1	1	149
17/05/23 06:15-06:30	3	32	1	36	20	59	5	84	2	2	3	7	1	0	2	3	130
17/05/23 06:30-06:45	16	86	2	104	34	142	6	182	10	8	10	28	6	0	0	6	320
17/05/23 06:45-07:00	6	69	5	80	15	85	6	106	6	4	1	11	4	0	2	6	203
17/05/23 07:00-07:15	8	78	3	89	23	134	7	164	1	2	6	9	4	0	5	9	271
17/05/23 07:15-07:30	8	81	4	93	20	128	11	159	8	6	9	23	6	0	6	12	287
17/05/23 07:30-07:45	15	115	4	134	23	219	6	248	2	3	19	24	10	0	7	17	423
17/05/23 07:45-08:00	12	158	7	177	16	215	12	243	2	4	23	29	9	1	8	18	467
17/05/23 08:00-08:15	62	396	14	472	60	490	28	578	8	10	84	102	38	1	11	50	1202
17/05/23 08:15-08:30	16	110	4	130	29	209	6	244	7	7	42	56	10	0	5	15	445
17/05/23 08:30-08:45	15	114	6	135	30	236	15	281	10	11	28	49	11	1	6	18	483
17/05/23 08:45-09:00	16	87	4	107	30	216	11	257	6	9	30	45	12	1	9	22	431

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
17/05/23 09:00-09:15	30	309	18	357	87	744	15	846	18	15	111	144	36	2	22	60	1407
17/05/23 09:15-09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/05/23 09:30-09:45	11	89	6	106	31	140	9	180	12	12	20	44	4	0	2	6	336
17/05/23 09:45-10:00	14	176	12	202	64	314	14	392	24	10	44	78	8	1	9	18	690
17/05/23 10:00-10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/05/23 10:15-10:30	2	103	5	110	25	113	2	140	12	12	16	40	7	0	3	10	300
17/05/23 10:30-10:45	26	194	12	232	50	240	4	294	24	24	36	84	12	0	12	24	634
17/05/23 10:45-11:00	20	202	12	234	48	250	8	306	22	16	26	64	12	0	8	20	624
17/05/23 11:00-11:15	10	234	32	276	58	288	10	356	24	22	42	88	14	0	8	22	742
17/05/23 11:15-11:30	7	135	13	155	40	124	1	165	21	11	22	54	6	1	14	21	395
17/05/23 11:30-11:45	22	242	12	276	64	238	8	310	16	8	30	54	26	3	25	54	694
17/05/23 11:45-12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17/05/23 12:00-12:15	11	129	7	147	51	140	4	195	16	14	21	51	7	1	19	27	420
17/05/23 12:15-12:30	8	141	18	167	46	99	5	150	19	11	30	60	13	0	17	30	407
17/05/23 12:30-12:45	24	260	26	310	70	252	12	334	40	24	48	112	22	6	60	88	844
17/05/23 12:45-13:00	19	123	10	152	40	148	9	197	29	27	26	82	12	1	11	24	455
17/05/23 13:00-	16	152	14	182	36	136	6	178	15	10	12	37	28	2	19	49	446

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
13:15																	
17/05/23 13:15-13:30	16	169	16	201	37	124	8	169	12	4	26	42	13	1	10	24	436
17/05/23 13:30-13:45	17	124	6	147	40	112	9	161	17	11	29	57	5	2	16	23	388
17/05/23 13:45-14:00	9	146	5	160	34	148	7	189	9	13	20	42	10	0	12	22	413
17/05/23 14:00-14:15	15	122	10	147	30	134	5	169	12	11	19	42	10	0	13	23	381
17/05/23 14:15-14:30	7	116	7	130	20	144	2	166	11	15	20	46	11	1	14	26	368
17/05/23 14:30-14:45	16	151	9	176	23	140	4	167	8	5	31	44	14	1	13	28	415
17/05/23 14:45-15:00	16	171	12	199	25	187	6	218	9	9	35	53	9	0	19	28	498
17/05/23 15:00-15:15	52	660	48	760	108	732	16	856	72	44	84	200	44	0	36	80	1896
17/05/23 15:15-15:30	30	471	30	531	69	522	9	600	33	33	132	198	42	1	26	69	1398
17/05/23 15:30-15:45	16	372	18	406	64	426	8	498	34	12	68	114	24	2	20	46	1064
17/05/23 15:45-16:00	32	514	42	588	56	476	8	540	38	12	62	112	32	2	28	62	1302
17/05/23 16:00-16:15	20	221	25	266	27	223	2	252	11	8	31	50	10	0	8	18	586
17/05/23 16:15-16:30	15	211	15	241	41	198	3	242	20	10	62	92	11	0	10	21	596
17/05/23 16:30-16:45	36	444	26	506	84	410	8	502	24	20	88	132	26	2	28	56	1196
17/05/23 16:45-17:00	22	394	44	460	68	382	2	452	44	24	66	134	26	2	36	64	1110
17/05/23 17:00-17:15	15	214	14	243	38	196	3	237	21	12	31	64	10	0	6	16	560

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
17/05/23 17:15-17:30	17	271	17	305	40	176	3	219	34	20	54	108	14	0	17	31	663
17/05/23 17:30-17:45	14	223	15	252	39	218	3	260	14	11	35	60	14	0	14	28	600
17/05/23 17:45-18:00	6	209	19	234	34	196	0	230	13	4	31	48	14	0	6	20	532
17/05/23 18:00-18:15	13	198	25	236	39	172	1	212	16	15	26	57	19	1	21	41	546
17/05/23 18:15-18:30	9	177	23	209	47	130	0	177	14	6	28	48	13	1	24	38	472
17/05/23 18:30-18:45	28	280	52	360	90	262	2	354	8	18	24	50	40	1	67	108	872
17/05/23 18:45-19:00	18	310	30	358	76	278	4	358	32	14	30	76	10	0	56	66	858
17/05/23 19:00-19:15	8	161	26	195	38	121	4	163	7	1	6	14	14	0	17	31	403
17/05/23 19:15-19:30	11	135	14	160	24	93	0	117	9	5	11	25	7	0	27	34	336
17/05/23 19:30-19:45	5	134	11	150	21	87	1	109	6	4	9	19	7	0	31	38	316
17/05/23 19:45-20:00	5	119	13	137	37	76	1	114	4	4	5	13	10	0	22	32	296
17/05/23 20:00-20:15	10	198	16	224	52	142	0	194	4	8	14	26	20	0	44	64	508
17/05/23 20:15-20:30	4	85	5	94	25	73	0	98	6	6	6	18	11	0	22	33	243
17/05/23 20:30-20:45	5	118	10	133	31	67	1	99	5	1	1	7	15	0	26	41	280
17/05/23 20:45-21:00	6	93	9	108	26	52	2	80	4	4	9	17	18	2	38	58	263
17/05/23 21:00-21:15	3	95	13	111	29	81	3	113	4	4	4	12	13	0	17	30	266
17/05/23 21:15-	5	93	4	102	14	66	1	81	3	3	3	9	15	0	34	49	241

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
21:30																	
17/05/23 21:30-21:45	1	92	9	102	16	59	1	76	7	1	5	13	9	0	7	16	207
17/05/23 21:45-22:00	2	44	1	47	16	39	0	55	1	0	1	2	20	0	12	32	136
17/05/23 22:00-22:15	2	42	3	47	5	38	0	43	0	0	1	1	5	0	11	16	107
17/05/23 22:15-22:30	2	50	1	53	6	31	0	37	4	1	4	9	5	0	13	18	117
17/05/23 22:30-22:45	1	33	2	36	5	20	0	25	1	0	1	2	5	0	14	19	82
17/05/23 22:45-23:00	1	25	4	30	6	19	0	25	0	1	3	4	2	0	15	17	76
17/05/23 23:00-23:15	1	14	1	16	1	21	1	23	0	0	1	1	14	0	13	27	67
17/05/23 23:15-23:30	0	18	0	18	2	15	1	18	3	0	2	5	5	0	13	18	59
17/05/23 23:30-23:45	2	24	0	26	0	13	0	13	3	0	3	6	4	0	12	16	61
17/05/23 23:45-00:00	0	32	0	32	0	11	0	11	0	0	2	2	2	0	5	7	52
18/05/23 00:00-00:15	0	19	0	19	1	6	1	8	1	1	3	5	6	0	2	8	40
18/05/23 00:15-00:30	0	27	0	27	3	21	0	24	3	3	15	21	12	0	24	36	108
18/05/23 00:30-00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/05/23 00:45-01:00	1	8	0	9	2	5	0	7	0	0	0	0	0	0	0	0	16
18/05/23 01:00-01:15	0	20	6	26	4	10	0	14	0	2	0	2	2	0	2	4	46
18/05/23 01:15-01:30	0	3	0	3	0	2	0	2	0	0	0	0	3	0	3	6	11

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
18/05/23 01:30-01:45	0	7	0	7	0	0	0	0	0	0	0	0	0	0	1	1	8
18/05/23 01:45-02:00	2	5	0	7	0	4	0	4	1	0	1	2	0	0	1	1	14
18/05/23 02:00-02:15	0	4	0	4	0	6	0	6	0	0	2	2	0	0	0	0	12
18/05/23 02:15-02:30	1	7	0	8	2	2	1	5	1	3	1	5	0	0	0	0	18
18/05/23 02:30-02:45	3	21	0	24	0	0	0	0	0	0	3	3	0	0	0	0	27
18/05/23 02:45-03:00	0	6	0	6	0	10	0	10	2	2	4	8	0	0	0	0	24
18/05/23 03:00-03:15	0	1	0	1	0	2	1	3	1	2	1	4	0	0	0	0	8
18/05/23 03:15-03:30	0	2	0	2	0	7	0	7	0	0	2	2	0	0	0	0	11
18/05/23 03:30-03:45	1	4	0	5	0	1	1	2	0	0	1	1	0	0	0	0	8
18/05/23 03:45-04:00	1	7	0	8	0	4	4	8	2	0	1	3	0	0	0	0	19
18/05/23 04:00-04:15	2	14	0	16	4	26	14	44	0	2	0	2	0	0	0	0	62
18/05/23 04:15-04:30	2	5	1	8	1	15	1	17	0	0	0	0	0	0	0	0	25
18/05/23 04:30-04:45	0	10	0	10	3	14	0	17	0	0	1	1	0	0	1	1	29
18/05/23 04:45-05:00	1	15	0	16	1	24	1	26	1	0	2	3	0	0	1	1	46
18/05/23 05:00-05:15	6	60	0	66	9	99	3	111	0	0	0	0	0	0	0	0	177
18/05/23 05:15-05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/05/23 05:30-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
05:45																	
18/05/23 05:45-06:00	19	101	6	126	43	249	4	296	10	11	8	29	4	0	4	8	459
18/05/23 06:00-06:15	21	81	3	105	27	219	12	258	3	0	9	12	3	0	0	3	378
18/05/23 06:15-06:30	6	90	6	102	38	126	8	172	0	2	4	6	4	0	4	8	288
18/05/23 06:30-06:45	6	32	0	38	18	79	4	101	2	2	3	7	5	0	1	6	152
18/05/23 06:45-07:00	3	57	3	63	18	106	2	126	5	1	3	9	5	0	3	8	206
18/05/23 07:00-07:15	18	174	6	198	38	252	20	310	4	8	10	22	2	0	4	6	536
18/05/23 07:15-07:30	9	93	4	106	19	138	8	165	6	7	12	25	6	0	10	16	312
18/05/23 07:30-07:45	16	97	7	120	20	220	8	248	3	1	11	15	9	0	5	14	397
18/05/23 07:45-08:00	11	123	7	141	26	227	11	264	6	7	41	54	12	1	4	17	476
18/05/23 08:00-08:15	21	161	5	187	25	260	11	296	6	12	55	73	14	1	6	21	577
18/05/23 08:15-08:30	25	133	5	163	27	218	14	259	6	10	50	66	13	1	7	21	509
18/05/23 08:30-08:45	12	120	2	134	21	205	16	242	7	5	23	35	7	0	6	13	424
18/05/23 08:45-09:00	28	424	16	468	64	792	36	892	16	28	76	120	32	0	12	44	1524
18/05/23 09:00-09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/05/23 09:15-09:30	26	216	14	256	64	320	6	390	28	16	36	80	12	0	14	26	752
18/05/23 09:30-09:45	11	87	8	106	24	125	10	159	7	5	14	26	8	0	9	17	308

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
18/05/23 09:45-10:00	8	85	9	102	30	125	2	157	8	7	24	39	6	1	11	18	316
18/05/23 10:00-10:15	5	100	6	111	32	139	5	176	12	6	12	30	10	0	7	17	334
18/05/23 10:15-10:30	7	85	3	95	31	108	7	146	13	4	10	27	4	0	6	10	278
18/05/23 10:30-10:45	9	96	11	116	37	110	6	153	6	5	15	26	6	0	7	13	308
18/05/23 10:45-11:00	11	96	3	110	38	123	5	166	12	8	17	37	12	0	7	19	332
18/05/23 11:00-11:15	16	228	20	264	58	296	2	356	26	12	58	96	30	2	16	48	764
18/05/23 11:15-11:30	24	315	27	366	108	420	15	543	57	24	72	153	27	2	16	45	1107
18/05/23 11:30-11:45	21	339	24	384	120	426	12	558	57	42	81	180	21	3	36	60	1182
18/05/23 11:45-12:00	18	242	26	286	92	262	8	362	36	24	46	106	34	2	14	50	804
18/05/23 12:00-12:15	27	414	42	483	162	369	6	537	63	33	69	165	18	5	55	78	1263
18/05/23 12:15-12:30	18	226	20	264	102	250	0	352	38	30	68	136	26	1	37	64	816
18/05/23 12:30-12:45	34	288	16	338	116	234	6	356	46	16	38	100	24	3	33	60	854
18/05/23 12:45-13:00	15	138	11	164	44	152	4	200	25	18	24	67	11	2	11	24	455
18/05/23 13:00-13:15	15	130	11	156	51	149	6	206	14	7	13	34	12	1	13	26	422
18/05/23 13:15-13:30	9	134	17	160	35	124	10	169	13	5	17	35	15	2	20	37	401
18/05/23 13:30-13:45	16	119	6	141	26	116	3	145	8	3	18	29	15	0	13	28	343
18/05/23 13:45-	11	146	7	164	22	158	5	185	10	4	13	27	5	0	13	18	394

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
14:00																	
18/05/23 14:00-14:15	13	132	8	153	43	155	0	198	14	5	23	42	10	0	15	25	418
18/05/23 14:15-14:30	14	284	14	312	68	348	12	428	20	14	40	74	30	1	55	86	900
18/05/23 14:30-14:45	30	380	20	430	34	288	18	340	26	16	60	102	10	0	44	54	926
18/05/23 14:45-15:00	7	181	13	201	21	154	4	179	14	11	47	72	9	0	12	21	473
18/05/23 15:00-15:15	13	167	26	206	24	187	9	220	13	6	34	53	16	1	19	36	515
18/05/23 15:15-15:30	22	374	96	492	86	366	6	458	32	14	50	96	36	2	64	102	1148
18/05/23 15:30-15:45	13	167	26	206	34	221	1	256	13	8	20	41	13	0	15	28	531
18/05/23 15:45-16:00	12	250	20	282	43	245	4	292	15	5	31	51	13	0	15	28	653
18/05/23 16:00-16:15	42	440	26	508	66	406	10	482	24	22	60	106	32	1	35	68	1164
18/05/23 16:15-16:30	18	214	13	245	30	181	2	213	24	12	49	85	11	1	27	39	582
18/05/23 16:30-16:45	16	208	11	235	27	217	1	245	20	7	41	68	10	0	10	20	568
18/05/23 16:45-17:00	28	394	48	470	80	420	8	508	34	12	82	128	32	1	49	82	1188
18/05/23 17:00-17:15	15	172	21	208	35	203	2	240	21	9	31	61	21	1	23	45	554
18/05/23 17:15-17:30	11	218	15	244	34	183	1	218	27	19	62	108	20	0	42	62	632
18/05/23 17:30-17:45	13	250	15	278	36	243	2	281	20	12	44	76	20	1	27	48	683
18/05/23 17:45-18:00	13	191	14	218	38	178	2	218	13	7	18	38	20	0	14	34	508

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
18/05/23 18:00-18:15	15	185	22	222	45	156	2	203	14	8	22	44	15	0	10	25	494
18/05/23 18:15-18:30	12	170	15	197	31	116	0	147	14	6	13	33	15	0	23	38	415
18/05/23 18:30-18:45	13	131	12	156	29	119	1	149	8	2	13	23	7	0	9	16	344
18/05/23 18:45-19:00	3	157	5	165	32	126	0	158	13	5	9	27	12	1	37	50	400
18/05/23 19:00-19:15	9	125	7	141	29	119	2	150	11	6	13	30	8	0	23	31	352
18/05/23 19:15-19:30	9	127	10	146	36	83	1	120	12	6	12	30	6	0	15	21	317
18/05/23 19:30-19:45	3	102	9	114	37	77	0	114	5	2	3	10	15	1	16	32	270
18/05/23 19:45-20:00	6	131	12	149	31	85	0	116	2	5	5	12	9	0	20	29	306
18/05/23 20:00-20:15	24	460	24	508	116	268	4	388	4	8	28	40	44	1	103	148	1084
18/05/23 20:15-20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/05/23 20:30-20:45	12	315	21	348	45	201	3	249	12	6	9	27	36	4	56	96	720
18/05/23 20:45-21:00	18	324	18	360	69	207	3	279	12	0	15	27	36	2	55	93	759
18/05/23 21:00-21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18/05/23 21:15-21:30	5	96	3	104	21	50	1	72	1	3	4	8	8	0	13	21	205
18/05/23 21:30-21:45	2	164	4	170	44	84	0	128	4	2	16	22	6	0	30	36	356
18/05/23 21:45-22:00	1	69	1	71	11	33	0	44	5	1	4	10	6	0	20	26	151
18/05/23 22:00-	2	46	2	50	7	42	0	49	2	2	2	6	5	0	14	19	124

Turning Movement Volume Report

Report Date: 6/22/2023 3:45:59 PM

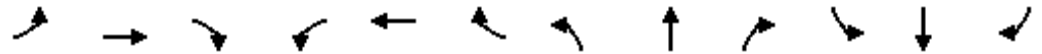
From 5/16/2023 to 5/18/2023

Washington & Freedom
Way

Intersection: 180

Time	N				S				E				W				Int Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
22:15																	
18/05/23 22:15-22:30	1	46	1	48	1	33	0	34	1	2	9	12	5	0	8	13	107
18/05/23 22:30-22:45	0	44	0	44	5	30	0	35	1	1	4	6	4	1	16	21	106
18/05/23 22:45-23:00	3	33	3	39	3	24	0	27	0	1	2	3	7	0	10	17	86
18/05/23 23:00-23:15	2	22	1	25	4	28	0	32	1	0	3	4	4	0	10	14	75
18/05/23 23:15-23:30	0	25	3	28	3	18	0	21	1	1	3	5	4	0	16	20	74
18/05/23 23:30-23:45	6	46	0	52	0	44	0	44	0	2	6	8	12	0	32	44	148
18/05/23 23:45-00:00	3	22	0	25	2	21	0	23	0	1	3	4	2	0	10	12	64
Summary	2740	35115	2709	40564	8053	37747	1181	46981	2804	1912	5558	10274	2774	128	4170	7072	104891

Attachment B
Analysis Worksheets
































Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	41	71	333	212	70	69	160	1153	143	317	1635	98
v/c Ratio	0.09	0.29	0.77	0.62	0.33	0.29	0.76	0.67	0.17	0.75	0.95	0.12
Control Delay	46.7	50.8	25.4	63.7	19.4	7.4	77.8	30.0	7.1	66.0	44.2	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	50.8	25.4	63.7	19.4	7.4	77.8	30.0	7.1	66.0	44.2	8.0
Queue Length 50th (ft)	14	51	56	80	3	0	118	330	9	120	583	6
Queue Length 95th (ft)	25	78	62	123	34	2	184	468	31	195	#1034	42
Internal Link Dist (ft)		518			327			521			364	
Turn Bay Length (ft)	210		200	210		225	235		255	235		255
Base Capacity (vph)	659	357	510	568	306	329	292	1729	834	568	1727	813
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.20	0.65	0.37	0.23	0.21	0.55	0.67	0.17	0.56	0.95	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Freedom Pt Dutch Bros
HCM 6th Signalized Intersection Summary

Existing plus Project
Timing Plan: AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 				 		 	 	
Traffic Volume (veh/h)	29	50	233	157	3	100	112	807	100	257	1324	79
Future Volume (veh/h)	29	50	233	157	3	100	112	807	100	257	1324	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	41	71	333	212	0	138	160	1153	143	317	1635	98
Peak Hour Factor	0.70	0.70	0.70	0.74	0.74	0.74	0.70	0.70	0.70	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	577	312	264	283	0	252	188	1717	766	379	1732	773
Arrive On Green	0.17	0.17	0.17	0.08	0.00	0.08	0.11	0.48	0.48	0.11	0.49	0.49
Sat Flow, veh/h	3456	1870	1585	3563	0	3170	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	41	71	333	212	0	138	160	1153	143	317	1635	98
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	1.2	3.9	20.0	7.0	0.0	5.0	10.6	29.8	6.1	10.8	52.4	4.0
Cycle Q Clear(g_c), s	1.2	3.9	20.0	7.0	0.0	5.0	10.6	29.8	6.1	10.8	52.4	4.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	577	312	264	283	0	252	188	1717	766	379	1732	773
V/C Ratio(X)	0.07	0.23	1.26	0.75	0.00	0.55	0.85	0.67	0.19	0.84	0.94	0.13
Avail Cap(c_a), veh/h	577	312	264	594	0	529	297	1717	766	577	1749	780
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(l)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	43.2	49.9	54.0	0.0	53.1	52.7	23.7	17.6	52.3	29.2	16.8
Incr Delay (d2), s/veh	0.1	0.4	143.5	1.5	0.0	0.7	7.5	1.1	0.2	4.0	11.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.8	18.3	3.1	0.0	2.0	5.0	11.9	2.2	4.8	23.1	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	43.6	193.5	55.5	0.0	53.8	60.2	24.8	17.8	56.3	40.2	16.9
LnGrp LOS	D	D	F	E	A	D	E	C	B	E	D	B
Approach Vol, veh/h		445			350			1456			2050	
Approach Delay, s/veh		155.6			54.8			28.0			41.6	
Approach LOS		F			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.1	63.9		25.3	16.6	64.4		13.5				
Change Period (Y+Rc), s	4.0	6.0		5.3	4.0	6.0		4.0				
Max Green Setting (Gmax), s	20.0	47.0		20.0	20.0	59.0		20.0				
Max Q Clear Time (g_c+I1), s	12.8	31.8		22.0	12.6	54.4		9.0				
Green Ext Time (p_c), s	0.4	9.0		0.0	0.1	4.1		0.5				

Intersection Summary

HCM 6th Ctrl Delay	49.9
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.

Freedom Pt Dutch Bros
Queues

Existing plus Project
Timing Plan: PM Peak Hour



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	126	78	270	158	97	96	104	1406	170	306	1318	18
v/c Ratio	0.28	0.32	0.61	0.48	0.42	0.41	0.54	0.86	0.21	0.69	0.77	0.02
Control Delay	44.9	47.6	11.3	56.1	18.5	16.8	61.9	35.1	8.9	57.2	29.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	47.6	11.3	56.1	18.5	16.8	61.9	35.1	8.9	57.2	29.7	0.1
Queue Length 50th (ft)	39	47	0	50	2	0	64	401	18	96	336	0
Queue Length 95th (ft)	70	95	42	94	34	29	142	#716	65	173	613	0
Internal Link Dist (ft)		518			327			521			364	
Turn Bay Length (ft)	210		200	210		225	235		255	235		255
Base Capacity (vph)	740	401	553	646	360	362	333	1966	931	646	1966	915
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.49	0.24	0.27	0.27	0.31	0.72	0.18	0.47	0.67	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Freedom Pt Dutch Bros
 HCM 6th Signalized Intersection Summary

Existing plus Project
 Timing Plan: PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	63	219	115	3	138	82	1111	134	236	1015	14
Future Volume (veh/h)	102	63	219	115	3	138	82	1111	134	236	1015	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	126	78	270	158	0	192	104	1406	170	306	1318	18
Peak Hour Factor	0.81	0.81	0.81	0.73	0.73	0.73	0.79	0.79	0.79	0.77	0.77	0.77
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	646	350	296	304	0	271	145	1547	690	377	1646	734
Arrive On Green	0.19	0.19	0.19	0.09	0.00	0.09	0.08	0.44	0.44	0.11	0.46	0.46
Sat Flow, veh/h	3456	1870	1585	3563	0	3170	1781	3554	1585	3456	3554	1585
Grp Volume(v), veh/h	126	78	270	158	0	192	104	1406	170	306	1318	18
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	0	1585	1781	1777	1585	1728	1777	1585
Q Serve(g_s), s	3.2	3.7	17.6	4.5	0.0	6.2	6.0	38.9	7.1	9.1	33.3	0.6
Cycle Q Clear(g_c), s	3.2	3.7	17.6	4.5	0.0	6.2	6.0	38.9	7.1	9.1	33.3	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	646	350	296	304	0	271	145	1547	690	377	1646	734
V/C Ratio(X)	0.20	0.22	0.91	0.52	0.00	0.71	0.72	0.91	0.25	0.81	0.80	0.02
Avail Cap(c_a), veh/h	656	355	301	676	0	602	338	1586	707	656	1990	888
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	36.3	42.0	46.1	0.0	46.9	47.2	27.8	18.8	45.9	24.1	15.4
Incr Delay (d2), s/veh	0.2	0.3	30.1	0.5	0.0	1.3	2.5	8.1	0.3	1.6	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.7	9.1	2.0	0.0	2.4	2.7	16.8	2.5	3.9	13.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	36.7	72.0	46.6	0.0	48.2	49.7	35.9	19.1	47.5	26.4	15.4
LnGrp LOS	D	D	E	D	A	D	D	D	B	D	C	B
Approach Vol, veh/h		474			350			1680			1642	
Approach Delay, s/veh		56.7			47.5			35.1			30.2	
Approach LOS		E			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.5	51.9		25.0	12.6	54.8		13.0				
Change Period (Y+Rc), s	4.0	6.0		5.3	4.0	6.0		4.0				
Max Green Setting (Gmax), s	20.0	47.0		20.0	20.0	59.0		20.0				
Max Q Clear Time (g_c+I1), s	11.1	40.9		19.6	8.0	35.3		8.2				
Green Ext Time (p_c), s	0.4	4.9		0.1	0.1	13.0		0.6				

Intersection Summary

HCM 6th Ctrl Delay	36.7
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.

LANE SUMMARY

 Site: 2 [INT_2_PP_AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
 Site Category: (None)
 Roundabout

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue		Lane Config	Lane Length ft	Cap. Adj.	Prob. Block. %
	[Total veh/h	HV %	[Total veh/h	HV %						[Veh	Dist] ft				
South: NB_Pride															
Lane 1 ^d	193	2.0	193	2.0	1100	0.176	100	4.8	LOS A	0.7	17.2	Full	800	0.0	0.0
Approach	193	2.0	193	2.0		0.176		4.8	LOS A	0.7	17.2				
East: WB_Freedom															
Lane 1 ^d	32	2.0	32	2.0	926	0.034	100	4.2	LOS A	0.1	3.1	Full	50	0.0	0.0
Approach	32	2.0	32	2.0		0.034		4.2	LOS A	0.1	3.1				
North: SB_Pride															
Lane 1 ^d	90	2.0	90	2.0	1086	0.083	100	4.0	LOS A	0.4	9.0	Full	225	0.0	0.0
Approach	90	2.0	90	2.0		0.083		4.0	LOS A	0.4	9.0				
West: EB_Freedom															
Lane 1 ^d	237	2.0	237	2.0	1371	0.173	100	3.8	LOS A	0.8	20.0	Full	450	0.0	0.0
Lane 2	205	2.0	205	2.0	1340	0.153	100	3.6	LOS A	0.7	18.9	Full	450	0.0	0.0
Approach	442	2.0	442	2.0		0.173		3.7	LOS A	0.8	20.0				
All Vehicles	758	2.0	758	2.0		0.176		4.1	LOS A	0.8	20.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Roundabout LOS Method: Same as Sign Control.

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

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

^d Dominant lane on roundabout approach

SIDRA INTERSECTION 9.1 | Copyright © 2000-2022 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise Level 2 | Processed: Monday, November 20, 2023 3:08:45 PM

Project: Not Saved

LANE SUMMARY

 Site: 2 [INT_2_PP_PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
 Site Category: (None)
 Roundabout

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %						[Veh]	[Dist]				
South: NB_Pride															
Lane 1 ^d	178	2.0	178	2.0	1016	0.175	100	5.1	LOS A	0.7	17.4	Full	800	0.0	0.0
Approach	178	2.0	178	2.0		0.175		5.1	LOS A	0.7	17.4				
East: WB_Freedom															
Lane 1 ^d	133	2.0	133	2.0	1039	0.128	100	4.6	LOS A	0.5	13.3	Full	50	0.0	0.0
Approach	133	2.0	133	2.0		0.128		4.6	LOS A	0.5	13.3				
North: SB_Pride															
Lane 1 ^d	97	2.0	97	2.0	1044	0.093	100	4.2	LOS A	0.4	10.0	Full	225	0.0	0.0
Approach	97	2.0	97	2.0		0.093		4.2	LOS A	0.4	10.0				
West: EB_Freedom															
Lane 1 ^d	305	2.0	305	2.0	1309	0.233	100	4.6	LOS A	1.1	28.5	Full	450	0.0	0.0
Lane 2	164	2.0	164	2.0	1294	0.127	100	3.7	LOS A	0.6	15.0	Full	450	0.0	0.0
Approach	470	2.0	470	2.0		0.233		4.3	LOS A	1.1	28.5				
All Vehicles	877	2.0	877	2.0		0.233		4.5	LOS A	1.1	28.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Roundabout LOS Method: Same as Sign Control.
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
 LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
 Roundabout Capacity Model: US HCM 6.
 Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

^d Dominant lane on roundabout approach

SIDRA INTERSECTION 9.1 | Copyright © 2000-2022 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise Level 2 | Processed: Monday, November 20, 2023 3:08:45 PM

Project: Not Saved