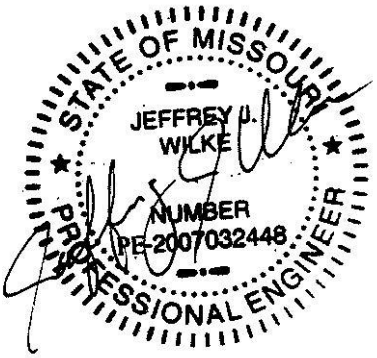
Traffic Impact Study

150 & Ward Multifamily

LEE'S SUMMIT, MISSOURI

DECEMBER 2024



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1.0 INTRODUCTION

This report serves as the traffic analysis for the 150 & Ward Multifamily development, generally located at the northwest corner of the Route 150 and Ward Road intersection in Lee's Summit, Missouri. The location of the development is shown on **Exhibit 1** in **Appendix A**.

1.1 REPORT PURPOSE AND OBJECTIVES

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic impact study was prepared based on criteria set forth by the City of Lee's Summit *Access Management Code*. The following information is provided.

- A description and map of the existing and proposed street network to be affected by the proposed development. This information includes existing and proposed roadway characteristics and existing traffic volumes.
- Trip generation calculations based on the Institute of Traffic Engineers (ITE) *Trip Generation Manual,* 11th Edition, for the proposed development. In addition, projected trip distributions onto the street network are provided.
- Analysis of impacts of the traffic generated by the proposed development on the street network, including analysis of peak period levels of service (LOS), delay times, and queuing at study area intersections.
- Evaluation of compliance with access management guidelines.
- Discussion of potential improvements and traffic management measures identified to mitigate operational concerns.

In summary, the study is to determine the trip generation of the 150 & Ward Multifamily development, assign new development trips to the street network, analyze various scenarios to determine the impacts of proposed site traffic, and identify potential mitigation measures needed to achieve acceptable operations at the study intersections.

2.0 EXISTING CONDITIONS

2.1 STUDY AREA

The development site is in the southern portion of Lee's Summit, Missouri, and consists of approximately 12 acres of undeveloped land. The land to the north of the site across Arborwalk Boulevard consists of single-family and multifamily neighborhoods. To the west of the site across Arborwalk Boulevard is open area that is part of Arborwalk Park. To the south of the site, there is undeveloped land that is planned to have commercial uses along Route 150. Southeast of the site there are existing commercial uses, including a gas station, at the northeast corner of Route 150 and Arborlake Drive. To the east of the site across Ward Road is a streamway buffer, then a single-family neighborhood.

Through discussion with City staff, three intersections along Route 150 and Ward Road were included within the study area for the traffic analysis. The Arborwalk Boulevard & Arborway Drive intersection will be the main access for the development, therefore it was also included as a study intersection. The list provides the existing intersection control for each of the study intersections.

- Route 150 & Ward Road (Signalized)
- Route 150 & Arborlake Drive/Stoney Creek Drive (Signalized)
- Ward Road & Arborwalk Boulevard (Side Street Stop)
- Arborwalk Boulevard & Arborway Drive (Roundabout)

2.2 STREET NETWORK

The existing street network within the study area includes Route 150, Ward Road, Arborlake Drive/Stoney Creek Drive, Arborwalk Boulevard, and Arborway Drive. The following provides a summary of the existing street network within the study area:

Route 150 (Missouri 150) is an east-west roadway to the south of the proposed development site. Route 150 is a four-lane divided highway with curbs and gutters. There is a sidewalk along the south side of Route 150 and a shared-use path along the north side. According to the Lee's Summit Thoroughfare Master Plan, Route 150 is classified as a Highway. The average annual daily traffic (AADT) on Route 150 is approximately 19,500 vpd according to the Missouri Department of Transportation (MoDOT) traffic volume maps. The posted speed limit is 45 miles per hour (mph). Route 150 provides access to the regional highway system with an interchange at Route 291 one mile to the east, and an interchange with I-49 roughly seven miles to the west of the site

Ward Road is a north-south roadway that runs along the east side of the proposed development. Ward Road is a four-lane, divided roadway with curbs and gutters and a posted speed limit of 45 mph. There is a sidewalk along the east side of Ward Road and a shared-use path along the west side. According to the Lee's Summit Thoroughfare Master Plan, Ward Road is classified as a Major Arterial. The AADT is approximately 7,500 vpd according to MoDOT traffic volume maps.

Arborlake Drive north-south roadway that runs west of the proposed development site. Arborlake Drive is a two-lane, divided roadway to the north of Route 150, with a posted speed limit of 30 mph. To the south of Route 150, the street is a two-lane undivided roadway and the name changes to Stoney Creek Drive. There are sidewalks along both sides of the roadway to the north and south of Route 150. According to the Lee's Summit Thoroughfare Master Plan, Arborlake Drive is classified as a Commercial Collector and Stoney Creek Drive is a Residential Collector.

Arborwalk Boulevard is a two-lane, undivided roadway that runs along the northwestern edge of the proposed development site. The roadway has curbs and gutters with a posted speed limit of 30 mph. There are sections of sidewalk and shared-use paths along the north side of the roadway. There are no sidewalks along the south side adjacent to the development site. According to the Lee's Summit Thoroughfare Master Plan, Arborwalk Boulevard is classified as a Commercial Collector.

2.3 DATA COLLECTION

Turning Movement Counts (TMCs) were collected at the four study intersections on Thursday, November 17, 2022. A 13-hour TMC (6:00 AM to 7:00 PM) was recorded at the Ward Road & Arborwalk Boulevard intersection. At Route 150 & Ward Road, Route 150 & Arborlake Drive/Stoney Creek Drive, and Arborwalk Boulevard & Arbor Park Drive peak hour TMCs were recorded from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM.

Turning movement counts are challenging to collect at roundabout intersections. Instead of collecting TMCs at the roundabout intersection, TMCs were collected at Arborwalk Boulevard & Arbor Park Drive. Turning movement volumes at the Arborwalk Boulevard & Arborway Drive roundabout intersection were derived by assigning the turning movement volumes at the roundabout intersection to balance with the counts at the two adjacent intersections. **Appendix B** provides the raw turning movement counts collected.

The Existing Conditions peak hour turning movement volumes are shown on **Exhibit 2**. The existing geometry with lane configurations and intersection control at the study intersections is shown on **Exhibit 3**.

3.0 PROPOSED DEVELOPMENT

3.1 SITE DESCRIPTION

The proposed 150 & Ward Multifamily development consists of eight multifamily apartment buildings. There will be five three- and four-story buildings arranged generally around the perimeter of the site. In the center of the site will be three buildings and an amenity area. The total number of apartment units is 275. Surface parking is provided in the interior of the site. Several garage spaces are also available at several locations in the surface parking lot.

The proposed site plan is included in **Appendix C** for reference.

3.2 SITE CIRCULATION

The proposed development will be accessed from two access points. Access A is a proposed full-access drive along Arborwalk Boulevard located approximately 450 feet south and west of the Arbor Park Drive intersection. Access B is proposed to be the south leg of the existing single-lane roundabout at Arborwalk Boulevard & Arborway Drive.

Vehicles will circulate within the site through the aisles of the surface parking lot. Sidewalks are provided in front of the buildings and at the perimeter of the site along Arborwalk Boulevard.

3.3 TRIP GENERATION

Trip generation estimates were prepared using the *ITE Trip Generation Manual,* 11th Edition. **Table 1** shows the expected trips to be generated by the proposed development. The total trip generation is anticipated to be 1,838 daily trips, 108 trips during the AM peak hour (26 entering and 82 exiting), and 139 trips during the PM peak hour (87 entering and 52 exiting).

TABLE 1: TRIP GENERATION

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise)	220	275 Dwelling Units	1,838	26	82	108	87	52	139

Appendix D provides the ITE Trip Generation Manual calculations used to determine the trip generation of the proposed site.

3.4 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The estimated trips generated by the proposed development were assigned to the street network based on the trip distributions summarized in **Table 2**. This distribution is based on existing traffic patterns, the surrounding street network, and engineering judgement.

TABLE 2: TRIP DISTRIBUTION

Direction To/From	Percentage
North on Ward Road	35%
East on Route 150	35%
West on Route 150	30%
Total	100%

The detailed residential distribution patterns through the study intersections are shown in **Exhibit 4**.

Exhibit 5 shows the total development trip assignment. The proposed development trip assignments were added to the Existing Conditions traffic volumes. **Exhibit 6** illustrates the Existing plus Development peak hour traffic volumes.

4.0 ACCESS MANAGEMENT

The City of Lee's Summit has access management guidelines in the *Access Management Code* that addresses the location and design of access points. The guidelines were used to review various aspects of the proposed development in the following sections.

4.1 ACCESS SPACING

The *Access Management Code* includes requirements for the minimum allowable spacing between connections, depending on street classification. For an industrial/commercial collector such as Arborwalk Boulevard, the minimum spacing requirement is 300 feet. The distance between proposed Access A and the driveway to the existing gas station is 475 feet, and the distance between Access A and Arbor Park Drive is 450 feet. Therefore, the proposed site driveway on Arborwalk Boulevard is adequately spaced.

4.2 TURN LANE ANALYSIS

The *Access Management Code* also provides standards for left- and right-turn lanes based on traffic volumes and street classification. According to the *Access Management Code*, left-turn lanes are not required on collector streets when the left-turn volume is less than 30 vehicles in an hour. The left-turn volumes are not projected to exceed 10 for any scenario. Therefore, a left-turn lane is not warranted at proposed Access A along Arborwalk Boulevard. Right-turn lanes are not required on collector streets when the right-turn volume is less than 100 vehicles in an hour. The right-turn volumes are not projected to exceed 13 for any scenario and a right-turn lane is not warranted at Access A along Arborwalk Boulevard.

4.3 DRIVEWAY THROAT LENGTH

A driveway's throat length is the distance along a driveway from the intersecting roadway to the first location on site where a driver can make a turn. Adequate throat lengths minimize the potential for inbound traffic to queue onto the public street. The throat length also provides space for outbound traffic to queue without adversely impacting site circulation.

The throat length requirements in the *Access Management Code* are based on the two-way traffic volume on the driveway and the adjacent street classification. Access A is projected to have between 25 and 30 vehicles during the peak hours. As such the minimum required throat length for collector roadways is 50 feet. Access is proposed to have a throat length of approximately 120 feet, which exceeds the minimum required throat length. Access B is projected to have between 80 and 105 vehicles during the peak hour. The *Access Management Code* states that for driveways with 100 vehicles per hour, the minimum throat length is the greater of 100 feet but may be longer if necessary to accommodate queue storage. Queue storage for Access B is discussed in the Intersection Capacity Analysis section of this study,

5.0 FUTURE CONDITIONS

Historical Annual Average Daily Traffic (AADT) volumes for Route 150 and Ward Road were analyzed to determine the growth rate for the study network. **Table 3** provides AADT volumes from 2016 and projected AADTs for 2050, as well as an annual growth rate for each facility. The AADT volumes are from the Mid-America Regional Council (MARC) Regional Traffic Forecast Map.

TABLE 3: ANNUAL GROWTH RATE

Road	Location	MARC Model AADT		Annual Growth Rate
		2016	2050	
Route 150	East of Ward Road	17,900	34,000	1.9%
	West of Ward Road	15,400	29,000	1.9%
Ward Road	North of Route 150	5,600	13,900	2.7%
	South of Route 150	7,100	12,400	1.7%

An average annual growth rate of 2.0% was assumed for all intersections within the study network based on the annual growth rates shown in **Table 3**. Traffic Volumes were grown to a 22-year future condition. No adjacent development traffic was included in the future year volume development.

6.0 INTERSECTION CAPACITY ANALYSIS

6.1 LEVEL OF SERVICE OVERVIEW

Intersection capacity analysis was performed at the study intersections for the following three scenarios:

- Existing Conditions (Year 2022)
- Existing plus Development Conditions
- Future Conditions (Year 2044)

The capacity analysis was performed for the weekday AM and PM peak hours using Synchro or Sidra traffic modeling software to determine intersection delay and level of service (LOS). Calculations were performed based on the methodologies outlined in the *Highway Capacity Manual (HCM)*, 7th Edition, which is published by the Transportation Research Board.

LOS is a qualitative measure used by traffic engineers to describe the operations of an intersection. It ranges from A to F, with A being the best and F being the worst level of operation. LOS A conditions are characterized by minimal vehicle delay and free-flow conditions, while LOS F is characterized by long vehicle delay – usually when demand exceeds available roadway capacity. **Table 4** shows the definition of LOS for unsignalized and signalized intersections.

TABLE 4: LEVEL OF SERVICE

Level of Service	Average Control Delay (seconds/vehicle) at:	
	Unsignalized Intersections	Signalized Intersections
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

Levels of service are evaluated based on the movement groupings which are required to yield to other traffic. Typically, these are left turns off the major street and the side street approaches for two-way stop-controlled intersections. For signalized intersections each movement grouping is evaluated, and LOS is evaluated for the intersection as a whole.

The City of Lee's Summit has adopted LOS C as the minimum desirable LOS. However, LOS D and E may be considered acceptable for low to moderate traffic volumes, the availability of alternate routes, and the duration of activity resulting in lower LOS.

The decision to install a traffic signal is based on an evaluation of the warrants listed in the 11th Edition of the *Manual on Uniform Traffic Control Devices* (MUTCD). The warranting criteria are based on traffic volumes, vehicle speeds, pedestrian volumes, crash history, and the adjacent street network. The traffic volume warrants were evaluated for this study.

The volume-to-capacity (v/c) ratio is a secondary measure of intersection performance. The v/c ratio represents the sufficiency of an intersection to accommodate the vehicular demand. A v/c ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are not expected to experience significant queues and delays. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay

and queuing conditions may occur. Once the demand exceeds the capacity (a v/c ratio greater than 1.0), traffic flow is unstable and excessive delay and queuing is expected. The v/c ratio is important in understanding low-volume movements that, due to their nature, may experience relatively high delays yet operate will under capacity.

Traffic queues were also evaluated as part of the analyses. Long traffic queues which extend beyond the amount of storage available, either between intersections or within turn lanes, can have significant impacts on operations. The projected vehicular queues were analyzed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes.

6.2 EXISTING (YEAR 2022) ANALYSIS

Capacity analysis was conducted for existing traffic conditions at the study intersections to determine baseline conditions for the existing analysis year and to calibrate the models. The analysis was performed for weekday AM and PM peak hours and is based on the lane configurations and traffic volumes shown in **Exhibits 2** and **3**. The Synchro and Sidra reports are provided in **Appendix E**.

Table 5 on the following page provides a summary of the capacity analysis at the study intersections.

Based on the analysis, all intersections currently operate at acceptable LOS. Several individual movements at the signalized intersections operate at LOS D or E in both the AM and PM peak hours. While these are lower levels of service, the 95th percentile queue lengths are relatively short, and the volume-to-capacity ratios indicate that the movements currently operate under capacity.

TABLE 5: EXISTING (YEAR 2022) PEAK HOUR CONDITIONS

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
Route 150 & Ward Road	Traffic Signal	EBL	57.2	E	81'	0.70	56.7	E	86'	0.71
		EBT	0.1	A	76'	0.15	0.5	A	132'	0.39
		EBR	0.1	A	< 50'	0.03	0.4	A	< 50'	0.19
		WBL	59.8	E	< 50'	0.47	60.4	E	82'	0.71
		WBT	11.2	B	239'	0.34	11.0	B	152'	0.23
		WBR	9.8	A	< 50'	0.16	10.5	B	< 50'	0.15
		NBL	59.1	E	106'	0.74	61.4	E	61'	0.64
		NBT	51.3	D	134'	0.58	51.0	D	105'	0.46
		NBR	53.1	D	52'	0.59	60.1	E	57'	0.79
		SBL	60.7	E	77'	0.70	59.1	E	108'	0.76
		SBT	49.8	D	52'	0.21	48.0	D	139'	0.51
		SBR	62.1	E	57'	0.81	51.1	D	155'	0.63
		Overall	29.8	C	--	--	26.7	C	--	--
Route 150 & Arborlake Drive/Stoney Creek Drive	Traffic Signal	EBL	4.7	A	< 50'	0.05	5.5	A	< 50'	0.10
		EBT/R	6.2	A	82'	0.15	10.1	B	288'	0.44
		WBL	4.3	A	< 50'	0.06	6.7	A	61'	0.34
		WBT	0.4	A	196'	0.38	0.2	A	107'	0.22
		NBL	48.9	D	70'	0.24	47.2	D	< 50'	0.13
		NBT	50.9	D	< 50'	0.11	49.3	D	< 50'	0.12
		NBR	63.7	E	55'	0.79	63.2	E	53'	0.08
		SBL	49.2	D	53'	0.18	46.6	D	70'	0.26
		SBT	51.5	D	< 50'	0.08	47.6	D	< 50'	0.12
		Overall	9.7	A	--	--	12.7	B	--	0.41
Ward Road & Arborwalk Boulevard	Side Street Stop	EBL	15.2	C	< 50'	0.19	19.4	C	< 50'	0.20
		EBR	9.4	A	< 50'	0.03	10.3	B	< 50'	0.06
		NBL	8.4	A	< 50'	0.01	8.9	A	< 50'	0.02
Arborwalk Boulevard & Arborway Drive/Access B	Roundabout	EB	0.4	A	< 50'	0.05	0.3	A	< 50'	0.06
		WB	0.2	A	< 50'	0.03	0.2	A	< 50'	0.08
		NB	2.1	A	< 50'	0.01	2.1	A	< 50'	0.00
		SB	2.7	A	< 50'	0.10	2.8	A	< 50'	0.07
Arborwalk Boulevard & Arbor Park Drive	Side Street Stop	EBL	8.9	A	< 50'	0.03	9.1	A	< 50'	0.01
		NBL	7.3	A	< 50'	0.01	7.3	A	< 50'	0.01

6.3 EXISTING PLUS DEVELOPMENT ANALYSIS

Capacity analysis was conducted for Existing plus Development Conditions at the study intersections to determine the impact of site generated traffic from the proposed development. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes shown in **Exhibit 6**. The lane configurations and intersection controls remain the same as the Existing Conditions scenario. All site driveways were analyzed as single-lane approaches. Access A was evaluated to be stop controlled at the intersection with Arborwalk Boulevard. The Synchro and Sidra reports are provided in **Appendix E.**

Table 6 on the next page provides a summary of the capacity analysis at the study intersections.

The analysis results in **Table 6** indicate that the addition of site generated trips from the proposed development is projected to have a negligible impact on the levels of service at the study intersections. All intersections are projected to operate at acceptable overall levels of service. As in the Existing Conditions scenario, several movements at the signalized intersections are projected to operate at LOS D or E during both peak hours. However, the 95th percentile queue lengths are relatively short, and the volume-to-capacity ratios indicate that the movements are projected to operate under capacity.

The Arborwalk Boulevard & Arborway Drive/Access B intersection is projected to operate acceptably with minimal delays and queueing. The 95th percentile queue for the northbound approach of the roundabout is projected to be less than 50 feet during both peak hours. The provided throat length of approximately 120 feet at Access B will contain the projected 95th percentile queues.

TABLE 6: EXISTING PLUS DEVELOPMENT PEAK HOUR CONDITIONS

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
Route 150 & Ward Road	Traffic Signal	EBL	57.2	E	81'	0.70	56.7	E	87'	0.71
		EBT	0.1	A	76'	0.15	0.5	B	131'	0.40
		EBR	0.1	A	< 50'	0.03	0.4	A	< 50'	0.19
		WBL	59.8	E	41'	0.47	60.4	E	82'	0.71
		WBT	11.2	B	245'	0.34	11.3	B	155'	0.23
		WBR	9.9	A	< 50'	0.17	11.1	B	< 50'	0.18
		NBL	59.1	E	106'	0.74	61.4	E	61'	0.64
		NBT	52.7	D	135'	0.63	51.1	D	107'	0.47
		NBR	55.1	E	52'	0.64	60.0	E	57'	0.79
		SBL	60.1	E	89'	0.73	58.8	E	115'	0.78
		SBT	49.9	D	53'	0.22	47.4	D	139'	0.49
		SBR	62.0	E	56'	0.81	50.2	D	55'	0.61
		Overall	30.3	C	--	--	26.7	C	--	--
Route 150 & Arborlake Drive/Stoney Creek Drive	Traffic Signal	EBL	4.6	A	< 50'	0.07	5.5	A	< 50'	0.13
		EBT/R	6.2	A	86'	0.15	10.1	B	288'	0.41
		WBL	4.3	A	< 50'	0.06	6.7	A	62'	0.32
		WBT	0.4	A	196'	0.38	0.2	A	111'	0.22
		NBL	48.9	D	69'	0.24	47.2	D	< 50'	0.08
		NBT	50.9	D	< 50'	0.11	49.3	D	< 50'	0.09
		NBR	63.7	E	54'	0.79	63.2	E	53'	0.82
		SBL	49.2	D	52'	0.18	46.6	D	70'	0.23
		SBT	51.5	D	< 50'	0.08	47.6	D	< 50'	0.11
		Overall	9.7	A	--	--	12.6	B	--	--
Ward Road & Arborwalk Boulevard	Side Street Stop	EBL	16.7	C	< 50'	0.27	24.0	C	< 50'	0.30
		EBR	9.6	A	< 50'	0.06	10.5	B	< 50'	0.09
		NBL	8.5	A	< 50'	0.02	9.2	A	< 50'	0.06
Arborwalk Boulevard & Arborway Drive/Access B	Roundabout	EB	0.5	A	< 50'	0.06	0.5	A	< 50'	0.08
		WB	0.3	A	< 50'	0.05	0.2	A	< 50'	0.13
		NB	2.4	A	< 50'	0.06	2.3	A	< 50'	0.04
		SB	2.8	A	< 50'	0.10	3.1	A	< 50'	0.09
Arborwalk Boulevard & Arbor Park Drive	Side Street Stop	EBL	9.0	A	< 50'	0.03	9.3	A	< 50'	0.02
		NBL	7.3	A	< 50'	0.01	7.4	A	< 50'	0.02
Arborwalk Boulevard & Access A	Side Street Stop	WBL	7.3	A	< 50'	0.01	7.4	A	< 50'	0.01
		SBL	9.1	A	< 50'	0.02	9.3	A	< 50'	0.02

6.4 FUTURE (YEAR 2044) ANALYSIS

Capacity analysis was conducted for future traffic conditions at the study intersections to determine the need for capacity improvements within the study network in the future. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes shown in **Exhibit 7**. The lane configurations and intersection controls remain the same as the Existing plus Development Conditions scenario. The Synchro and Sidra reports are provided in **Appendix E.**

Table 7 provides a summary of the capacity analysis at the study intersections.

Overall, the signalized intersections are projected to operate at acceptable levels of service in the future. The analysis results indicate that several movements are projected to operate at LOS D or E at the signalized intersections. Some longer queues are projected in the eastbound and westbound through lanes of Route 150. Most of these queues do not extend through to adjacent intersections. However, the eastbound through movement at the Route 150 & Arborlake Drive/Stoney Creek Drive intersection is projected to have 95th percentile queue of 655 feet during the PM peak hour. This length of queue would block the right-in, right-out access that serves the adjacent single-family neighborhood. The signalized intersections were analyzed with a 120-second cycle length. A shorter cycle length would reduce queues and improve operations at the intersections.

All movements at the unsignalized intersections are projected to operate acceptably, except for the eastbound left-turn movement at Ward Road & Arborwalk Boulevard. The left-turn movement is projected to operate at LOS E in the AM peak hour and LOS F in the PM peak hour. During the PM peak hour, the 95th percentile queue is projected to be six car lengths.

TABLE 7: FUTURE (YEAR 2044) PEAK HOUR CONDITIONS

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
Route 150 & Ward Road	Traffic Signal	EBL	57.2	E	116'	0.78	55.1	E	120'	0.79
		EBT	0.3	A	133'	0.26	1.7	C	385'	0.73
		EBR	0.1	A	< 50'	0.06	0.8	C	106'	0.36
		WBL	62.0	E	58'	0.64	63.3	D	119'	0.79
		WBT	21.4	C	487'	0.62	19.6	C	277'	0.43
		WBR	16.7	B	70'	0.30	18.6	B	< 50'	0.31
		NBL	60.7	E	154'	0.82	60.8	E	88'	0.71
		NBT	48.4	D	189'	0.65	47.3	D	150'	0.52
		NBR	50.5	D	59'	0.67	70.8	D	76'	0.87
		SBL	62.3	E	124'	0.79	64.2	E	168'	0.85
		SBT	45.6	D	72'	0.24	42.6	D	196'	0.54
		SBR	69.2	E	97'	0.87	47.4	D	62'	0.67
		Overall	33.8	C	--	--	29.0	C	--	--
Route 150 & Arborlake Drive/Stoney Creek Drive	Traffic Signal	EBL	6.4	A	< 50'	0.13	9.3	A	< 50'	0.24
		EBT/R	9.2	A	132'	0.24	22.7	C	655'	0.73
		WBL	6.2	A	< 50'	0.11	26.6	C	219'	0.79
		WBT	1.0	A	306'	0.64	0.4	A	152'	0.38
		NBL	44.7	D	100'	0.28	42.2	D	< 50'	0.10
		NBT	47.1	D	< 50'	0.12	44.8	D	< 50'	0.18
		NBR	63.8	E	65'	0.85	73.0	E	68'	0.88
		SBL	45.6	D	75'	0.23	40.5	D	100'	0.28
		SBT	48.4	D	< 50'	0.08	42.2	D	60'	0.12
		Overall	10.5	B	--	--	20.9	C	--	--
Ward Road & Arborwalk Boulevard	Side Street Stop	EBL	38.4	E	93'	0.61	>100	F	140'	0.87
		EBR	10.4	B	< 50'	0.09	12.4	B	< 50'	0.15
		NBL	9.2	A	< 50'	0.03	11.0	B	< 50'	0.09
Arborwalk Boulevard & Arborway Drive	Roundabout	EB	0.7	A	< 50'	0.10	0.7	A	< 50'	0.12
		WB	0.4	A	< 50'	0.06	0.3	A	< 50'	0.18
		NB	2.8	A	< 50'	0.07	2.7	A	< 50'	0.04
		SB	2.9	A	< 50'	0.16	3.2	A	< 50'	0.12
Arborwalk Boulevard & Arbor Park Drive	Side Street Stop	EBL	9.3	A	< 50'	0.05	9.8	A	< 50'	0.03
		NBL	7.4	A	< 50'	0.01	7.5	A	< 50'	0.01
Arborwalk Boulevard & Access A	Side Street Stop	WBL	9.4	A	< 50'	0.03	9.7	A	< 50'	0.02
		SBL	7.4	A	< 50'	0.01	7.5	A	< 50'	0.01

7.0 TRAFFIC SIGNAL WARRANT ANALYSIS

The need for a traffic signal is evaluated based on the applicable factors contained in the traffic signal warrants of the MUTCD. Given the lower level of service observed at the Ward Road & Arborwalk Boulevard intersection, traffic signal warrant analysis was conducted.

For the warrant analysis hourly traffic count data collected at the intersection from 6:00 AM to 7:00 PM was compared to the minimum volume criteria of the traffic volume warrants (Warrants 1 through 3) of the MUTCD for Existing Conditions. For Existing plus Development Conditions, the hourly variation of daily traffic from the *Trip Generation Manual* was used to project site trips. The site trips were then added to the existing hourly volumes. For future conditions, the existing volumes were increased by 2.0% per year, and the site trips were added. The results of the warrant analysis are summarized in **Table 8**. The traffic signal warrant analysis worksheets are provided in **Appendix F**.

TABLE 8: TRAFFIC SIGNAL WARRANT ANALYSIS

MUTCD Warrant	Existing Conditions	Existing plus Development	Future Conditions
Warrant 1a (Eight-Hour Vehicular Volume, Minimum Vehicular Volume)	NO	NO	NO
Warrant 1b (Eight-Hour Vehicular Volume, Interruption of continuous Traffic)	NO	NO	YES
Warrant 2 (Four-Hour Vehicular Volume)	NO	NO	YES
Warrant 3 (Peak Hour)	NO	NO	YES

The results of the analysis indicate that a traffic signal is projected to be warranted at the intersection in the future, but not for Existing or Existing plus Development conditions. Signalization is expected to improve operations for the eastbound movements at the intersection in the future.

8.0 CONCLUSIONS AND RECOMMENDATIONS

A traffic impact study for the 150 & Ward Multifamily development has been prepared by Kimley-Horn. The proposed site is located near the northwest corner of the Route 150 and Ward Road intersection in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The following provides a summary of the analysis.

Intersection capacity analysis was performed at the study intersections for the following three scenarios:

- Existing Conditions (Year 2022)
- Existing plus Development Conditions
- Future Conditions (Year 2044)

All study intersections were found to currently be operating at acceptable levels of service.

The proposed development is projected to generate 1,838 daily trips, with 108 trips in the AM peak hour, and 139 trips in the PM peak hour. The site trips were added to the street network and all study intersections are projected to continue to operate at acceptable levels of service. Traffic volumes are not projected to satisfy turn lane warrants at the proposed Access A intersection along Arborwalk Boulevard. The As such, no improvements are identified to mitigate the addition of site trips for the proposed development.

The Future Conditions scenario includes background traffic growth. All intersections are projected to operate at acceptable levels of service with one exception. The eastbound left movement at the intersection of Ward Road & Arborwalk Boulevard is projected to operate at a LOS E during the AM peak hour and LOS F during the PM peak hour. Traffic signal warrant analysis indicated that a traffic signal is projected to be warranted at Ward Road & Arborwalk Boulevard in the future. Signalization is expected to improve operations for the eastbound movements at the intersection.

APPENDIX

Appendix A: EXHIBITS

Appendix B: TURNING MOVEMENT COUNTS

Appendix C: SITE PLAN

Appendix D: ITE TRIP GENERATION MANUAL SHEETS

Appendix E: CAPACITY ANALYSIS REPORTS

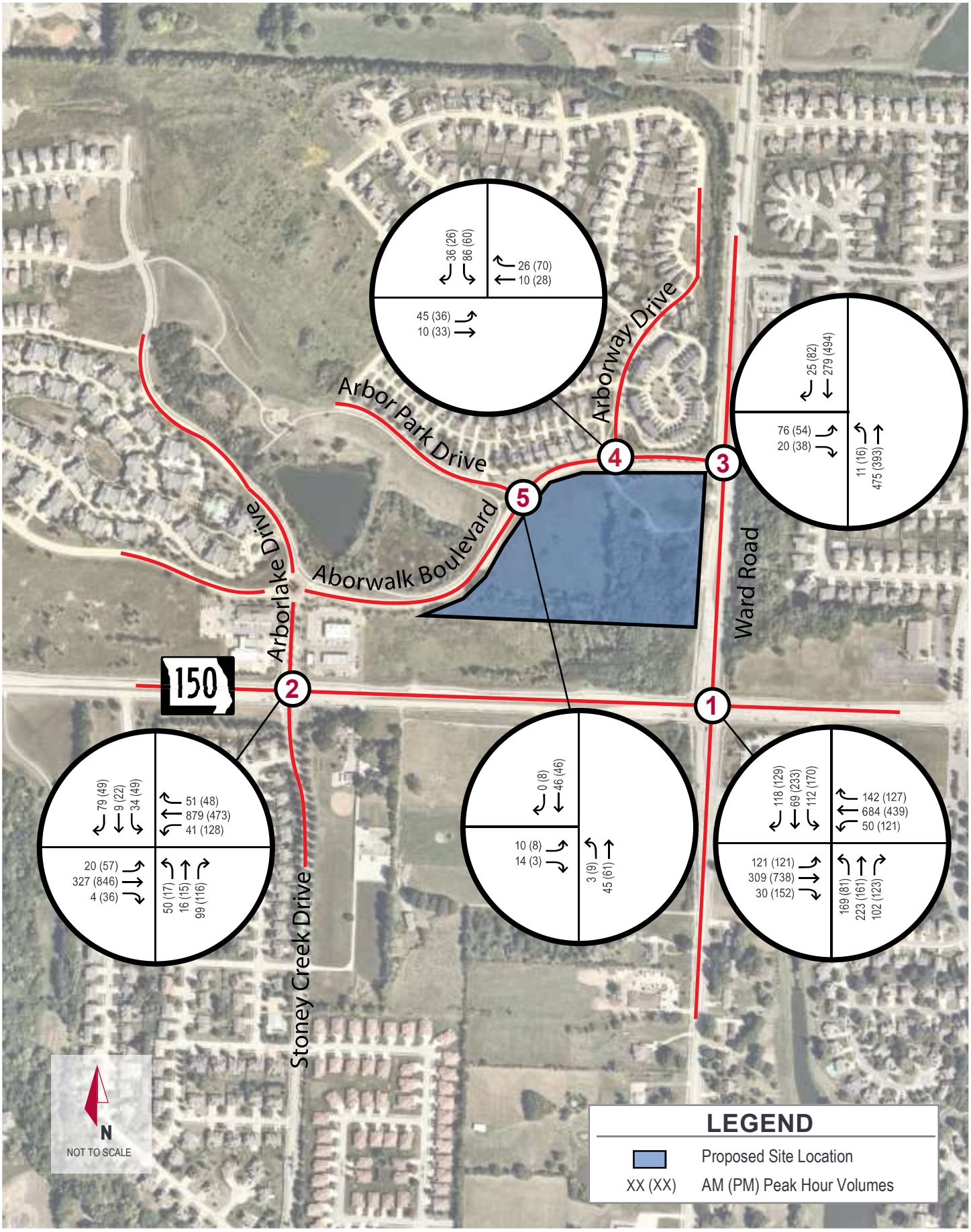
Appendix F: SIGNAL WARRANT ANALYSIS

Appendix A: Exhibits

Kimley»Horn

EXHIBIT 1

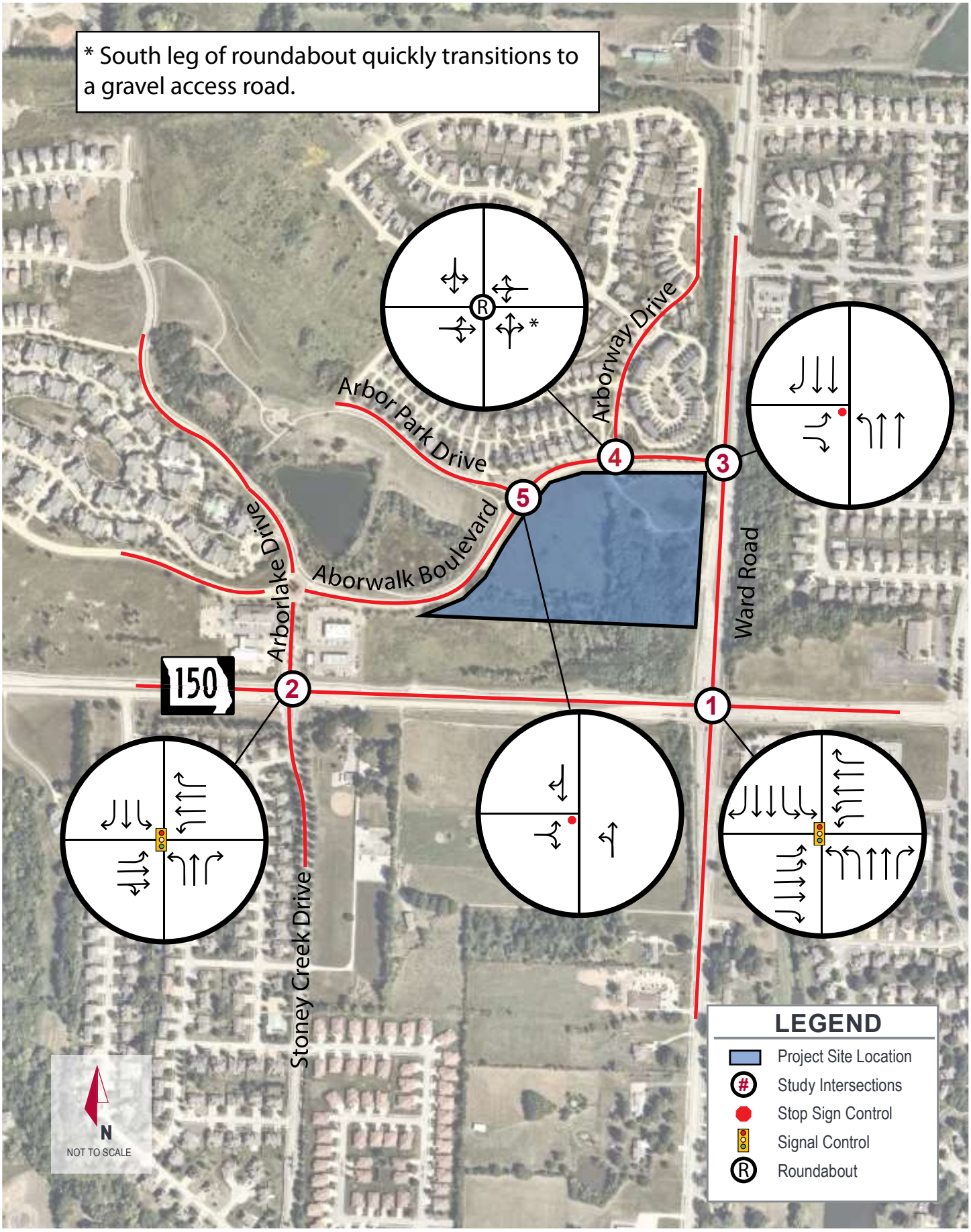
PROJECT SITE LOCATION AND STUDY AREA



Kimley»Horn

EXHIBIT 2

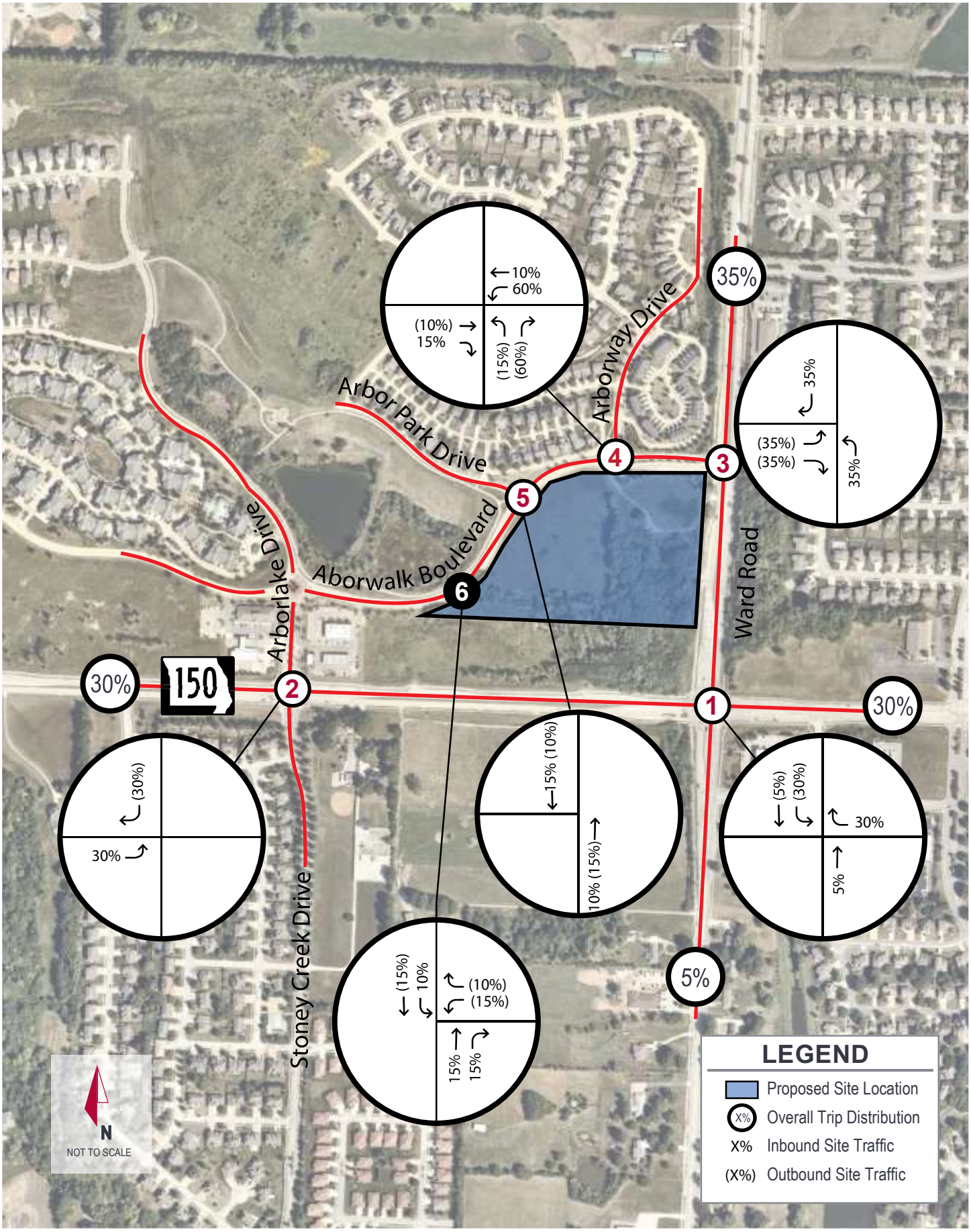
EXISTING CONDITIONS
PEAK HOUR TRAFFIC VOLUMES



Kimley»Horn

EXHIBIT 3

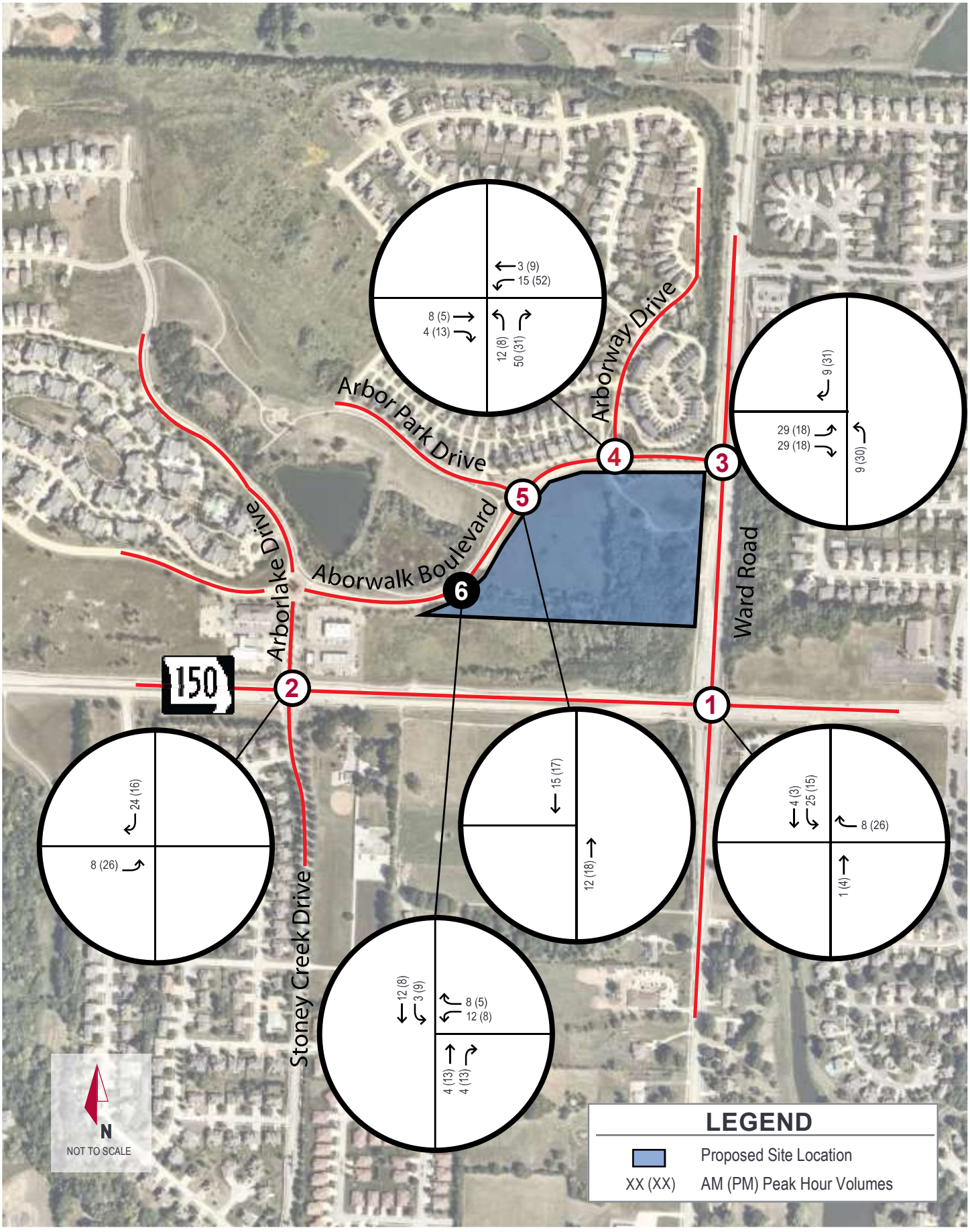
EXISTING GEOMETRY AND INTERSECTION CONTROL



Kimley»Horn

EXHIBIT 4

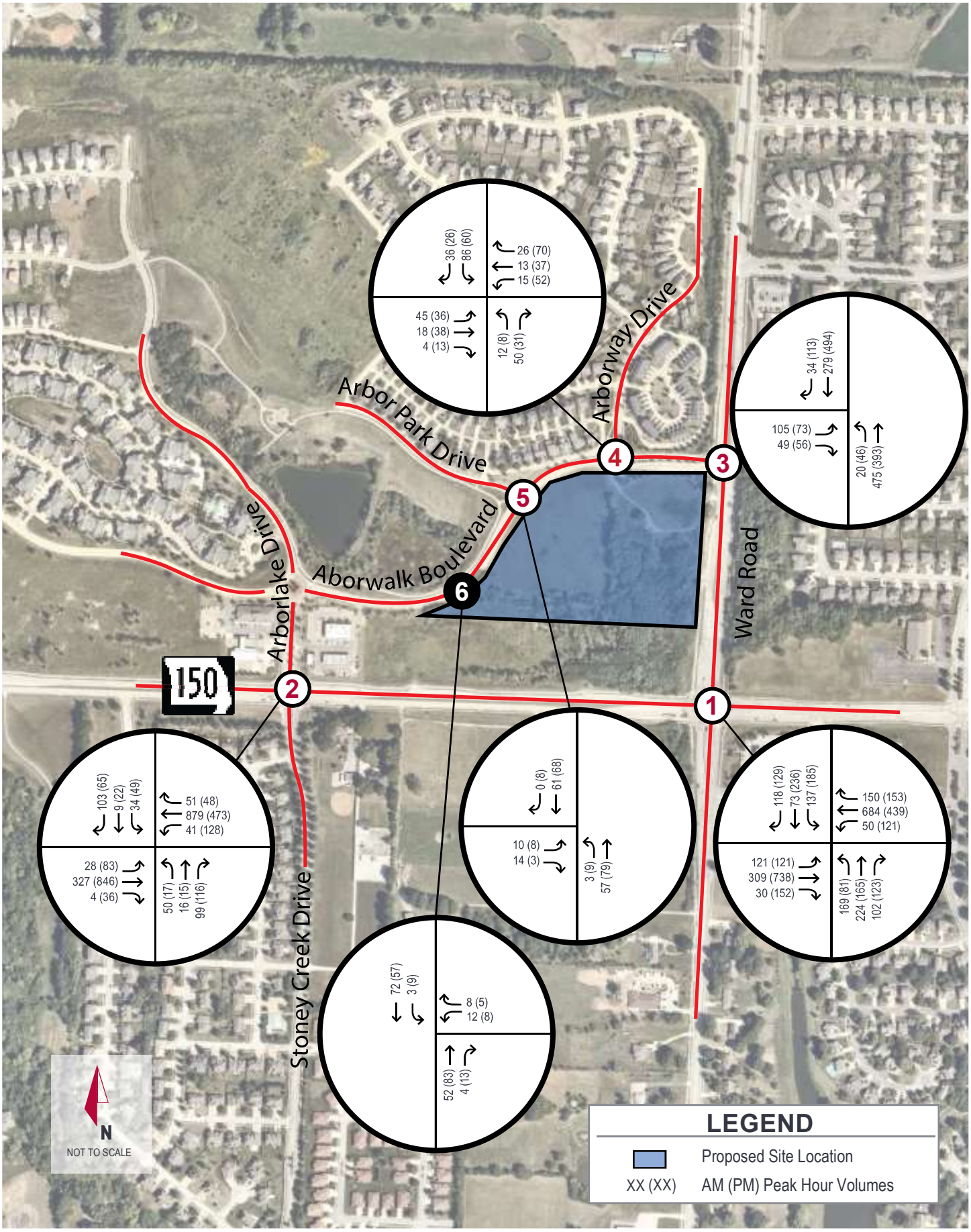
SITE TRIP DISTRIBUTION



Kimley»Horn

EXHIBIT 5

PROJECT TRAFFIC

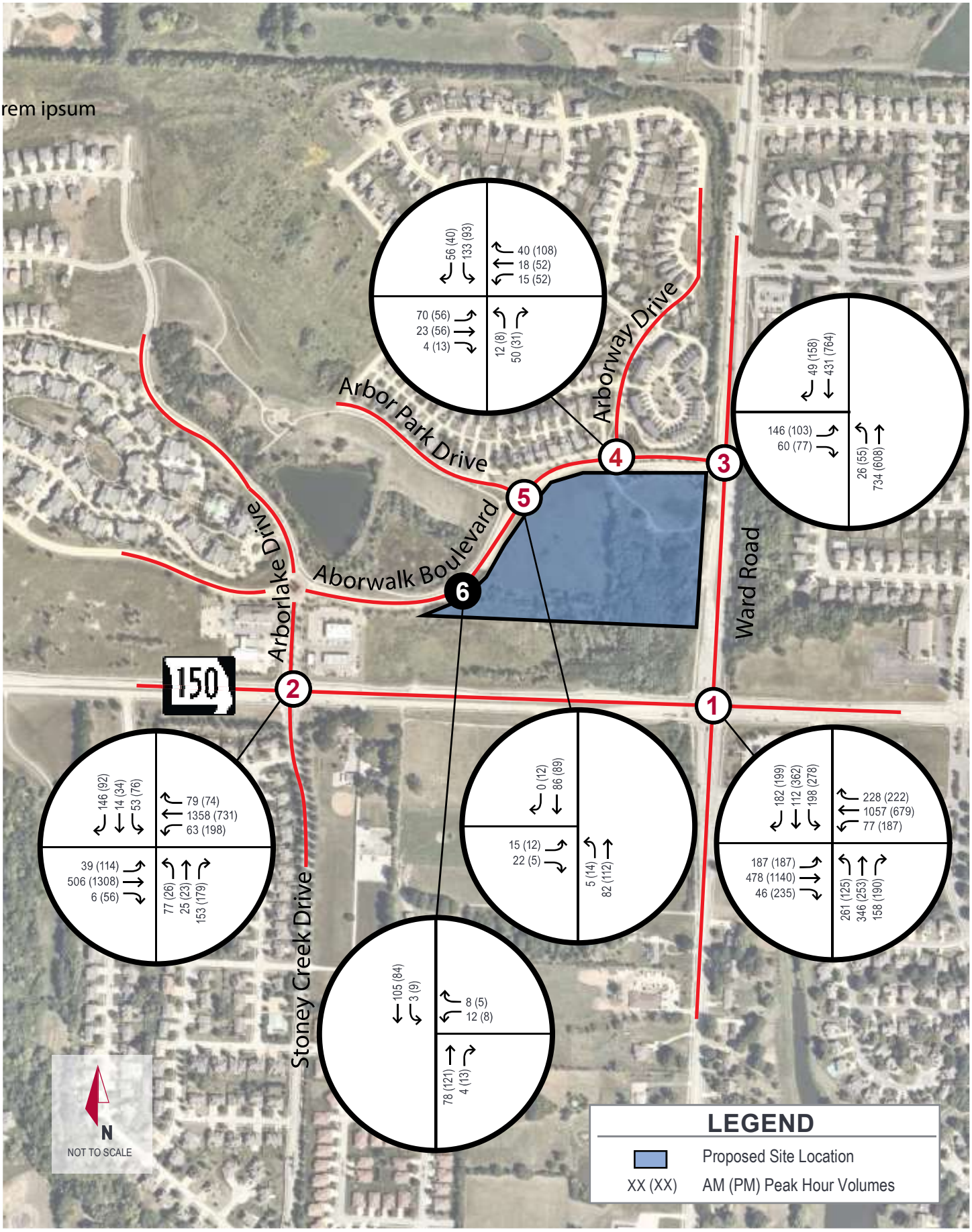


Kimley»Horn

EXHIBIT 6

EXISTING PLUS DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES

Lorem ipsum



Kimley»Horn

EXHIBIT 7

FUTURE PEAK HOUR TRAFFIC VOLUMES

Appendix B: Turning Movement Counts

1_MO-150 & Ward Road - TMC

Thu Nov 17, 2022
Full Length (6 AM-7 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

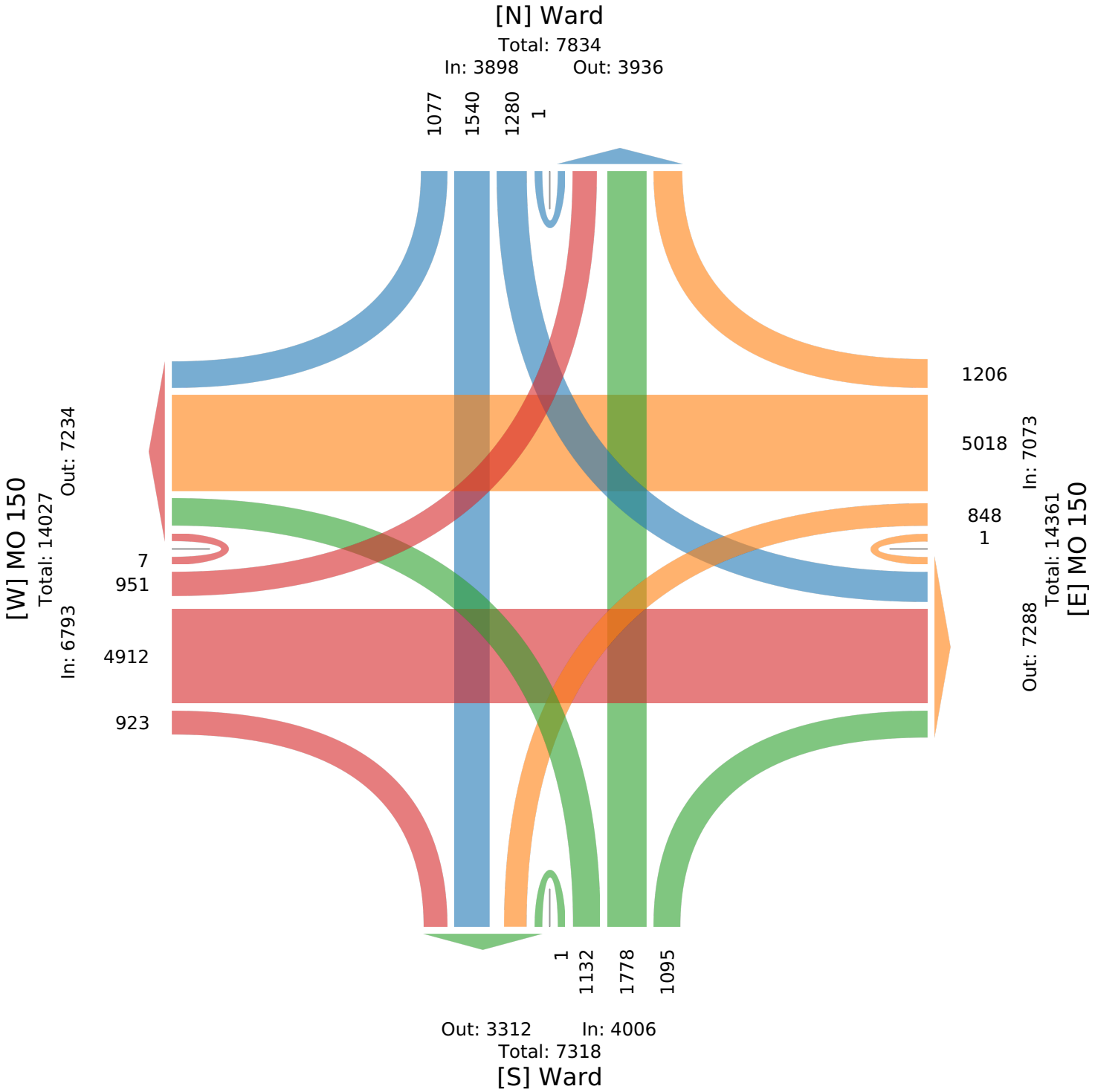
Leg	MO 150					MO 150					Ward					Ward					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 6:00AM	3	18	2	0	**23**	0	62	2	0	**64**	16	13	10	0	**39**	2	5	11	0	**18**	**144**
6:15AM	11	38	5	0	**54**	1	117	8	0	**126**	27	11	8	0	**46**	5	7	11	0	**23**	**249**
6:30AM	9	54	4	1	**68**	8	141	15	0	**164**	25	28	13	0	**66**	11	9	10	0	**30**	**328**
6:45AM	28	70	9	0	**107**	5	123	52	0	**180**	26	59	20	0	**105**	16	6	9	0	**31**	**423**
Hourly Total	51	180	20	1	**252**	14	443	77	0	**534**	94	111	51	0	**256**	34	27	41	0	**102**	**1144**
7:00AM	47	52	6	0	**105**	11	124	72	0	**207**	47	61	21	0	**129**	36	7	27	0	**70**	**511**
7:15AM	32	87	6	0	**125**	8	183	25	0	**216**	36	53	29	1	**119**	34	20	37	1	**92**	**552**
7:30AM	21	88	8	1	**118**	16	203	23	0	**242**	46	53	32	0	**131**	22	20	32	0	**74**	**565**
7:45AM	21	87	10	0	**118**	15	174	22	0	**211**	40	56	20	0	**116**	20	22	22	0	**64**	**509**
Hourly Total	121	314	30	1	**466**	50	684	142	0	**876**	169	223	102	1	**495**	112	69	118	1	**300**	**2137**
8:00AM	28	90	11	0	**129**	11	153	20	0	**184**	32	51	32	0	**115**	19	15	15	0	**49**	**477**
8:15AM	25	68	8	0	**101**	14	131	35	0	**180**	35	45	20	0	**100**	18	25	17	0	**60**	**441**
8:30AM	19	70	12	0	**101**	7	120	28	0	**155**	36	45	19	0	**100**	15	15	13	0	**43**	**399**
8:45AM	24	85	18	0	**127**	14	95	24	0	**133**	29	48	30	0	**107**	16	22	21	0	**59**	**426**
Hourly Total	96	313	49	0	**458**	46	499	107	0	**652**	132	189	101	0	**422**	68	77	66	0	**211**	**1743**
9:00AM	17	83	15	0	**115**	13	77	24	0	**114**	28	36	21	0	**85**	14	19	13	0	**46**	**360**
9:15AM	13	50	9	0	**72**	9	90	19	0	**118**	23	25	14	0	**62**	17	17	13	0	**47**	**299**
9:30AM	11	69	8	0	**88**	11	92	21	0	**124**	27	32	21	0	**80**	9	17	15	0	**41**	**333**
9:45AM	11	74	9	0	**94**	10	64	14	0	**88**	13	26	12	0	**51**	14	14	16	0	**44**	**277**
Hourly Total	52	276	41	0	**369**	43	323	78	0	**444**	91	119	68	0	**278**	54	67	57	0	**178**	**1269**
10:00AM	14	69	8	0	**91**	14	64	9	0	**87**	20	30	10	0	**60**	20	24	17	0	**61**	**299**
10:15AM	13	58	6	0	**77**	11	74	19	0	**104**	30	22	13	0	**65**	13	16	21	0	**50**	**296**
10:30AM	11	72	10	0	**93**	3	90	17	0	**110**	19	24	12	0	**55**	20	24	14	0	**58**	**316**
10:45AM	15	63	16	0	**94**	12	70	15	0	**97**	17	29	17	0	**63**	18	22	13	0	**53**	**307**
Hourly Total	53	262	40	0	**355**	40	298	60	0	**398**	86	105	52	0	**243**	71	86	65	0	**222**	**1218**
11:00AM	9	57	7	0	**73**	13	82	11	0	**106**	17	37	23	0	**77**	8	19	10	0	**37**	**293**
11:15AM	18	77	18	0	**113**	14	73	12	0	**99**	17	41	21	0	**79**	23	25	17	0	**65**	**356**
11:30AM	11	72	20	0	**103**	12	69	20	0	**101**	13	27	13	0	**53**	21	18	19	0	**58**	**315**
11:45AM	12	90	16	0	**118**	14	75	13	0	**102**	9	19	14	0	**42**	26	23	10	0	**59**	**321**
Hourly Total	50	296	61	0	**407**	53	299	56	0	**408**	56	124	71	0	**251**	78	85	56	0	**219**	**1285**
12:00PM	9	71	17	0	**97**	18	83	23	0	**124**	16	32	17	0	**65**	18	35	14	0	**67**	**353**
12:15PM	12	70	17	0	**99**	10	84	16	0	**110**	15	23	26	0	**64**	24	34	10	0	**68**	**341**
12:30PM	9	84	12	0	**105**	18	77	14	0	**109**	24	27	7	0	**58**	19	21	20	0	**60**	**332**
12:45PM	11	82	11	0	**104**	12	86	18	0	**116**	22	32	17	0	**71**	28	19	15	0	**62**	**353**
Hourly Total	41	307	57	0	**405**	58	330	71	0	**459**	77	114	67	0	**258**	89	109	59	0	**257**	**1379**
1:00PM	12	88	16	0	**116**	13	64	10	0	**87**	19	31	16	0	**66**	17	17	13	0	**47**	**316**
1:15PM	12	71	16	0	**99**	13	60	19	0	**92**	10	27	20	0	**57**	16	31	14	0	**61**	**309**
1:30PM	7	88	13	0	**108**	10	62	13	0	**85**	21	40	15	0	**76**	31	22	17	0	**70**	**339**
1:45PM	20	85	19	0	**124**	8	81	22	0	**111**	14	19	23	0	**56**	24	41	17	0	**82**	**373**
Hourly Total	51	332	64	0	**447**	44	267	64	0	**375**	64	117	74	0	**255**	88	111	61	0	**260**	**1337**
2:00PM	18	77	22	0	**117**	16	80	32	0	**128**	18	26	27	0	**71**	19	25	12	0	**56**	**372**
2:15PM	19	106	15	0	**140**	27	72	17	0	**116**	20	32	13	0	**65**	42	44	33	0	**119**	**440**
2:30PM	13	82	21	1	**117**	18	73	22	0	**113**	13	42	29	0	**84**	55	54	45	0	**154**	**468**
2:45PM	17	119	21	1	**158**	27	105	27	0	**159**	14	39	30	0	**83**	40	35	26	0	**101**	**501**
Hourly Total	67	384	79	2	**532**	88	330	98	0	**516**	65	139	99	0	**303**	156	158	116	0	**430**	**1781**
3:00PM	20	112	22	1	**155**	17	86	30	0	**133**	27	34	26	0	**87**	32	46	28	0	**106**	**481**
3:15PM	20	123	18	0	**161**	20	117	29	0	**166**	20	25	17	0	**62**	37	42	30	0	**109**	**498**
3:30PM	21	129	26	0	**176**	23	95	31	0	**149**	15	37	21	0	**73**	29	60	39	0	**128**	**526**
3:45PM	17	132	36	0	**185**	14	105	27	0	**146**	16	29	23	0	**68**	30	55	24	0	**109**	**508**
Hourly Total	78	496	102	1	**677**	74	403	117	0	**594**	78	125	87	0	**290**	128	203	121	0	**452**	**2013**
4:00PM	18	146	28	0	**192**	22	84	30	0	**136**	16	36	24	0	**76**	29	49	29	0	**107**	**511**
4:15PM	26	189	34	0	**249**	30	87	26	0	**143**	14	29	21	0	**64**	34	43	15	0	**92**	**548**
4:30PM	24	173	46	0	**243**	31	87	21	0	**139**	21	45	31	0	**97**	33	43	27	0	**103**	**582**
4:45PM	32	201	34	1	**268**	35	106	27	0	**168**	13	39	33	0	**85**	34	70	30	0	**134**	**655**

Leg	MO 150					MO 150					Ward					Ward					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	**App**	L	T	R	U	**App**	L	T	R	U	**App**	L	T	R	U	**App**	**Int**
Hourly Total	100	709	142	1	**952**	118	364	104	0	**586**	64	149	109	0	**322**	130	205	101	0	**436**	**2296**
5:00PM	27	153	32	0	**212**	36	94	33	0	**163**	24	38	26	0	**88**	38	53	45	0	**136**	**599**
5:15PM	31	212	42	0	**285**	33	134	37	0	**204**	22	49	40	0	**111**	58	56	24	0	**138**	**738**
5:30PM	34	172	44	0	**250**	17	105	30	0	**152**	22	35	24	0	**81**	40	54	30	0	**124**	**607**
5:45PM	27	136	34	1	**198**	20	82	37	0	**139**	18	48	34	0	**100**	38	41	32	0	**111**	**548**
Hourly Total	119	673	152	1	**945**	106	415	137	0	**658**	86	170	124	0	**380**	174	204	131	0	**509**	**2492**
6:00PM	34	98	32	0	**164**	30	90	25	0	**145**	14	26	28	0	**68**	34	36	22	0	**92**	**469**
6:15PM	12	98	18	0	**128**	23	90	22	0	**135**	22	27	15	0	**64**	29	41	30	0	**100**	**427**
6:30PM	15	90	19	0	**124**	28	93	16	0	**137**	19	24	24	0	**67**	17	36	17	0	**70**	**398**
6:45PM	11	84	17	0	**112**	33	90	32	1	**156**	15	16	23	0	**54**	18	26	16	0	**60**	**382**
Hourly Total	72	370	86	0	**528**	114	363	95	1	**573**	70	93	90	0	**253**	98	139	85	0	**322**	**1676**
Total	951	4912	923	7	**6793**	848	5018	1206	1	**7073**	1132	1778	1095	1	**4006**	1280	1540	1077	1	**3898**	**21770**
% Approach	14.0%	72.3%	13.6%	0.1%	-	12.0%	70.9%	17.1%	0%	-	28.3%	44.4%	27.3%	0%	-	32.8%	39.5%	27.6%	0%	-	-
% Total	4.4%	22.6%	4.2%	0%	**31.2%**	3.9%	23.1%	5.5%	0%	**32.5%**	5.2%	8.2%	5.0%	0%	**18.4%**	5.9%	7.1%	4.9%	0%	**17.9%**	-
Lights	930	4740	911	7	**6588**	826	4850	1181	1	**6858**	1113	1763	1070	1	**3947**	1237	1529	1048	1	**3815**	21208
% Lights	97.8%	96.5%	98.7%	100%	**97.0%**	97.4%	96.7%	97.9%	100%	**97.0%**	98.3%	99.2%	97.7%	100%	**98.5%**	96.6%	99.3%	97.3%	100%	**97.9%**	97.4%
Articulated Trucks	3	40	2	0	**45**	3	36	0	0	**39**	3	3	3	0	**9**	3	1	1	0	**5**	98
% Articulated Trucks	0.3%	0.8%	0.2%	0%	**0.7%**	0.4%	0.7%	0%	0%	**0.6%**	0.3%	0.2%	0.3%	0%	**0.2%**	0.2%	0.1%	0.1%	0%	**0.1%**	0.5%
Buses and Single-Unit Trucks	18	132	10	0	**160**	19	132	25	0	**176**	16	12	22	0	**50**	40	10	28	0	**78**	464
% Buses and Single-Unit Trucks	1.9%	2.7%	1.1%	0%	**2.4%**	2.2%	2.6%	2.1%	0%	**2.5%**	1.4%	0.7%	2.0%	0%	**1.2%**	3.1%	0.6%	2.6%	0%	**2.0%**	2.1%

*L: Left, R: Right, T: Thru, U: U-Turn

1_MO-150 & Ward Road - TMC
Thu Nov 17, 2022
Full Length (6 AM-7 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1_MO-150 & Ward Road - TMC

Thu Nov 17, 2022
AM Peak (7 AM - 8 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

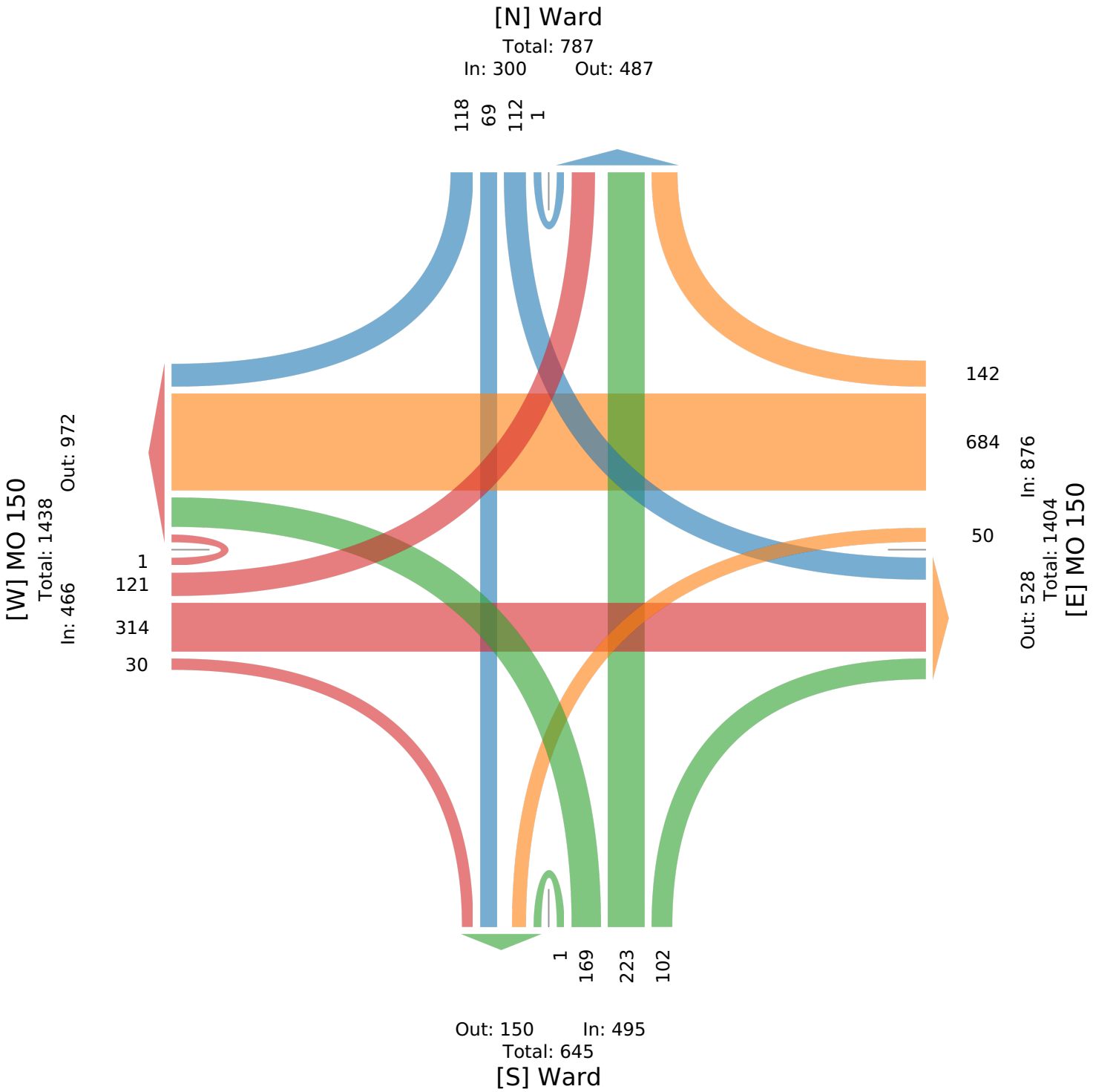
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	MO 150					MO 150					Ward					Ward					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 7:00AM	47	52	6	0	**105**	11	124	72	0	**207**	47	61	21	0	**129**	36	7	27	0	**70**	**511**
7:15AM	32	87	6	0	**125**	8	183	25	0	**216**	36	53	29	1	**119**	34	20	37	1	**92**	**552**
7:30AM	21	88	8	1	**118**	16	203	23	0	**242**	46	53	32	0	**131**	22	20	32	0	**74**	**565**
7:45AM	21	87	10	0	**118**	15	174	22	0	**211**	40	56	20	0	**116**	20	22	22	0	**64**	**509**
Total	121	314	30	1	**466**	50	684	142	0	**876**	169	223	102	1	**495**	112	69	118	1	**300**	**2137**
% Approach	26.0%	67.4%	6.4%	0.2%	-	5.7%	78.1%	16.2%	0%	-	34.1%	45.1%	20.6%	0.2%	-	37.3%	23.0%	39.3%	0.3%	-	-
% Total	5.7%	14.7%	1.4%	0%	**21.8%**	2.3%	32.0%	6.6%	0%	**41.0%**	7.9%	10.4%	4.8%	0%	**23.2%**	5.2%	3.2%	5.5%	0%	**14.0%**	-
PHF	0.644	0.892	0.750	0.250	**0.932**	0.781	0.842	0.493	-	**0.905**	0.899	0.914	0.797	0.250	**0.945**	0.778	0.784	0.797	0.250	**0.815**	0.946
Lights	120	303	27	1	**451**	46	656	138	0	**840**	168	221	100	1	**490**	101	68	114	1	**284**	2065
% Lights	99.2%	96.5%	90.0%	100%	**96.8%**	92.0%	95.9%	97.2%	0%	**95.9%**	99.4%	99.1%	98.0%	100%	**99.0%**	90.2%	98.6%	96.6%	100%	**94.7%**	96.6%
Articulated Trucks	1	1	1	0	**3**	1	4	0	0	**5**	1	0	1	0	**2**	0	0	0	0	**0**	10
% Articulated Trucks	0.8%	0.3%	3.3%	0%	**0.6%**	2.0%	0.6%	0%	0%	**0.6%**	0.6%	0%	1.0%	0%	**0.4%**	0%	0%	0%	0%	**0%**	0.5%
Buses and Single-Unit Trucks	0	10	2	0	**12**	3	24	4	0	**31**	0	2	1	0	**3**	11	1	4	0	**16**	62
% Buses and Single-Unit Trucks	0%	3.2%	6.7%	0%	**2.6%**	6.0%	3.5%	2.8%	0%	**3.5%**	0%	0.9%	1.0%	0%	**0.6%**	9.8%	1.4%	3.4%	0%	**5.3%**	2.9%

*L: Left, R: Right, T: Thru, U: U-Turn

1_MO-150 & Ward Road - TMC
Thu Nov 17, 2022
AM Peak (7 AM - 8 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1_MO-150 & Ward Road - TMC

Thu Nov 17, 2022
Midday Peak (12 PM - 1 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

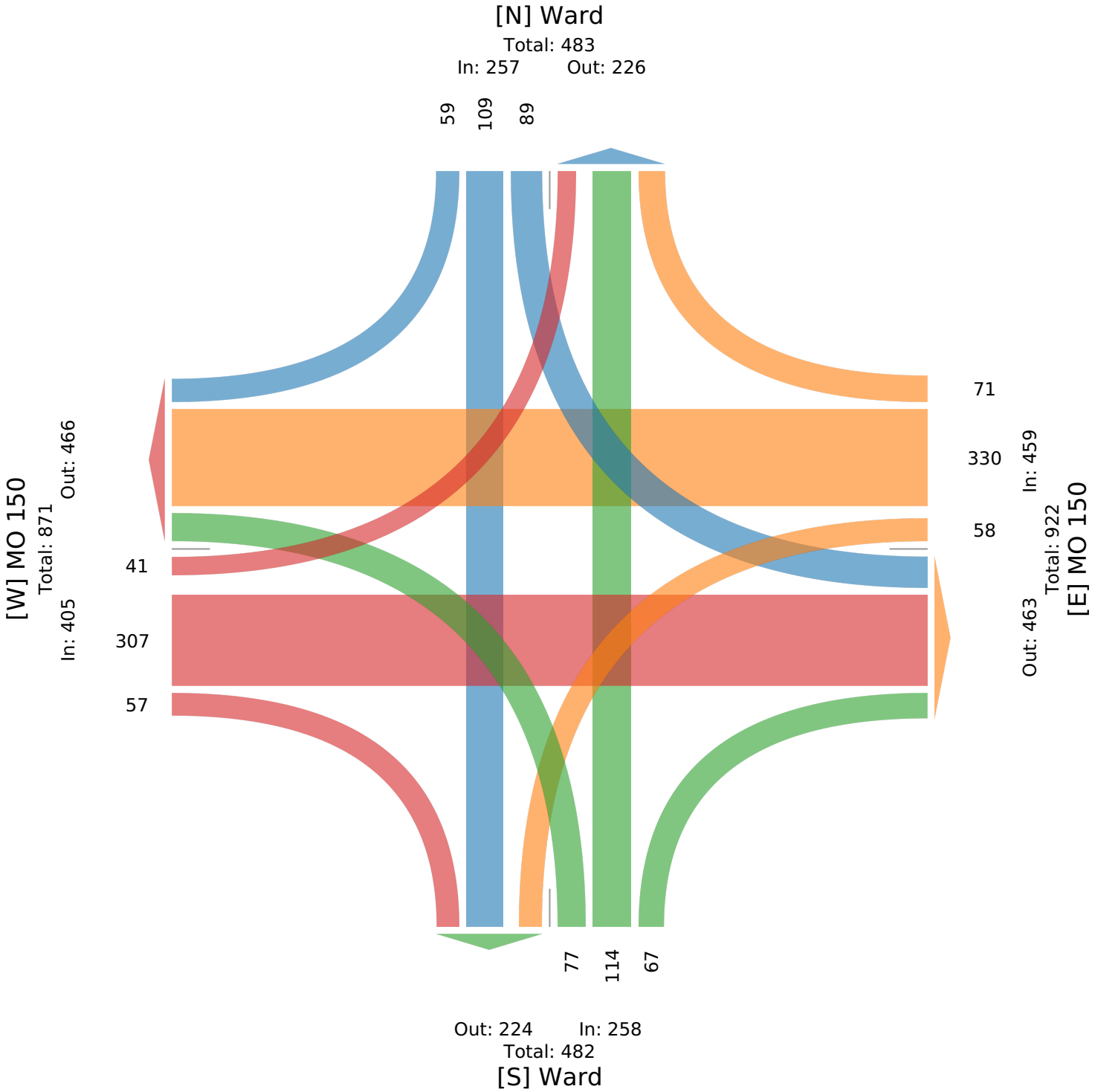
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	MO 150					MO 150					Ward					Ward					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 12:00PM	9	71	17	0	**97**	18	83	23	0	**124**	16	32	17	0	**65**	18	35	14	0	**67**	**353**
12:15PM	12	70	17	0	**99**	10	84	16	0	**110**	15	23	26	0	**64**	24	34	10	0	**68**	**341**
12:30PM	9	84	12	0	**105**	18	77	14	0	**109**	24	27	7	0	**58**	19	21	20	0	**60**	**332**
12:45PM	11	82	11	0	**104**	12	86	18	0	**116**	22	32	17	0	**71**	28	19	15	0	**62**	**353**
Total	41	307	57	0	**405**	58	330	71	0	**459**	77	114	67	0	**258**	89	109	59	0	**257**	**1379**
% Approach	10.1%	75.8%	14.1%	0%	-	12.6%	71.9%	15.5%	0%	-	29.8%	44.2%	26.0%	0%	-	34.6%	42.4%	23.0%	0%	-	-
% Total	3.0%	22.3%	4.1%	0%	**29.4%**	4.2%	23.9%	5.1%	0%	**33.3%**	5.6%	8.3%	4.9%	0%	**18.7%**	6.5%	7.9%	4.3%	0%	**18.6%**	-
PHF	0.854	0.914	0.838	-	**0.964**	0.806	0.959	0.772	-	**0.925**	0.802	0.891	0.644	-	**0.908**	0.795	0.779	0.738	-	**0.945**	0.977
Lights	38	294	56	0	**388**	58	312	66	0	**436**	75	111	65	0	**251**	85	108	55	0	**248**	1323
% Lights	92.7%	95.8%	98.2%	0%	**95.8%**	100%	94.5%	93.0%	0%	**95.0%**	97.4%	97.4%	97.0%	0%	**97.3%**	95.5%	99.1%	93.2%	0%	**96.5%**	95.9%
Articulated Trucks	0	6	0	0	**6**	0	3	0	0	**3**	0	1	0	0	**1**	2	0	0	0	**2**	12
% Articulated Trucks	0%	2.0%	0%	0%	**1.5%**	0%	0.9%	0%	0%	**0.7%**	0%	0.9%	0%	0%	**0.4%**	2.2%	0%	0%	0%	**0.8%**	0.9%
Buses and Single-Unit Trucks	3	7	1	0	**11**	0	15	5	0	**20**	2	2	2	0	**6**	2	1	4	0	**7**	44
% Buses and Single-Unit Trucks	7.3%	2.3%	1.8%	0%	**2.7%**	0%	4.5%	7.0%	0%	**4.4%**	2.6%	1.8%	3.0%	0%	**2.3%**	2.2%	0.9%	6.8%	0%	**2.7%**	3.2%

*L: Left, R: Right, T: Thru, U: U-Turn

1_MO-150 & Ward Road - TMC
Thu Nov 17, 2022
Midday Peak (12 PM - 1 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



1_MO-150 & Ward Road - TMC

Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

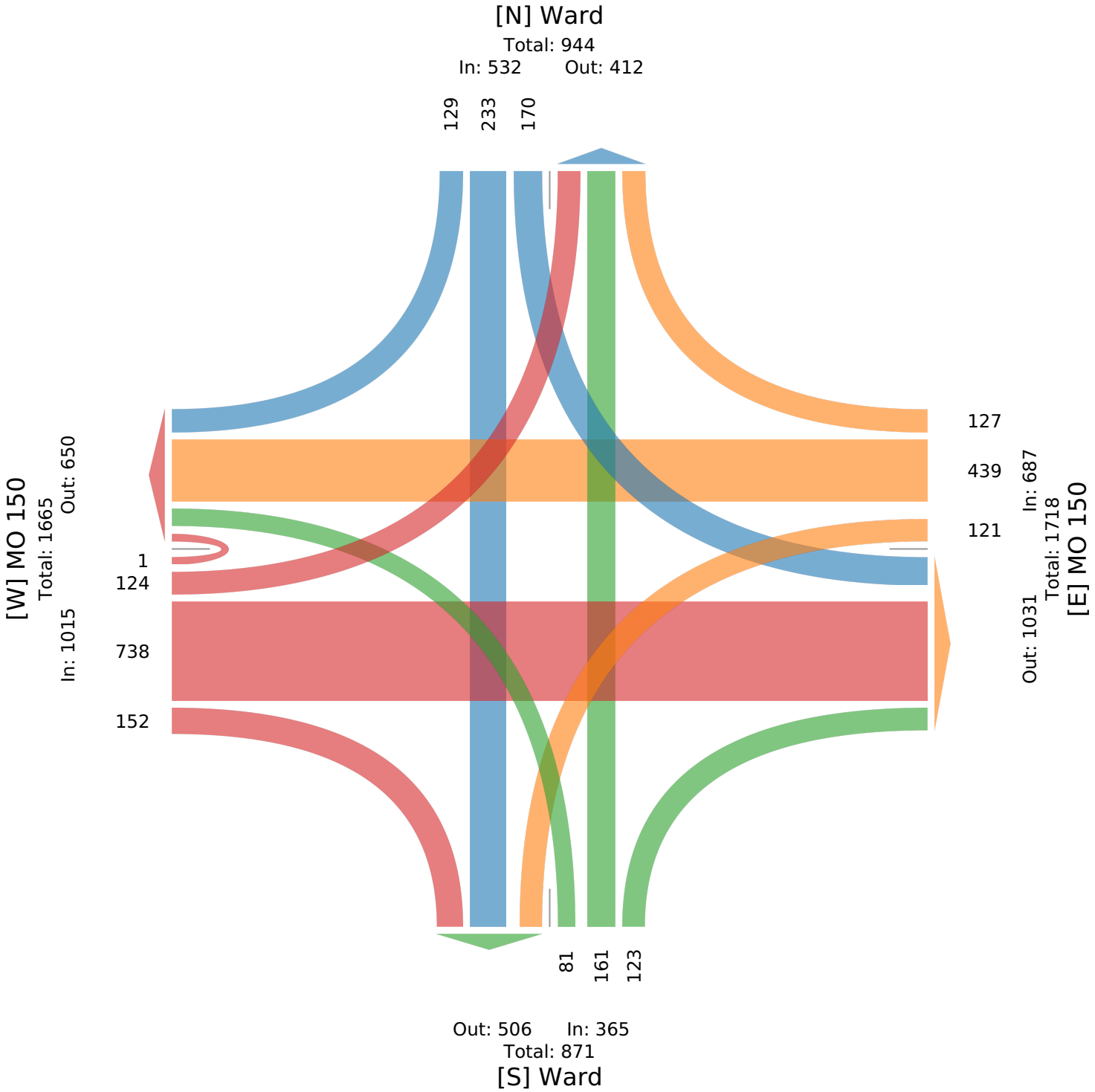
GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	MO 150					MO 150					Ward					Ward					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	**App**	L	T	R	U	**App**	L	T	R	U	**App**	L	T	R	U	**App**	**Int**
2022-11-17 4:45PM	32	201	34	1	**268**	35	106	27	0	**168**	13	39	33	0	**85**	34	70	30	0	**134**	**655**
5:00PM	27	153	32	0	**212**	36	94	33	0	**163**	24	38	26	0	**88**	38	53	45	0	**136**	**599**
5:15PM	31	212	42	0	**285**	33	134	37	0	**204**	22	49	40	0	**111**	58	56	24	0	**138**	**738**
5:30PM	34	172	44	0	**250**	17	105	30	0	**152**	22	35	24	0	**81**	40	54	30	0	**124**	**607**
Total	124	738	152	1	**1015**	121	439	127	0	**687**	81	161	123	0	**365**	170	233	129	0	**532**	**2599**
% Approach	12.2%	72.7%	15.0%	0.1%	**-**	17.6%	63.9%	18.5%	0%	**-**	22.2%	44.1%	33.7%	0%	**-**	32.0%	43.8%	24.2%	0%	**-**	-
% Total	4.8%	28.4%	5.8%	0%	**39.1%**	4.7%	16.9%	4.9%	0%	**26.4%**	3.1%	6.2%	4.7%	0%	**14.0%**	6.5%	9.0%	5.0%	0%	**20.5%**	-
PHF	0.912	0.870	0.864	0.250	**0.890**	0.840	0.819	0.858	-	**0.842**	0.844	0.821	0.769	-	**0.822**	0.733	0.832	0.717	-	**0.964**	0.880
Lights	123	730	152	1	**1006**	120	434	127	0	**681**	81	161	123	0	**365**	169	233	129	0	**531**	2583
% Lights	99.2%	98.9%	100%	100%	**99.1%**	99.2%	98.9%	100%	0%	**99.1%**	100%	100%	100%	0%	**100%**	99.4%	100%	100%	0%	**99.8%**	99.4%
Articulated Trucks	0	3	0	0	**3**	1	2	0	0	**3**	0	0	0	0	**0**	0	0	0	0	**0**	6
% Articulated Trucks	0%	0.4%	0%	0%	**0.3%**	0.8%	0.5%	0%	0%	**0.4%**	0%	0%	0%	0%	**0%**	0%	0%	0%	0%	**0%**	0.2%
Buses and Single-Unit Trucks	1	5	0	0	**6**	0	3	0	0	**3**	0	0	0	0	**0**	1	0	0	0	**1**	10
% Buses and Single-Unit Trucks	0.8%	0.7%	0%	0%	**0.6%**	0%	0.7%	0%	0%	**0.4%**	0%	0%	0%	0%	**0%**	0.6%	0%	0%	0%	**0.2%**	0.4%

*L: Left, R: Right, T: Thru, U: U-Turn

1_MO-150 & Ward Road - TMC
Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012132, Location: 38.853263, -94.398718

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

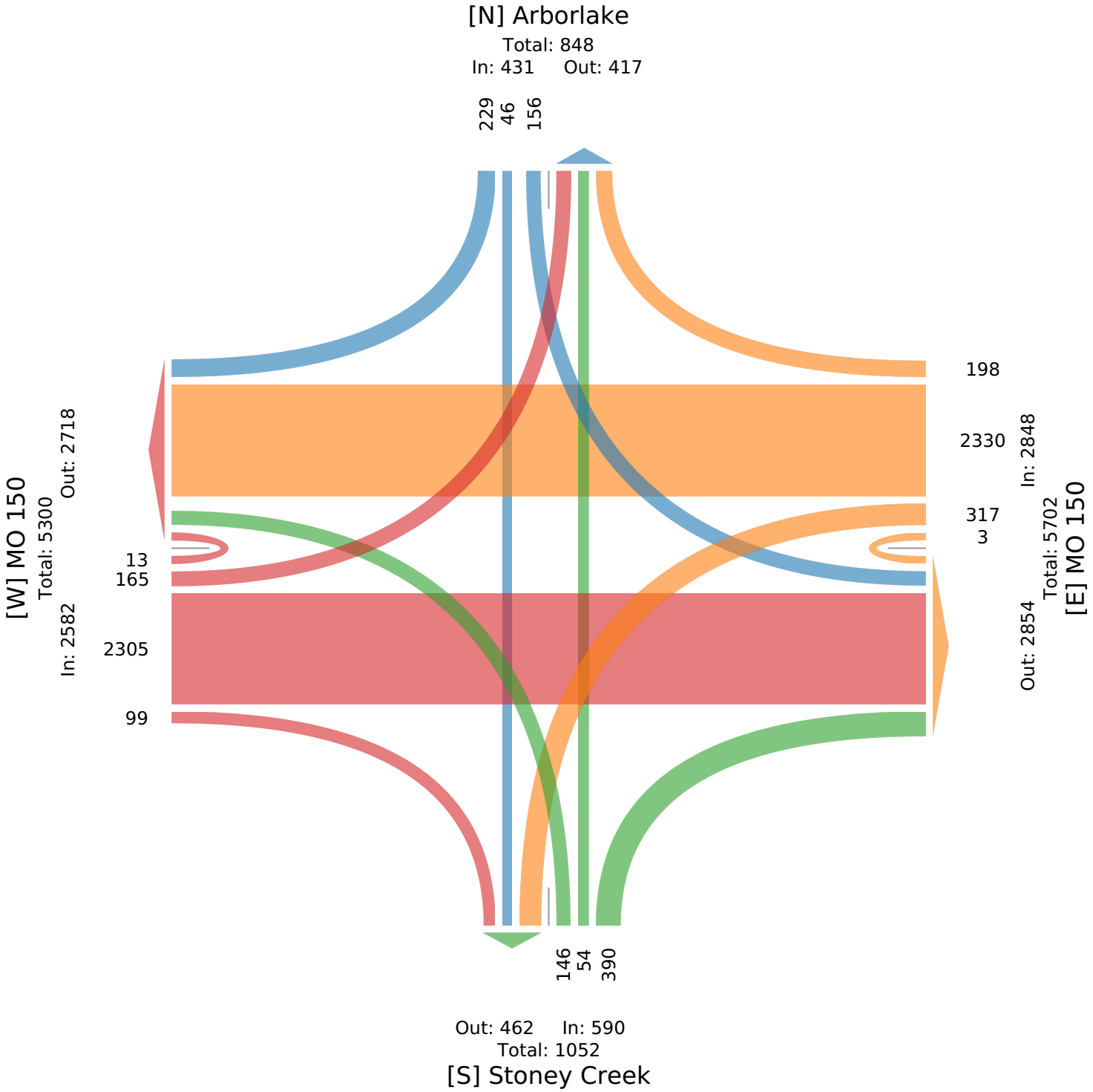
Leg	MO 150					MO 150					Stoney Creek					Arborlake					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 7:00AM	5	69	1	0	**75**	9	185	11	0	**205**	10	4	33	0	**47**	3	2	12	0	**17**	**344**
7:15AM	4	85	2	0	**91**	11	227	13	0	**251**	20	5	22	0	**47**	11	1	23	0	**35**	**424**
7:30AM	4	81	1	2	**88**	13	253	17	0	**283**	11	5	23	0	**39**	9	2	29	0	**40**	**450**
7:45AM	7	92	0	1	**100**	8	212	10	0	**230**	9	2	21	0	**32**	11	4	15	0	**30**	**392**
Hourly Total	20	327	4	3	**354**	41	877	51	0	**969**	50	16	99	0	**165**	34	9	79	0	**122**	**1610**
8:00AM	7	98	1	0	**106**	15	185	10	0	**210**	12	3	27	0	**42**	7	0	16	0	**23**	**381**
8:15AM	6	69	2	2	**79**	12	155	10	0	**177**	11	2	22	0	**35**	7	2	12	0	**21**	**312**
8:30AM	11	75	4	1	**91**	13	146	13	1	**173**	12	5	24	0	**41**	5	4	10	0	**19**	**324**
8:45AM	10	99	2	2	**113**	10	128	9	0	**147**	27	4	19	0	**50**	10	0	19	0	**29**	**339**
Hourly Total	34	341	9	5	**389**	50	614	42	1	**707**	62	14	92	0	**168**	29	6	57	0	**92**	**1356**
4:00PM	12	183	17	0	**212**	23	99	9	2	**133**	8	3	14	0	**25**	11	3	9	0	**23**	**393**
4:15PM	16	230	16	2	**264**	17	90	12	0	**119**	3	2	22	0	**27**	15	2	11	0	**28**	**438**
4:30PM	15	211	8	0	**234**	23	95	17	0	**135**	2	2	23	0	**27**	10	2	10	0	**22**	**418**
4:45PM	14	217	9	1	**241**	26	109	9	0	**144**	6	4	27	0	**37**	17	3	5	0	**25**	**447**
Hourly Total	57	841	50	3	**951**	89	393	47	2	**531**	19	11	86	0	**116**	53	10	35	0	**98**	**1696**
5:00PM	13	190	8	0	**211**	28	128	14	0	**170**	7	5	31	0	**43**	10	8	12	0	**30**	**454**
5:15PM	17	251	13	0	**281**	40	122	12	0	**174**	1	3	33	0	**37**	11	5	19	0	**35**	**527**
5:30PM	13	188	6	0	**207**	34	113	13	0	**160**	3	3	25	0	**31**	11	6	13	0	**30**	**428**
5:45PM	11	167	9	2	**189**	35	83	19	0	**137**	4	2	24	0	**30**	8	2	14	0	**24**	**380**
Hourly Total	54	796	36	2	**888**	137	446	58	0	**641**	15	13	113	0	**141**	40	21	58	0	**119**	**1789**
Total	165	2305	99	13	**2582**	317	2330	198	3	**2848**	146	54	390	0	**590**	156	46	229	0	**431**	**6451**
% Approach	6.4%	89.3%	3.8%	0.5%	**-**	11.1%	81.8%	7.0%	0.1%	**-**	24.7%	9.2%	66.1%	0%	**-**	36.2%	10.7%	53.1%	0%	**-**	-
% Total	2.6%	35.7%	1.5%	0.2%	**40.0%**	4.9%	36.1%	3.1%	0%	**44.1%**	2.3%	0.8%	6.0%	0%	**9.1%**	2.4%	0.7%	3.5%	0%	**6.7%**	-
Lights	157	2250	96	13	**2516**	316	2264	192	3	**2775**	142	53	387	0	**582**	151	41	218	0	**410**	6283
% Lights	95.2%	97.6%	97.0%	100%	**97.4%**	99.7%	97.2%	97.0%	100%	**97.4%**	97.3%	98.1%	99.2%	0%	**98.6%**	96.8%	89.1%	95.2%	0%	**95.1%**	97.4%
Articulated Trucks	0	6	0	0	**6**	0	14	0	0	**14**	0	0	1	0	**1**	1	0	2	0	**3**	24
% Articulated Trucks	0%	0.3%	0%	0%	**0.2%**	0%	0.6%	0%	0%	**0.5%**	0%	0%	0.3%	0%	**0.2%**	0.6%	0%	0.9%	0%	**0.7%**	0.4%
Buses and Single-Unit Trucks	8	49	3	0	**60**	1	52	6	0	**59**	4	1	2	0	**7**	4	5	9	0	**18**	144
% Buses and Single-Unit Trucks	4.8%	2.1%	3.0%	0%	**2.3%**	0.3%	2.2%	3.0%	0%	**2.1%**	2.7%	1.9%	0.5%	0%	**1.2%**	2.6%	10.9%	3.9%	0%	**4.2%**	2.2%

*L: Left, R: Right, T: Thru, U: U-Turn

2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

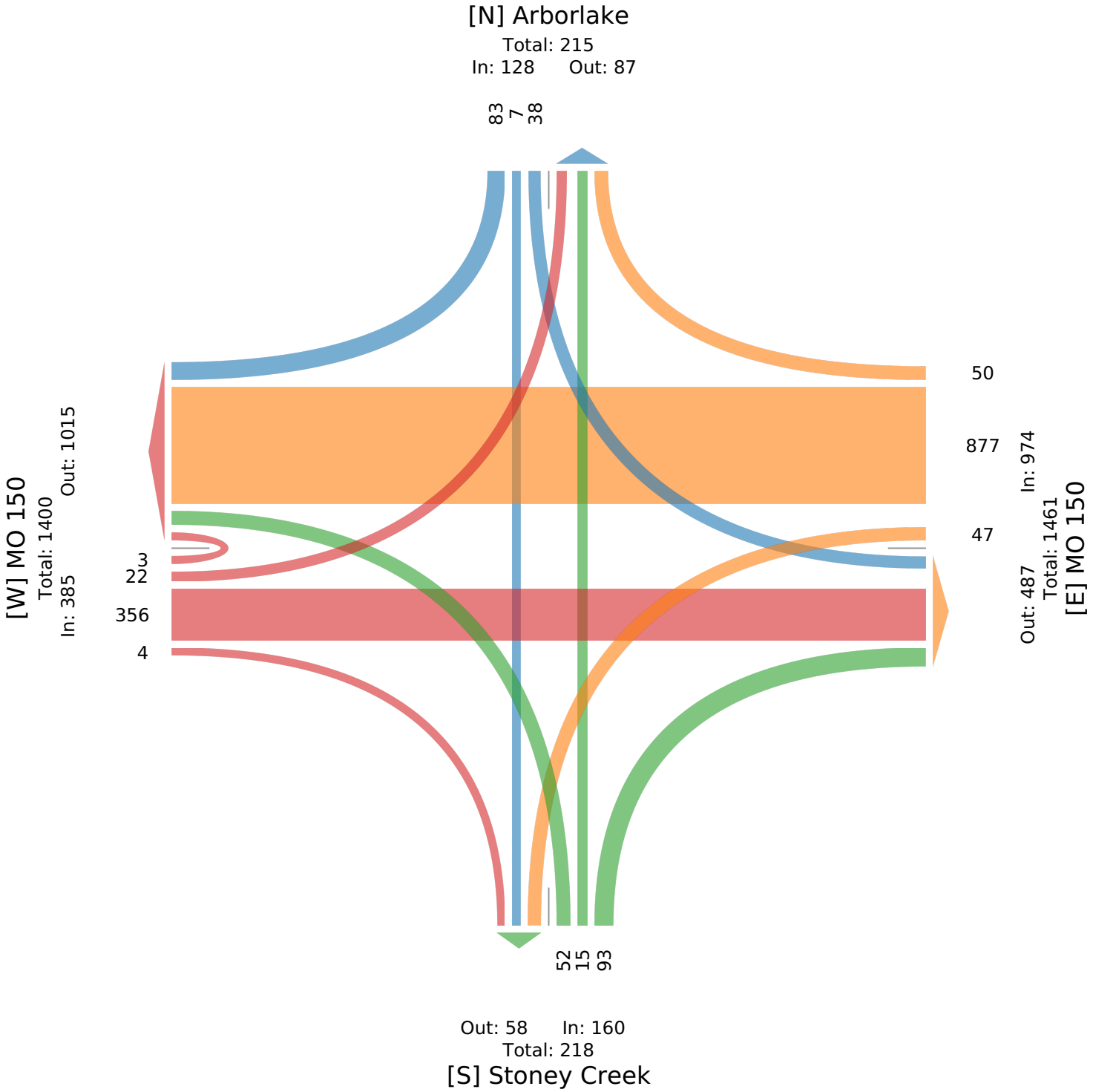
Leg	MO 150					MO 150					Stoney Creek					Arborlake					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 7:15AM	4	85	2	0	**91**	11	227	13	0	**251**	20	5	22	0	**47**	11	1	23	0	**35**	**424**
7:30AM	4	81	1	2	**88**	13	253	17	0	**283**	11	5	23	0	**39**	9	2	29	0	**40**	**450**
7:45AM	7	92	0	1	**100**	8	212	10	0	**230**	9	2	21	0	**32**	11	4	15	0	**30**	**392**
8:00AM	7	98	1	0	**106**	15	185	10	0	**210**	12	3	27	0	**42**	7	0	16	0	**23**	**381**
Total	22	356	4	3	**385**	47	877	50	0	**974**	52	15	93	0	**160**	38	7	83	0	**128**	**1647**
% Approach	5.7%	92.5%	1.0%	0.8%	**-**	4.8%	90.0%	5.1%	0%	**-**	32.5%	9.4%	58.1%	0%	**-**	29.7%	5.5%	64.8%	0%	**-**	-
% Total	1.3%	21.6%	0.2%	0.2%	**23.4%**	2.9%	53.2%	3.0%	0%	**59.1%**	3.2%	0.9%	5.6%	0%	**9.7%**	2.3%	0.4%	5.0%	0%	**7.8%**	-
PHF	0.786	0.908	0.500	0.375	**0.908**	0.783	0.867	0.735	-	**0.860**	0.650	0.750	0.861	-	**0.851**	0.864	0.438	0.716	-	**0.800**	0.915
Lights	18	335	4	3	**360**	47	852	47	0	**946**	52	15	93	0	**160**	36	6	78	0	**120**	1586
% Lights	81.8%	94.1%	100%	100%	**93.5%**	100%	97.1%	94.0%	0%	**97.1%**	100%	100%	100%	0%	**100%**	94.7%	85.7%	94.0%	0%	**93.8%**	96.3%
Articulated Trucks	0	3	0	0	**3**	0	5	0	0	**5**	0	0	0	0	**0**	1	0	1	0	**2**	10
% Articulated Trucks	0%	0.8%	0%	0%	**0.8%**	0%	0.6%	0%	0%	**0.5%**	0%	0%	0%	0%	**0%**	2.6%	0%	1.2%	0%	**1.6%**	0.6%
Buses and Single-Unit Trucks	4	18	0	0	**22**	0	20	3	0	**23**	0	0	0	0	**0**	1	1	4	0	**6**	51
% Buses and Single-Unit Trucks	18.2%	5.1%	0%	0%	**5.7%**	0%	2.3%	6.0%	0%	**2.4%**	0%	0%	0%	0%	**0%**	2.6%	14.3%	4.8%	0%	**4.7%**	3.1%

*L: Left, R: Right, T: Thru, U: U-Turn

2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
AM Peak (7:15 AM - 8:15 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

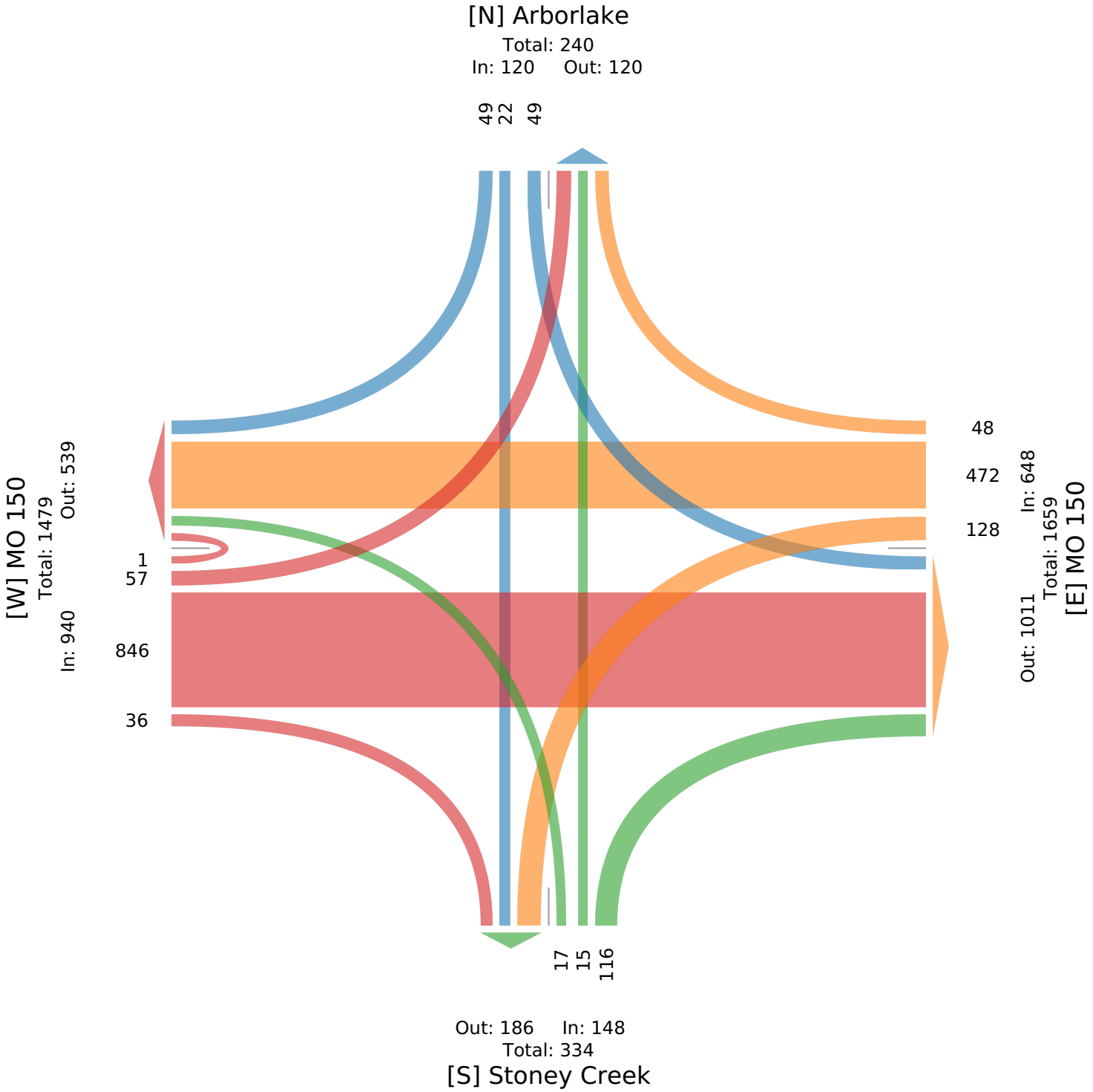
Leg	MO 150					MO 150					Stoney Creek					Arborlake					
Direction	Eastbound					Westbound					Northbound					Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2022-11-17 4:45PM	14	217	9	1	**241**	26	109	9	0	**144**	6	4	27	0	**37**	17	3	5	0	**25**	**447**
5:00PM	13	190	8	0	**211**	28	128	14	0	**170**	7	5	31	0	**43**	10	8	12	0	**30**	**454**
5:15PM	17	251	13	0	**281**	40	122	12	0	**174**	1	3	33	0	**37**	11	5	19	0	**35**	**527**
5:30PM	13	188	6	0	**207**	34	113	13	0	**160**	3	3	25	0	**31**	11	6	13	0	**30**	**428**
Total	57	846	36	1	**940**	128	472	48	0	**648**	17	15	116	0	**148**	49	22	49	0	**120**	**1856**
% Approach	6.1%	90.0%	3.8%	0.1%	**-**	19.8%	72.8%	7.4%	0%	**-**	11.5%	10.1%	78.4%	0%	**-**	40.8%	18.3%	40.8%	0%	**-**	-
% Total	3.1%	45.6%	1.9%	0.1%	**50.6%**	6.9%	25.4%	2.6%	0%	**34.9%**	0.9%	0.8%	6.3%	0%	**8.0%**	2.6%	1.2%	2.6%	0%	**6.5%**	-
PHF	0.838	0.843	0.692	0.250	**0.836**	0.800	0.922	0.857	-	**0.931**	0.607	0.750	0.879	-	**0.860**	0.721	0.688	0.645	-	**0.857**	0.880
Lights	56	838	36	1	**931**	128	468	48	0	**644**	17	15	114	0	**146**	48	22	48	0	**118**	1839
% Lights	98.2%	99.1%	100%	100%	**99.0%**	100%	99.2%	100%	0%	**99.4%**	100%	100%	98.3%	0%	**98.6%**	98.0%	100%	98.0%	0%	**98.3%**	99.1%
Articulated Trucks	0	1	0	0	**1**	0	2	0	0	**2**	0	0	1	0	**1**	0	0	0	0	**0**	4
% Articulated Trucks	0%	0.1%	0%	0%	**0.1%**	0%	0.4%	0%	0%	**0.3%**	0%	0%	0.9%	0%	**0.7%**	0%	0%	0%	0%	**0%**	0.2%
Buses and Single-Unit Trucks	1	7	0	0	**8**	0	2	0	0	**2**	0	0	1	0	**1**	1	0	1	0	**2**	13
% Buses and Single-Unit Trucks	1.8%	0.8%	0%	0%	**0.9%**	0%	0.4%	0%	0%	**0.3%**	0%	0%	0.9%	0%	**0.7%**	2.0%	0%	2.0%	0%	**1.7%**	0.7%

*L: Left, R: Right, T: Thru, U: U-Turn

2_MO-150 & Arborlake Drive/Stoney Creek Drive - TMC

Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012130, Location: 38.853449, -94.404891

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC

Thu Nov 17, 2022
Full Length (6 AM-7 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

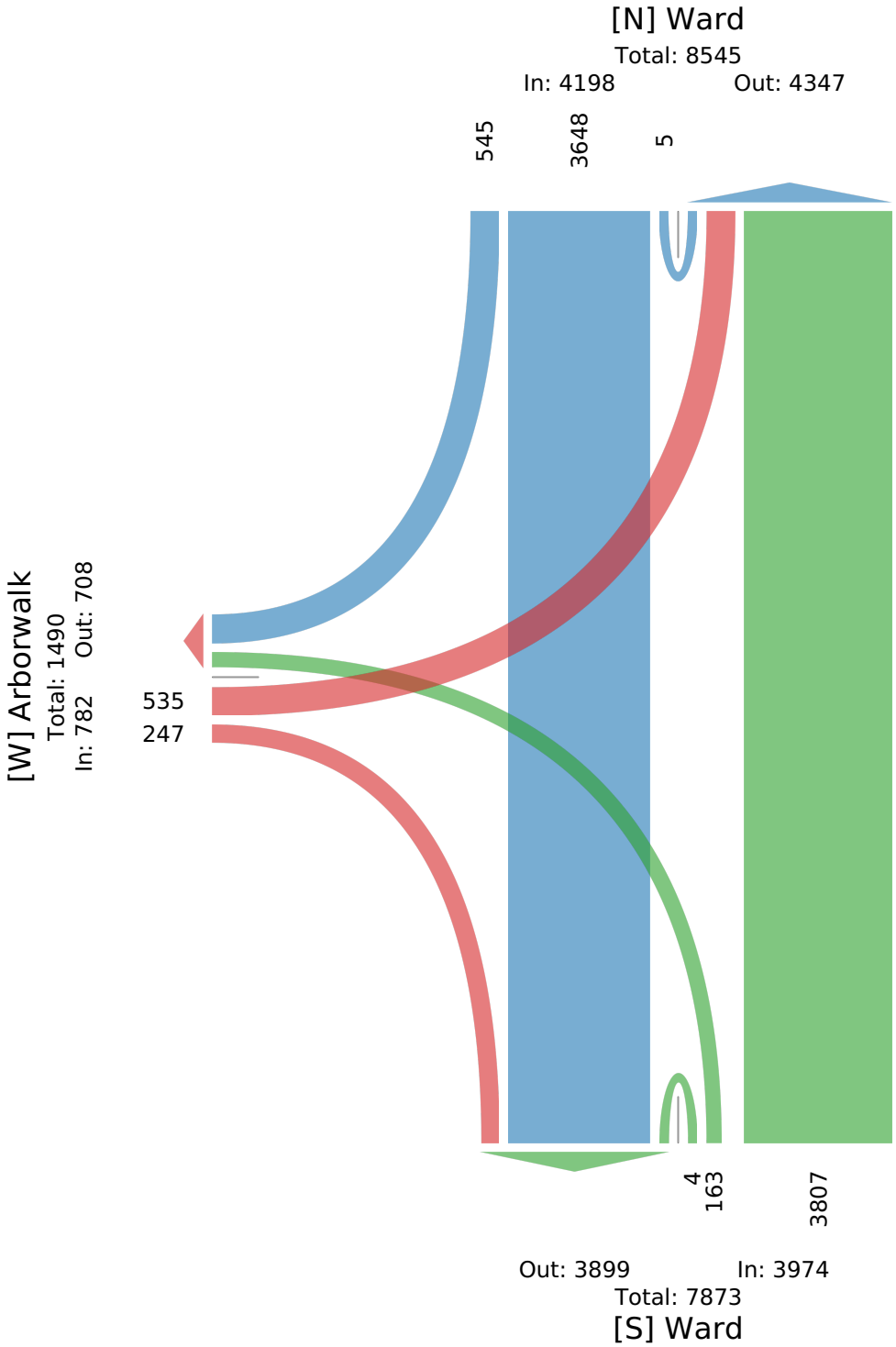
Leg	Arborwalk				Ward				Ward				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	App	L	T	U	App	T	R	U	App	Int
2022-11-17 6:00AM	4	1	0	**5**	0	16	0	**16**	15	3	0	**18**	**39**
6:15AM	8	2	0	**10**	1	31	0	**32**	21	4	0	**25**	**67**
6:30AM	17	4	0	**21**	0	53	0	**53**	26	2	0	**28**	**102**
6:45AM	21	7	0	**28**	2	136	0	**138**	25	4	0	**29**	**195**
Hourly Total	50	14	0	**64**	3	236	0	**239**	87	13	0	**100**	**403**
7:00AM	27	3	0	**30**	2	179	0	**181**	69	4	0	**73**	**284**
7:15AM	17	3	0	**20**	1	114	0	**115**	92	10	0	**102**	**237**
7:30AM	18	8	0	**26**	6	92	0	**98**	65	4	0	**69**	**193**
7:45AM	16	7	0	**23**	2	100	0	**102**	53	7	0	**60**	**185**
Hourly Total	78	21	0	**99**	11	485	0	**496**	279	25	0	**304**	**899**
8:00AM	14	1	0	**15**	2	96	0	**98**	51	3	0	**54**	**167**
8:15AM	8	4	0	**12**	5	104	0	**109**	48	11	0	**59**	**180**
8:30AM	13	5	0	**18**	4	88	0	**92**	40	7	0	**47**	**157**
8:45AM	13	2	0	**15**	2	95	0	**97**	53	5	0	**58**	**170**
Hourly Total	48	12	0	**60**	13	383	0	**396**	192	26	0	**218**	**674**
9:00AM	5	4	0	**9**	2	77	0	**79**	45	8	0	**53**	**141**
9:15AM	5	5	0	**10**	3	52	0	**55**	37	12	0	**49**	**114**
9:30AM	9	0	0	**9**	0	63	0	**63**	43	6	1	**50**	**122**
9:45AM	6	1	0	**7**	1	59	0	**60**	44	4	0	**48**	**115**
Hourly Total	25	10	0	**35**	6	251	0	**257**	169	30	1	**200**	**492**
10:00AM	11	6	0	**17**	4	50	0	**54**	53	4	0	**57**	**128**
10:15AM	6	2	0	**8**	2	51	0	**53**	48	6	0	**54**	**115**
10:30AM	11	6	0	**17**	0	52	0	**52**	51	9	0	**60**	**129**
10:45AM	7	5	0	**12**	1	55	0	**56**	54	5	1	**60**	**128**
Hourly Total	35	19	0	**54**	7	208	0	**215**	206	24	1	**231**	**500**
11:00AM	1	2	0	**3**	2	56	0	**58**	31	8	1	**40**	**101**
11:15AM	9	5	0	**14**	4	61	0	**65**	60	6	2	**68**	**147**
11:30AM	7	7	0	**14**	2	55	0	**57**	53	7	0	**60**	**131**
11:45AM	10	4	0	**14**	1	45	0	**46**	54	10	0	**64**	**124**
Hourly Total	27	18	0	**45**	9	217	0	**226**	198	31	3	**232**	**503**
12:00PM	7	6	0	**13**	5	60	0	**65**	61	10	0	**71**	**149**
12:15PM	12	7	0	**19**	2	45	0	**47**	59	13	0	**72**	**138**
12:30PM	12	5	0	**17**	9	46	0	**55**	61	7	0	**68**	**140**
12:45PM	5	3	0	**8**	2	60	0	**62**	57	11	0	**68**	**138**
Hourly Total	36	21	0	**57**	18	211	0	**229**	238	41	0	**279**	**565**
1:00PM	8	4	0	**12**	4	51	0	**55**	43	3	0	**46**	**113**
1:15PM	6	2	0	**8**	1	58	0	**59**	62	9	0	**71**	**138**
1:30PM	4	4	0	**8**	6	57	0	**63**	67	9	0	**76**	**147**
1:45PM	8	5	0	**13**	4	58	1	**63**	77	12	0	**89**	**165**
Hourly Total	26	15	0	**41**	15	224	1	**240**	249	33	0	**282**	**563**
2:00PM	6	3	0	**9**	3	72	0	**75**	52	14	0	**66**	**150**
2:15PM	10	4	0	**14**	4	63	0	**67**	123	13	0	**136**	**217**
2:30PM	10	2	0	**12**	2	73	0	**75**	144	14	0	**158**	**245**
2:45PM	8	6	0	**14**	4	81	0	**85**	97	11	0	**108**	**207**
Hourly Total	34	15	0	**49**	13	289	0	**302**	416	52	0	**468**	**819**
3:00PM	10	0	0	**10**	6	82	0	**88**	104	9	0	**113**	**211**
3:15PM	9	8	0	**17**	7	69	0	**76**	106	14	0	**120**	**213**
3:30PM	10	7	0	**17**	3	82	0	**85**	117	11	0	**128**	**230**
3:45PM	14	4	0	**18**	6	70	0	**76**	105	19	0	**124**	**218**
Hourly Total	43	19	0	**62**	22	303	0	**325**	432	53	0	**485**	**872**
4:00PM	11	4	0	**15**	5	82	0	**87**	101	18	0	**119**	**221**
4:15PM	13	15	0	**28**	4	78	0	**82**	80	22	0	**102**	**212**
4:30PM	8	5	0	**13**	1	97	0	**98**	95	10	0	**105**	**216**
4:45PM	19	7	0	**26**	3	95	0	**98**	128	16	0	**144**	**268**

Leg	Arborwalk				Ward				Ward				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
Hourly Total	51	31	0	**82**	13	352	0	**365**	404	66	0	**470**	**917**
5:00PM	18	10	0	**28**	7	91	0	**98**	126	18	0	**144**	**270**
5:15PM	10	12	0	**22**	4	109	1	**114**	130	28	0	**158**	**294**
5:30PM	8	9	0	**17**	2	97	1	**100**	110	20	0	**130**	**247**
5:45PM	3	5	0	**8**	4	106	0	**110**	104	21	0	**125**	**243**
Hourly Total	39	36	0	**75**	17	403	2	**422**	470	87	0	**557**	**1054**
6:00PM	13	3	0	**16**	4	77	0	**81**	91	12	0	**103**	**200**
6:15PM	11	5	0	**16**	4	60	0	**64**	90	17	0	**107**	**187**
6:30PM	9	4	0	**13**	2	48	0	**50**	69	20	0	**89**	**152**
6:45PM	10	4	0	**14**	6	60	1	**67**	58	15	0	**73**	**154**
Hourly Total	43	16	0	**59**	16	245	1	**262**	308	64	0	**372**	**693**
Total	535	247	0	**782**	163	3807	4	**3974**	3648	545	5	**4198**	**8954**
% Approach	68.4%	31.6%	0%	**-**	4.1%	95.8%	0.1%	**-**	86.9%	13.0%	0.1%	**-**	-
% Total	6.0%	2.8%	0%	**8.7%**	1.8%	42.5%	0%	**44.4%**	40.7%	6.1%	0.1%	**46.9%**	-
Lights	521	242	0	**763**	154	3750	4	**3908**	3576	527	5	**4108**	8779
% Lights	97.4%	98.0%	0%	**97.6%**	94.5%	98.5%	100%	**98.3%**	98.0%	96.7%	100%	**97.9%**	98.0%
Articulated Trucks	2	0	0	**2**	2	4	0	**6**	4	1	0	**5**	13
% Articulated Trucks	0.4%	0%	0%	**0.3%**	1.2%	0.1%	0%	**0.2%**	0.1%	0.2%	0%	**0.1%**	0.1%
Buses and Single-Unit Trucks	12	5	0	**17**	7	53	0	**60**	68	17	0	**85**	162
% Buses and Single-Unit Trucks	2.2%	2.0%	0%	**2.2%**	4.3%	1.4%	0%	**1.5%**	1.9%	3.1%	0%	**2.0%**	1.8%

*L: Left, R: Right, T: Thru, U: U-Turn

3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC
Thu Nov 17, 2022
Full Length (6 AM-7 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC

Thu Nov 17, 2022
AM Peak (6:45 AM - 7:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

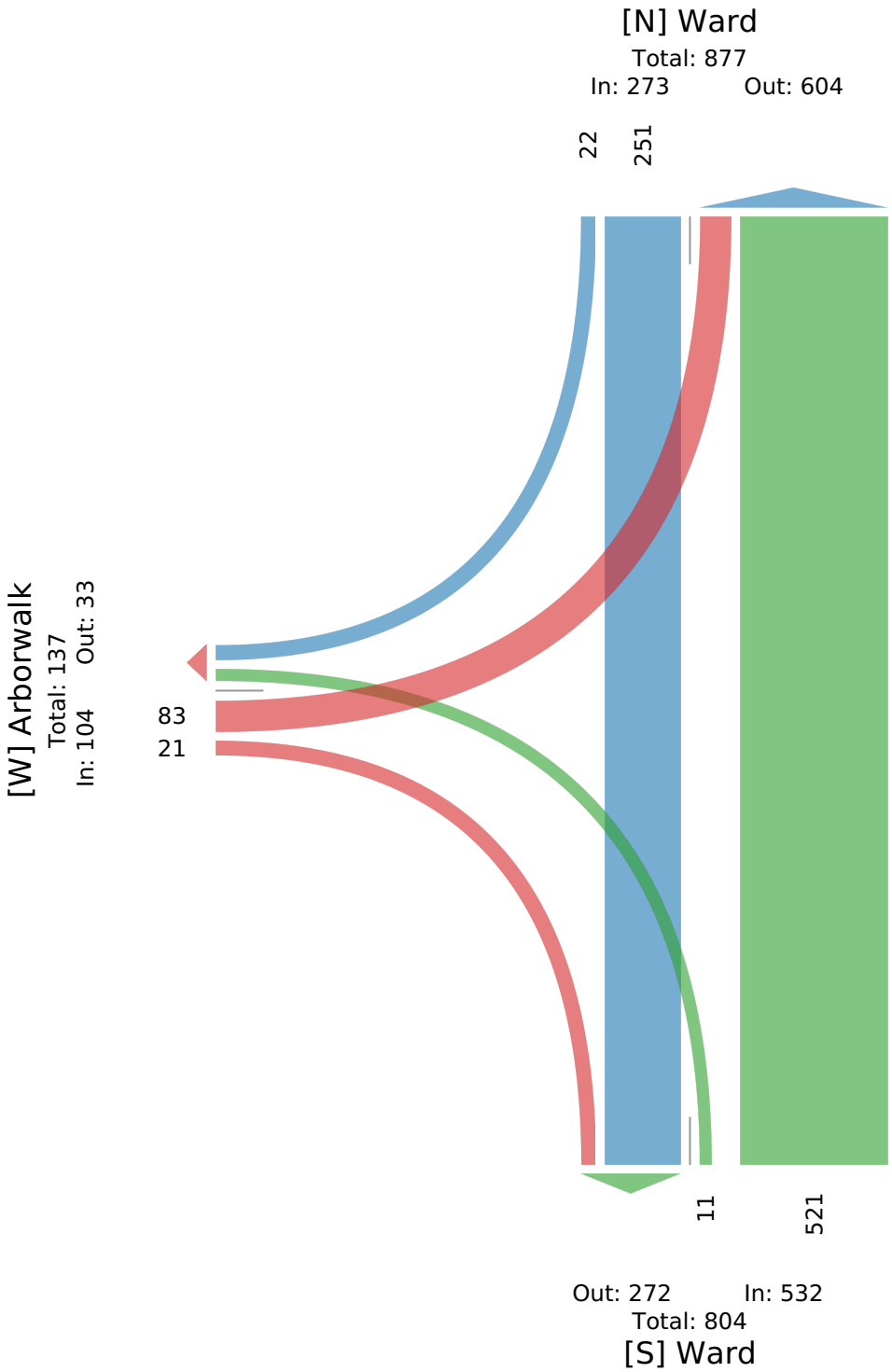
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Arborwalk Eastbound				Ward Northbound				Ward Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 6:45AM	21	7	0	**28**	2	136	0	**138**	25	4	0	**29**	**195**
7:00AM	27	3	0	**30**	2	179	0	**181**	69	4	0	**73**	**284**
7:15AM	17	3	0	**20**	1	114	0	**115**	92	10	0	**102**	**237**
7:30AM	18	8	0	**26**	6	92	0	**98**	65	4	0	**69**	**193**
Total	83	21	0	**104**	11	521	0	**532**	251	22	0	**273**	**909**
% Approach	79.8%	20.2%	0%	**-**	2.1%	97.9%	0%	**-**	91.9%	8.1%	0%	**-**	-
% Total	9.1%	2.3%	0%	**11.4%**	1.2%	57.3%	0%	**58.5%**	27.6%	2.4%	0%	**30.0%**	-
PHF	0.769	0.656	-	**0.867**	0.458	0.728	-	**0.735**	0.682	0.550	-	**0.669**	0.800
Lights	83	19	0	**102**	7	514	0	**521**	238	17	0	**255**	878
% Lights	100%	90.5%	0%	**98.1%**	63.6%	98.7%	0%	**97.9%**	94.8%	77.3%	0%	**93.4%**	96.6%
Articulated Trucks	0	0	0	**0**	1	0	0	**1**	0	0	0	**0**	1
% Articulated Trucks	0%	0%	0%	**0%**	9.1%	0%	0%	**0.2%**	0%	0%	0%	**0%**	0.1%
Buses and Single-Unit Trucks	0	2	0	**2**	3	7	0	**10**	13	5	0	**18**	30
% Buses and Single-Unit Trucks	0%	9.5%	0%	**1.9%**	27.3%	1.3%	0%	**1.9%**	5.2%	22.7%	0%	**6.6%**	3.3%

*L: Left, R: Right, T: Thru, U: U-Turn

3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC
Thu Nov 17, 2022
AM Peak (6:45 AM - 7:45 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC

Thu Nov 17, 2022
Midday Peak (12 PM - 1 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

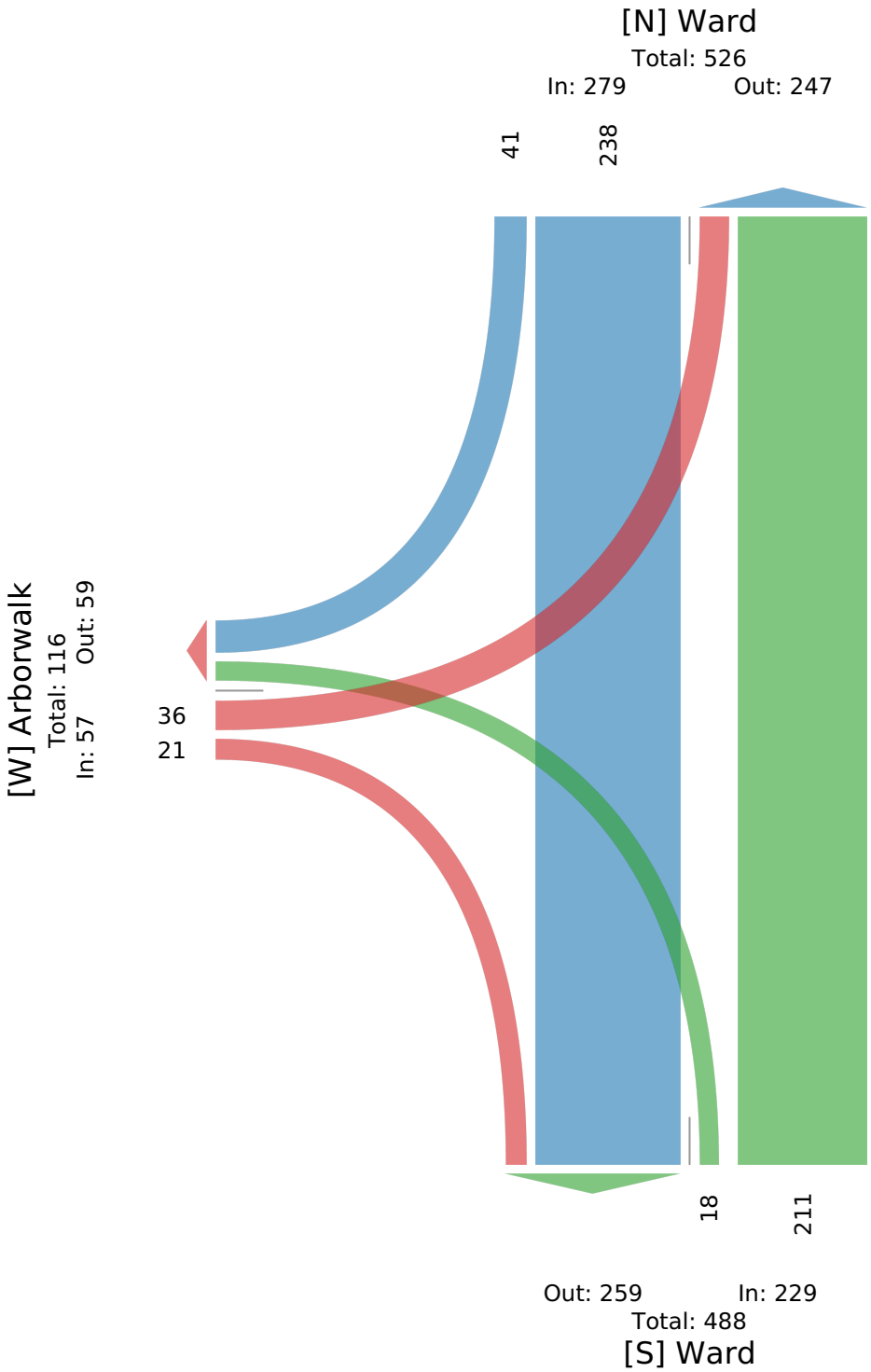
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Arborwalk				Ward				Ward				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 12:00PM	7	6	0	**13**	5	60	0	**65**	61	10	0	**71**	**149**
12:15PM	12	7	0	**19**	2	45	0	**47**	59	13	0	**72**	**138**
12:30PM	12	5	0	**17**	9	46	0	**55**	61	7	0	**68**	**140**
12:45PM	5	3	0	**8**	2	60	0	**62**	57	11	0	**68**	**138**
Total	36	21	0	**57**	18	211	0	**229**	238	41	0	**279**	**565**
% Approach	63.2%	36.8%	0%	**-**	7.9%	92.1%	0%	**-**	85.3%	14.7%	0%	**-**	-
% Total	6.4%	3.7%	0%	**10.1%**	3.2%	37.3%	0%	**40.5%**	42.1%	7.3%	0%	**49.4%**	-
PHF	0.750	0.750	-	**0.750**	0.500	0.879	-	**0.881**	0.975	0.788	-	**0.969**	0.948
Lights	35	21	0	**56**	16	202	0	**218**	229	39	0	**268**	542
% Lights	97.2%	100%	0%	**98.2%**	88.9%	95.7%	0%	**95.2%**	96.2%	95.1%	0%	**96.1%**	95.9%
Articulated Trucks	0	0	0	**0**	1	1	0	**2**	1	1	0	**2**	4
% Articulated Trucks	0%	0%	0%	**0%**	5.6%	0.5%	0%	**0.9%**	0.4%	2.4%	0%	**0.7%**	0.7%
Buses and Single-Unit Trucks	1	0	0	**1**	1	8	0	**9**	8	1	0	**9**	19
% Buses and Single-Unit Trucks	2.8%	0%	0%	**1.8%**	5.6%	3.8%	0%	**3.9%**	3.4%	2.4%	0%	**3.2%**	3.4%

*L: Left, R: Right, T: Thru, U: U-Turn

3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC
Thu Nov 17, 2022
Midday Peak (12 PM - 1 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC

Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

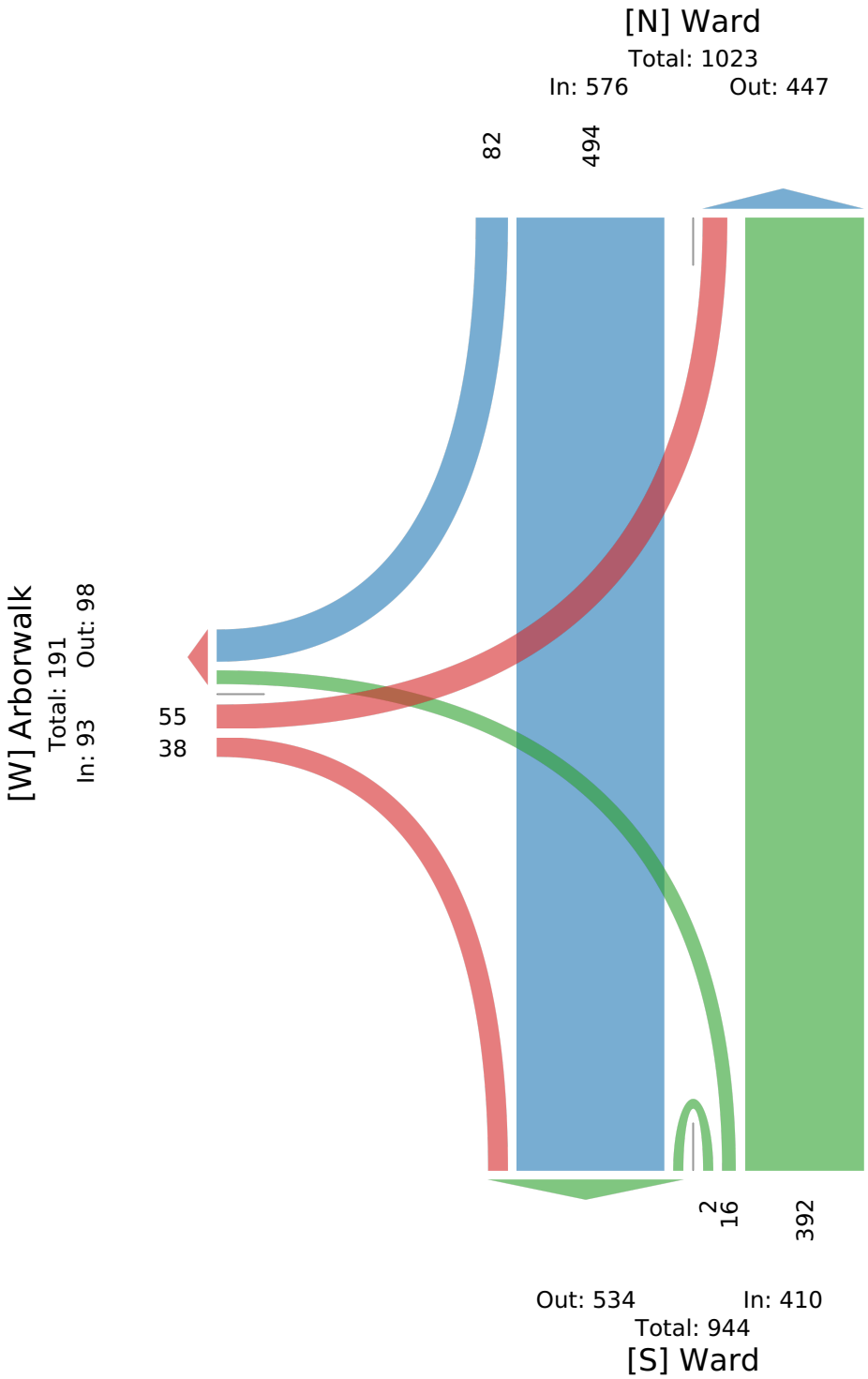
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Arborwalk				Ward				Ward				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 4:45PM	19	7	0	**26**	3	95	0	**98**	128	16	0	**144**	**268**
5:00PM	18	10	0	**28**	7	91	0	**98**	126	18	0	**144**	**270**
5:15PM	10	12	0	**22**	4	109	1	**114**	130	28	0	**158**	**294**
5:30PM	8	9	0	**17**	2	97	1	**100**	110	20	0	**130**	**247**
Total	55	38	0	**93**	16	392	2	**410**	494	82	0	**576**	**1079**
% Approach	59.1%	40.9%	0%	**-**	3.9%	95.6%	0.5%	**-**	85.8%	14.2%	0%	**-**	-
% Total	5.1%	3.5%	0%	**8.6%**	1.5%	36.3%	0.2%	**38.0%**	45.8%	7.6%	0%	**53.4%**	-
PHF	0.724	0.792	-	**0.830**	0.571	0.899	0.500	**0.899**	0.950	0.732	-	**0.911**	0.918
Lights	55	38	0	**93**	16	391	2	**409**	492	82	0	**574**	1076
% Lights	100%	100%	0%	**100%**	100%	99.7%	100%	**99.8%**	99.6%	100%	0%	**99.7%**	99.7%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	0	0	0	**0**	0	1	0	**1**	2	0	0	**2**	3
% Buses and Single-Unit Trucks	0%	0%	0%	**0%**	0%	0.3%	0%	**0.2%**	0.4%	0%	0%	**0.3%**	0.3%

*L: Left, R: Right, T: Thru, U: U-Turn

3_Ward Road & Arborwalk Boulevard - 13 hour ... - TMC
Thu Nov 17, 2022
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1033007, Location: 38.856098, -94.398473

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



4_Arborwalk Boulevard & Arbor Park Drive - TMC

Thu Nov 17, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

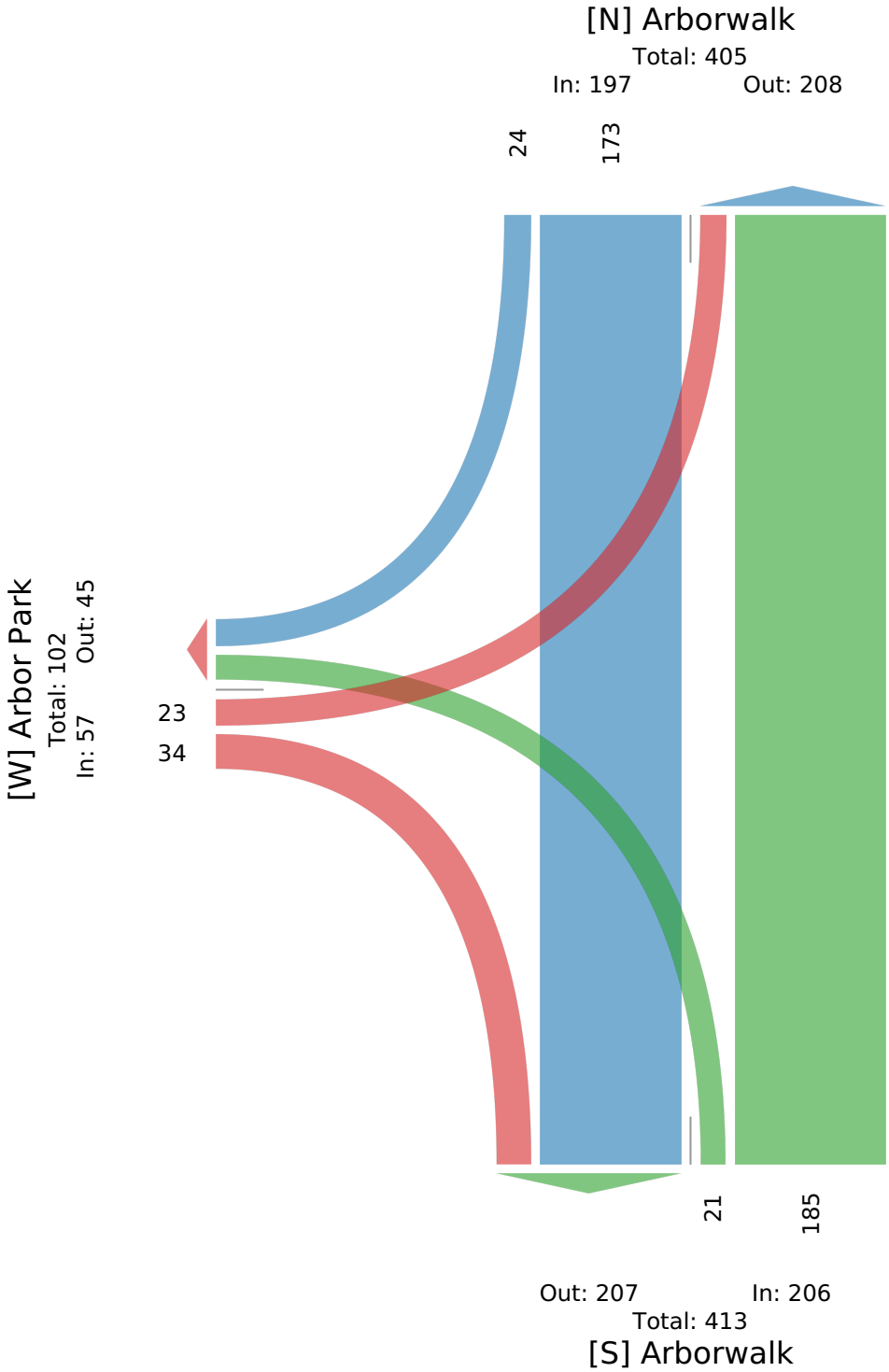
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Arbor Park				Arborwalk				Arborwalk				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 7:00AM	1	3	0	**4**	0	16	0	**16**	9	0	0	**9**	**29**
7:15AM	3	4	0	**7**	1	8	0	**9**	12	0	0	**12**	**28**
7:30AM	4	4	0	**8**	1	9	0	**10**	15	0	0	**15**	**33**
7:45AM	2	3	0	**5**	1	12	0	**13**	10	0	0	**10**	**28**
Hourly Total	10	14	0	**24**	3	45	0	**48**	46	0	0	**46**	**118**
8:00AM	0	6	0	**6**	1	6	0	**7**	2	2	0	**4**	**17**
8:15AM	0	0	0	**0**	1	8	0	**9**	9	2	0	**11**	**20**
8:30AM	2	1	0	**3**	1	10	0	**11**	8	2	0	**10**	**24**
8:45AM	1	3	0	**4**	0	8	0	**8**	8	2	0	**10**	**22**
Hourly Total	3	10	0	**13**	3	32	0	**35**	27	8	0	**35**	**83**
4:00PM	1	2	0	**3**	2	9	0	**11**	13	3	0	**16**	**30**
4:15PM	0	3	0	**3**	1	18	0	**19**	12	1	0	**13**	**35**
4:30PM	1	0	0	**1**	2	13	0	**15**	9	2	0	**11**	**27**
4:45PM	2	2	0	**4**	6	15	0	**21**	7	0	0	**7**	**32**
Hourly Total	4	7	0	**11**	11	55	0	**66**	41	6	0	**47**	**124**
5:00PM	3	0	0	**3**	1	18	0	**19**	12	1	0	**13**	**35**
5:15PM	2	0	0	**2**	1	20	0	**21**	14	5	0	**19**	**42**
5:30PM	1	1	0	**2**	1	8	0	**9**	13	2	0	**15**	**26**
5:45PM	0	2	0	**2**	1	7	0	**8**	20	2	0	**22**	**32**
Hourly Total	6	3	0	**9**	4	53	0	**57**	59	10	0	**69**	**135**
Total	23	34	0	**57**	21	185	0	**206**	173	24	0	**197**	**460**
% Approach	40.4%	59.6%	0%	**-**	10.2%	89.8%	0%	**-**	87.8%	12.2%	0%	**-**	-
% Total	5.0%	7.4%	0%	**12.4%**	4.6%	40.2%	0%	**44.8%**	37.6%	5.2%	0%	**42.8%**	-
Lights	23	34	0	**57**	18	182	0	**200**	163	24	0	**187**	444
% Lights	100%	100%	0%	**100%**	85.7%	98.4%	0%	**97.1%**	94.2%	100%	0%	**94.9%**	96.5%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	0	0	0	**0**	3	3	0	**6**	10	0	0	**10**	16
% Buses and Single-Unit Trucks	0%	0%	0%	**0%**	14.3%	1.6%	0%	**2.9%**	5.8%	0%	0%	**5.1%**	3.5%

*L: Left, R: Right, T: Thru, U: U-Turn

4_Arborwalk Boulevard & Arbor Park Drive - TMC
Thu Nov 17, 2022
Full Length (7 AM-9 AM, 4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



4_Arborwalk Boulevard & Arbor Park Drive - TMC

Thu Nov 17, 2022
AM Peak (7 AM - 8 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

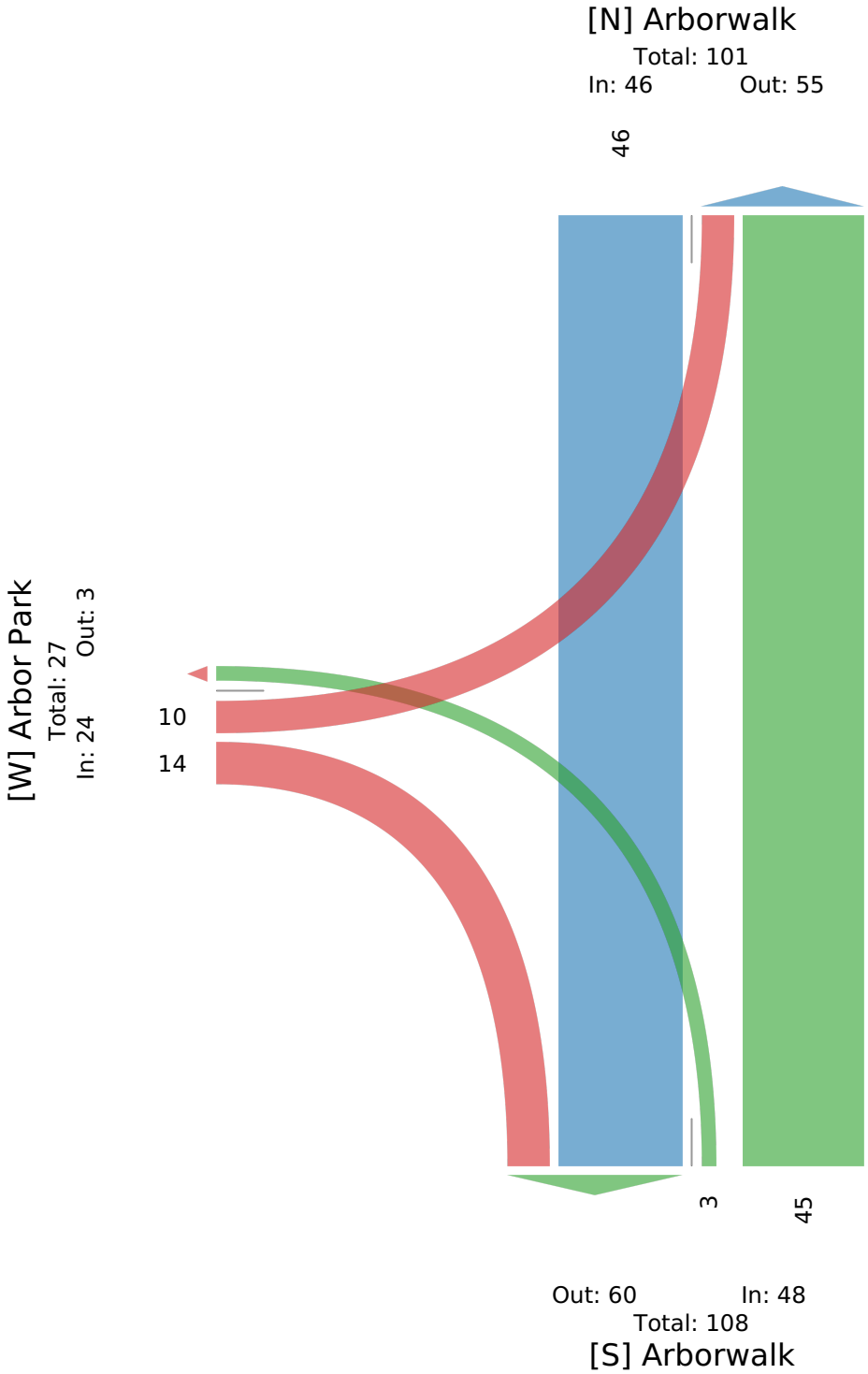
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Arbor Park				Arborwalk				Arborwalk				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 7:00AM	1	3	0	**4**	0	16	0	**16**	9	0	0	**9**	**29**
7:15AM	3	4	0	**7**	1	8	0	**9**	12	0	0	**12**	**28**
7:30AM	4	4	0	**8**	1	9	0	**10**	15	0	0	**15**	**33**
7:45AM	2	3	0	**5**	1	12	0	**13**	10	0	0	**10**	**28**
Total	10	14	0	**24**	3	45	0	**48**	46	0	0	**46**	**118**
% Approach	41.7%	58.3%	0%	**-**	6.3%	93.8%	0%	**-**	100%	0%	0%	**-**	-
% Total	8.5%	11.9%	0%	**20.3%**	2.5%	38.1%	0%	**40.7%**	39.0%	0%	0%	**39.0%**	-
PHF	0.625	0.875	-	**0.750**	0.750	0.703	-	**0.750**	0.767	-	-	**0.767**	0.894
Lights	10	14	0	**24**	2	43	0	**45**	40	0	0	**40**	109
% Lights	100%	100%	0%	**100%**	66.7%	95.6%	0%	**93.8%**	87.0%	0%	0%	**87.0%**	92.4%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	0	0	0	**0**	1	2	0	**3**	6	0	0	**6**	9
% Buses and Single-Unit Trucks	0%	0%	0%	**0%**	33.3%	4.4%	0%	**6.3%**	13.0%	0%	0%	**13.0%**	7.6%

*L: Left, R: Right, T: Thru, U: U-Turn

4_Arborwalk Boulevard & Arbor Park Drive - TMC
Thu Nov 17, 2022
AM Peak (7 AM - 8 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



4_Arborwalk Boulevard & Arbor Park Drive - TMC

Thu Nov 17, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

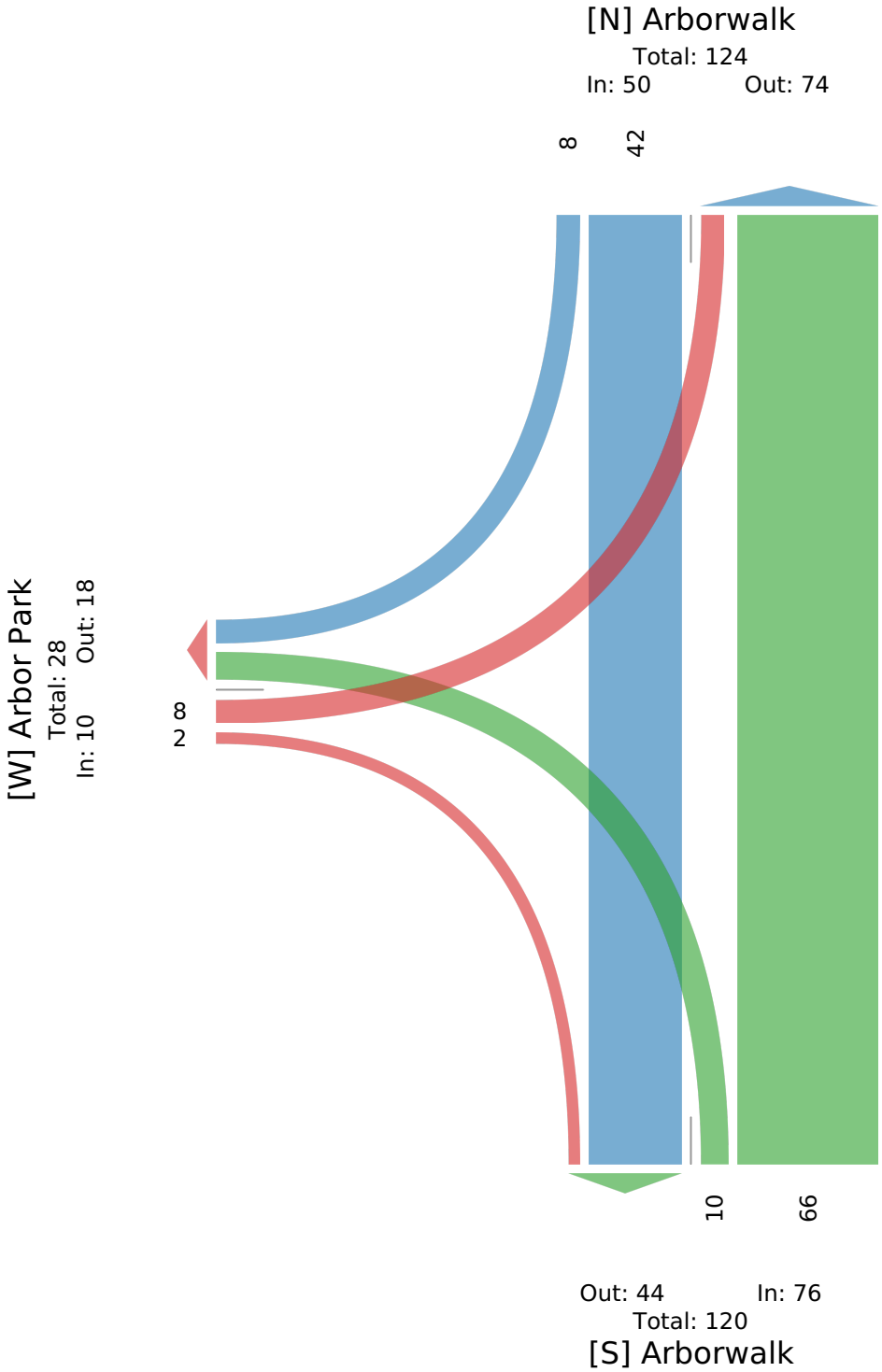
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg	Arbor Park				Arborwalk				Arborwalk				
Direction	Eastbound				Northbound				Southbound				
Time	L	R	U	**App**	L	T	U	**App**	T	R	U	**App**	**Int**
2022-11-17 4:30PM	1	0	0	**1**	2	13	0	**15**	9	2	0	**11**	**27**
4:45PM	2	2	0	**4**	6	15	0	**21**	7	0	0	**7**	**32**
5:00PM	3	0	0	**3**	1	18	0	**19**	12	1	0	**13**	**35**
5:15PM	2	0	0	**2**	1	20	0	**21**	14	5	0	**19**	**42**
Total	8	2	0	**10**	10	66	0	**76**	42	8	0	**50**	**136**
% Approach	80.0%	20.0%	0%	**-**	13.2%	86.8%	0%	**-**	84.0%	16.0%	0%	**-**	-
% Total	5.9%	1.5%	0%	**7.4%**	7.4%	48.5%	0%	**55.9%**	30.9%	5.9%	0%	**36.8%**	-
PHF	0.667	0.250	-	**0.625**	0.417	0.825	-	**0.905**	0.750	0.400	-	**0.658**	0.810
Lights	8	2	0	**10**	10	66	0	**76**	42	8	0	**50**	136
% Lights	100%	100%	0%	**100%**	100%	100%	0%	**100%**	100%	100%	0%	**100%**	100%
Articulated Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Articulated Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Buses and Single-Unit Trucks	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Buses and Single-Unit Trucks	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%

*L: Left, R: Right, T: Thru, U: U-Turn

4_Arborwalk Boulevard & Arbor Park Drive - TMC
Thu Nov 17, 2022
PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 1012133, Location: 38.855693, -94.401528

GEWALT HAMILTON ASSOCIATES, INC.
Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Appendix C: Site Plan

PARKING SUMMARY

SURFACE STALLS PROVIDED	455
GARAGE STALLS PROVIDED	20
TOTAL STALLS PROVIDED	475
UNITS PROVIDED	275
SURFACE PARKING RATIO (STALLS/UNIT)	1.65
GARAGE PARKING RATIO (STALLS/UNIT)	0.07
TOTAL PARKING RATIO (STALLS/UNIT)	1.73

SITE PLAN LEGEND

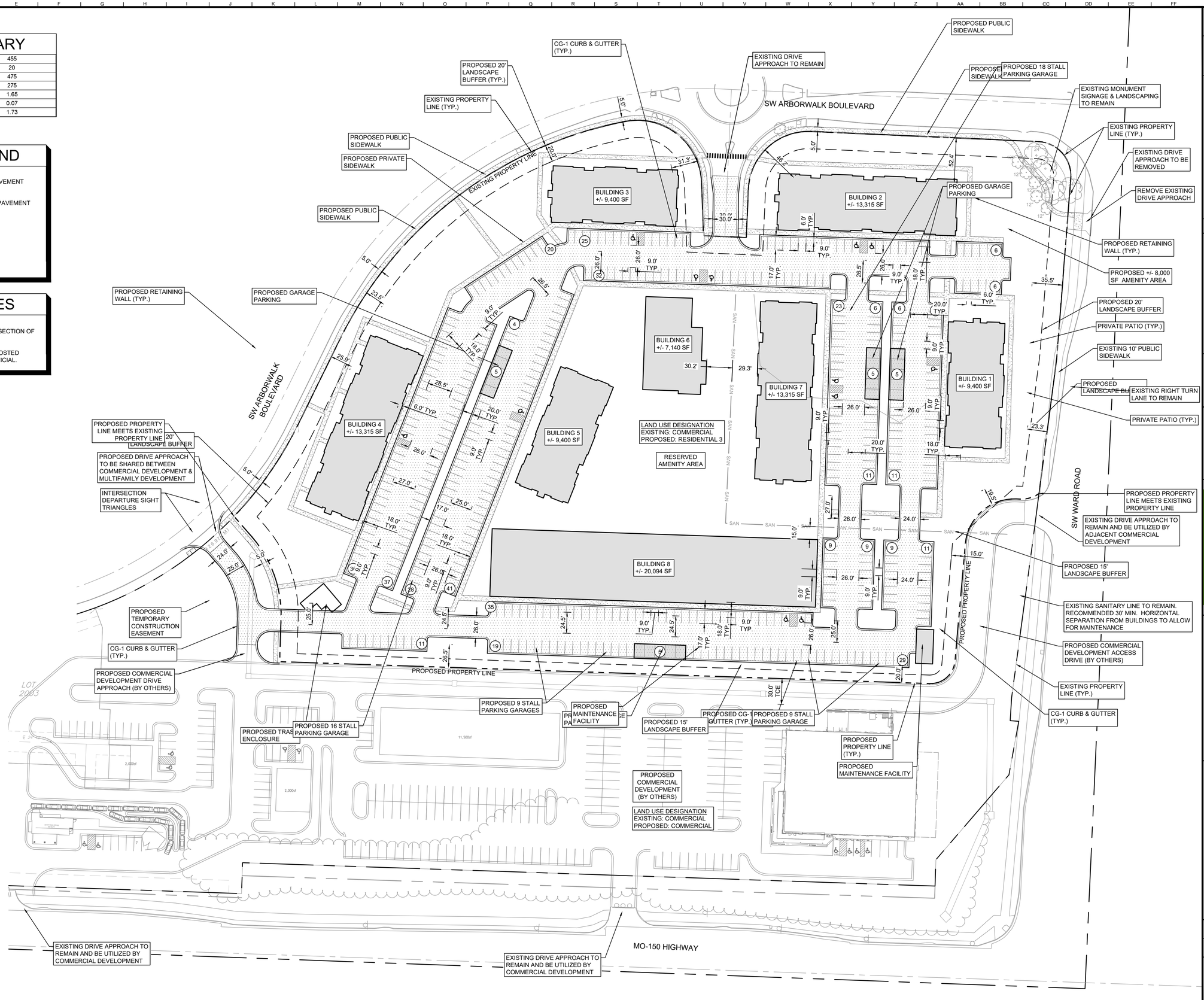
- HEAVY DUTY CONCRETE PAVEMENT
- STANDARD DUTY ASPHALT PAVEMENT
- CONCRETE SIDEWALK
- BUILDING
- CG-1 CURB AND GUTTER

SITE PLAN NOTES

1. ALL SIGNS MUST COMPLY WITH THE SIGN REQUIREMENTS AS OUTLINE IN THE SIGN SECTION OF THE UNIFIED DEVELOPMENT ORDINANCE.
2. ALL FIRE LANES SHALL BE MARKED AND POSTED WHERE REQUIRED BY THE FIRE CODE OFFICIAL.

NORTH

GRAPHIC SCALE IN FEET
0 25' 50' 100'



No.	REVISIONS	DATE	BY

Kimley»Horn

805 PENNSYLVANIA AVE. SUITE 150
KANSAS CITY, MO 64105
PHONE: 816-652-2350
WWW.KIMLEY-HORN.COM
MO CERTIFICATE OF AUTHORITY #2015312.
EXPIRES: 12/31/24

SCALE: AS NOTED
DESIGNED BY: LLG
DRAWN BY: LLG
CHECKED BY: PJJ

PRELIMINARY NOT FOR CONSTRUCTION

MILHAUS.

SITE PLAN

150 & WARD MULTIFAMILY DEVELOPMENT

150 HIGHWAY & SW WARD ROAD
LEE'S SUMMIT, MISSOURI, 64082

ORIGINAL ISSUE: 12/17/2024
KHA PROJECT NO. 268277000
SHEET NUMBER
C200

Appendix D: ITE Trip Generation Manual Sheets

Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
- A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
- A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.
- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), affordable housing (Land Use 223), and off-campus student apartment (low-rise) (Land Use 225) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in British Columbia (CAN), California, Delaware, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, and Washington.

Source Numbers

188, 204, 237, 300, 305, 306, 320, 321, 357, 390, 412, 525, 530, 579, 583, 638, 864, 866, 896, 901, 903, 904, 936, 939, 944, 946, 947, 948, 963, 964, 966, 967, 1012, 1013, 1014, 1036, 1047, 1056, 1071, 1076

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

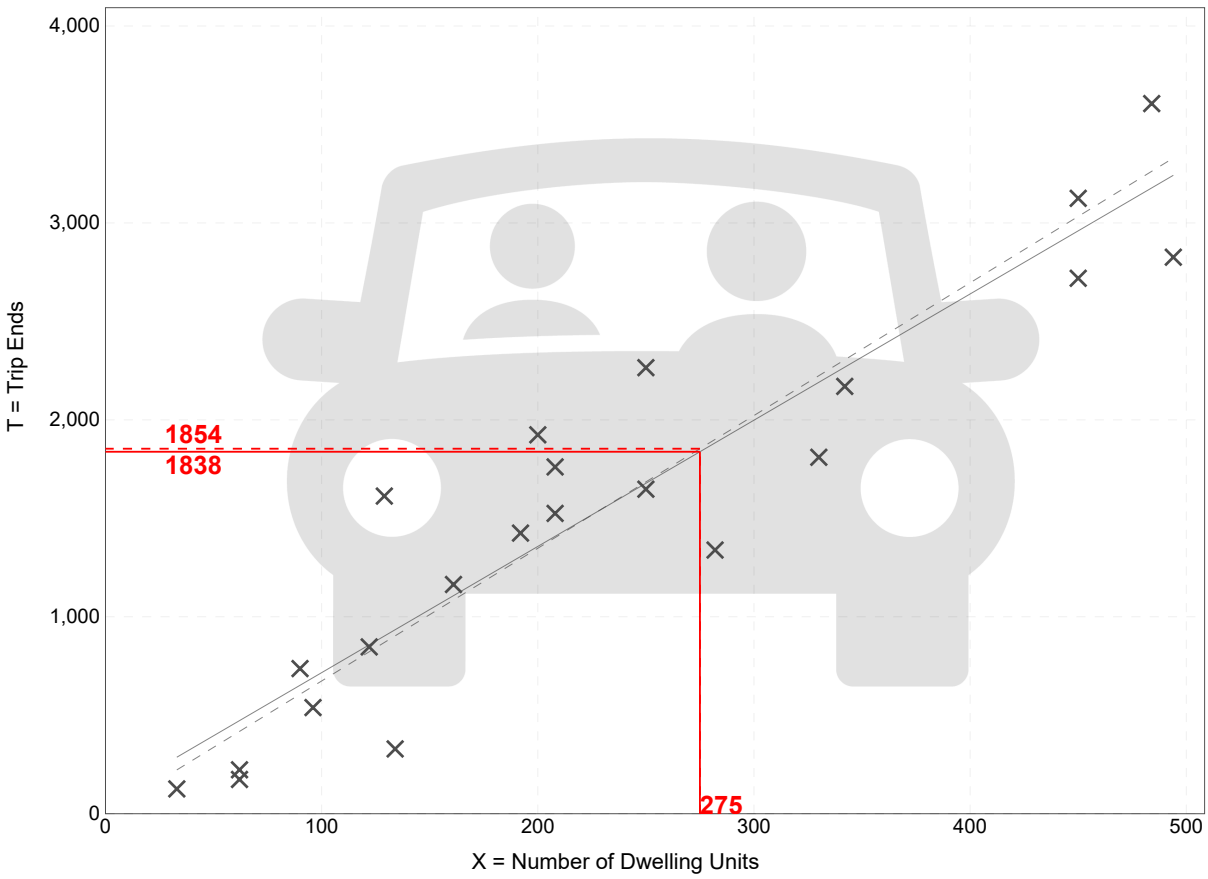
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Fitted Curve Equation: T = 6.41(X) + 75.31

R^2= 0.86

Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

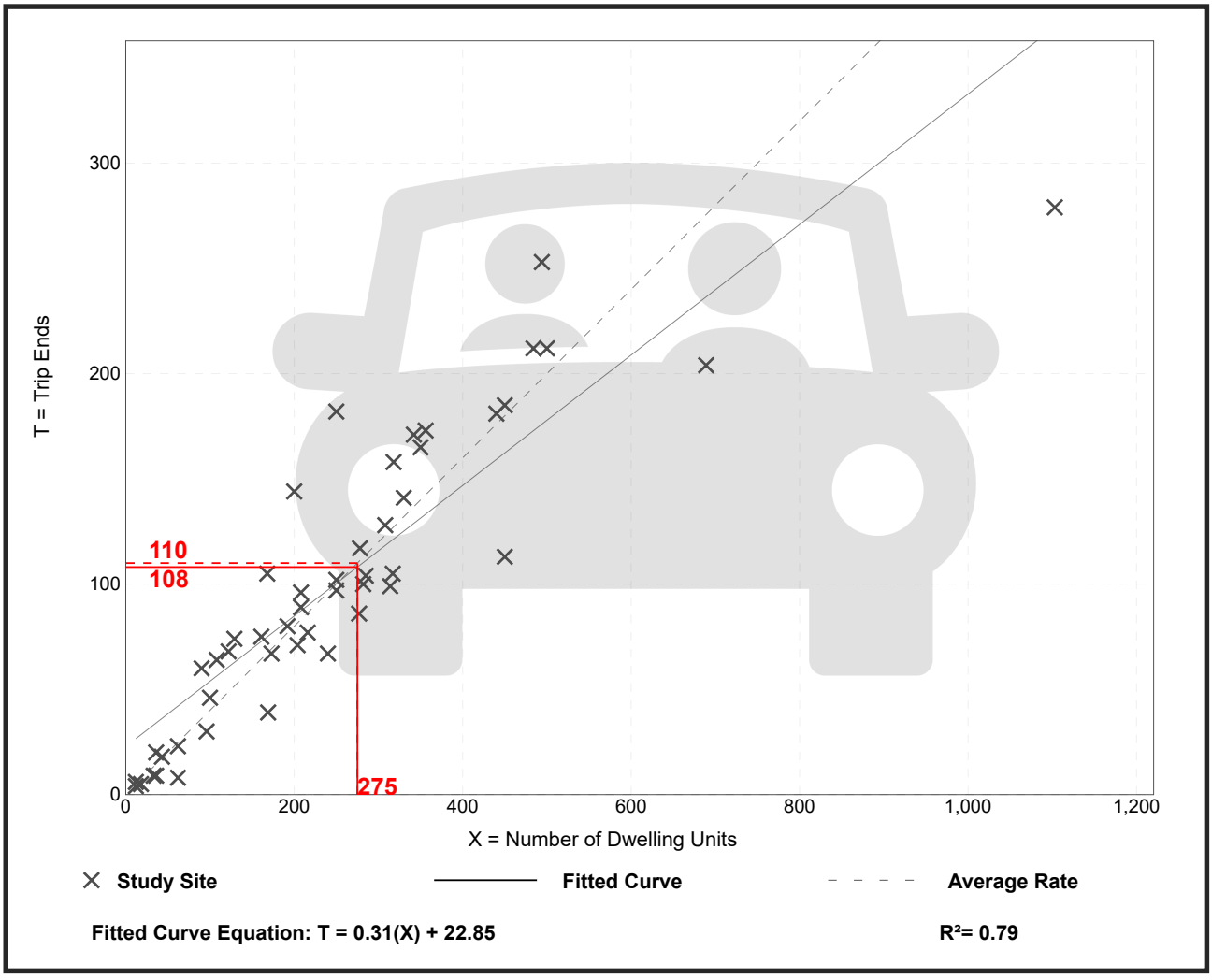
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	49
Avg. Num. of Dwelling Units:	249
Directional Distribution:	24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



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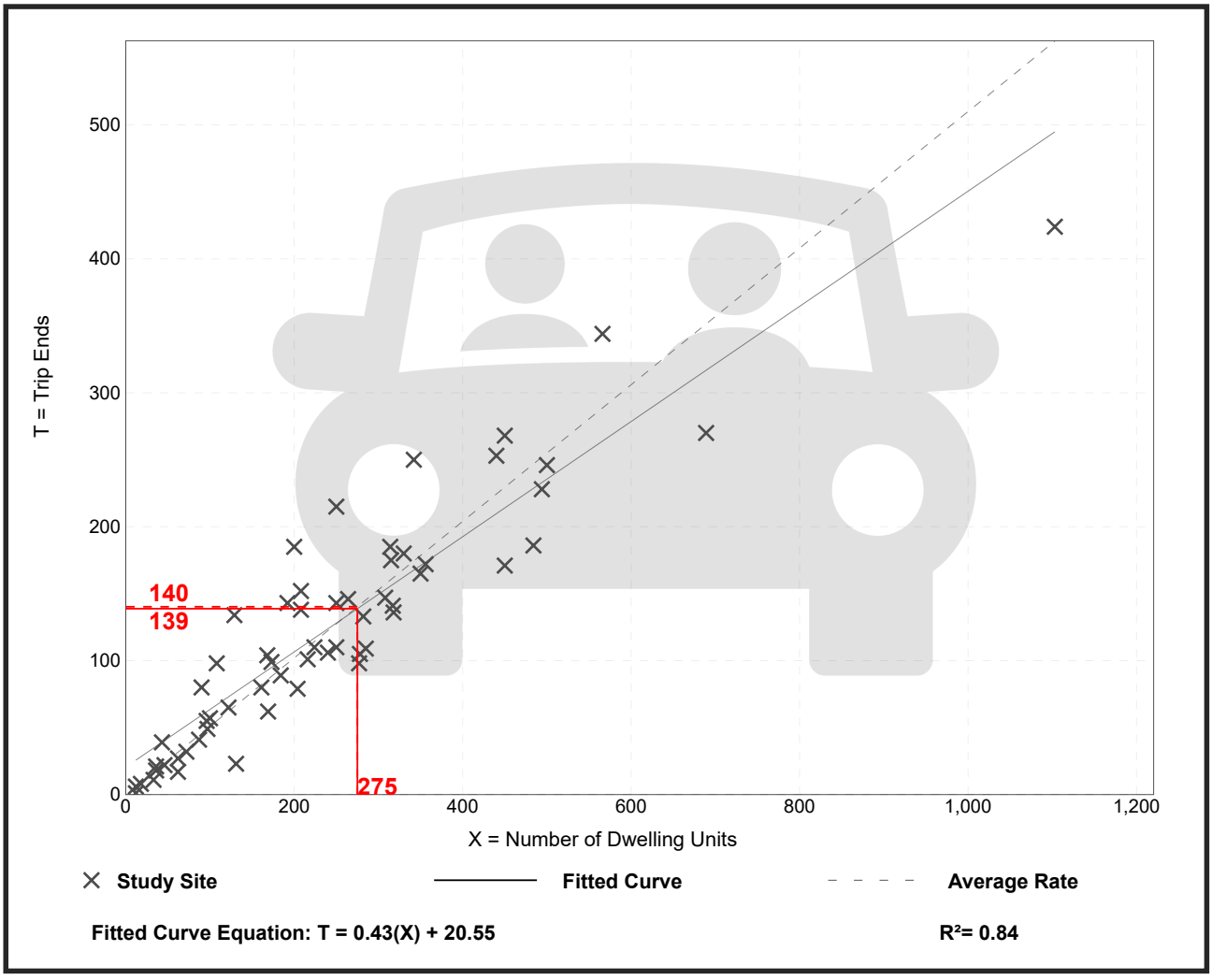
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



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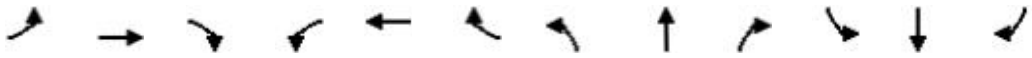
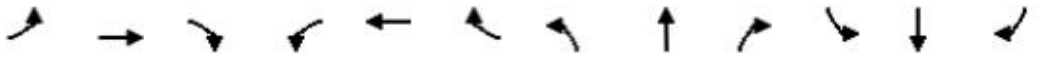
Appendix E: Capacity Analysis Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	336	33	54	743	154	184	242	111	122	75	128
v/c Ratio	0.46	0.16	0.04	0.27	0.37	0.16	0.55	0.61	0.40	0.46	0.22	0.48
Control Delay (s/veh)	63.4	9.8	0.2	56.6	15.7	2.8	57.5	57.1	13.0	57.8	50.5	14.5
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 (s/veh)	63.4	9.8	0.2	56.6	15.7	2.8	57.5	57.1	13.0	57.8	50.5	14.5
Queue Length 50th (ft)	55	44	0	21	156	0	71	95	0	47	28	0
Queue Length 95th (ft)	81	76	0	41	239	34	106	134	52	77	52	57
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	358	2115	931	233	1983	962	472	752	423	358	663	398
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	0.37	0.16	0.04	0.23	0.37	0.16	0.39	0.32	0.26	0.34	0.11	0.32

Intersection Summary



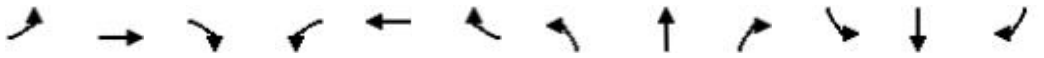
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	309	30	50	684	142	169	223	102	112	69	118
Future Volume (veh/h)	121	309	30	50	684	142	169	223	102	112	69	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	132	336	33	54	743	154	184	242	111	122	75	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	187	2248	954	114	2180	980	247	420	187	175	358	159
Arrive On Green	0.11	1.00	1.00	0.03	0.62	0.62	0.07	0.12	0.12	0.05	0.10	0.10
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	132	336	33	54	743	154	184	242	111	122	75	128
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	4.4	0.0	0.0	1.9	12.2	4.9	6.3	7.7	8.0	4.4	2.3	9.6
Cycle Q Clear(g_c), s	4.4	0.0	0.0	1.9	12.2	4.9	6.3	7.7	8.0	4.4	2.3	9.6
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	187	2248	954	114	2180	980	247	420	187	175	358	159
V/C Ratio(X)	0.70	0.15	0.03	0.47	0.34	0.16	0.74	0.58	0.59	0.70	0.21	0.81
Avail Cap(c_a), veh/h	360	2248	954	233	2180	980	475	755	337	364	666	295
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	0.0	0.0	56.8	10.8	9.4	54.6	50.1	50.2	55.8	49.6	52.8
Incr Delay (d2), s/veh	4.7	0.1	0.1	3.0	0.4	0.3	4.4	1.3	3.0	4.9	0.3	9.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.0	0.8	4.4	1.6	2.8	3.4	3.2	1.9	1.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.2	0.1	0.1	59.8	11.2	9.8	59.1	51.3	53.1	60.7	49.8	62.1
LnGrp LOS	E	A	A	E	B	A	E	D	D	E	D	E
Approach Vol, veh/h		501			951			537			325	
Approach Delay, s/veh		15.2			13.8			54.3			58.7	
Approach LOS		B			B			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	18.7	8.7	81.6	13.1	16.6	11.0	79.3
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	25.5	8.5	54.5	16.5	22.5	12.5	50.5
Max Q Clear Time (g_c+I1), s	6.4	10.0	3.9	2.0	8.3	11.6	6.4	14.2
Green Ext Time (p_c), s	0.2	1.5	0.0	2.2	0.3	0.5	0.2	5.8

Intersection Summary	
HCM 7th Control Delay, s/veh	29.8
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	359	45	955	55	54	17	108	37	10	86
v/c Ratio	0.06	0.15	0.06	0.38	0.05	0.28	0.11	0.47	0.22	0.11	0.49
Control Delay (s/veh)	4.8	7.5	3.7	7.1	0.7	45.3	52.6	16.6	44.1	54.9	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	4.8	7.5	3.7	7.1	0.7	45.3	52.6	16.6	44.1	54.9	18.5
Queue Length 50th (ft)	3	48	6	163	0	37	13	0	25	8	0
Queue Length 95th (ft)	12	82	14	196	4	70	36	55	53	25	44
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	394	2388	796	2529	1126	203	364	396	179	312	362
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.15	0.06	0.38	0.05	0.27	0.05	0.27	0.21	0.03	0.24

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	327	4	41	879	51	50	16	99	34	9	79
Future Volume (veh/h)	20	327	4	41	879	51	50	16	99	34	9	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1633	1811	1870	1870	1856	1811	1870	1870	1870	1811	1693	1811
Adj Flow Rate, veh/h	22	355	4	45	955	0	54	17	108	37	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	18	6	2	2	3	6	2	2	2	6	14	6
Cap, veh/h	454	2447	28	801	2513		229	161	136	206	133	
Arrive On Green	0.02	0.70	0.70	0.06	1.00	0.00	0.04	0.09	0.09	0.03	0.08	0.00
Sat Flow, veh/h	1555	3485	39	1781	3526	1535	1781	1870	1585	1725	1693	1535
Grp Volume(v), veh/h	22	175	184	45	955	0	54	17	108	37	10	0
Grp Sat Flow(s),veh/h/ln	1555	1721	1804	1781	1763	1535	1781	1870	1585	1725	1693	1535
Q Serve(g_s), s	0.5	4.0	4.1	0.8	0.0	0.0	3.3	1.0	8.0	2.3	0.7	0.0
Cycle Q Clear(g_c), s	0.5	4.0	4.1	0.8	0.0	0.0	3.3	1.0	8.0	2.3	0.7	0.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	454	1208	1267	801	2513		229	161	136	206	133	
V/C Ratio(X)	0.05	0.14	0.15	0.06	0.38		0.24	0.11	0.79	0.18	0.08	
Avail Cap(c_a), veh/h	518	1208	1267	855	2513		289	366	310	263	317	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.6	5.9	5.9	4.3	0.0	0.0	48.4	50.6	53.8	48.8	51.3	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.2	0.0	0.4	0.0	0.5	0.3	9.9	0.4	0.2	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	0.1	1.3	1.4	0.2	0.1	0.0	1.5	0.5	3.5	1.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.7	6.2	6.2	4.3	0.4	0.0	48.9	50.9	63.7	49.2	51.5	0.0
LnGrp LOS	A	A	A	A	A		D	D	E	D	D	
Approach Vol, veh/h		381			1000			179			47	
Approach Delay, s/veh		6.1			0.6			58.0			49.7	
Approach LOS		A			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	14.8	8.4	88.8	9.0	13.9	7.1	90.0
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	7.5	23.5	7.5	63.5	8.5	22.5	7.5	63.5
Max Q Clear Time (g_c+I1), s	4.3	10.0	2.8	6.1	5.3	2.7	2.5	2.0
Green Ext Time (p_c), s	0.0	0.3	0.0	2.0	0.0	0.0	0.0	7.6

Intersection Summary	
HCM 7th Control Delay, s/veh	9.7
HCM 7th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	20	11	475	279	25
Future Vol, veh/h	76	20	11	475	279	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	14	27	2	5	16
Mvmt Flow	83	22	12	516	303	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	585	152	330	0	-	0
Stage 1	303	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.84	7.18	4.64	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.44	2.47	-	-	-
Pot Cap-1 Maneuver	442	831	1064	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	437	831	1064	-	-	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	741	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.97	0.19	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1064	-	437	831	-	-
HCM Lane V/C Ratio	0.011	-	0.189	0.026	-	-
HCM Control Delay (s/veh)	8.4	-	15.2	9.4	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.7	0.1	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

AM Peak Hour
Site Category: Existing Conditions
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	3	2.0	1154	0.003	100	2.1	LOS A	0.0	0.3	Full	1600	0.0	0.0
Approach	3	2.0		0.003		2.1	LOS A	0.0	0.3				
East: Arborwalk Boulevard													
Lane 1[d]	40	2.0	1283	0.031	100	0.2	LOS A	0.1	3.3	Full	1600	0.0	0.0
Approach	40	2.0		0.031		0.2	LOS A	0.1	3.3				
North: Arborway Drive													
Lane 1[d]	134	2.0	1335	0.100	100	2.7	LOS A	0.5	11.6	Full	1600	0.0	0.0
Approach	134	2.0		0.100		2.7	LOS A	0.5	11.6				
West: Arborwalk Boulevard													
Lane 1[d]	61	2.0	1225	0.050	100	0.4	LOS A	0.2	5.4	Full	1600	0.0	0.0
Approach	61	2.0		0.050		0.4	LOS A	0.2	5.4				
Intersection	238	2.0		0.100		1.7	LOS A	0.5	11.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	2.0	1154	0.003	100	NA	NA
Approach	1	1	1	3	2.0		0.003			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	11	28	40	2.0	1283	0.031	100	NA	NA
Approach	1	11	28	40	2.0		0.031			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	93	1	39	134	2.0	1335	0.100	100	NA	NA
Approach	93	1	39	134	2.0		0.100			
West: Arborwalk Boulevard										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	49	11	1	61	2.0	1225	0.050	100	NA	NA
Approach	49	11	1	61	2.0		0.050			
	Total	%HV	Deg.Satn (v/c)							
Intersection	238	2.0	0.100							

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Arborway Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

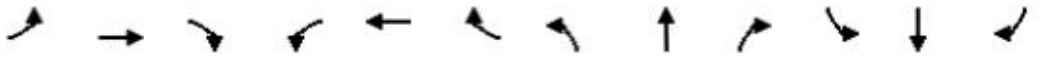
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	14	3	45	46	0
Future Vol, veh/h	10	14	3	45	46	0
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	16	3	51	52	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	109	52	52	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	57	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	888	1016	1554	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	965	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	886	1016	1554	-	-	-
Mov Cap-2 Maneuver	886	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	965	-	-	-	-	-

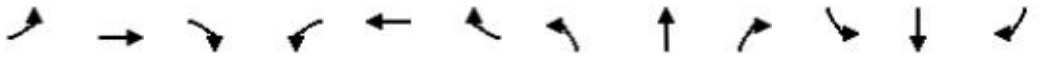
Approach	EB	NB	SB
HCM Control Delay, s/v	8.87	0.46	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	113	-	958	-	-
HCM Lane V/C Ratio	0.002	-	0.028	-	-
HCM Control Delay (s/veh)	7.3	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	829	171	136	493	143	91	181	138	191	262	145
v/c Ratio	0.47	0.42	0.19	0.49	0.25	0.15	0.37	0.54	0.50	0.58	0.58	0.44
Control Delay (s/veh)	64.2	11.5	1.0	57.8	14.6	2.9	57.1	57.3	14.6	58.0	54.0	11.7
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 (s/veh)	64.2	11.5	1.0	57.8	14.6	2.9	57.1	57.3	14.6	58.0	54.0	11.7
Queue Length 50th (ft)	57	101	0	52	96	0	35	71	0	73	102	0
Queue Length 95th (ft)	86	132	9	82	152	33	61	105	57	108	139	55
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	359	1957	902	341	1965	950	278	634	396	437	840	482
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	0.38	0.42	0.19	0.40	0.25	0.15	0.33	0.29	0.35	0.44	0.31	0.30

Intersection Summary



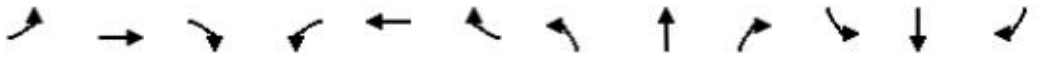
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	738	152	121	439	127	81	161	123	170	233	129
Future Volume (veh/h)	121	738	152	121	439	127	81	161	123	170	233	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	136	829	171	136	493	143	91	181	138	191	262	145
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	192	2117	898	191	2126	956	142	389	174	250	518	229
Arrive On Green	0.11	1.00	1.00	0.06	0.61	0.61	0.04	0.11	0.11	0.08	0.15	0.15
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	136	829	171	136	493	143	91	181	138	191	262	145
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	4.6	0.0	0.0	4.9	7.7	4.7	3.1	5.7	10.2	6.9	8.2	10.4
Cycle Q Clear(g_c), s	4.6	0.0	0.0	4.9	7.7	4.7	3.1	5.7	10.2	6.9	8.2	10.4
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	192	2117	898	191	2126	956	142	389	174	250	518	229
V/C Ratio(X)	0.71	0.39	0.19	0.71	0.23	0.15	0.64	0.46	0.79	0.76	0.51	0.63
Avail Cap(c_a), veh/h	360	2117	898	343	2126	956	274	637	284	445	844	373
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	0.0	55.5	10.7	10.2	56.7	50.1	52.1	54.3	47.3	48.2
Incr Delay (d2), s/veh	4.3	0.5	0.4	4.9	0.3	0.3	4.7	0.9	8.0	4.8	0.8	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.1	0.1	2.1	2.8	1.6	1.4	2.5	4.3	2.9	3.6	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.5	0.4	60.4	11.0	10.5	61.4	51.0	60.1	59.1	48.0	51.1
LnGrp LOS	E	A	A	E	B	B	E	D	E	E	D	D
Approach Vol, veh/h		1136			772			410			598	
Approach Delay, s/veh		7.2			19.6			56.4			52.3	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	17.6	11.5	77.1	9.4	22.0	11.2	77.4
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	16.5	21.5	12.5	51.5	9.5	28.5	12.5	51.5
Max Q Clear Time (g_c+I1), s	8.9	12.2	6.9	2.0	5.1	12.4	6.6	9.7
Green Ext Time (p_c), s	0.3	1.0	0.2	7.0	0.1	1.7	0.2	3.7

Intersection Summary	
HCM 7th Control Delay, s/veh	26.7
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	64	991	144	531	54	19	17	130	55	25	55
v/c Ratio	0.10	0.43	0.34	0.22	0.05	0.11	0.15	0.58	0.28	0.12	0.19
Control Delay (s/veh)	5.0	11.8	8.8	7.2	0.6	41.2	54.9	18.6	44.9	49.0	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	5.0	11.8	8.8	7.2	0.6	41.2	54.9	18.6	44.9	49.0	1.4
Queue Length 50th (ft)	10	181	21	80	0	13	13	0	37	17	0
Queue Length 95th (ft)	27	288	61	107	0	32	35	53	70	44	0
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	660	2315	501	2466	1132	175	333	395	201	349	407
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.43	0.29	0.22	0.05	0.11	0.05	0.33	0.27	0.07	0.14

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	846	36	128	473	48	17	15	116	49	22	49
Future Volume (veh/h)	57	846	36	128	473	48	17	15	116	49	22	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	64	951	40	144	531	0	19	17	130	55	25	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	709	2323	98	448	2404		233	186	158	240	219	
Arrive On Green	0.04	0.67	0.67	0.09	1.00	0.00	0.02	0.10	0.10	0.04	0.12	0.00
Sat Flow, veh/h	1781	3475	146	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	64	486	505	144	531	0	19	17	130	55	25	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1844	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.3	15.0	15.0	3.2	0.0	0.0	1.1	1.0	9.7	3.3	1.4	0.0
Cycle Q Clear(g_c), s	1.3	15.0	15.0	3.2	0.0	0.0	1.1	1.0	9.7	3.3	1.4	0.0
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	709	1188	1233	448	2404		233	186	158	240	219	
V/C Ratio(X)	0.09	0.41	0.41	0.32	0.22		0.08	0.09	0.82	0.23	0.11	
Avail Cap(c_a), veh/h	740	1188	1233	599	2404		295	335	284	285	351	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.4	9.1	9.1	6.3	0.0	0.0	47.1	49.1	53.0	46.1	47.4	0.0
Incr Delay (d2), s/veh	0.1	1.0	1.0	0.4	0.2	0.0	0.1	0.2	10.2	0.5	0.2	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	0.4	5.4	5.5	0.9	0.1	0.0	0.5	0.5	4.2	1.5	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.5	10.1	10.1	6.7	0.2	0.0	47.2	49.3	63.2	46.6	47.6	0.0
LnGrp LOS	A	B	B	A	A		D	D	E	D	D	
Approach Vol, veh/h		1055			675			166			80	
Approach Delay, s/veh		9.8			1.6			59.9			46.9	
Approach LOS		A			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	16.5	9.9	84.7	6.8	18.6	8.9	85.7
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	7.5	21.5	15.5	57.5	6.5	22.5	6.5	66.5
Max Q Clear Time (g_c+I1), s	5.3	11.7	5.2	17.0	3.1	3.4	3.3	2.0
Green Ext Time (p_c), s	0.0	0.3	0.2	6.8	0.0	0.1	0.0	3.6

Intersection Summary	
HCM 7th Control Delay, s/veh	12.7
HCM 7th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	38	16	393	494	82
Future Vol, veh/h	55	38	16	393	494	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	43	18	442	555	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	812	278	647	0	-	0
Stage 1	555	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	317	720	934	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	311	720	934	-	-	-
Mov Cap-2 Maneuver	311	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	15.71	0.35	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	934	-	311	720	-	-
HCM Lane V/C Ratio	0.019	-	0.199	0.059	-	-
HCM Control Delay (s/veh)	8.9	-	19.4	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.2	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

PM Peak Hour
Site Category: Existing Conditons
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	3	1.7	1173	0.003	100	2.1	LOS A	0.0	0.3	Full	1600	0.0	0.0
Approach	3	1.7		0.003		2.1	LOS A	0.0	0.3				
East: Arborwalk Boulevard													
Lane 1[d]	108	2.0	1296	0.083	100	0.2	LOS A	0.4	9.4	Full	1600	0.0	0.0
Approach	108	2.0		0.083		0.2	LOS A	0.4	9.4				
North: Arborway Drive													
Lane 1[d]	95	2.0	1308	0.072	100	2.8	LOS A	0.3	8.1	Full	1600	0.0	0.0
Approach	95	2.0		0.072		2.8	LOS A	0.3	8.1				
West: Arborwalk Boulevard													
Lane 1[d]	76	2.0	1261	0.060	100	0.3	LOS A	0.3	6.6	Full	1600	0.0	0.0
Approach	76	2.0		0.060		0.3	LOS A	0.3	6.6				
Intersection	282	2.0		0.083		1.1	LOS A	0.4	9.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	1.7	1173	0.003	100	NA	NA
Approach	1	1	1	3	1.7		0.003			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	30	76	108	2.0	1296	0.083	100	NA	NA
Approach	1	30	76	108	2.0		0.083			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	65	1	28	95	2.0	1308	0.072	100	NA	NA
Approach	65	1	28	95	2.0		0.072			

West: Arborwalk Boulevard

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL %	Ov. Lane No.
Lane 1	39	36	1	76	2.0	1261	0.060	100	NA	NA
Approach	39	36	1	76	2.0		0.060			

	Total	%HV	Deg.Satn (v/c)
Intersection	282	2.0	0.083

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Arborway Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

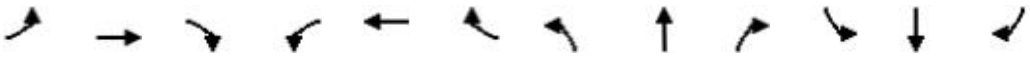
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	3	9	61	46	8
Future Vol, veh/h	8	3	9	61	46	8
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	3	10	69	52	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	145	56	61	0	-	0
Stage 1	56	-	-	-	-	-
Stage 2	89	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	848	1010	1543	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	842	1010	1543	-	-	-
Mov Cap-2 Maneuver	842	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	935	-	-	-	-	-

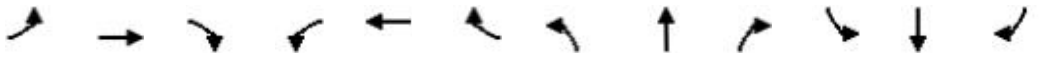
Approach	EB	NB	SB
HCM Control Delay, s/v	9.14	0.94	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	231	-	882	-	-
HCM Lane V/C Ratio	0.007	-	0.014	-	-
HCM Control Delay (s/veh)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	336	33	54	743	163	184	243	111	149	79	128
v/c Ratio	0.46	0.16	0.04	0.27	0.38	0.17	0.55	0.61	0.40	0.52	0.21	0.46
Control Delay (s/veh)	63.1	10.2	0.2	56.6	16.3	2.9	57.5	57.0	13.0	58.0	49.4	13.6
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 (s/veh)	63.1	10.2	0.2	56.6	16.3	2.9	57.5	57.0	13.0	58.0	49.4	13.6
Queue Length 50th (ft)	55	47	0	21	160	0	71	95	0	57	30	0
Queue Length 95th (ft)	81	76	0	41	245	36	106	135	52	89	53	56
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	358	2085	920	233	1954	954	472	752	423	361	663	398
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	0.37	0.16	0.04	0.23	0.38	0.17	0.39	0.32	0.26	0.41	0.12	0.32

Intersection Summary



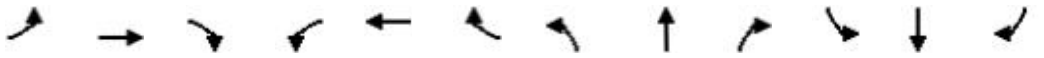
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	309	30	50	684	150	169	224	102	137	73	118
Future Volume (veh/h)	121	309	30	50	684	150	169	224	102	137	73	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	132	336	33	54	743	163	184	243	111	149	79	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	187	2248	954	114	2180	980	247	389	173	204	359	159
Arrive On Green	0.11	1.00	1.00	0.03	0.62	0.62	0.07	0.11	0.11	0.06	0.10	0.10
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	132	336	33	54	743	163	184	243	111	149	79	128
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	4.4	0.0	0.0	1.9	12.2	5.2	6.3	7.8	8.0	5.4	2.5	9.6
Cycle Q Clear(g_c), s	4.4	0.0	0.0	1.9	12.2	5.2	6.3	7.8	8.0	5.4	2.5	9.6
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	187	2248	954	114	2180	980	247	389	173	204	359	159
V/C Ratio(X)	0.70	0.15	0.03	0.47	0.34	0.17	0.74	0.63	0.64	0.73	0.22	0.81
Avail Cap(c_a), veh/h	360	2248	954	233	2180	980	475	755	337	364	666	295
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	0.0	0.0	56.8	10.8	9.5	54.6	51.1	51.2	55.2	49.6	52.8
Incr Delay (d2), s/veh	4.7	0.1	0.1	3.0	0.4	0.4	4.4	1.7	3.9	4.9	0.3	9.2
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	1.9	0.0	0.0	0.8	4.4	1.7	2.8	3.5	3.3	2.3	1.1	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.2	0.1	0.1	59.8	11.2	9.9	59.1	52.7	55.1	60.1	49.9	62.0
LnGrp LOS	E	A	A	E	B	A	E	D	E	E	D	E
Approach Vol, veh/h		501			960			538			356	
Approach Delay, s/veh		15.2			13.7			55.4			58.5	
Approach LOS		B			B			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	17.6	8.7	81.6	13.1	16.6	11.0	79.3
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	25.5	8.5	54.5	16.5	22.5	12.5	50.5
Max Q Clear Time (g_c+I1), s	7.4	10.0	3.9	2.0	8.3	11.6	6.4	14.2
Green Ext Time (p_c), s	0.2	1.5	0.0	2.2	0.3	0.6	0.2	5.9

Intersection Summary	
HCM 7th Control Delay, s/veh	30.3
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	30	359	45	955	55	54	17	108	37	10	112
v/c Ratio	0.08	0.15	0.06	0.38	0.05	0.27	0.10	0.46	0.21	0.10	0.57
Control Delay (s/veh)	5.2	7.8	3.9	7.5	0.8	44.3	51.5	15.8	43.1	53.6	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	5.2	7.8	3.9	7.5	0.8	44.3	51.5	15.8	43.1	53.6	21.0
Queue Length 50th (ft)	5	48	6	155	0	37	13	0	25	8	0
Queue Length 95th (ft)	16	86	17	196	4	69	35	54	52	25	55
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	390	2372	790	2510	1118	209	364	396	185	312	376
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.15	0.06	0.38	0.05	0.26	0.05	0.27	0.20	0.03	0.30

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	327	4	41	879	51	50	16	99	34	9	103
Future Volume (veh/h)	28	327	4	41	879	51	50	16	99	34	9	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1633	1811	1870	1870	1856	1811	1870	1870	1870	1811	1693	1811
Adj Flow Rate, veh/h	30	355	4	45	955	0	54	17	108	37	10	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	18	6	2	2	3	6	2	2	2	6	14	6
Cap, veh/h	461	2447	28	801	2497		229	161	136	206	133	
Arrive On Green	0.03	0.70	0.70	0.06	1.00	0.00	0.04	0.09	0.09	0.03	0.08	0.00
Sat Flow, veh/h	1555	3485	39	1781	3526	1535	1781	1870	1585	1725	1693	1535
Grp Volume(v), veh/h	30	175	184	45	955	0	54	17	108	37	10	0
Grp Sat Flow(s),veh/h/ln	1555	1721	1804	1781	1763	1535	1781	1870	1585	1725	1693	1535
Q Serve(g_s), s	0.6	4.0	4.1	0.8	0.0	0.0	3.3	1.0	8.0	2.3	0.7	0.0
Cycle Q Clear(g_c), s	0.6	4.0	4.1	0.8	0.0	0.0	3.3	1.0	8.0	2.3	0.7	0.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	461	1208	1267	801	2497		229	161	136	206	133	
V/C Ratio(X)	0.07	0.14	0.15	0.06	0.38		0.24	0.11	0.79	0.18	0.08	
Avail Cap(c_a), veh/h	518	1208	1267	855	2497		289	366	310	263	317	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.91	0.91	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.5	5.9	5.9	4.3	0.0	0.0	48.4	50.6	53.8	48.8	51.3	0.0
Incr Delay (d2), s/veh	0.1	0.3	0.2	0.0	0.4	0.0	0.5	0.3	9.9	0.4	0.2	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	0.2	1.3	1.4	0.2	0.1	0.0	1.5	0.5	3.5	1.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.6	6.2	6.2	4.3	0.4	0.0	48.9	50.9	63.7	49.2	51.5	0.0
LnGrp LOS	A	A	A	A	A		D	D	E	D	D	
Approach Vol, veh/h		389			1000			179			47	
Approach Delay, s/veh		6.0			0.6			58.0			49.7	
Approach LOS		A			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	14.8	8.4	88.8	9.0	13.9	7.7	89.5
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	7.5	23.5	7.5	63.5	8.5	22.5	7.5	63.5
Max Q Clear Time (g_c+I1), s	4.3	10.0	2.8	6.1	5.3	2.7	2.6	2.0
Green Ext Time (p_c), s	0.0	0.3	0.0	2.0	0.0	0.0	0.0	7.6

Intersection Summary	
HCM 7th Control Delay, s/veh	9.7
HCM 7th LOS	A

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	105	49	20	475	279	34
Future Vol, veh/h	105	49	20	475	279	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	14	27	2	5	16
Mvmt Flow	114	53	22	516	303	37

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	605	152	340	0	-	0
Stage 1	303	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.84	7.18	4.64	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.44	2.47	-	-	-
Pot Cap-1 Maneuver	429	831	1054	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	724	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	420	831	1054	-	-	-
Mov Cap-2 Maneuver	420	-	-	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	724	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.47	0.34	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1054	-	420	831	-	-
HCM Lane V/C Ratio	0.021	-	0.271	0.064	-	-
HCM Control Delay (s/veh)	8.5	-	16.7	9.6	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	0.2	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

AM Peak Hour
Site Category: Existing plus Development Conditions
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	68	2.0	1143	0.060	100	2.4	LOS A	0.3	6.4	Full	1600	0.0	0.0
Approach	68	2.0		0.060		2.4	LOS A	0.3	6.4				
East: Arborwalk Boulevard													
Lane 1[d]	59	2.0	1267	0.046	100	0.3	LOS A	0.2	5.0	Full	1600	0.0	0.0
Approach	59	2.0		0.046		0.3	LOS A	0.2	5.0				
North: Arborway Drive													
Lane 1[d]	134	2.0	1293	0.103	100	2.8	LOS A	0.5	11.9	Full	1600	0.0	0.0
Approach	134	2.0		0.103		2.8	LOS A	0.5	11.9				
West: Arborwalk Boulevard													
Lane 1[d]	73	2.0	1206	0.060	100	0.5	LOS A	0.3	6.6	Full	1600	0.0	0.0
Approach	73	2.0		0.060		0.5	LOS A	0.3	6.6				
Intersection	334	2.0		0.103		1.8	LOS A	0.5	11.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	1	54	68	2.0	1143	0.060	100	NA	NA
Approach	13	1	54	68	2.0		0.060			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	16	14	28	59	2.0	1267	0.046	100	NA	NA
Approach	16	14	28	59	2.0		0.046			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	93	1	39	134	2.0	1293	0.103	100	NA	NA
Approach	93	1	39	134	2.0		0.103			
West: Arborwalk Boulevard										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	49	20	4	73	2.0	1206	0.060	100	NA	NA
Approach	49	20	4	73	2.0		0.060			
	Total	%HV	Deg.Satn (v/c)							
Intersection	334	2.0		0.103						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
North Exit: Arborway Drive Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	14	3	57	61	0
Future Vol, veh/h	10	14	3	57	61	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	15	3	62	66	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	135	66	66	0	-	0
Stage 1	66	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	859	997	1535	-	-	-
Stage 1	956	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	857	997	1535	-	-	-
Mov Cap-2 Maneuver	857	-	-	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	954	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	8.97	0.37	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	90	-	934	-	-
HCM Lane V/C Ratio	0.002	-	0.028	-	-
HCM Control Delay (s/veh)	7.3	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

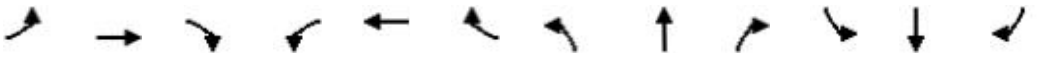
Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	8	52	4	3	72
Future Vol, veh/h	12	8	52	4	3	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	9	57	4	3	78

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	143	59	0	0	61	0
Stage 1	59	-	-	-	-	-
Stage 2	85	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	849	1007	-	-	1542	-
Stage 1	964	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	847	1007	-	-	1542	-
Mov Cap-2 Maneuver	847	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	936	-	-	-	-	-

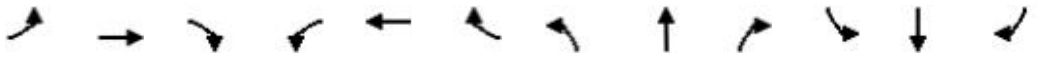
Approach	WB	NB	SB
HCM Control Delay, s/v	9.08	0	0.29
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	905	72	-
HCM Lane V/C Ratio	-	-	0.024	0.002	-
HCM Control Delay (s/veh)	-	-	9.1	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	829	171	136	493	172	91	185	138	208	265	145
v/c Ratio	0.47	0.43	0.19	0.49	0.25	0.18	0.37	0.54	0.50	0.60	0.56	0.43
Control Delay (s/veh)	65.2	11.7	1.0	57.8	15.0	2.9	57.1	57.3	14.5	58.0	52.7	11.3
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 (s/veh)	65.2	11.7	1.0	57.8	15.0	2.9	57.1	57.3	14.5	58.0	52.7	11.3
Queue Length 50th (ft)	57	101	0	52	98	0	35	73	0	80	102	0
Queue Length 95th (ft)	87	131	9	82	155	36	61	107	57	115	139	55
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	359	1936	894	341	1944	953	278	634	396	439	840	482
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	0.38	0.43	0.19	0.40	0.25	0.18	0.33	0.29	0.35	0.47	0.32	0.30

Intersection Summary



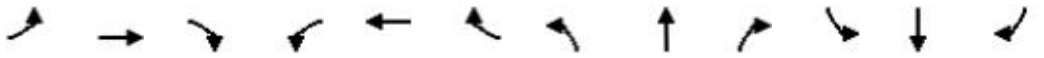
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	738	152	121	439	153	81	165	123	185	236	129
Future Volume (veh/h)	121	738	152	121	439	153	81	165	123	185	236	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	136	829	171	136	493	172	91	185	138	208	265	145
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	192	2097	890	191	2106	947	142	390	174	267	537	238
Arrive On Green	0.11	1.00	1.00	0.06	0.60	0.60	0.04	0.11	0.11	0.08	0.15	0.15
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	136	829	171	136	493	172	91	185	138	208	265	145
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	4.6	0.0	0.0	4.9	7.8	5.9	3.1	5.9	10.2	7.6	8.2	10.3
Cycle Q Clear(g_c), s	4.6	0.0	0.0	4.9	7.8	5.9	3.1	5.9	10.2	7.6	8.2	10.3
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	192	2097	890	191	2106	947	142	390	174	267	537	238
V/C Ratio(X)	0.71	0.40	0.19	0.71	0.23	0.18	0.64	0.47	0.79	0.78	0.49	0.61
Avail Cap(c_a), veh/h	360	2097	890	343	2106	947	274	637	284	445	844	373
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	0.0	55.5	11.0	10.7	56.7	50.2	52.1	54.0	46.7	47.6
Incr Delay (d2), s/veh	4.3	0.5	0.4	4.9	0.3	0.4	4.7	0.9	7.9	4.9	0.7	2.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.1	0.1	2.1	2.9	2.0	1.4	2.6	4.3	3.2	3.6	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.7	0.5	0.4	60.4	11.3	11.1	61.4	51.1	60.0	58.8	47.4	50.2
LnGrp LOS	E	A	A	E	B	B	E	D	E	E	D	D
Approach Vol, veh/h		1136			801			414			618	
Approach Delay, s/veh		7.2			19.6			56.3			51.9	
Approach LOS		A			B			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	17.7	11.5	76.5	9.4	22.6	11.2	76.8
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	16.5	21.5	12.5	51.5	9.5	28.5	12.5	51.5
Max Q Clear Time (g_c+I1), s	9.6	12.2	6.9	2.0	5.1	12.3	6.6	9.8
Green Ext Time (p_c), s	0.4	1.0	0.2	7.0	0.1	1.8	0.2	3.8

Intersection Summary	
HCM 7th Control Delay, s/veh	26.7
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	93	991	144	531	54	19	17	130	55	25	73
v/c Ratio	0.14	0.43	0.34	0.22	0.05	0.11	0.15	0.58	0.28	0.12	0.25
Control Delay (s/veh)	5.0	11.8	8.8	7.7	0.7	41.2	54.9	18.6	44.9	49.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	5.0	11.8	8.8	7.7	0.7	41.2	54.9	18.6	44.9	49.0	2.0
Queue Length 50th (ft)	15	181	21	81	0	13	13	0	37	17	0
Queue Length 95th (ft)	37	288	62	111	0	32	35	53	70	44	0
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	657	2315	506	2391	1100	175	333	395	201	349	407
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.43	0.28	0.22	0.05	0.11	0.05	0.33	0.27	0.07	0.18

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	846	36	128	473	48	17	15	116	49	22	65
Future Volume (veh/h)	83	846	36	128	473	48	17	15	116	49	22	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	93	951	40	144	531	0	19	17	130	55	25	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	714	2323	98	448	2393		233	186	158	240	219	
Arrive On Green	0.04	0.67	0.67	0.09	1.00	0.00	0.02	0.10	0.10	0.04	0.12	0.00
Sat Flow, veh/h	1781	3475	146	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	93	486	505	144	531	0	19	17	130	55	25	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1844	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.9	15.0	15.0	3.2	0.0	0.0	1.1	1.0	9.7	3.3	1.4	0.0
Cycle Q Clear(g_c), s	1.9	15.0	15.0	3.2	0.0	0.0	1.1	1.0	9.7	3.3	1.4	0.0
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	714	1188	1233	448	2393		233	186	158	240	219	
V/C Ratio(X)	0.13	0.41	0.41	0.32	0.22		0.08	0.09	0.82	0.23	0.11	
Avail Cap(c_a), veh/h	740	1188	1233	599	2393		295	335	284	285	351	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.96	0.96	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.4	9.1	9.1	6.3	0.0	0.0	47.1	49.1	53.0	46.1	47.4	0.0
Incr Delay (d2), s/veh	0.1	1.0	1.0	0.4	0.2	0.0	0.1	0.2	10.2	0.5	0.2	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	0.6	5.4	5.5	0.9	0.1	0.0	0.5	0.5	4.2	1.5	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.5	10.1	10.1	6.7	0.2	0.0	47.2	49.3	63.2	46.6	47.6	0.0
LnGrp LOS	A	B	B	A	A		D	D	E	D	D	
Approach Vol, veh/h		1084			675			166			80	
Approach Delay, s/veh		9.7			1.6			59.9			46.9	
Approach LOS		A			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	16.5	9.9	84.7	6.8	18.6	9.3	85.3
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	7.5	21.5	15.5	57.5	6.5	22.5	6.5	66.5
Max Q Clear Time (g_c+I1), s	5.3	11.7	5.2	17.0	3.1	3.4	3.9	2.0
Green Ext Time (p_c), s	0.0	0.3	0.2	6.8	0.0	0.1	0.0	3.6

Intersection Summary	
HCM 7th Control Delay, s/veh	12.6
HCM 7th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	56	46	393	494	113
Future Vol, veh/h	73	56	46	393	494	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	63	52	442	555	127

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	879	278	682	0	-	0
Stage 1	555	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	287	720	907	-	-	-
Stage 1	539	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	270	720	907	-	-	-
Mov Cap-2 Maneuver	270	-	-	-	-	-
Stage 1	508	-	-	-	-	-
Stage 2	705	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	18.13	0.97	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	907	-	270	720	-	-
HCM Lane V/C Ratio	0.057	-	0.303	0.087	-	-
HCM Control Delay (s/veh)	9.2	-	24	10.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.2	0.3	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

PM Peak Hour
Site Category: Existing plus Development Conditions
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	43	2.0	1163	0.037	100	2.3	LOS A	0.2	3.9	Full	1600	0.0	0.0
Approach	43	2.0		0.037		2.3	LOS A	0.2	3.9				
East: Arborwalk Boulevard													
Lane 1[d]	173	2.0	1286	0.134	100	0.2	LOS A	0.6	15.9	Full	1600	0.0	0.0
Approach	173	2.0		0.134		0.2	LOS A	0.6	15.9				
North: Arborway Drive													
Lane 1[d]	95	2.0	1212	0.078	100	3.1	LOS A	0.3	8.6	Full	1600	0.0	0.0
Approach	95	2.0		0.078		3.1	LOS A	0.3	8.6				
West: Arborwalk Boulevard													
Lane 1[d]	95	2.0	1191	0.079	100	0.5	LOS A	0.3	8.7	Full	1600	0.0	0.0
Approach	95	2.0		0.079		0.5	LOS A	0.3	8.7				
Intersection	405	2.0		0.134		1.2	LOS A	0.6	15.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	1	34	43	2.0	1163	0.037	100	NA	NA
Approach	9	1	34	43	2.0		0.037			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	40	76	173	2.0	1286	0.134	100	NA	NA
Approach	57	40	76	173	2.0		0.134			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	65	1	28	95	2.0	1212	0.078	100	NA	NA
Approach	65	1	28	95	2.0		0.078			
West: Arborwalk Boulevard										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	39	41	14	95	2.0	1191	0.079	100	NA	NA
Approach	39	41	14	95	2.0		0.079			
	Total	%HV	Deg.Satn (v/c)							
Intersection	405	2.0		0.134						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Arborway Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	3	9	79	63	8
Future Vol, veh/h	8	3	9	79	63	8
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	3	10	89	71	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	184	75	80	0	-	0
Stage 1	75	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	805	986	1518	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	799	986	1518	-	-	-
Mov Cap-2 Maneuver	799	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.33	0.76	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	184	-	843	-	-
HCM Lane V/C Ratio	0.007	-	0.015	-	-
HCM Control Delay (s/veh)	7.4	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

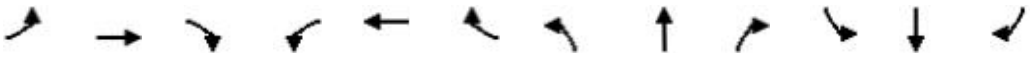
Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	5	83	13	9	57
Future Vol, veh/h	8	5	83	13	9	57
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	6	93	15	10	64

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	185	101	0	0	108	0
Stage 1	101	-	-	-	-	-
Stage 2	84	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	804	955	-	-	1483	-
Stage 1	923	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	799	955	-	-	1483	-
Mov Cap-2 Maneuver	799	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	932	-	-	-	-	-

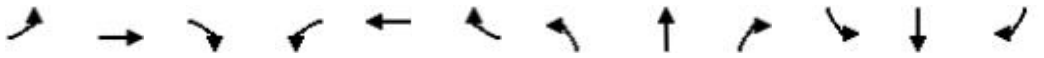
Approach	WB	NB	SB
HCM Control Delay, s/v	9.3	0	1.02
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	852	245	-
HCM Lane V/C Ratio	-	-	0.017	0.007	-
HCM Control Delay (s/veh)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	203	520	50	84	1149	248	284	376	172	215	122	198
v/c Ratio	0.59	0.28	0.06	0.38	0.67	0.28	0.68	0.69	0.44	0.66	0.25	0.56
Control Delay (s/veh)	65.4	13.7	0.3	57.8	26.9	5.4	59.1	54.6	9.9	61.6	46.8	18.1
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 (s/veh)	65.4	13.7	0.3	57.8	26.9	5.4	59.1	54.6	9.9	61.6	46.8	18.1
Queue Length 50th (ft)	85	79	1	32	350	16	109	147	0	82	45	26
Queue Length 95th (ft)	116	133	0	58	487	70	154	189	59	124	72	97
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	372	1880	838	241	1710	878	472	752	471	358	663	424
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	0.55	0.28	0.06	0.35	0.67	0.28	0.60	0.50	0.37	0.60	0.18	0.47

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	478	46	77	1057	228	261	346	158	198	112	182
Future Volume (veh/h)	187	478	46	77	1057	228	261	346	158	198	112	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	203	520	50	84	1149	248	284	376	172	215	122	198
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	259	1974	838	131	1851	832	348	576	257	271	516	228
Arrive On Green	0.15	1.00	1.00	0.04	0.53	0.53	0.10	0.16	0.16	0.08	0.15	0.15
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	203	520	50	84	1149	248	284	376	172	215	122	198
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	6.8	0.0	0.0	3.0	27.6	10.6	9.7	11.9	12.2	7.8	3.6	14.8
Cycle Q Clear(g_c), s	6.8	0.0	0.0	3.0	27.6	10.6	9.7	11.9	12.2	7.8	3.6	14.8
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	259	1974	838	131	1851	832	348	576	257	271	516	228
V/C Ratio(X)	0.78	0.26	0.06	0.64	0.62	0.30	0.82	0.65	0.67	0.79	0.24	0.87
Avail Cap(c_a), veh/h	360	1974	838	233	1851	832	475	755	337	364	666	295
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.1	0.0	0.0	56.8	19.8	15.8	52.9	47.1	47.3	54.0	45.4	50.2
Incr Delay (d2), s/veh	7.1	0.3	0.1	5.2	1.6	0.9	7.8	1.3	3.2	8.4	0.2	19.0
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	2.9	0.1	0.0	1.3	10.8	3.8	4.5	5.2	4.9	3.4	1.6	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.2	0.3	0.1	62.0	21.4	16.7	60.7	48.4	50.5	62.3	45.6	69.2
LnGrp LOS	E	A	A	E	C	B	E	D	D	E	D	E
Approach Vol, veh/h		773			1481			832			535	
Approach Delay, s/veh		15.2			22.9			53.0			61.1	
Approach LOS		B			C			D			E	

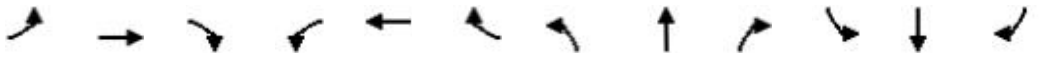
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	23.9	9.3	72.2	16.6	21.9	13.5	68.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	25.5	8.5	54.5	16.5	22.5	12.5	50.5
Max Q Clear Time (g_c+I1), s	9.8	14.2	5.0	2.0	11.7	16.8	8.8	29.6
Green Ext Time (p_c), s	0.2	2.1	0.1	3.7	0.4	0.6	0.2	8.8

Intersection Summary	
HCM 7th Control Delay, s/veh	33.8
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	42	557	68	1476	86	84	27	166	58	15	159
v/c Ratio	0.19	0.24	0.11	0.61	0.08	0.39	0.19	0.61	0.31	0.14	0.64
Control Delay (s/veh)	6.9	8.9	5.8	12.0	3.1	47.0	53.3	17.3	45.2	53.7	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.9	8.9	5.8	12.0	3.1	47.0	53.3	17.3	45.2	53.7	20.2
Queue Length 50th (ft)	7	86	10	250	2	57	20	0	39	11	0
Queue Length 95th (ft)	19	132	m31	306	m12	100	48	65	75	32	65
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	229	2333	646	2414	1079	222	364	443	190	312	414
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.24	0.11	0.61	0.08	0.38	0.07	0.37	0.31	0.05	0.38

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	506	6	63	1358	79	77	25	153	53	14	146
Future Volume (veh/h)	39	506	6	63	1358	79	77	25	153	53	14	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1633	1811	1870	1870	1856	1811	1870	1870	1870	1811	1693	1811
Adj Flow Rate, veh/h	42	550	7	68	1476	0	84	27	166	58	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	18	6	2	2	3	6	2	2	2	6	14	6
Cap, veh/h	312	2262	29	624	2313		297	230	195	253	182	
Arrive On Green	0.03	0.65	0.65	0.07	1.00	0.00	0.05	0.12	0.12	0.04	0.11	0.00
Sat Flow, veh/h	1555	3479	44	1781	3526	1535	1781	1870	1585	1725	1693	1535
Grp Volume(v), veh/h	42	272	285	68	1476	0	84	27	166	58	15	0
Grp Sat Flow(s),veh/h/ln	1555	1721	1803	1781	1763	1535	1781	1870	1585	1725	1693	1535
Q Serve(g_s), s	1.1	7.9	7.9	1.5	0.0	0.0	5.0	1.5	12.3	3.6	1.0	0.0
Cycle Q Clear(g_c), s	1.1	7.9	7.9	1.5	0.0	0.0	5.0	1.5	12.3	3.6	1.0	0.0
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	1119	1172	624	2313		297	230	195	253	182	
V/C Ratio(X)	0.13	0.24	0.24	0.11	0.64		0.28	0.12	0.85	0.23	0.08	
Avail Cap(c_a), veh/h	361	1119	1172	669	2313		326	366	310	292	317	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.70	0.70	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.3	8.7	8.7	6.1	0.0	0.0	44.2	46.8	51.6	45.1	48.2	0.0
Incr Delay (d2), s/veh	0.2	0.5	0.5	0.1	1.0	0.0	0.5	0.2	12.3	0.5	0.2	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	0.3	2.8	2.9	0.5	0.3	0.0	2.2	0.7	5.4	1.6	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	9.2	9.2	6.2	1.0	0.0	44.7	47.1	63.8	45.6	48.4	0.0
LnGrp LOS	A	A	A	A	A		D	D	E	D	D	
Approach Vol, veh/h		599			1544			277			73	
Approach Delay, s/veh		9.0			1.2			56.4			46.2	
Approach LOS		A			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	19.2	9.0	82.5	11.1	17.4	8.3	83.2
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	7.5	23.5	7.5	63.5	8.5	22.5	7.5	63.5
Max Q Clear Time (g_c+I1), s	5.6	14.3	3.5	9.9	7.0	3.0	3.1	2.0
Green Ext Time (p_c), s	0.0	0.4	0.0	3.3	0.0	0.0	0.0	15.7

Intersection Summary	
HCM 7th Control Delay, s/veh	10.5
HCM 7th LOS	B

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	146	60	26	734	431	49
Future Vol, veh/h	146	60	26	734	431	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	14	27	2	5	16
Mvmt Flow	159	65	28	798	468	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	924	234	522	0	-	0
Stage 1	468	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Critical Hdwy	6.84	7.18	4.64	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.44	2.47	-	-	-
Pot Cap-1 Maneuver	268	732	885	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	260	732	885	-	-	-
Mov Cap-2 Maneuver	260	-	-	-	-	-
Stage 1	577	-	-	-	-	-
Stage 2	605	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	30.24	0.31	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	885	-	260	732	-	-
HCM Lane V/C Ratio	0.032	-	0.611	0.089	-	-
HCM Control Delay (s/veh)	9.2	-	38.4	10.4	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	3.7	0.3	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

AM Peak Hour
Site Category: Future Conditions
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	68	2.0	1048	0.065	100	2.8	LOS A	0.3	6.9	Full	1600	0.0	0.0
Approach	68	2.0		0.065		2.8	LOS A	0.3	6.9				
East: Arborwalk Boulevard													
Lane 1[d]	79	2.0	1232	0.064	100	0.4	LOS A	0.3	7.0	Full	1600	0.0	0.0
Approach	79	2.0		0.064		0.4	LOS A	0.3	7.0				
North: Arborway Drive													
Lane 1[d]	207	2.0	1286	0.161	100	2.9	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	207	2.0		0.161		2.9	LOS A	0.8	19.6				
West: Arborwalk Boulevard													
Lane 1[d]	105	2.0	1143	0.092	100	0.7	LOS A	0.4	10.2	Full	1600	0.0	0.0
Approach	105	2.0		0.092		0.7	LOS A	0.4	10.2				
Intersection	460	2.0		0.161		2.0	LOS A	0.8	19.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	1	54	68	2.0	1048	0.065	100	NA	NA
Approach	13	1	54	68	2.0		0.065			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	16	20	43	79	2.0	1232	0.064	100	NA	NA
Approach	16	20	43	79	2.0		0.064			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	145	1	61	207	2.0	1286	0.161	100	NA	NA
Approach	145	1	61	207	2.0		0.161			

West: Arborwalk Boulevard										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	76	25	4	105	2.0	1143	0.092	100	NA	NA
Approach	76	25	4	105	2.0		0.092			

	Total	%HV	Deg.Satn (v/c)
Intersection	460	2.0	0.161

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Arborway Drive Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	22	5	82	86	0
Future Vol, veh/h	15	22	5	82	86	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	24	5	89	93	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	193	93	93	0	-	0
Stage 1	93	-	-	-	-	-
Stage 2	100	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	795	964	1501	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	792	964	1501	-	-	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	924	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.26	0.43	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	103	-	886	-	-
HCM Lane V/C Ratio	0.004	-	0.045	-	-
HCM Control Delay (s/veh)	7.4	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

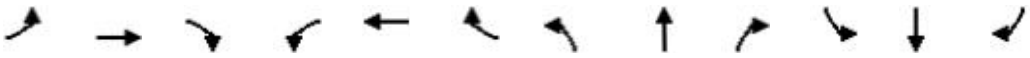
Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	8	78	4	3	105
Future Vol, veh/h	12	8	78	4	3	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	9	85	4	3	114

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	208	87	0	0	89	0
Stage 1	87	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	781	972	-	-	1506	-
Stage 1	936	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	779	972	-	-	1506	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.37	0	0.21
HCM LOS	A		

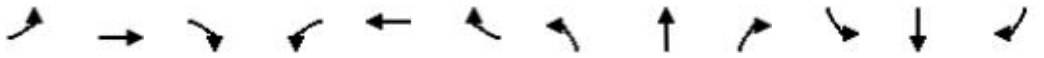
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	846	50	-
HCM Lane V/C Ratio	-	-	0.026	0.002	-
HCM Control Delay (s/veh)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	210	1281	264	210	763	249	140	284	213	312	407	224
v/c Ratio	0.60	0.75	0.32	0.62	0.45	0.28	0.54	0.63	0.57	0.76	0.64	0.48
Control Delay (s/veh)	59.2	24.8	9.1	59.6	22.0	3.3	61.7	55.8	14.0	63.4	49.9	8.7
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 (s/veh)	59.2	24.8	9.1	59.6	22.0	3.3	61.7	55.8	14.0	63.4	49.9	8.7
Queue Length 50th (ft)	88	189	13	81	200	0	54	112	9	120	154	0
Queue Length 95th (ft)	m120	385	m106	119	277	46	88	150	76	168	196	62
Internal Link Dist (ft)		1672			696			640			959	
Turn Bay Length (ft)	210		205	220		220	170		135	260		120
Base Capacity (vph)	377	1700	815	360	1709	898	271	634	447	437	840	543
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	0.56	0.75	0.32	0.58	0.45	0.28	0.52	0.45	0.48	0.71	0.48	0.41

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



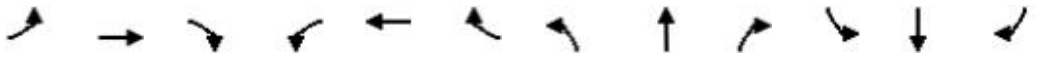
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	1140	235	187	679	222	125	253	190	278	362	199
Future Volume (veh/h)	187	1140	235	187	679	222	125	253	190	278	362	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	1841	1752	1781	1841	1856	1870	1870	1870	1752	1870	1856
Adj Flow Rate, veh/h	210	1281	264	210	763	249	140	284	213	312	407	224
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	4	10	8	4	3	2	2	2	10	2	3
Cap, veh/h	266	1749	743	266	1763	793	196	551	246	369	754	334
Arrive On Green	0.15	1.00	1.00	0.08	0.50	0.50	0.06	0.16	0.16	0.11	0.21	0.21
Sat Flow, veh/h	3456	3497	1485	3291	3497	1572	3456	3554	1585	3237	3554	1572
Grp Volume(v), veh/h	210	1281	264	210	763	249	140	284	213	312	407	224
Grp Sat Flow(s),veh/h/ln	1728	1749	1485	1646	1749	1572	1728	1777	1585	1618	1777	1572
Q Serve(g_s), s	7.0	0.0	0.0	7.5	16.6	11.2	4.8	8.8	15.7	11.3	12.2	15.7
Cycle Q Clear(g_c), s	7.0	0.0	0.0	7.5	16.6	11.2	4.8	8.8	15.7	11.3	12.2	15.7
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	266	1749	743	266	1763	793	196	551	246	369	754	334
V/C Ratio(X)	0.79	0.73	0.36	0.79	0.43	0.31	0.71	0.52	0.87	0.85	0.54	0.67
Avail Cap(c_a), veh/h	360	1749	743	343	1763	793	274	637	284	445	844	373
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	0.0	0.0	54.2	18.9	17.5	55.6	46.6	49.5	52.1	42.0	43.4
Incr Delay (d2), s/veh	5.3	1.7	0.8	9.1	0.8	1.0	5.2	0.7	21.4	12.1	0.6	4.0
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	3.0	0.4	0.2	3.4	6.5	4.1	2.2	3.8	7.5	5.1	5.3	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.1	1.7	0.8	63.3	19.6	18.6	60.8	47.3	70.8	64.2	42.6	47.4
LnGrp LOS	E	A	A	E	B	B	E	D	E	E	D	D
Approach Vol, veh/h		1755			1222			637			943	
Approach Delay, s/veh		8.0			26.9			58.1			50.9	
Approach LOS		A			C			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	23.1	14.2	64.5	11.3	30.0	13.7	65.0
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	16.5	21.5	12.5	51.5	9.5	28.5	12.5	51.5
Max Q Clear Time (g_c+I1), s	13.3	17.7	9.5	2.0	6.8	17.7	9.0	18.6
Green Ext Time (p_c), s	0.3	0.9	0.2	13.6	0.1	2.4	0.2	6.4

Intersection Summary	
HCM 7th Control Delay, s/veh	29.0
HCM 7th LOS	C

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	128	1533	222	821	83	29	26	201	85	38	103
v/c Ratio	0.26	0.73	0.67	0.35	0.08	0.16	0.20	0.68	0.43	0.21	0.37
Control Delay (s/veh)	6.8	22.5	39.7	8.6	1.4	42.3	54.6	19.0	49.5	51.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.8	22.5	39.7	8.6	1.4	42.3	54.6	19.0	49.5	51.7	7.2
Queue Length 50th (ft)	24	453	137	120	0	19	20	0	57	28	0
Queue Length 95th (ft)	47	655	219	152	3	44	46	68	100	60	26
Internal Link Dist (ft)		1287		1672			122			245	
Turn Bay Length (ft)	200		215		190	75		100	210		200
Base Capacity (vph)	495	2087	347	2358	1086	179	333	448	202	349	407
Starvation Cap Reductn	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
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.73	0.64	0.35	0.08	0.16	0.08	0.45	0.42	0.11	0.25

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	1308	56	198	731	74	26	23	179	76	34	92
Future Volume (veh/h)	114	1308	56	198	731	74	26	23	179	76	34	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	128	1470	63	222	821	0	29	26	201	85	38	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	528	2018	86	280	2160		303	269	228	307	320	
Arrive On Green	0.05	0.58	0.58	0.14	1.00	0.00	0.03	0.14	0.14	0.05	0.17	0.00
Sat Flow, veh/h	1781	3472	148	1781	3554	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	128	751	782	222	821	0	29	26	201	85	38	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1844	1781	1777	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.5	36.7	37.0	6.3	0.0	0.0	1.6	1.4	14.9	4.8	2.1	0.0
Cycle Q Clear(g_c), s	3.5	36.7	37.0	6.3	0.0	0.0	1.6	1.4	14.9	4.8	2.1	0.0
Prop In Lane	1.00		0.08	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	528	1033	1072	280	2160		303	269	228	307	320	
V/C Ratio(X)	0.24	0.73	0.73	0.79	0.38		0.10	0.10	0.88	0.28	0.12	
Avail Cap(c_a), veh/h	544	1033	1072	382	2160		353	335	284	323	351	
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.88	0.88	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.0	18.2	18.3	19.7	0.0	0.0	42.1	44.6	50.4	40.0	42.1	0.0
Incr Delay (d2), s/veh	0.2	4.5	4.4	6.9	0.4	0.0	0.1	0.2	22.6	0.5	0.2	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	14.8	15.4	3.8	0.1	0.0	0.7	0.7	7.2	2.1	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	9.3	22.7	22.7	26.6	0.4	0.0	42.2	44.8	73.0	40.5	42.2	0.0
LnGrp LOS	A	C	C	C	A		D	D	E	D	D	
Approach Vol, veh/h		1661			1043			256			123	
Approach Delay, s/veh		21.6			6.0			66.6			41.0	
Approach LOS		C			A			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	21.7	13.1	74.3	7.6	25.0	9.9	77.4
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	7.5	21.5	15.5	57.5	6.5	22.5	6.5	66.5
Max Q Clear Time (g_c+I1), s	6.8	16.9	8.3	39.0	3.6	4.1	5.5	2.0
Green Ext Time (p_c), s	0.0	0.3	0.3	9.8	0.0	0.1	0.0	6.2

Intersection Summary	
HCM 7th Control Delay, s/veh	20.9
HCM 7th LOS	C

Notes

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	103	77	55	608	764	158
Future Vol, veh/h	103	77	55	608	764	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	-	250	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	87	62	683	858	178

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1324	429	1036	0	-	0
Stage 1	858	-	-	-	-	-
Stage 2	465	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	147	574	667	-	-	-
Stage 1	375	-	-	-	-	-
Stage 2	599	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	134	574	667	-	-	-
Mov Cap-2 Maneuver	134	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	599	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	67.25	0.91	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	667	-	134	574	-	-
HCM Lane V/C Ratio	0.093	-	0.865	0.151	-	-
HCM Control Delay (s/veh)	11	-	108.3	12.4	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0.3	-	5.6	0.5	-	-

LANE SUMMARY

Site: 4 [Arborwalk Boulevard & Arborway Drive (Site Folder: General)]

PM Peak Hour
Site Category: Future Conditons
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Access B													
Lane 1[d]	43	2.0	1073	0.041	100	2.7	LOS A	0.2	4.2	Full	1600	0.0	0.0
Approach	43	2.0		0.041		2.7	LOS A	0.2	4.2				
East: Arborwalk Boulevard													
Lane 1[d]	230	2.0	1257	0.183	100	0.3	LOS A	0.9	22.8	Full	1600	0.0	0.0
Approach	230	2.0		0.183		0.3	LOS A	0.9	22.8				
North: Arborway Drive													
Lane 1[d]	146	2.0	1192	0.122	100	3.2	LOS A	0.6	14.0	Full	1600	0.0	0.0
Approach	146	2.0		0.122		3.2	LOS A	0.6	14.0				
West: Arborwalk Boulevard													
Lane 1[d]	136	2.0	1147	0.118	100	0.7	LOS A	0.5	13.4	Full	1600	0.0	0.0
Approach	136	2.0		0.118		0.7	LOS A	0.5	13.4				
Intersection	555	2.0		0.183		1.4	LOS A	0.9	22.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site 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: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Access B

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	1	34	43	2.0	1073	0.041	100	NA	NA
Approach	9	1	34	43	2.0		0.041			

East: Arborwalk Boulevard

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	57	117	230	2.0	1257	0.183	100	NA	NA
Approach	57	57	117	230	2.0		0.183			

North: Arborway Drive

Mov. From N	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	101	1	43	146	2.0	1192	0.122	100	NA	NA
Approach	101	1	43	146	2.0		0.122			
West: Arborwalk Boulevard										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	61	61	14	136	2.0	1147	0.118	100	NA	NA
Approach	61	61	14	136	2.0		0.118			
	Total	%HV	Deg.Satn (v/c)							
Intersection	555	2.0		0.183						

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Access B Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
East Exit: Arborwalk Boulevard Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
North Exit: Arborway Drive Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: Arborwalk Boulevard Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	5	14	112	89	12
Future Vol, veh/h	12	5	14	112	89	12
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	6	16	126	100	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	264	107	113	0	-	0
Stage 1	107	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	725	947	1476	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	717	947	1476	-	-	-
Mov Cap-2 Maneuver	717	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	9.78	0.83	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	200	-	772	-	-
HCM Lane V/C Ratio	0.011	-	0.025	-	-
HCM Control Delay (s/veh)	7.5	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	5	121	13	9	84
Future Vol, veh/h	8	5	121	13	9	84
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	6	136	15	10	94

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	258	143	0	0	151	0
Stage 1	143	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	731	904	-	-	1431	-
Stage 1	884	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	725	904	-	-	1431	-
Mov Cap-2 Maneuver	725	-	-	-	-	-
Stage 1	884	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.67	0	0.73
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	785	174	-
HCM Lane V/C Ratio	-	-	0.019	0.007	-
HCM Control Delay (s/veh)	-	-	9.7	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Appendix F: Signal Warrant Analysis

SIGNAL WARRANTS ANALYSIS

Ward Road and Arborwalk Boulevard
Existing (2022) Conditions

Kimley»Horn

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description		Lanes
45	Major App1:	Northbound Ward Road	
45	Major App3:	Southbound Ward Road	
30	Minor App2:	Eastbound Arborwalk Boulevard	
	Minor App4:		

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

				420	630		140	70		140	70		
HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A	MAJOR 1B	MINOR APP. 2	MINOR 2 1A	MINOR 2 1B	MINOR APP. 4	MINOR 4 1A	MINOR 4 1B	**MAJ & MIN 1A**	**MAJ & MIN 1B**
THRESHOLDS 1A/1B:													
0:00 - 1:00			0										
1:00 - 2:00			0										
2:00 - 3:00			0										
3:00 - 4:00			0										
4:00 - 5:00			0										
5:00 - 6:00			0										
6:00 - 7:00	239	100	339			64							
7:00 - 8:00	496	304	800	X	X	99		X					**X**
8:00 - 9:00	396	218	614	X		60							
9:00 - 10:00	257	200	457	X		35							
10:00 - 11:00	215	231	446	X		54							
11:00 - 12:00	226	232	458	X		45							
12:00 - 13:00	229	279	508	X		57							
13:00 - 14:00	240	282	522	X		41							
14:00 - 15:00	302	468	770	X	X	49							
15:00 - 16:00	325	485	810	X	X	62							
16:00 - 17:00	365	470	835	X	X	82		X					**X**
17:00 - 18:00	422	557	979	X	X	75		X					**X**
18:00 - 19:00	262	372	634	X	X	59							
19:00 - 20:00			0										
20:00 - 21:00			0										
21:00 - 22:00			0										
22:00 - 23:00			0										
23:00 - 24:00			0										

	Met (Hr)	Required (Hr)	
Warrant 1a	0	8	Not satisfied
Warrant 1b	3	8	Not satisfied
Warrant 2	0	4	Not satisfied
Warrant 3	0	1	Not satisfied
Warrant 7	0	8	Not satisfied

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description		Lanes
45	Major App1:	Northbound Ward Road	
45	Major App3:	Southbound Ward Road	
30	Minor App2:	Eastbound Arborwalk Boulevard	
	Minor App4:		

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

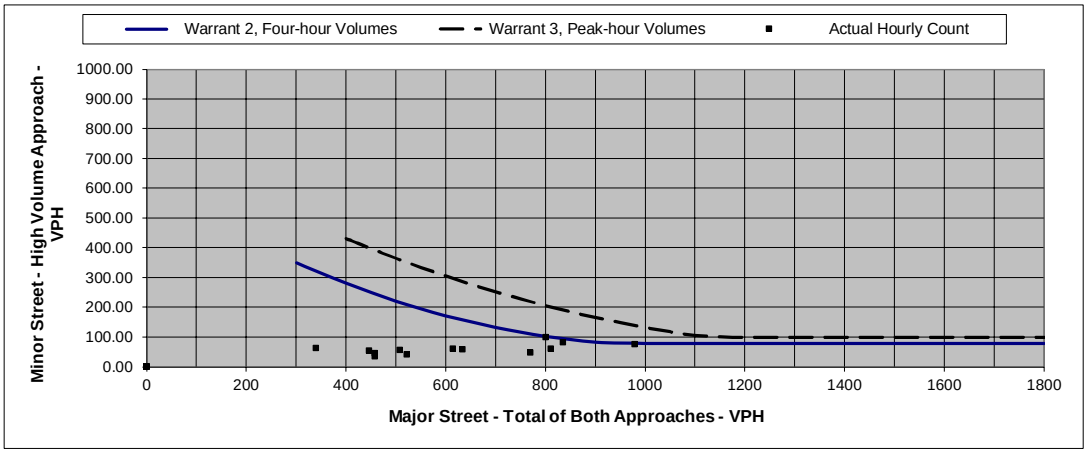


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

SIGNAL WARRANTS ANALYSIS

Ward Road and Arborwalk Boulevard
Existing + Development Conditions

Kimley»Horn

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description	
45	Major App1:	Northbound Ward Road
45	Major App3:	Southbound Ward Road
30	Minor App2:	Eastbound Arborwalk Boulevard
	Minor App4:	

Lanes

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

				420	630		140	70		140	70		
HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A	MAJOR 1B	MINOR APP. 2	MINOR 2 1A	MINOR 2 1B	MINOR APP. 4	MINOR 4 1A	MINOR 4 1B	**MAJ & MIN 1A**	**MAJ & MIN 1B**
0:00 - 1:00			0										
1:00 - 2:00			0										
2:00 - 3:00			0										
3:00 - 4:00			0										
4:00 - 5:00			0										
5:00 - 6:00			0										
6:00 - 7:00	244	105	348			108		X					
7:00 - 8:00	502	310	813	X	X	168	X	X				**X**	**X**
8:00 - 9:00	406	228	634	X	X	115		X					**X**
9:00 - 10:00	266	209	476	X		67							
10:00 - 11:00	223	239	461	X		85		X					
11:00 - 12:00	238	244	482	X		75		X					
12:00 - 13:00	243	293	537	X		83		X					
13:00 - 14:00	253	295	548	X		69							
14:00 - 15:00	320	486	806	X	X	81		X					**X**
15:00 - 16:00	347	507	854	X	X	96		X					**X**
16:00 - 17:00	397	502	900	X	X	118		X					**X**
17:00 - 18:00	459	594	1052	X	X	124		X					**X**
18:00 - 19:00	293	403	696	X	X	102		X					**X**
19:00 - 20:00			0										
20:00 - 21:00			0										
21:00 - 22:00			0										
22:00 - 23:00			0										
23:00 - 24:00			0										

	Met (Hr)	Required (Hr)	
Warrant 1a	1	8	Not satisfied
Warrant 1b	7	8	Not satisfied
Warrant 2	3	4	Not satisfied
Warrant 3	0	1	Not satisfied
Warrant 7	0	8	Not satisfied

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description	
45	Major App1:	Northbound Ward Road
45	Major App3:	Southbound Ward Road
30	Minor App2:	Eastbound Arborwalk Boulevard
	Minor App4:	

Lanes

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

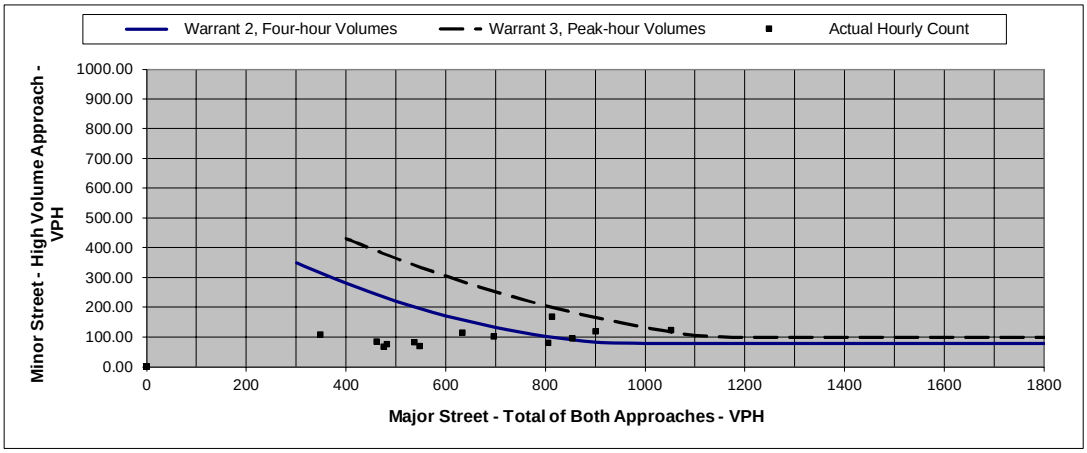


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

SIGNAL WARRANTS ANALYSIS

Ward Road and Arborwalk Boulevard
Future Conditions

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description	Lanes
45	Major App1:	Northbound Ward Road
45	Major App3:	Southbound Ward Road
30	Minor App2:	Eastbound Arborwalk Boulevard
	Minor App4:	

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

				420	630		140	70		140	70		
HOUR	MAJOR APP. 1	MAJOR APP. 3	TOTAL 1+3	MAJOR 1A	MAJOR 1B	MINOR APP. 2	MINOR 2 1A	MINOR 2 1B	MINOR APP. 4	MINOR 4 1A	MINOR 4 1B	**MAJ & MIN 1A**	**MAJ & MIN 1B**
0:00 - 1:00			0										
1:00 - 2:00			0										
2:00 - 3:00			0										
3:00 - 4:00			0										
4:00 - 5:00			0										
5:00 - 6:00			0										
6:00 - 7:00	353	150	503	X		138		X					
7:00 - 8:00	729	449	1178	X	X	214	X	X				**X**	**X**
8:00 - 9:00	587	328	914	X	X	142	X	X				**X**	**X**
9:00 - 10:00	384	301	684	X	X	83		X					**X**
10:00 - 11:00	321	344	665	X	X	110		X					**X**
11:00 - 12:00	341	350	692	X	X	96		X					**X**
12:00 - 13:00	348	421	769	X	X	109		X					**X**
13:00 - 14:00	363	424	786	X	X	88		X					**X**
14:00 - 15:00	458	700	1158	X	X	103		X					**X**
15:00 - 16:00	496	729	1224	X	X	124		X					**X**
16:00 - 17:00	564	717	1281	X	X	155	X	X				**X**	**X**
17:00 - 18:00	651	848	1500	X	X	158	X	X				**X**	**X**
18:00 - 19:00	413	573	986	X	X	129		X					**X**
19:00 - 20:00			0										
20:00 - 21:00			0										
21:00 - 22:00			0										
22:00 - 23:00			0										
23:00 - 24:00			0										

	Met (Hr)	Required (Hr)	
Warrant 1a	4	8	Not satisfied
Warrant 1b	**12**	8	**Satisfied**
Warrant 2	**7**	4	**Satisfied**
Warrant 3	**4**	1	**Satisfied**
Warrant 7	0	8	Not satisfied

LOCATION: Lee's Summit
COUNTY: Jackson
REF. POINT:
DATE: 12/11/2024
OPERATOR: KH

Speed	Approach Description	Lanes
45	Major App1:	Northbound Ward Road
45	Major App3:	Southbound Ward Road
30	Minor App2:	Eastbound Arborwalk Boulevard
	Minor App4:	

0.70 FACTOR USED? yes
POPULATION < 10,000? no
EXISTING SIGNAL ? no

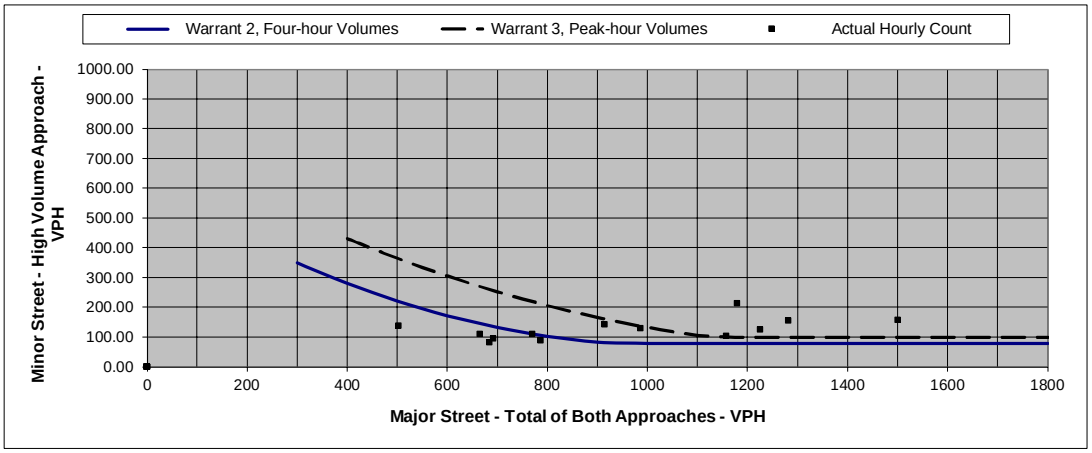


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds