Transportation Impact Study
Lakeview

October 11, 2023
Original December 15, 2022

Prepared for:
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1 INTRODUCTION

This report documents the results of a study to evaluate the potential traffic impacts of the proposed Lakeview residential project, in the City of Loveland. Rollins Consult LLC conducted the study as required for the project's development application.

PROJECT DESCRIPTION

The proposed Lakeview project is in located directly east of Boyd Lake in Loveland. Figure 1 illustrates the project location and study area. The site is adjacent to residential areas to the north and south, commercial/industrial and undeveloped land to the east, and Boyd Lake to the west.

The project site is depicted on Figure 2. The project proposes the following land uses and transportation elements:

- A mixture of residential land use to include single family and multi-family.
- For purposes of the traffic study, the following residential land use mix was assumed: 510 single family dwelling units and 132 multi-family dwellings.
- A community center and open space are planned within the project.
- There are numerous access points to the Lakeview project along Boyd Lake Avenue at four locations: Valley Oak Drive, Medford Drive, Lake Shore Drive, and Emerald Shore Circle.
- Bicycle and pedestrian facilities will be supported on the public facilities adjacent to the development. The internal roadway network will provide sidewalks.

Figure 1 – Project Location

Figure 2 – Site Plan

STUDY SCOPE

The scope of work for this study was developed with the City of Loveland staff and is provided in Appendix A. The base assumptions, technical methodologies, and geographic coverage of the study were all identified as part of the study approach. The study analyzes the potential project-generated traffic impacts on the adjacent street system.

The study evaluates the transportation system after the completion of the proposed project for both the short range (2025) and long range (2040) conditions. The following transportation scenarios were analyzed for the AM and PM peak hours:

- **Existing Conditions** – The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing transportation system is described. Peak hour intersection operations are evaluated.
- **Project Travel Demand** – The traffic generated by the Project will be estimated, distributed, and assigned to the transportation network.
- **Internal Roadway Network** - The anticipated daily traffic volumes on the project roadways and adjacent local streets will be evaluated.
- **Future Background Conditions** – Future traffic conditions are projected without the proposed Project for the buildout years 2025 and 2040. The traffic volumes on the roadway system will be factored and analyzed to reflect conditions for these future years. This analysis will include the consideration of traffic from other projects.
- **Total Future Conditions** – The traffic associated with the Project will be added to the Background traffic for years 2025 and 2040. The intersection operations will be determined.
- **Pedestrian Connections** - Pedestrian mobility to nearby schools and destinations will be documented. The need for additional pedestrian safety improvements is evaluated.

The study examined four existing intersections within the study area. These were identified by the City of Loveland for inclusion in the study. The study intersections are listed below.

1. Boyd Lake Avenue at Valley Oak Drive
2. Boyd Lake Avenue at Medford Drive
3. Boyd Lake Avenue at Lake Shore Drive
4. Boyd Lake Avenue at Emerald Shore Circle

2 EXISTING CONDITIONS

The transportation system has numerous elements that are described in this chapter. The roadway network and traffic volume information are presented for the study intersections.

ADJACENT LANDUSE

The Project site is located adjacent to the eastern side of Boyd Lake. North Boyd Lake and Boyd Lake Shores residential areas are located north and south of the site. East of the site is commercial, industrial, and the Fort Collins/Loveland Airport. The site is currently undeveloped land.

TRANSPORTATION NETWORK

The primary roadways that serve the Project site are described below. Roadway designations were provided in the City of Loveland, *Connect Loveland Transportation Master Plan,* City of Loveland 2040 Roadway Network, April 2020.

Roadway Network

Boyd Lake Avenue - This road is a north/south street that currently provides two southbound lanes and one northbound lane. The speed limit is 45 mph north of Emerald Shore Circle and 35 mph to the south. There is a sidewalk on the west side of the road and striped bike lanes on both sides. Near Emerald Shore Circle there is a raised median. Boyd Lake Avenue is shown as a four-lane arterial Major Arterial in the 2040 Roadway Network.

Valley Oak Drive - This east/west two-lane road serves the North Boyd Lake neighborhood. Near its intersection, with Boyd Lake Avenue there are sidewalks and bike lanes on both sides of the street. No parking is allowed in this section. Within the neighborhood, Valley Oak Drive is a two-lane local street with sidewalks and parking on both sides.

Medford Drive - This road is an east-west street that serves the adjacent industrial uses. There is a sidewalk on the south side of the street.

Lake Shore Drive - This two-lane east/west collector street will serve the Lakeview development and provide access to the current residential areas. There are sidewalks and bike lanes on both sides of the street. There is no parking allowed on either side of the street. The speed limit is posted at 25 mph. In the future, Lake Shore Drive will be extended to the east of Boyd Lake Avenue with the development of the Boyd Lake Commerce Center, an industrial park. The City anticipates this will be a roundabout by 2040.

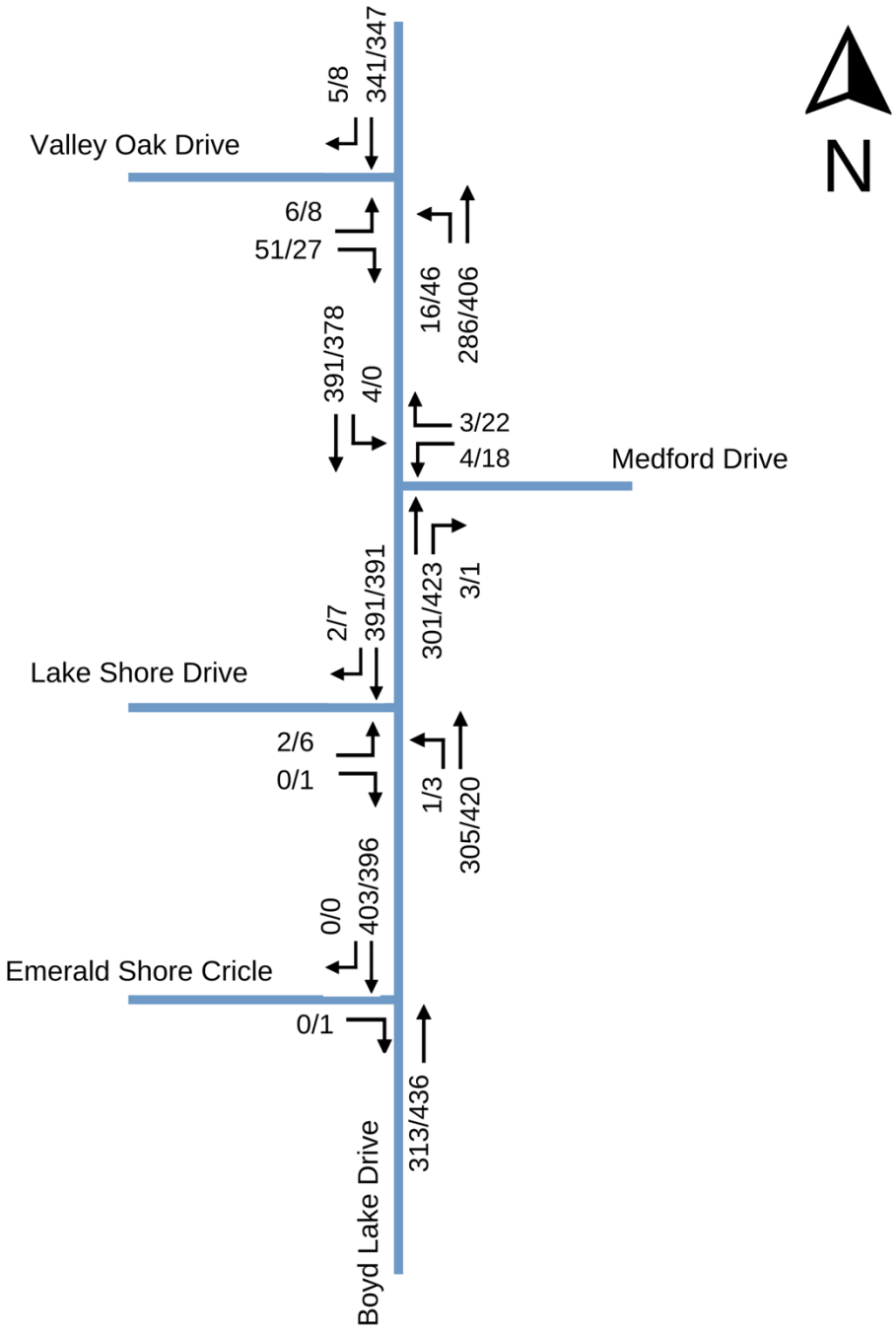
Emerald Shore Circle - This two-lane east/west street is currently built to provide circulation within the Lakeview project. There are sidewalks on both sides of the street

and the speed limit is posted at 25 mph. There is a median in Boyd Lake Avenue that limits the movements to/from Emerald Shore Circle to right-turns only. In the future, Boyd Lake Commerce Center, Emerald Shore Circle will be built on the east side of Boyd Lake Avenue. This future intersection will allow for a southbound left-turn from Boyd Lake Avenue to the commerce center. Northbound left turns into Lakeview will not be allowed.

EXISTING TRAFFIC CONDITIONS

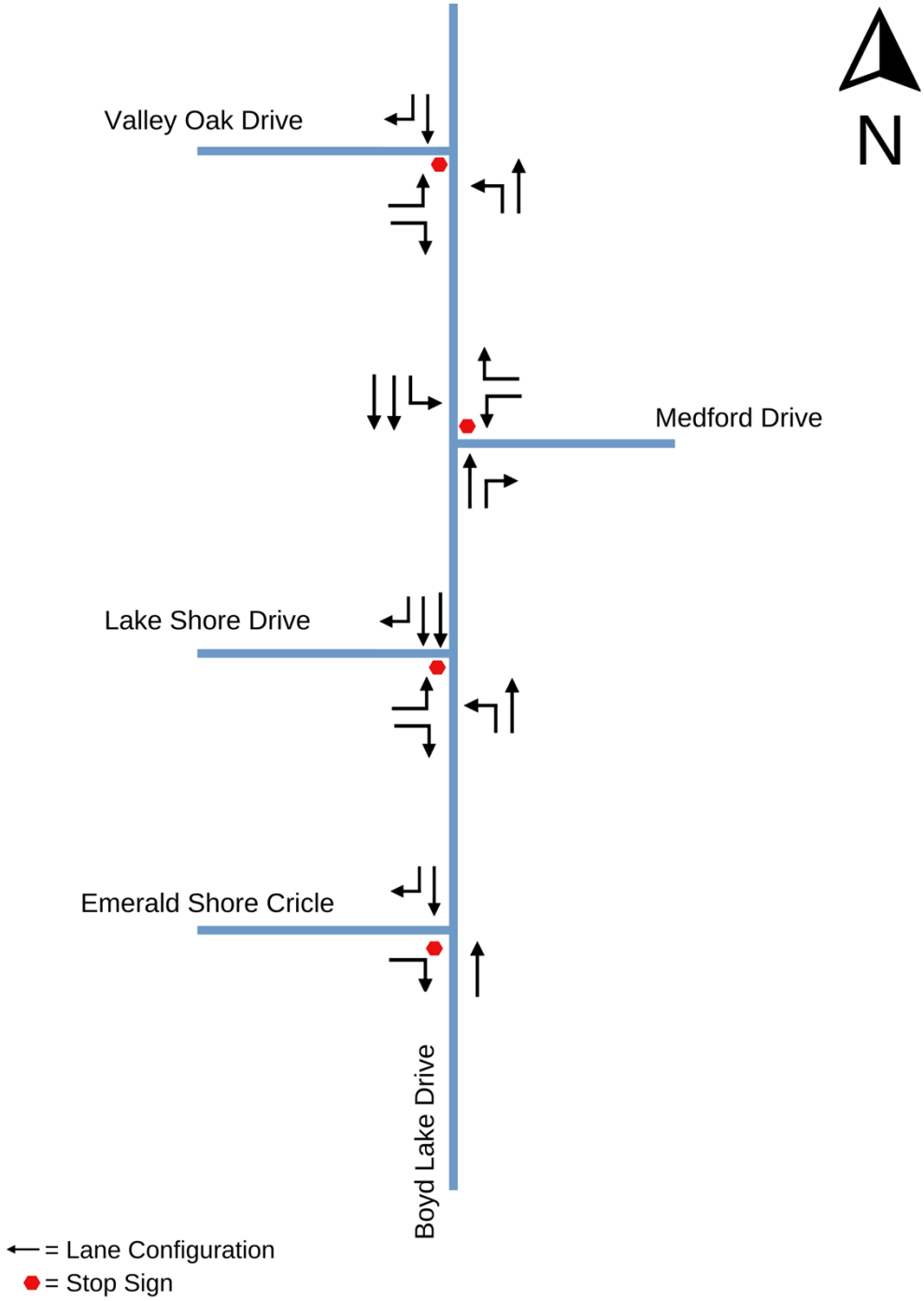
Existing intersection operations were evaluated for both the morning and evening peak hours. Intersection count data was collected in October of 2022. These counts were performed at the four existing study intersections. Appendix B includes the intersection turning movement. The resulting peak hour turning movement volumes are provided on Figure 3. The current lane configurations of the study intersections are shown on Figure 4.

Figure 3 – Existing Peak Hour Traffic Volumes



AM/PM Peak Hour Turning Movements

Figure 4 – Existing Lane Configurations



Intersection Level of Service Analysis Methodologies

Transportation professionals evaluate intersections to determine how they are currently operating and will operate in the future. The methods employed can be found in the Transportation Research Board's, 6th Edition, 2016 *Highway Capacity Manual* (HCM). Level of service (LOS) is based on a "graded" system from LOS A, with very little to no delays to LOS F which represents excessive delays and congestion. Table 1 provides the thresholds for acceptable levels of service. The table is from the *Larimer County Urban Area Street Standards* (LCUASS), August 1, 2021.

Table 1
Intersection Level of Service Thresholds

Intersection Component	Major Intersection[1]	Minor Intersection[2]	Driveway
Overall (City Limits)	LOS C	LOS C	No Limit
Overall (GMAs)	LOS D	LOS D	No Limit
Any Leg	LOS D	LOS E	No Limit
Any Movement	LOS E	LOS F	No Limit

[1] Includes all signalized and unsignalized arterial/arterial and arterial/ major collector intersections.
[2] Includes all unsignalized intersections (except major intersections) and high volume driveways
[3] There are no LOS standards for I-25 Interchanges.
[4] On State Highways, overall LOS D is acceptable.

Unsignalized Intersection

Peak hour levels of motor vehicle delay at unsignalized intersections were estimated using the method from Chapter 17 of the 2016 *Highway Capacity Manual*. The delays for the entire intersection and the movement and/or approach are determined. Table 2 summarizes the relationship between the average control delay per vehicle and LOS for unsignalized intersections.

Table 2 Unsignalized Intersection Level of Service Definitions

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	≤10.0	No delay for stop-controlled approaches.
B	10.0 and ≤15.0	Operations with minor delay.
C	>15.0 and ≤25.0	Operations with moderate delays.
D	>25.0 and ≤35.0	Operations with increasingly unacceptable delays.
E	>35.0 and ≤50.0	Operations with high delays, and long queues.
F	>50.0	Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.

Source: Transportation Research Board, Highway Capacity Manual, 2016

Existing Intersection Conditions

Using the HCM methodology, the weekday AM and PM peak hour intersection operations were determined. The results are provided in Table 3. As indicated in Table 3, the study intersections are currently operating at acceptable levels of service. The detailed analysis worksheets are provided in Appendix C.

Table 3 Existing Intersection Level of Service

#	Intersection	Overall Movement	AM Peak	ACF LOS Failure?	PM Peak	ACF LOS Failure?
1	Boyd Lake Avenue at Valley Oak Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	C	No	C	No
		EB RT	B	No	B	No
2	Boyd Lake Avenue at Medford Drive T-Stop	Overall	A	No	A	No
		WB LT	B	No	B	No
		WB RT	B	No	B	No
		SB LT	A	No	A	No
3	Boyd Lake Avenue at Lake Shore Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	C	No	C	No
		EB RT	A	No	A	No
4	Boyd Lake Avenue at Emerald Shore Circle T-Stop	Overall	A	No	A	No
		EB RT	A	No	A	No

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. LOS is reported for both overall intersection and each constrained STOP-controlled movement or approach.

3 PROJECT TRAVEL DEMAND

This chapter provides an overview of the project and a description of the travel demand methodology to estimate vehicle trip generation, distribution, and assignment of project-generated traffic along area roadways and intersections.

PROJECT CHARACTERISTICS

The proposed Lakeview includes a mixture of residential land uses. The project will be located to the east of Boyd Lake. The amount of development for each residential use was estimated and includes:

- 510 single family homes
- 132 multi-family dwelling units

The project site plan is depicted on Figure 2. As shown on the figure, vehicular access to the project will be from numerous access points to/from Boyd Lake Avenue.

PROJECT TRIP GENERATION

The trip generation characteristics of the project were estimated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 11^{1h} Edition. Table 4 provides the trip generation estimated for the full buildout of the Lakeview development. As indicated in the table, the full buildout is estimated to generate approximately 5,440 daily trips, 392 morning, and 537 evening peak hour trips.

Table 4 – Estimated Trip Generation

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units KSF	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	510	4517	85	243	328	290	170	460
Multi-Family Low Rise	220	132	921	15	48	64	49	29	77
TOTAL			5,439	101	291	392	338	199	537

Based on ITE Trip Generation 11th Edition

PROJECT TRIP DISTRIBUTION | ASSIGNMENT

The distribution of the project traffic onto the roadway system was based on the location of the project in northern Colorado, the current travel patterns, and input from City staff. The project trip distribution is depicted on Figure 5.

Figure 5 – Trip Distribution

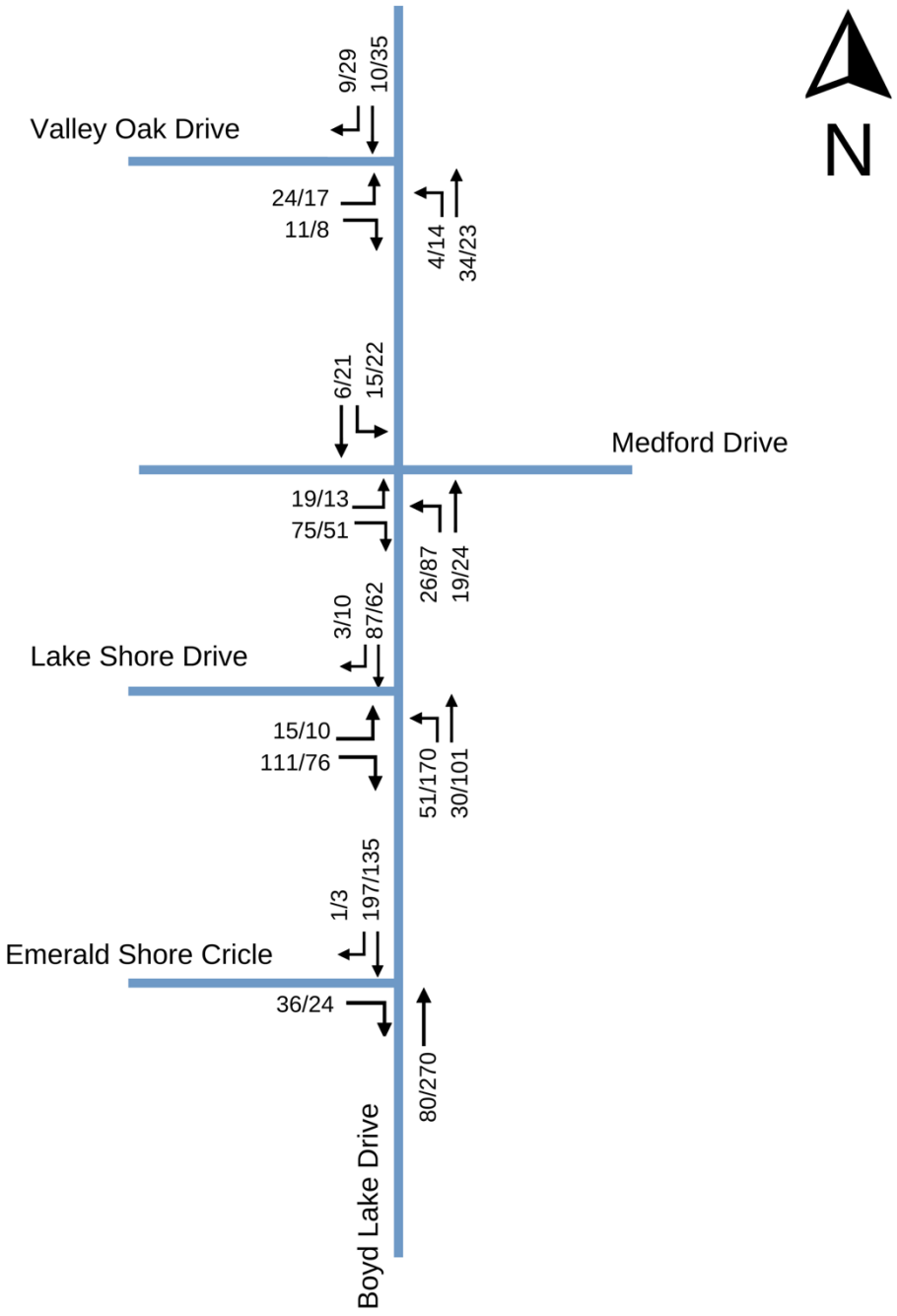
The trip estimates were assigned to the roadway network based on this distribution. The resulting peak hour traffic associated with the full buildout of the Lakeview project is shown on Figure 6.

INTERNAL AND ADJACENT ROADWAY NETWORK

The daily traffic on the internal roadway and adjacent network was determined based on the trip generation estimates, distribution pattern, and assignment. The daily traffic is shown on Figure 7. Sections of two roadways will be collectors, Medford Drive near Boyd Lake Avenue and Lake Shore Drive from Boyd Lake Avenue to the western side of the community area.

As shown on Figure 7, some residents of the Lakeview community may use the adjacent local streets. Some of the residents may travel south to access Boyd Lake

Figure 6 – Project Traffic



AM/PM Peak Hour Turning Movements

Figure 7 – Daily Traffic

4 FUTURE TRAFFIC PROJECTIONS

Estimates of future traffic conditions both with and without the proposed Lakeview project were necessary to evaluate the potential impact of the project on the local street system. The background base traffic scenario represents future traffic conditions without the addition of the project, while the total scenario represents future traffic conditions with the completion of the proposed project. These projections were developed for the years 2025 and 2040. The development of these future traffic scenarios is described in this chapter.

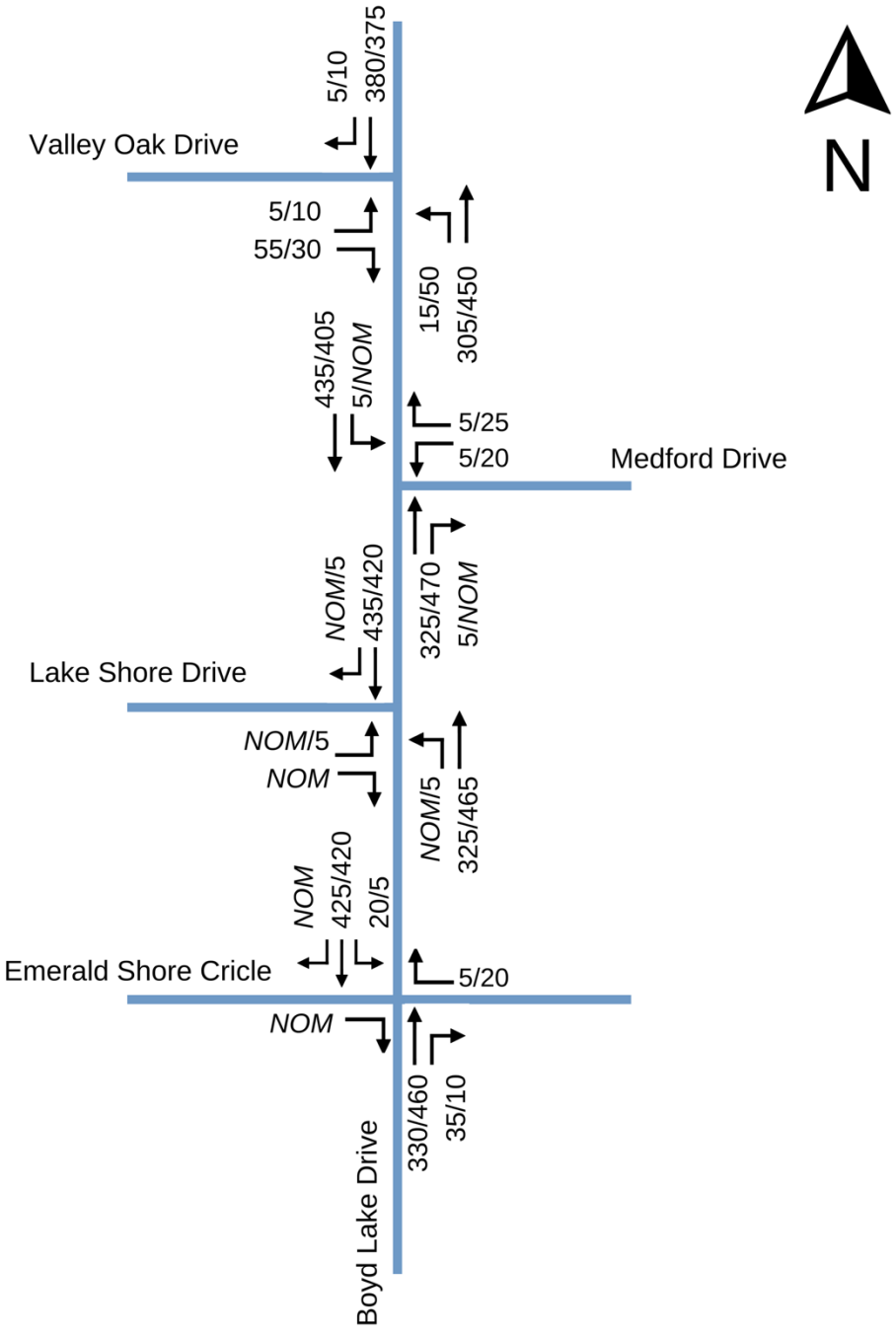
BACKGROUND 2025 TRAFFIC PROJECTIONS

The background 2025 traffic projections reflect growth in traffic from two primary sources: ambient growth in the existing traffic volumes due to regional growth both in and outside of the study area, and consideration of traffic generated by nearby planned projects. Each of these elements is described below.

- The **areawide/ambient growth** in traffic was determined based on historic growth within the City of Loveland. A growth of 2 percent annually was used.
- The future traffic related to the **other proposed projects** was added to the background traffic.
    - The Boyd Lake Commerce Center project is located east of Boyd Lake Avenue. Information from the *Boyd Lake Commerce Center, Final Traffic Study,* prepared by Lamp Rynearson, March 22, 2022. The first phase of this project was included in the 2025 background analysis.

The resulting Background 2025 traffic projections for the study intersections are provided on Figure 8.

Figure 8 – Background Traffic 2025



AM/PM Peak Hour Turning Movements
Rounded to nearest 5 vehicles/ NOM= Nominal

BACKGROUND 2040 TRAFFIC PROJECTIONS

The background 2040 traffic projections were developed based on the same method described for the 2025 projections. The existing traffic was factored by 1.36, the full buildout of the Boyd Lake Commerce Center was added, and traffic from the future buildout of the Millennium GDP was included.

- Information from the *Millennium GDP Amendment, Transportation Study,* prepared by Felsburg Holt & Ullevig, July 2023 was used for the future traffic volumes on Boyd Lake Avenue. Daily traffic projections are provided in the Millennium study. It was assumed that the AM peak hour was 8% of the daily and the PM peak hour represented 10% of the daily traffic volumes.

The resulting Background 2040 traffic projections for the study intersections are provided on Figure 9.

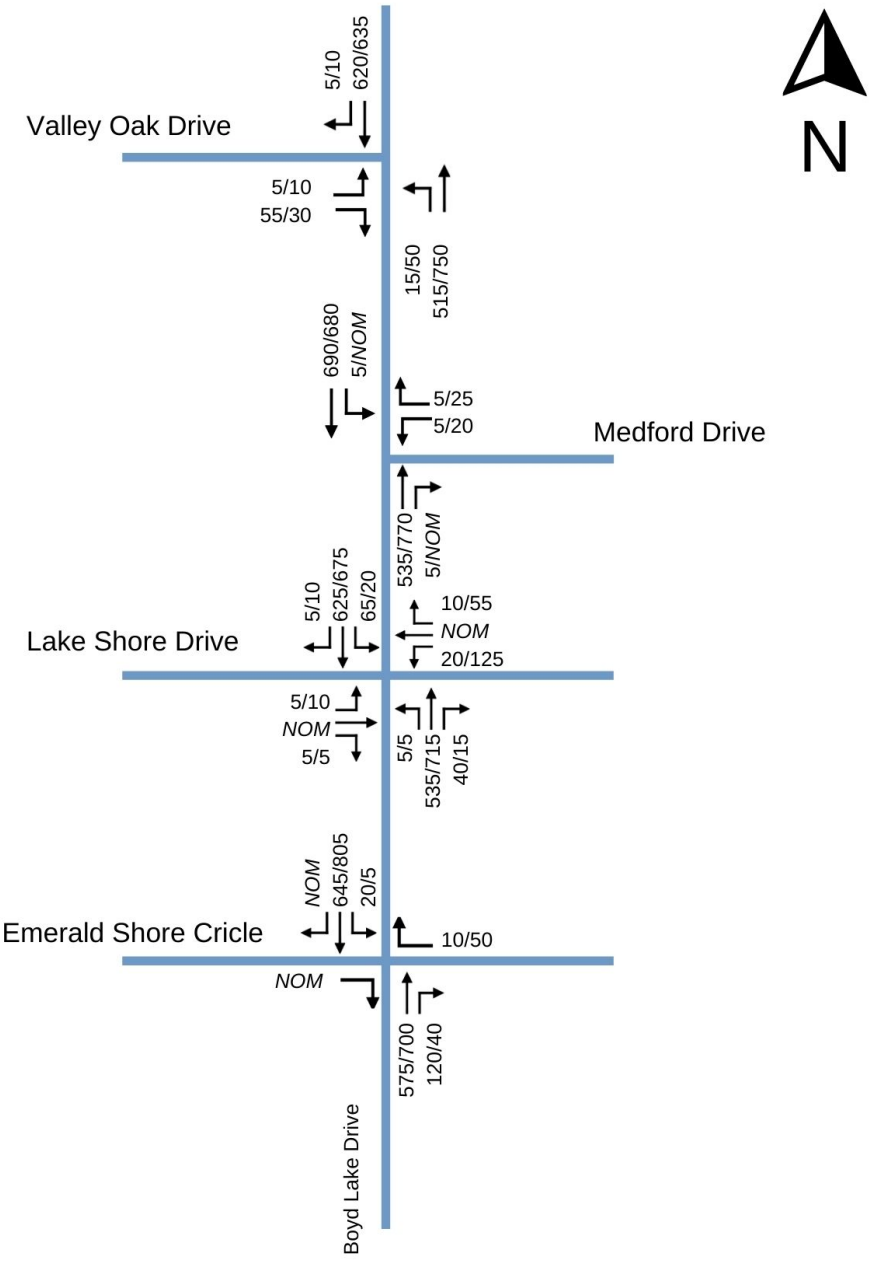
TOTAL TRAFFIC PROJECTIONS

The total traffic projections include both the background plus project traffic. The full buildout of the Lakeview project-generated traffic volumes from Figure 6 was added to the 2025 background traffic volumes illustrated on Figure 8 to develop background plus project peak hour traffic volumes. The resulting 2025 total traffic is depicted on Figure 10. The total 2040 traffic was developed by adding the project-generated traffic from Figure 6 to the background traffic on Figure 9. The total 2040 projected traffic is shown on Figure 11.

TRAFFIC PROJECTION ON ADJACENT LOCAL STREETS

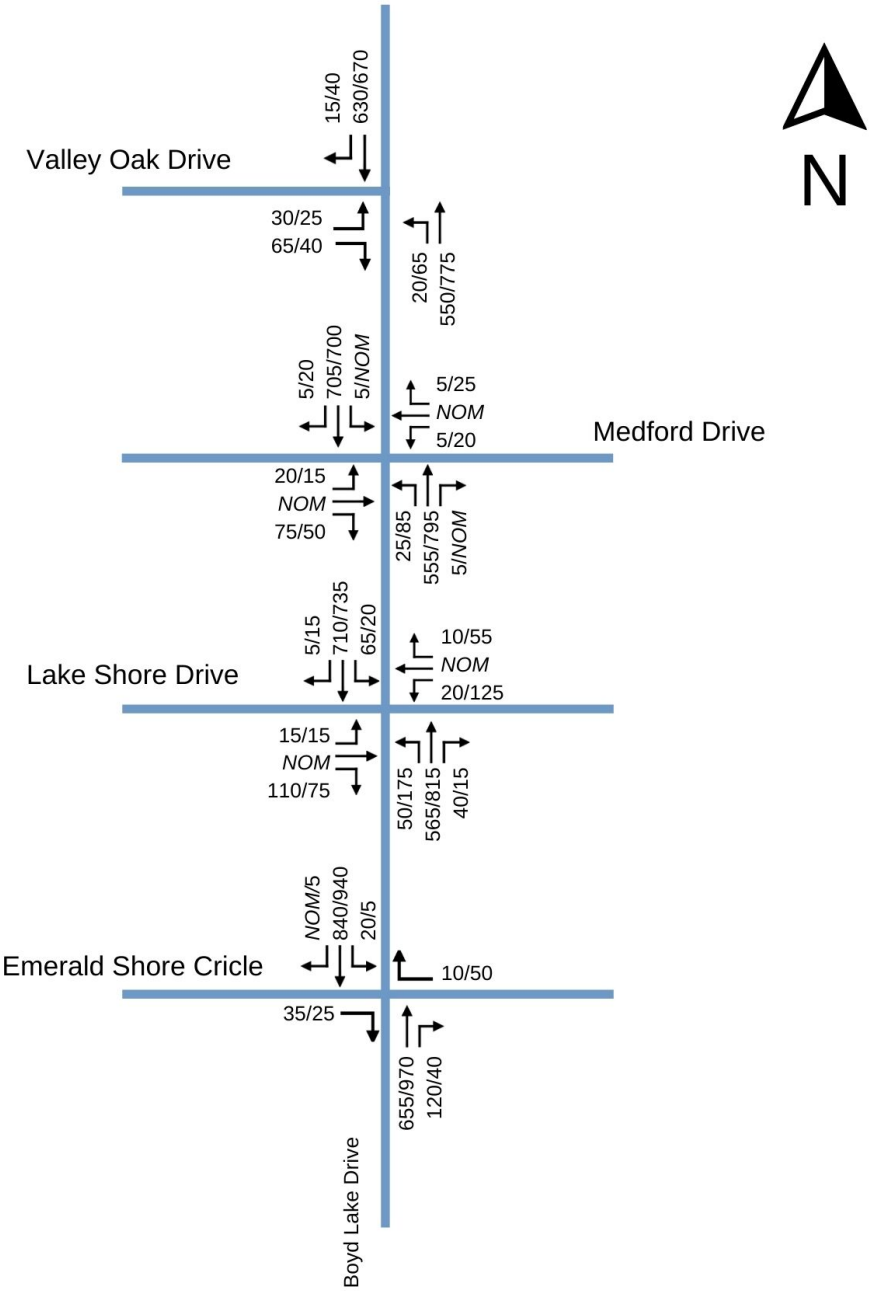
The traffic to and from the Lakeview project may use the existing local streets in the area. Estimates of the daily trips are provided on Figure 7. As shown, it is estimated that approximately 185 daily trips may occur on the adjacent streets, south of Lakeview, on Valley Oak Drive and White Bark Place. The acceptable threshold on local streets with residential homes fronting directly on the street is 1,000 daily trips. Based on the existing homes and the peak hour traffic data for Boyd Lake Avenue at Kendall Parkway/White Bark Place, it was estimated that the existing daily trips on White Bark Place are less than 400. The total traffic on the local streets near Lakeview is not anticipated to exceed the 1,000 daily trip threshold.

Figure 9 – Background Traffic 2040



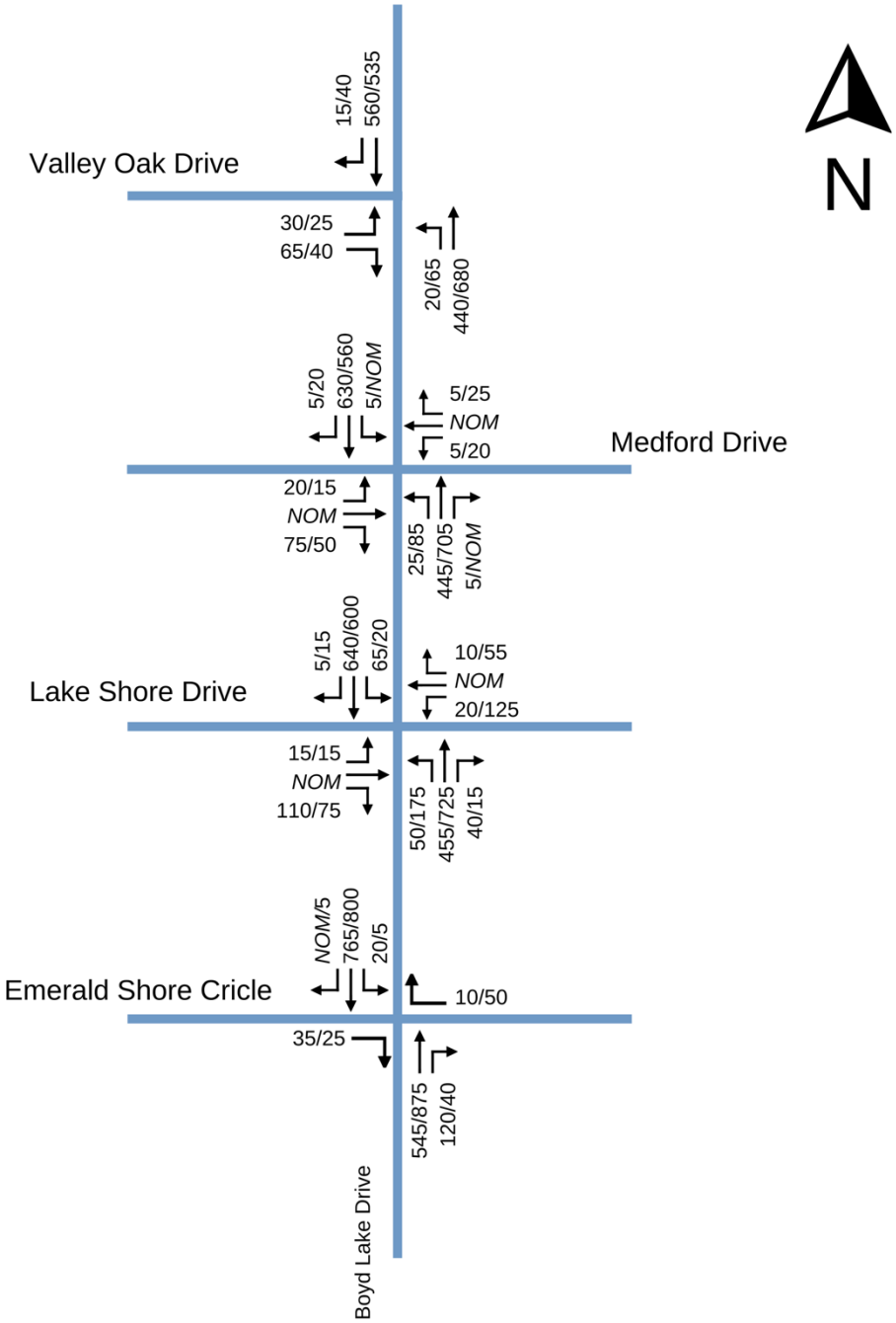
AM/PM Peak Hour Turning Movements
Rounded to nearest 5 vehicles/ NOM= Nominal

Figure 10 – Total Traffic 2025



AM/PM Peak Hour Turning Movements
Rounded to nearest 5 vehicles/ NOM= Nominal

Figure 11 – Total Traffic 2040



AM/PM Peak Hour Turning Movements
Rounded to nearest 5 vehicles/ NOM= Nominal

5 TRAFFIC IMPACT ANALYSIS

This chapter presents an analysis of the potential impacts of the traffic generated by the proposed Lakeview project on the local street system. The analysis compares the projected levels of service at each study intersection under future background and total conditions to estimate the incremental increase in the level of service caused by the proposed Project. This provides the information needed to assess the potential impact of the Project using the acceptable operations criteria. The future traffic projections at the four study intersections were analyzed to determine their operating conditions for years 2025 and 2040.

FUTURE 2025 TRAFFIC CONDITIONS

The results of the intersection operations analysis for year 2025 are provided in Table 5 and Table 6 for both the background and total traffic scenarios respectively. The study results, shown in both tables, indicate that the future 2025 operations are anticipated to operate at acceptable levels.

FUTURE 2040 CONDITIONS AND IMPROVEMENTS

The 2040 analysis results are provided in Table 7 and Table 8 for background and total traffic scenarios respectively. The analysis assumes the following roadway improvements will be constructed by 2040. The 2040 intersection configurations are illustrated on Figure 12.

- Boyd Lake Avenue would be a four-lane facility
- The intersection of Boyd Lake Avenue at Lake Shore Drive will be a roundabout

The results indicate that the intersections will operate at acceptable levels under both background and total traffic conditions.

Table 5 Future Background 2025
Intersection Level of Service

#	Intersection	Overall Movement	AM LOS	APF LOS Failure?	PM LOS	APF LOS Failure?
1	Boyd Lake Avenue at Valley Oak Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	C	No	C	No
		EB RT	B	No	B	No
2	Boyd Lake Avenue at Medford Drive T-Stop	Overall	A	No	A	No
		WB LT	B	No	C	No
		WB RT	B	No	B	No
		SB LT	A	No	A	No
3	Boyd Lake Avenue at Lake Shore Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	C	No	C	No
		EB RT	A	No	A	No
4	Boyd Lake Avenue at Emerald Shore Circle T-Stop	Overall	A	No	A	No
		EB RT	A	No	B	No
		WB RT	B	No	B	No
		SB LT	A	No	A	No

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. LOS is reported for both overall intersection and each constrained STOP-controlled movement or approach.

Table 6 Future Total 2025
Intersection Level of Service

#	Intersection	Overall Movement	AM LOS	APF LOS Failure?	PM LOS	APF LOS Failure?
1	Boyd Lake Avenue at Valley Oak Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	C	No	C	No
		EB RT	B	No	B	No
2	Boyd Lake Avenue at Medford Drive Two-Way Stop	Overall	A	No	A	No
		WB LT	C	No	D	No
		WB RT	B	No	B	No
		NB LT	A	No	A	No
		EB LT	D	No	E	No
		EB RT	B	No	B	No
		SB LT	A	No	A	No
3	Boyd Lake Avenue at Lake Shore Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	D	No	E	No
		EB RT	B	No	A	No
4	Boyd Lake Avenue at Emerald Shore Circle Two-Way Stop	Overall	A	No	A	No
		EB RT	C	No	B	No
		WB RT	B	No	B	No
		SB LT	A	No	A	No

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. LOS is reported for both overall intersection and each constrained STOP-controlled movement or approach.

Table 7 Future Background 2040 Intersection Level of Service

#	Intersection	Overall Movement	AM LOS	APF LOS Failure?	PM LOS	APF LOS Failure?
1	Boyd Lake Avenue at Valley Oak Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	D	No	D	No
		EB RT	B	No	B	No
2	Boyd Lake Avenue at Medford Drive T-Stop	Overall	A	No	A	No
		WB LT	C	No	D	No
		WB RT	B	No	B	No
		SB LT	A	No	A	No
3	Boyd Lake Avenue at Lake Shore Drive Roundabout	Overall	A	No	B	No
		EB Approach	A	No	A	No
		WB Approach	A	No	B	No
		NB LT/T	A	No	A	No
		NB RT	A	No	A	No
		SB LT/T	B	No	B	No
		SB RT	A	No	A	No
4	Boyd Lake Avenue at Emerald Shore Circle T-Stop	Overall	A	No	A	No
		EB RT	A	No	B	No
		WB RT	B	No	B	No
		SB LT	A	No	B	No

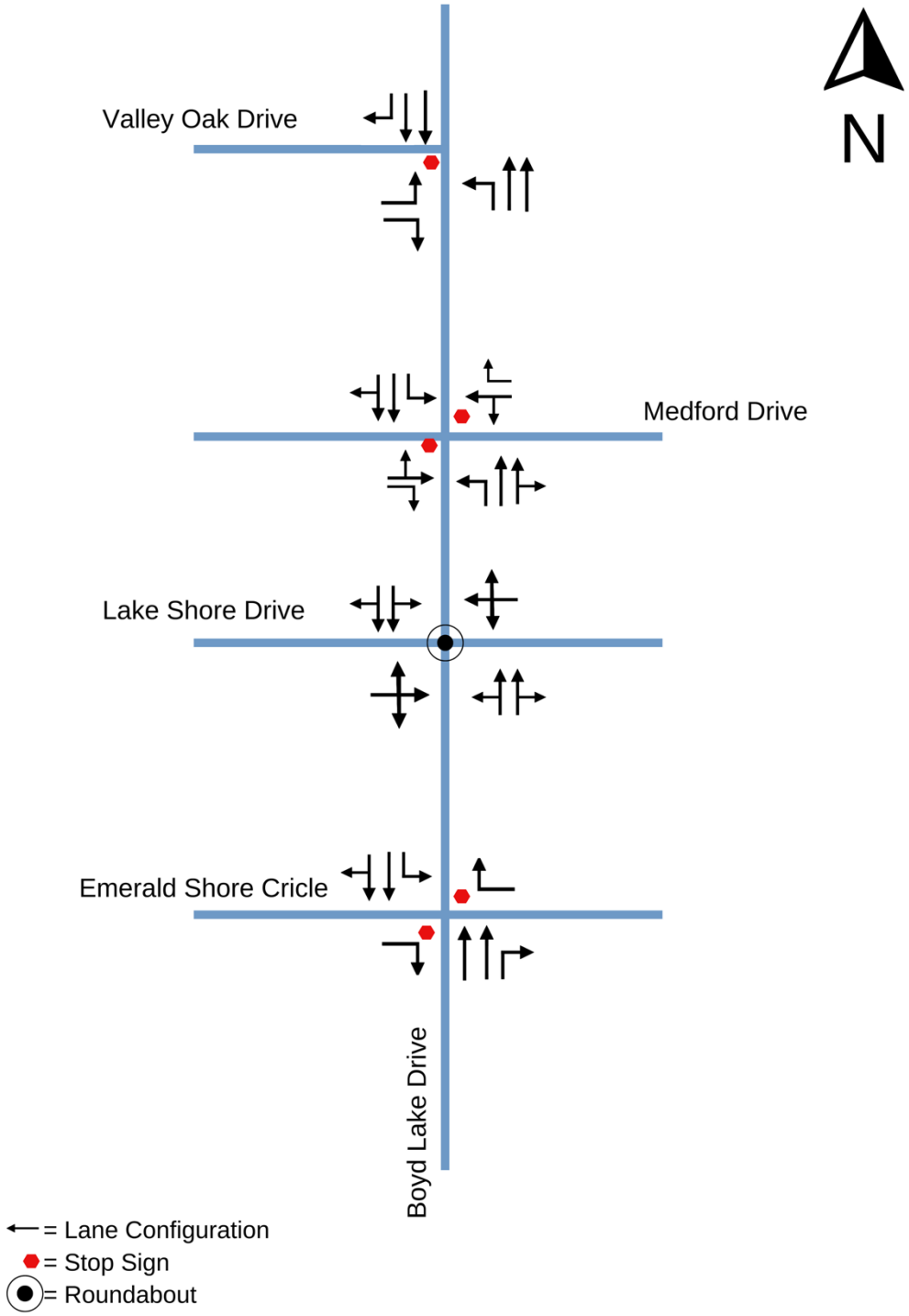
1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. LOS is reported for both overall intersection and each constrained STOP-controlled movement or approach.

Table 8 Future Total 2040
Intersection Level of Service

#	Intersection	Overall Movement	AM LOS	APF LOS Failure?	PM LOS	APF LOS Failure?
1	Boyd Lake Avenue at Valley Oak Drive T-Stop	Overall	A	No	A	No
		NB LT	A	No	A	No
		EB LT	D	No	E	No
		EB RT	B	No	B	No
2	Boyd Lake Avenue at Medford Drive Two-Way Stop	Overall	A	No	A	No
		WB LT	E	No	F	No
		WB RT	B	No	B	No
		NB LT	A	No	A	No
		EB LT	E	No	E	No
		EB RT	B	No	B	No
		SB LT	A	No	A	No
3	Boyd Lake Avenue at Lake Shore Drive Roundabout	Overall	B	No	C	No
		EB Approach	B	No	B	No
		WB Approach	A	No	C	No
		NB LT/T	B	No	C	No
		NB RT	A	No	A	No
		SB LT/T	B	No	C	No
		SB RT	A	No	A	No
4	Boyd Lake Avenue at Emerald Shore Circle T-Stop	Overall	A	No	A	No
		EB RT	B	No	B	No
		WB RT	B	No	B	No
		SB LT	A	No	B	No

1. LOS calculations performed using Synchro which is based on the Transportation Research Board HCM 2016.
2. LOS is reported for both overall intersection and each constrained STOP-controlled movement or approach.

Figure 12 – 2040 Intersection Configuration



6 PEDESTRIAN MOBILITY

The City of Loveland has established pedestrian level of service definitions. They address several elements or quality indicators that impact the environments these users experience. The elements identified as important to support a beneficial pedestrian environment are:

1. Directness
2. Continuity
3. Street Crossings
4. Visual Interest and Amenity
5. Security

Each of these is described in depth in the City of Loveland, *Bicycle and Pedestrian Plan,* May 1, 2012. Destinations within 1,320 feet of the Project are identified and analyzed for each pedestrian element. Schools within 1 ½ miles that serve the Lakeview project are also included. The pedestrian study area is depicted in Appendix D. The results of this analysis are summarized in Table 7 along with the associated LOS for each element.

Table 7 – Pedestrian Level of Service

Destination	Pedestrian Elements LOS				
	Directness	Continuity	Street Crossing	Visual Interest	Security
Residential Area North	C	A	A	A	B
Residential Area South	B	A	A	A	B
Residential Area Southeast	B	A	B	C	C

SCHOOLS

One school, within 1 ½ miles, would serve the project, High Plains School (K through 8). Pedestrian and bicycle access to High Plains School is described below.

High Plains Elementary and Middle School – Bus service will be provided to students attending High Plains School. Currently, bus pick-up is located at Clearwater Drive at Valley Oak Drive on the north side of the Lakeview project and Avenida del Sol Drive at Valley Oak Drive on the south end of the site. Sidewalks will be available to/from each of these bus stops.

For students walking and bicycling to the school, it will be just over a mile (south end of Lakeview) to 1.8 miles (north end of Lakeview) distance. Pedestrians would walk on the west side of Boyd Lake Avenue to the roundabout at Kendall Parkway. South of Kendall Parkway there are no sidewalks on the west side of Boyd Lake Avenue. Pedestrians and bicycles would cross Boyd Lake Avenue to the east side where sidewalks are available and continue to the school. There are crosswalks and signs at the roundabout for pedestrians crossing at this location. This location is analyzed below for upgraded crossing protection.

High School – There are no high schools within 1 ½ miles of the project site.

Crossing at Boyd Lake Avenue and Kendall Parkway - The intersection of Boyd Lake Avenue at Kendall Parkway was evaluated for upgrades to pedestrian protection. The Town of Windsor, *Pedestrian Crossing Guidelines,* December 2018 and the National Center for Safe Routes to School, *How Children Get To School,* November 2011 were utilized for this evaluation.

The minimum threshold for a pedestrian crossing at an uncontrolled intersection is 18 pedestrians in one hour and/or 10 school-aged pedestrians traveling to/from school in any one hour. Previous peak hour counts at this location were conducted for the Boyd Lake Commerce Center (the counts are provided in Appendix B). The counts indicated one pedestrian crossing Kendall Parkway however, the school was not in session.

Based on information provided by Thompson School District, estimates for student population are 0.15 students per single family home and 0.095 to 0.075 students per multi-family dwelling unit. Applying these values to the proposed Lakeview project results in the potential for 89 students. The *How Children Get To School* was used to estimate the number of students that would walk or bicycle to the High Plains School. Data from Table 5 (provided in Appendix E) was used. This indicates for a distance of 1 to 2 miles between home and school, 4% and 1.6% of students would walk or ride to school respectively. For the return trip, from school to home, 7.9% would walk and 1.6% would ride. Application of these values to the Lakeview project indicated that during the morning 5 students would walk/bike and 8 students during the afternoon.

The estimated number of students during the afternoon is close to the 10-student threshold. Due to the complexity of a multi-lane roundabout, it is suggested that pedestrian-activated RRFBs be installed at Boyd Lake Avenue and Kendall Parkway. This is based on Table 1 from the Windsor guidelines for pedestrians crossing 5 lanes with a raised median, speed at 40/45 mph, and daily volumes on the road of 1,000 to greater than 15,000. This table is provided in Appendix F.

7 CONCLUSIONS

This study was undertaken to analyze the potential traffic impacts of the proposed Lakeview project in the City of Loveland. The following summarizes the results of this analysis:

- The Lakeview was assumed to include 510 single family dwellings and 132 multi-family dwelling units.
- The project is located on land where infrastructure has been constructed and no residential development has occurred. Lakeview is located on the east side of Boyd Lake and west of Boyd Lake Avenue.
- The estimated trips are approximately 5,440 daily, 390 morning, and 540 evening peak hour trips.
- The project will have two roadway sections with projected daily traffic at collector street levels (1,001 to 3,000 daily trips).
- Currently, the study intersections operate at acceptable levels.
- Under future 2025 conditions, the intersections will continue to operate at acceptable levels of service.
- Under 2040 conditions, with the anticipated roadway improvements, the study intersections will operate at acceptable levels of service.
- The Lakeview residents may use other nearby local streets. The added traffic from Lakeview onto local streets south of the project site on both Valley Oak Drive and White Bark Place is not expected to exceed the threshold for a local street.
- It is recommended that the roundabout at Boyd Lake Avenue and Kendall Place be improved to enhance pedestrian safety. A Rectangular Rapid Flashing Beacon (RRFB) is recommended at this location.

APPENDICES

- Appendix A: Loveland Scoping Information
- Appendix B: Intersection Turning Movement Count Data
- Appendix C: Level of Service Worksheets
- Appendix D: Pedestrian Study Area
- Appendix E: Travel Mode To/From School by Distance
- Appendix F: Crossing Treatments at Uncontrolled Locations

APPENDIX A – Loveland Scoping Information


LAKEVIEW - CONCEPT RENDERING
11.19.21
Boyd Lake Ave
LEGEND
TH LOTS
50' LOTS
60' LOTS
70' LOTS
LOT CALCULATIONS
70' LOTS 124
60' LOTS 134
50' LOTS 126
TH LOTS 86
TOTAL 470
1:200

Attachment A
Transportation Impact Study Base Assumptions

Project Information			
Project Name	Lakevie		
Project Location	On Boyd Lake Ave between Valley Oak Dr and Emerald Shore Cir		
TIS Assumptions			
Type of Study	Full:		Intermediate:
	MTIS: Full/Master TIS		Memo:
Study Area Boundaries	North: CR 30/71st St		South: Kendal Pkwy
	East: Boyd Lake Ave		West: Boyd Lake Ave
Study Years	Short Range: 2025		Long Range: 2040
Future Traffic Growth Rate	2%/year		
Study Intersections	1. All access drives		5. Boyd Lake at Emerald Shore Cr
	2. Boyd Lake at Valley Oak Dr		6.
	3. Boyd Lake at Medford Dr		7.
	4. Boyd Lake at Lake Shore Dr		8.
Time Period for Study	AM: 7:00-9:00	PM: 4:00-6:00	Sat Noon:
Trip Generation Rates	ITE Trip Generation 11th		
Trip Adjustment Factors	Passby: N		Captive Market: N
Overall Trip Distribution	SEE ATTACHED SKETCH		
Mode Split Assumptions			
Design Vehicle Information			
Committed Roadway Improvements	To Be provided by City of		
Other Traffic Studies	Boyd Lake Commerce Park		
Areas Requiring Special Study	Pedestrian routes to nearby destinations and safe routes to school per LCUASS criteria		

Date: _____

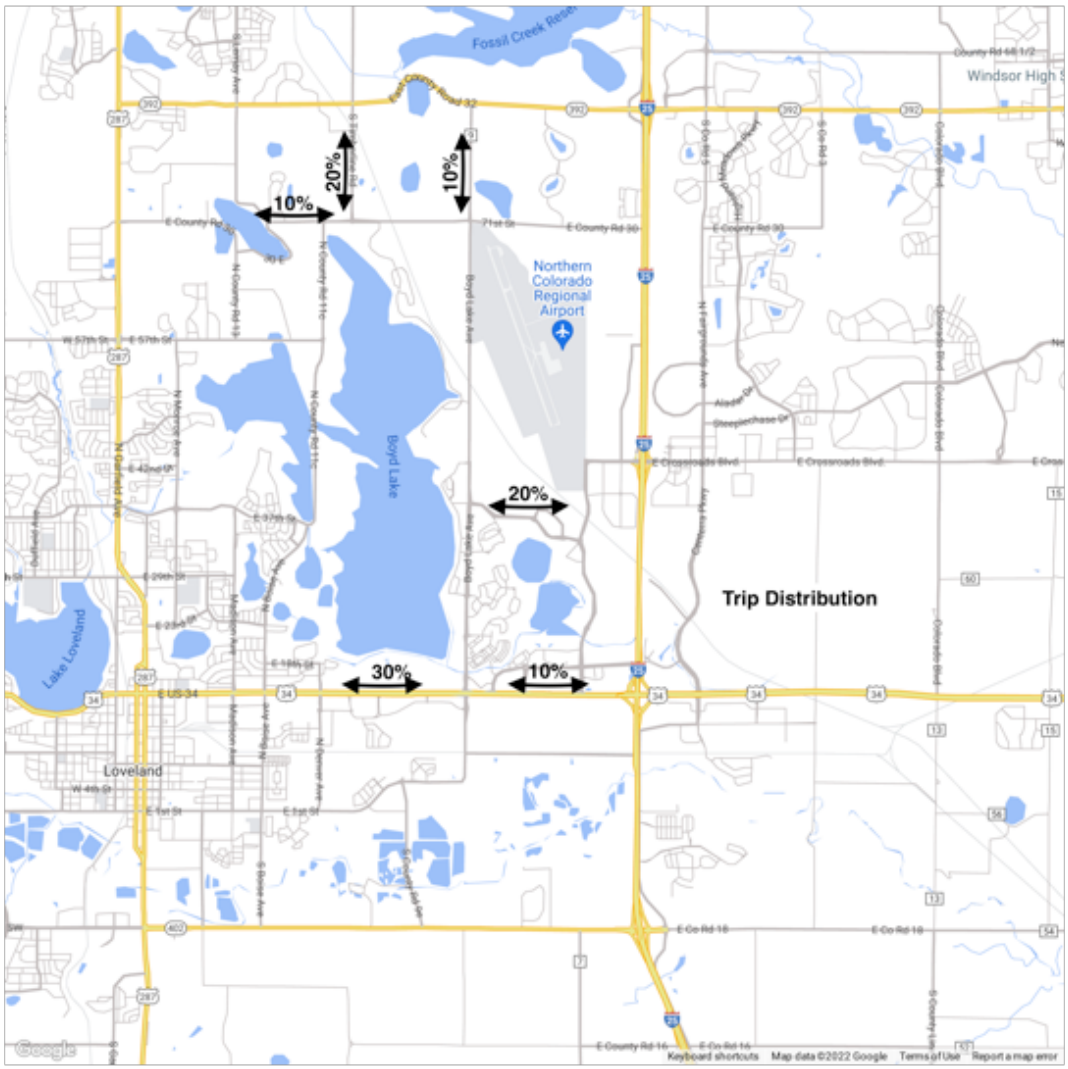
Traffic Engineer: _____

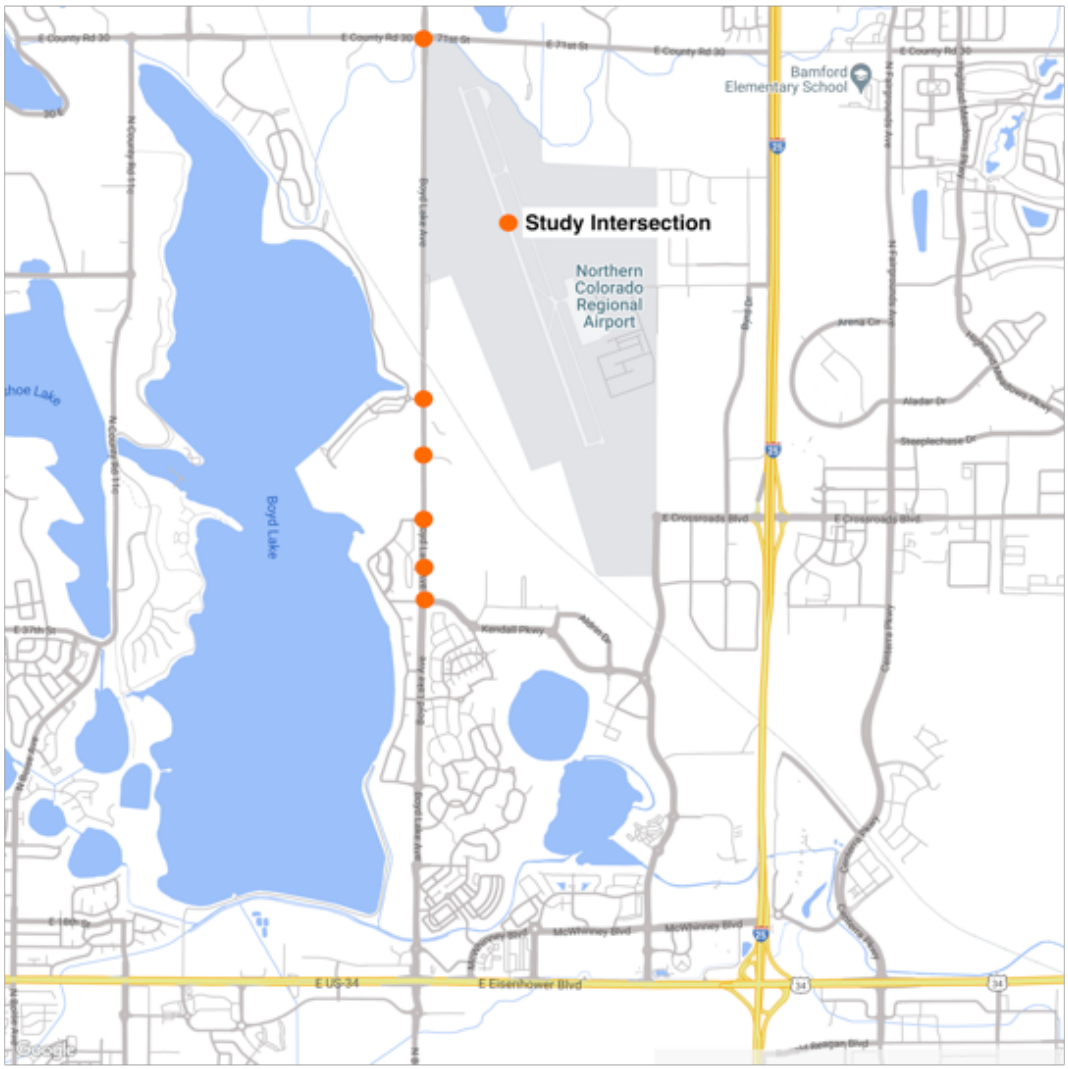
Local Entity Engineer: Randy Maizland 7.25.22

Lakeview

ITE Land Use Code & Rates		Project	Project Trip Generation						
Land Use	Land Use Code	Dwelling Units KSF	Daily	AM			PM		
				IN	Out	Total	IN	Out	Total
Single-Family Detached	210	384	3479	66	188	253	222	130	352
Multi-Family Low Rise	220	86	627	12	38	50	36	21	58
TOTAL			4,106	78	225	303	258	152	410

ITE Trip Generation 11th Edition


Fossil Creek Reservoir
Windsor High S
10%
20%
10%
Northern Colorado Regional Airport
Boyd Lake
20%
Trip Distribution
Lake Loveland
30%
10%
Loveland
Google
Keyboard shortcuts
Map data ©2022 Google
Terms of Use
Report a map error


Study Intersection
Bamford Elementary School
Northern Colorado Regional Airport
Boyd Lake
E US-34
E Eisenhower Blvd
McWhinney Blvd
Kendall Pkwy
E Crossroads Blvd
Steeplechase Dr
Aladar Dr
Arena Cir
Google

Gmail **Ruthie Rollins <ruthie.rollins@gmail.com>**

Proposal to Revise Distribution for Lakeview Project in Loveland

8 messages

Ruth Rollins <ruthie.rollins@gmail.com> Fri, Nov 4, 2022 at 7:27 AM
To: Randy Maizland <randy.maizland@cityofloveland.org>

Good Morning Randy,

After reviewing the existing peak hour counts at Valley Oak Drive and Boyd Lake Drive, it is proposed that the trip distribution for the proposed Lakeview project is revised. Attached is the original distribution with the proposed in red, the existing turning movement counts, and a percent distribution for Valley Oak at Boyd Lake.

Originally it was proposed that the traffic was distributed at 40% north and 60% south. Based on the counts it is suggested that this be revised to 20% north and 80% south.

Let me know if you agree.

Thank you,
Ruth
--
Ruth Rollins, P.E.
970 213-2393
Have a wonderful day :)

Lakeview Existing Distribution.pdf
4487K

Randy Maizland <Randy.Maizland@cityofloveland.org> Mon, Nov 7, 2022 at 8:18 AM
To: Ruth Rollins <ruthie.rollins@gmail.com>

Hello Ruth,

I would be happy to look this over and if it supports the proposed revision then we can probably approve that change. On the old “trust but verify” principle, could you also send me the count data/diagrams from the traffic counting company too?

Respectfully,

Randy Maizland
Civil Engineer II – Transportation Development Planning & Policy

Public Works Department

970.962.2618

Randy.Maizland@cityofloveland.org

[Quoted text hidden]

Ruth Rollins <ruthie.rollins@gmail.com> Mon, Nov 7, 2022 at 8:27 AM
To: Randy Maizland <Randy.Maizland@cityofloveland.org>

Good Morning Randy,

Here is the count data.

Thank you,
Ruth
[Quoted text hidden]

P-03058 - Loveland - Lakeview TMC's_Final Data.zip
1173K

Ruth Rollins <ruthie.rollins@gmail.com> Mon, Nov 14, 2022 at 6:30 AM
To: Randy Maizland <Randy.Maizland@cityofloveland.org>

Good Morning Randy!

Just checking in about the revised distribution.

Thank you,
Ruth
[Quoted text hidden]

Randy Maizland <Randy.Maizland@cityofloveland.org> Tue, Nov 15, 2022 at 8:10 AM
To: Ruth Rollins <ruthie.rollins@gmail.com>

Hi Ruth, sorry for the delay. Need just a little more time. Should be able to respond today.

Randy

[Quoted text hidden]

Randy Maizland <Randy.Maizland@cityofloveland.org> Tue, Nov 15, 2022 at 11:23 AM
To: Ruth Rollins <ruthie.rollins@gmail.com>

Hi Ruth,

When I total up NB and SB peak hour counts on Boyd Lake Ave. I'm coming up with numbers very close to the original 60/40% (SB/NB) split assumption. Now I can't find the diagram you sent me though. Do you have time for a quick phone call to walk me through your findings and justification for the proposed changes? I'm fee until noon today and then from 5:00-5:30. Free from 11-noon tomorrow.

Thanks,

[Quoted text hidden]

Ruth Rollins <ruthie.rollins@gmail.com> Tue, Nov 15, 2022 at 11:27 AM
To: Randy Maizland <randy.maizland@cityofloveland.org>

[Quoted text hidden]

Lakeview Existing Distribution.pdf
4487K

Randy Maizland <Randy.Maizland@cityofloveland.org> Tue, Nov 15, 2022 at 11:37 AM
To: Ruth Rollins <ruthie.rollins@gmail.com>

Hi Ruth,

I agree that the distribution from the Lakeview development should be very similar to that of the existing neighborhood to the north at Valley Oak. I'm OK with the 80/20 revision. If you could please just note in your TIS that this change was agreed upon through this email on 11/15 that would be fine… or we can re-approve the scoping. Whatever works best for you. Sorry it took so long to look at this.

Respectfully,

Randy Maizland
Civil Engineer II – Transportation Development Planning & Policy

Public Works Department

970.962.2618

Randy.Maizland@cityofloveland.org

City of Loveland DEVELOPMENTCENTER

From: Ruth Rollins
Sent: Tuesday, November 15, 2022 11:28 AM
To: Randy Maizland <Randy.Maizland@cityofloveland.org>

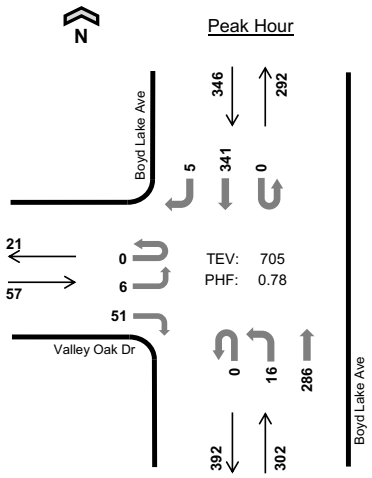
[Quoted text hidden]

[Quoted text hidden]

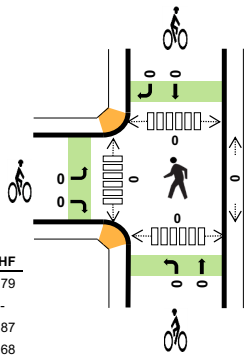
APPENDIX B – Intersection Turning Movement Count Data

www.idaxdata.com

Boyd Lake Ave
Valley Oak Dr



Date: 10/18/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	1.8%	0.79
WB	-	-
NB	4.3%	0.87
SB	3.2%	0.68
TOTAL	3.5%	0.78

Two-Hour Count Summaries

Interval Start		Valley Oak Dr Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	4	0	5	0	0	0	0	0	1	49	0	0	0	43	0	102	0
7:15 AM		0	2	0	8	0	0	0	0	0	0	53	0	0	0	60	2	125	0
7:30 AM		**0**	**3**	**0**	**10**	**0**	**0**	**0**	**0**	**0**	**2**	**85**	**0**	**0**	**0**	**76**	**2**	**178**	0
7:45 AM		**0**	**1**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**5**	**76**	**0**	**0**	**0**	**126**	**1**	**225**	630
8:00 AM		**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**4**	**73**	**0**	**0**	**0**	**64**	**2**	**161**	689
8:15 AM		**0**	**2**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**5**	**52**	**0**	**0**	**0**	**75**	**0**	**141**	**705**
8:30 AM		0	5	0	6	0	0	0	0	0	3	70	0	0	0	56	1	141	668
8:45 AM		0	2	0	7	0	0	0	0	0	2	48	0	0	0	73	1	133	576
Count Total		0	19	0	77	0	0	0	0	0	22	506	0	0	0	573	9	1,206	0
Peak Hour	**All**	**0**	**6**	**0**	**51**	**0**	**0**	**0**	**0**	**0**	**16**	**286**	**0**	**0**	**0**	**341**	**5**	**705**	**0**
	HV	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**12**	**0**	**0**	**0**	**11**	**0**	**25**	**0**
	HV%	**-**	**0%**	**-**	**2%**	**-**	**-**	**-**	**-**	**-**	**6%**	**4%**	**-**	**-**	**-**	**3%**	**0%**	**4%**	**0**

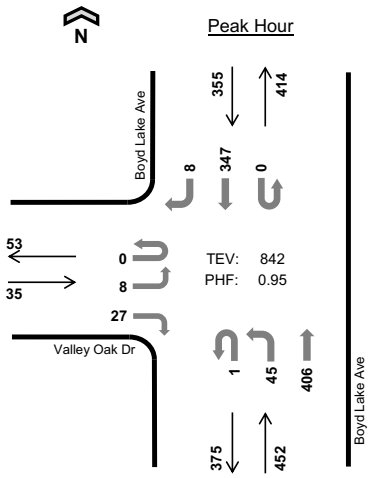
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**1**	**0**	**4**	**1**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**6**	**3**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**2**	**5**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	0	4	*4*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	6	1	*7*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	20	21	*42*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**1**	**0**	**13**	**11**	***25***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

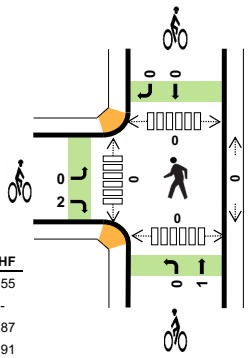
Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

www.idaxdata.com

Boyd Lake Ave
Valley Oak Dr



Date: 10/18/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.0%	0.55
WB	-	-
NB	1.1%	0.87
SB	2.0%	0.91
TOTAL	1.4%	0.95

Two-Hour Count Summaries

Interval Start	Valley Oak Dr Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	0	8	0	0	0	0	0	8	91	0	0	0	72	2	182	0
4:15 PM	0	0	0	7	0	0	0	0	0	7	64	0	0	0	88	0	166	0
4:30 PM	**0**	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**10**	**120**	**0**	**0**	**0**	**85**	**2**	**222**	0
4:45 PM	**0**	**3**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**8**	**78**	**0**	**0**	**0**	**96**	**1**	**199**	769
5:00 PM	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**12**	**111**	**0**	**0**	**0**	**75**	**2**	**206**	793
5:15 PM	**0**	**1**	**0**	**7**	**0**	**0**	**0**	**0**	**1**	**15**	**97**	**0**	**0**	**0**	**91**	**3**	**215**	**842**
5:30 PM	0	0	0	5	0	0	0	0	0	9	77	0	0	0	84	4	179	799
5:45 PM	0	0	0	5	0	0	0	0	0	11	70	0	0	0	68	1	155	755
Count Total	0	9	0	52	0	0	0	0	1	80	708	0	0	0	659	15	1,524	0
Peak Hour All	**0**	**8**	**0**	**27**	**0**	**0**	**0**	**0**	**1**	**45**	**406**	**0**	**0**	**0**	**347**	**8**	**842**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**7**	**0**	**12**	**0**
Peak Hour HV%	**-**	**0%**	**-**	**0%**	**-**	**-**	**-**	**-**	**0%**	**0%**	**1%**	**-**	**-**	**-**	**2%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	4	2	*6*	0	0	1	0	*1*	0	0	0	0	*0*
4:15 PM	1	0	1	0	*2*	0	0	1	0	*1*	0	0	0	0	*0*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**1**	***1***	**2**	**0**	**0**	**0**	***2***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	0	2	3	*5*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	13	13	*27*	2	0	3	0	*5*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**5**	**7**	***12***	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

www.idaxdata.com

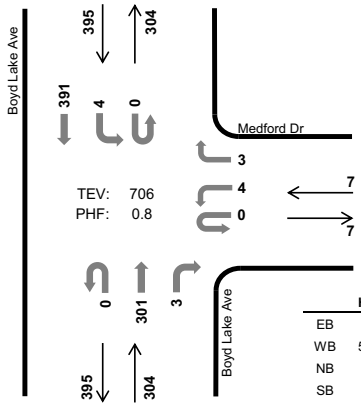
Boyd Lake Ave
Medford Dr

idax

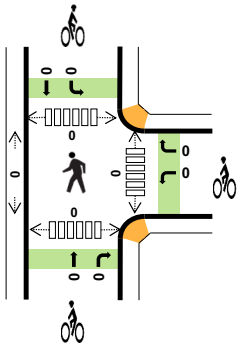
N

Peak Hour

Date: 10/18/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	-	-
WB	57.1%	0.58
NB	2.0%	0.84
SB	2.8%	0.70
TOTAL	3.0%	0.80



Two-Hour Count Summaries

Interval Start	n/a Eastbound				Medford Dr Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	1	0	0	1	0	49	2	0	0	43	0	96	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	53	3	0	0	67	0	123	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**88**	**2**	**0**	**0**	**88**	**0**	**180**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**78**	**1**	**0**	**2**	**139**	**0**	**221**	620
8:00 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**76**	**0**	**0**	**1**	**81**	**0**	**161**	685
8:15 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**59**	**0**	**0**	**1**	**83**	**0**	**144**	**706**
8:30 AM	0	0	0	0	0	1	0	0	0	0	74	1	0	1	60	0	137	663
8:45 AM	0	0	0	0	0	0	0	1	0	0	52	2	0	1	73	0	129	571
Count Total	0	0	0	0	0	6	0	4	1	0	529	11	0	6	634	0	1,191	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**3**	**0**	**0**	**301**	**3**	**0**	**4**	**391**	**0**	**706**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**6**	**0**	**0**	**0**	**11**	**0**	**21**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**50%**	**-**	**67%**	**-**	**-**	**2%**	**0%**	**-**	**0%**	**3%**	**-**	**3%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**2**	**4**	**2**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**0**	**5**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	0	6	*6*	0	0	0	0	*0*	1	0	0	0	*1*
8:45 AM	0	1	5	5	*11*	0	0	0	0	*0*	1	0	0	0	*1*
Count Total	0	5	12	26	*43*	0	0	0	0	*0*	2	0	0	0	*2*
Peak Hr	**0**	**4**	**6**	**11**	***21***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

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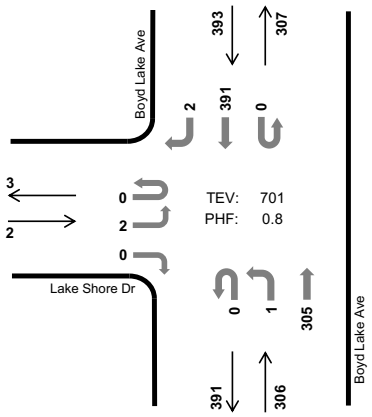
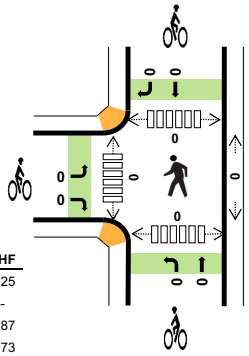
Boyd Lake Ave
Lake Shore Dr

Peak Hour



Date: 10/18/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	0.0%	0.25
WB	-	-
NB	4.6%	0.87
SB	3.6%	0.73
TOTAL	4.0%	0.80

Two-Hour Count Summaries

Interval Start	Lake Shore Dr Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	0	0	0	0	0	53	0	0	0	44	0	98	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	58	0	0	0	66	1	126	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**88**	**0**	**0**	**0**	**88**	**0**	**176**	0
7:45 AM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**83**	**0**	**0**	**0**	**132**	**2**	**219**	619
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**76**	**0**	**0**	**0**	**87**	**0**	**163**	684
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**58**	**0**	**0**	**0**	**84**	**0**	**143**	**701**
8:30 AM	0	2	0	1	0	0	0	0	0	1	72	0	0	0	59	1	136	661
8:45 AM	0	1	0	0	0	0	0	0	0	0	51	0	0	0	74	1	127	569
Count Total	0	7	0	1	0	0	0	0	0	2	539	0	0	0	634	5	1,188	0
Peak Hour All	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**305**	**0**	**0**	**0**	**391**	**2**	**701**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**13**	**1**	**28**	**0**
Peak Hour HV%	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**5%**	**-**	**-**	**-**	**3%**	**50%**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	0	0	1	2	*3*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**5**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**5**	**6**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	1	0	1	6	*8*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	5	2	*7*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	21	26	*48*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**14**	**14**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

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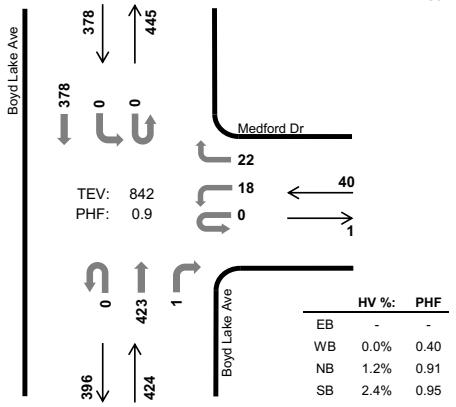
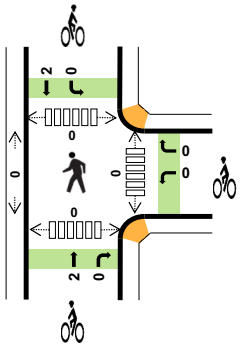
Boyd Lake Ave
Medford Dr

Peak Hour

Date: 10/18/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	-	-
WB	0.0%	0.40
NB	1.2%	0.91
SB	2.4%	0.95
TOTAL	1.7%	0.90



Two-Hour Count Summaries

Interval Start		n/a Eastbound				Medford Dr Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	0	0	0	1	0	0	0	0	98	1	0	0	75	0	175	0
4:15 PM		0	0	0	0	0	6	0	3	0	0	75	0	0	0	98	0	182	0
4:30 PM		**0**	**0**	**0**	**0**	**0**	**10**	**0**	**15**	**0**	**0**	**113**	**0**	**0**	**0**	**95**	**0**	**233**	0
4:45 PM		**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**0**	**84**	**0**	**0**	**0**	**99**	**0**	**188**	778
5:00 PM		**0**	**0**	**0**	**0**	**0**	**5**	**0**	**4**	**0**	**0**	**115**	**1**	**0**	**0**	**89**	**0**	**214**	817
5:15 PM		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**111**	**0**	**0**	**0**	**95**	**0**	**207**	**842**
5:30 PM		0	0	0	0	0	0	0	2	0	0	83	0	0	0	84	0	169	778
5:45 PM		0	0	0	0	0	0	0	0	0	0	78	0	0	0	77	0	155	745
Count Total		0	0	0	0	0	25	0	27	0	0	757	2	0	0	712	0	1,523	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**22**	**0**	**0**	**423**	**1**	**0**	**0**	**378**	**0**	**842**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**9**	**0**	**14**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**0%**	**-**	**-**	**1%**	**0%**	**-**	**-**	**2%**	**-**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	1	1	*2*	0	0	1	0	*1*	0	0	0	0	*0*
4:30 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**2**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	3	*3*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	9	18	*27*	0	0	3	2	*5*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**5**	**9**	***14***	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

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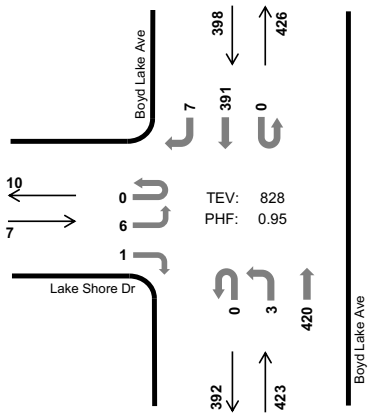
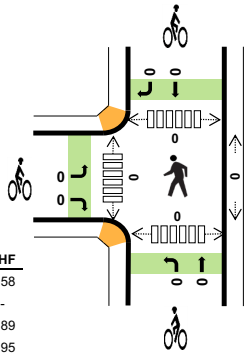
Boyd Lake Ave
Lake Shore Dr

Peak Hour



Date: 10/18/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.0%	0.58
WB	-	-
NB	1.7%	0.89
SB	1.0%	0.95
TOTAL	1.3%	0.95

Two-Hour Count Summaries

Interval Start		Lake Shore Dr Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	1	0	0	0	0	0	0	0	0	100	0	0	0	77	3	181	0
4:15 PM		0	0	0	2	0	0	0	0	0	0	69	0	0	0	97	2	170	0
4:30 PM		**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**114**	**0**	**0**	**0**	**101**	**0**	**219**	0
4:45 PM		**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**79**	**0**	**0**	**0**	**101**	**4**	**188**	758
5:00 PM		**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**118**	**0**	**0**	**0**	**93**	**2**	**215**	792
5:15 PM		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**109**	**0**	**0**	**0**	**96**	**1**	**206**	**828**
5:30 PM		0	2	0	0	0	0	0	0	0	0	81	0	0	0	81	3	167	776
5:45 PM		0	0	0	0	0	0	0	0	0	0	79	0	0	0	78	2	159	747
Count Total		0	9	0	3	0	0	0	0	0	3	749	0	0	0	724	17	1,505	0
Peak Hour	**All**	**0**	**6**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**420**	**0**	**0**	**0**	**391**	**7**	**828**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**4**	**0**	**11**	**0**
	HV%	**-**	**0%**	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**0%**	**2%**	**-**	**-**	**-**	**1%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	3	3	*7*	0	0	1	0	*1*	0	0	0	0	*0*
4:15 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**3**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**2**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	2	*2*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	1	0	11	13	*25*	0	0	1	0	*1*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**7**	**4**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

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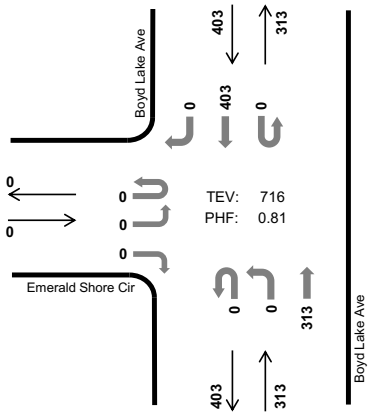
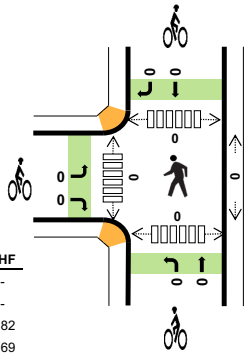
Boyd Lake Ave
Emerald Shore Cir

Peak Hour



Date: 10/27/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	-	-
WB	-	-
NB	2.9%	0.82
SB	2.0%	0.69
TOTAL	2.4%	0.81

Two-Hour Count Summaries

Interval Start	Emerald Shore Cir Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	46	0	0	0	44	0	90	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	62	0	0	0	66	0	128	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**96**	**0**	**0**	**0**	**79**	**0**	**175**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**75**	**0**	**0**	**0**	**147**	**0**	**222**	615
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**68**	**0**	**0**	**0**	**116**	**0**	**184**	709
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**74**	**0**	**0**	**0**	**61**	**0**	**135**	**716**
8:30 AM	0	0	0	0	0	0	0	0	0	0	71	0	0	0	64	0	135	676
8:45 AM	0	0	0	0	0	0	0	0	0	0	51	0	0	0	65	0	116	570
Count Total	0	0	0	0	0	0	0	0	0	0	543	0	0	0	642	0	1,185	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**313**	**0**	**0**	**0**	**403**	**0**	**716**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**0**	**8**	**0**	**17**	**0**
Peak Hour HV%	-	-	-	-	-	-	-	-	-	-	**3%**	-	-	-	**2%**	-	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

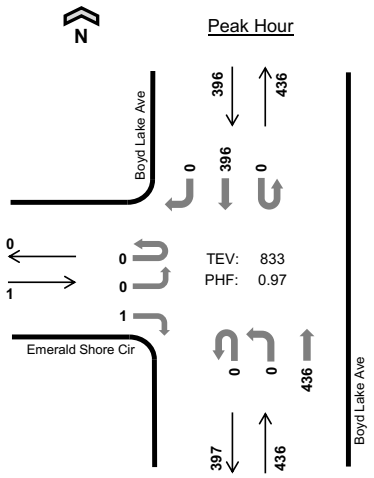
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**0**	**0**	**1**	**4**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	3	3	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	16	19	*35*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**9**	**8**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

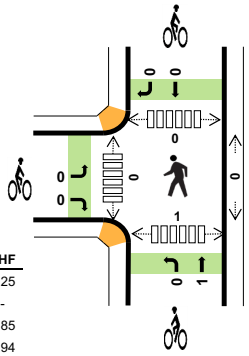
Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

www.idaxdata.com

Boyd Lake Ave
Emerald Shore Cir

Date: 10/27/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	0.0%	0.25
WB	-	-
NB	0.5%	0.85
SB	0.3%	0.94
TOTAL	0.4%	0.97

Two-Hour Count Summaries

Interval Start	Emerald Shore Cir Eastbound				n/a Westbound				Boyd Lake Ave Northbound				Boyd Lake Ave Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	108	0	0	0	81	0	189	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	90	0	0	0	86	0	176	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**103**	**0**	**0**	**0**	**104**	**0**	**207**	0
4:45 PM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**111**	**0**	**0**	**0**	**100**	**0**	**212**	784
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**128**	**0**	**0**	**0**	**87**	**0**	**215**	810
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**94**	**0**	**0**	**0**	**105**	**0**	**199**	**833**
5:30 PM	0	0	0	0	0	0	0	0	0	0	96	0	0	0	75	0	171	797
5:45 PM	0	0	0	0	0	0	0	0	0	0	81	0	0	0	63	0	144	729
Count Total	0	0	0	1	0	0	0	0	0	0	811	0	0	0	701	0	1,513	0
Peak Hour All	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**436**	**0**	**0**	**0**	**396**	**0**	**833**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**3**	**0**
Peak Hour HV%	**-**	**-**	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**-**	**-**	**0%**	**-**	**0%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

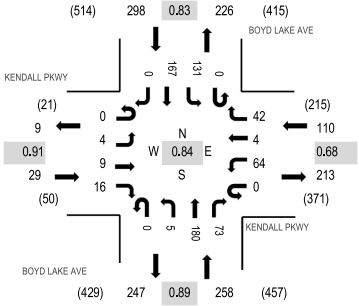
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	3	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	1	*1*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	*1*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	0	0	0	*0*	0	0	1	0	*1*	0	0	0	2	*2*
5:45 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	7	4	*11*	0	0	2	0	*2*	0	0	0	4	*4*
Peak Hr	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	***1***

Project Manager: (720) 646-1008 project.manager.co@idaxdata.com

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

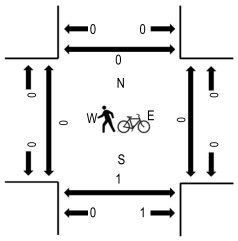
Location: 2 BOYD LAKE AVE & KENDALL PKWY AM
Date: Tuesday, June 15, 2021
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



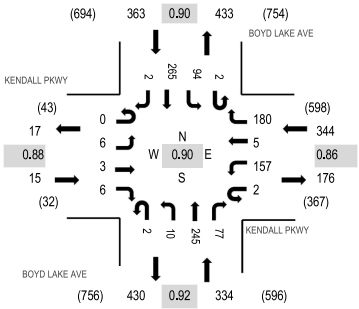
Traffic Counts

Interval Start Time	KENDALL PKWY Eastbound				KENDALL PKWY Westbound				BOYD LAKE AVE Northbound				BOYD LAKE AVE Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	2	3	0	6	0	8	0	2	22	8	0	19	27	2	99	623	0	0	0	0
7:15 AM	0	0	0	2	0	8	0	8	0	0	51	17	0	22	39	0	147	679	0	0	0	0
7:30 AM	0	1	1	6	0	9	1	13	0	1	40	17	0	33	47	0	169	695	0	0	0	0
7:45 AM	0	0	2	5	0	19	3	14	0	1	50	24	0	44	46	0	208	671	0	0	1	0
8:00 AM	0	1	1	4	0	16	0	7	0	2	49	16	0	27	32	0	155	613	0	0	0	0
8:15 AM	0	2	5	1	0	20	0	8	0	1	41	16	0	27	42	0	163		0	0	0	0
8:30 AM	0	1	1	4	0	16	1	12	0	1	37	16	0	24	32	0	145		0	0	0	0
8:45 AM	0	2	2	4	1	21	1	23	0	4	25	16	0	30	20	1	150		0	0	0	0
Count Total	0	7	14	29	1	115	6	93	0	12	315	130	0	226	285	3	1,236		0	0	1	0
Peak Hour	0	4	9	16	0	64	4	42	0	5	180	73	0	131	167	0	695		0	0	1	0

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

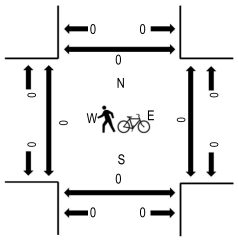
Location: 2 BOYD LAKE AVE & KENDALL PKWY PM
Date: Tuesday, June 15, 2021
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	KENDALL PKWY Eastbound				KENDALL PKWY Westbound				BOYD LAKE AVE Northbound				BOYD LAKE AVE Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	1	0	0	0	1	27	2	40	0	2	29	20	0	37	46	0	205	969	0	0	0	0
4:15 PM	0	1	0	1	0	37	1	37	1	2	66	22	0	29	58	0	255	1,056	0	0	0	0
4:30 PM	0	1	0	3	0	50	2	46	0	2	60	19	0	27	59	0	269	1,049	0	0	0	0
4:45 PM	0	4	1	0	0	25	2	43	1	3	56	16	1	15	73	0	240	1,002	0	0	0	0
5:00 PM	0	0	2	2	2	45	0	54	0	3	63	20	1	23	75	2	292	951	0	0	0	0
5:15 PM	0	1	2	3	0	30	3	46	0	3	56	15	0	27	59	3	248		0	0	0	0
5:30 PM	0	0	3	3	0	28	0	28	0	4	60	18	0	27	49	2	222		0	0	0	0
5:45 PM	0	0	2	2	0	27	1	21	0	3	40	12	0	27	52	2	189		0	0	0	0
Count Total	1	7	10	14	3	269	11	315	2	22	430	142	2	212	471	9	1,920		0	0	0	0
Peak Hour	0	6	3	6	2	157	5	180	2	10	245	77	2	94	265	2	1,056		0	0	0	0

APPENDIX B – Level of Service Worksheets

Existing

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/11/2022

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	51	16	286	341	5
Future Vol, veh/h	6	51	16	286	341	5
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	8	65	21	367	437	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	846	437	443	0	-	0
Stage 1	437	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	330	615	1107	-	-	-
Stage 1	647	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	324	615	1107	-	-	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1107	-	324	615	-	-
HCM Lane V/C Ratio	0.019	-	0.024	0.106	-	-
HCM Control Delay (s)	8.3	-	16.4	11.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.4	-	-

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/11/2022

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	27	46	406	347	8
Future Vol, veh/h	8	27	46	406	347	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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	28	48	427	365	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	888	365	373	0	-	0
Stage 1	365	-	-	-	-	-
Stage 2	523	-	-	-	-	-
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	314	680	1185	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	301	680	1185	-	-	-
Mov Cap-2 Maneuver	301	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	595	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1185	-	301	680	-	-
HCM Lane V/C Ratio	0.041	-	0.028	0.042	-	-
HCM Control Delay (s)	8.2	-	17.3	10.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/11/2022

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	3	301	3	4	391
Future Vol, veh/h	4	3	301	3	4	391
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	0	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	5	4	376	4	5	489

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	631	376	0	0	380	0
Stage 1	376	-	-	-	-	-
Stage 2	255	-	-	-	-	-
Critical Hdwy	6.645	6.245	-	-	4.145	-
Critical Hdwy Stg 1	5.445	-	-	-	-	-
Critical Hdwy Stg 2	5.845	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	-	-	2.2285	-
Pot Cap-1 Maneuver	427	667	-	-	1170	-
Stage 1	691	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	425	667	-	-	1170	-
Mov Cap-2 Maneuver	425	-	-	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	759	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	425	667	1170	-
HCM Lane V/C Ratio	-	-	0.012	0.006	0.004	-
HCM Control Delay (s)	-	-	13.6	10.4	8.1	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	0	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/11/2022

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	22	423	1	0	378
Future Vol, veh/h	18	22	423	1	0	378
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	0	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	24	470	1	0	420

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	680	470	0	0	471	0
Stage 1	470	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	400	593	-	-	1089	-
Stage 1	628	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	400	593	-	-	1089	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	628	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	400	593	1089	-
HCM Lane V/C Ratio	-	-	0.05	0.041	-	-
HCM Control Delay (s)	-	-	14.5	11.3	0	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/11/2022

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	1	305	391	2
Future Vol, veh/h	2	0	1	305	391	2
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	3	0	1	381	489	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	872	245	492	0	-	0
Stage 1	489	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Critical Hdwy	6.66	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.538	3.338	2.238	-	-	-
Pot Cap-1 Maneuver	302	751	1057	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	302	751	1057	-	-	-
Mov Cap-2 Maneuver	302	-	-	-	-	-
Stage 1	577	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1057	-	302	-	-	-
HCM Lane V/C Ratio	0.001	-	0.008	-	-	-
HCM Control Delay (s)	8.4	-	17	0	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/11/2022

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	1	3	420	391	7
Future Vol, veh/h	6	1	3	420	391	7
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	1	3	442	412	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	860	206	419	0	-	0
Stage 1	412	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	310	801	1138	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	801	1138	-	-	-
Mov Cap-2 Maneuver	309	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.8	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1138	-	309	801	-	-
HCM Lane V/C Ratio	0.003	-	0.02	0.001	-	-
HCM Control Delay (s)	8.2	-	16.9	9.5	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/11/2022

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	313	403	0
Future Vol, veh/h	0	0	0	313	403	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	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	386	498	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	498	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	572	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	572	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

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

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/11/2022

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	436	396	0
Future Vol, veh/h	0	1	0	436	396	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	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	449	408	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	408	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	643	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	643	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	643	-	-
HCM Lane V/C Ratio	-	0.002	-	-
HCM Control Delay (s)	-	10.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Background 2025

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/11/2022

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	55	16	305	380	5
Future Vol, veh/h	6	55	16	305	380	5
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	8	71	21	391	487	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	920	487	493	0	-	0
Stage 1	487	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	298	576	1060	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	292	576	1060	-	-	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1060	-	292	576	-	-
HCM Lane V/C Ratio	0.019	-	0.026	0.122	-	-
HCM Control Delay (s)	8.5	-	17.7	12.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.4	-	-

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/11/2022

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	30	50	450	375	10
Future Vol, veh/h	10	30	50	450	375	10
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	32	53	474	395	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	975	395	406	0	-	0
Stage 1	395	-	-	-	-	-
Stage 2	580	-	-	-	-	-
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	279	654	1153	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	266	654	1153	-	-	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1153	-	266	654	-	-
HCM Lane V/C Ratio	0.046	-	0.04	0.048	-	-
HCM Control Delay (s)	8.3	-	19.1	10.8	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/11/2022

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	325	5	5	435
Future Vol, veh/h	5	5	325	5	5	435
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	0	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	6	406	6	6	544

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	690	406	0	0	412	0
Stage 1	406	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.645	6.245	-	-	4.145	-
Critical Hdwy Stg 1	5.445	-	-	-	-	-
Critical Hdwy Stg 2	5.845	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	-	-	2.2285	-
Pot Cap-1 Maneuver	393	641	-	-	1139	-
Stage 1	669	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	391	641	-	-	1139	-
Mov Cap-2 Maneuver	391	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	733	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	391	641	1139	-
HCM Lane V/C Ratio	-	-	0.016	0.01	0.005	-
HCM Control Delay (s)	-	-	14.4	10.7	8.2	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	0	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/13/2022

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	25	470	1	0	405
Future Vol, veh/h	20	25	470	1	0	405
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	0	-	0	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	28	522	1	0	450

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	747	522	0	0	523	0
Stage 1	522	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	364	554	-	-	1042	-
Stage 1	594	-	-	-	-	-
Stage 2	792	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	364	554	-	-	1042	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	792	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	364	554	1042	-
HCM Lane V/C Ratio	-	-	0.061	0.05	-	-
HCM Control Delay (s)	-	-	15.5	11.8	0	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	0	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/11/2022

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	1	325	435	2
Future Vol, veh/h	2	0	1	325	435	2
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	3	0	1	406	544	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	952	272	547	0	-	0
Stage 1	544	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	6.66	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.538	3.338	2.238	-	-	-
Pot Cap-1 Maneuver	269	721	1009	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	269	721	1009	-	-	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	541	-	-	-	-	-
Stage 2	665	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1009	-	269	-	-	-
HCM Lane V/C Ratio	0.001	-	0.009	-	-	-
HCM Control Delay (s)	8.6	-	18.5	0	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/11/2022

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	1	5	465	420	7
Future Vol, veh/h	6	1	5	465	420	7
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	1	5	489	442	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	941	221	449	0	-	0
Stage 1	442	-	-	-	-	-
Stage 2	499	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	277	783	1110	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	276	783	1110	-	-	-
Mov Cap-2 Maneuver	276	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	609	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1110	-	276	783	-	-
HCM Lane V/C Ratio	0.005	-	0.023	0.001	-	-
HCM Control Delay (s)	8.3	-	18.3	9.6	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/11/2022

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	5	0	330	35	20	425	0
Future Vol, veh/h	0	0	0	0	0	5	0	330	35	20	425	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	92	81	92	92	92	81	81	92	92	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	407	38	22	525	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	525	-	-	407	-	0	0	445	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	552	0	0	644	0	-	-	1115	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	552	-	-	644	-	-	-	1115	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.6	0	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	644	1115	-	-
HCM Lane V/C Ratio	-	-	-	0.008	0.019	-	-
HCM Control Delay (s)	-	-	0	10.6	8.3	-	-
HCM Lane LOS	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	-	-	-	0	0.1	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/11/2022

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	0	0	20	0	460	10	5	420	0
Future Vol, veh/h	0	0	1	0	0	20	0	460	10	5	420	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	92	97	92	92	92	97	97	92	92	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	0	0	22	0	474	11	5	433	0

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	-	-	433	-	-	474	-	0	0	485	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	623	0	0	590	0	-	-	1078	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	623	-	-	590	-	-	-	1078	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.8	11.3	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	623	590	1078	-	-
HCM Lane V/C Ratio	-	-	0.002	0.037	0.005	-	-
HCM Control Delay (s)	-	-	10.8	11.3	8.4	-	-
HCM Lane LOS	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0	-	-

Total 2025

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/11/2022

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	65	20	340	390	15
Future Vol, veh/h	30	65	20	340	390	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	38	83	26	436	500	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	988	500	519	0	-	0
Stage 1	500	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	272	567	1037	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	265	567	1037	-	-	-
Mov Cap-2 Maneuver	265	-	-	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	613	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1037	-	265	567	-	-
HCM Lane V/C Ratio	0.025	-	0.145	0.147	-	-
HCM Control Delay (s)	8.6	-	20.9	12.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	0.5	-	-

HCM 6th TWSC
1: Boyd Lake & Valley Oak 12/12/2022

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	40	65	475	410	40
Future Vol, veh/h	25	40	65	475	410	40
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	42	68	500	432	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1068	432	474	0	-	0
Stage 1	432	-	-	-	-	-
Stage 2	636	-	-	-	-	-
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	245	624	1088	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	230	624	1088	-	-	-
Mov Cap-2 Maneuver	230	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.6	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1088	-	230	624	-	-
HCM Lane V/C Ratio	0.063	-	0.114	0.067	-	-
HCM Control Delay (s)	8.5	-	22.7	11.2	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.2	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/11/2022

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	75	5	0	5	25	345	5	5	450	5
Future Vol, veh/h	20	0	75	5	0	5	25	345	5	5	450	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	80	92	80	92	80	80	80	80	92
Heavy Vehicles, %	2	2	2	3	2	3	2	3	3	3	3	2
Mvmt Flow	22	0	82	6	0	6	27	431	6	6	563	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1069	1069	284	779	1065	431	568	0	0	437	0	0
Stage 1	578	578	-	485	485	-	-	-	-	-	-	-
Stage 2	491	491	-	294	580	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.345	6.53	6.245	4.13	-	-	4.145	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.145	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.545	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.5285	4.019	3.3285	2.219	-	-	2.2285	-	-
Pot Cap-1 Maneuver	187	221	714	298	222	621	1002	-	-	1115	-	-
Stage 1	469	500	-	560	551	-	-	-	-	-	-	-
Stage 2	558	547	-	688	499	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	181	214	714	257	215	621	1002	-	-	1115	-	-
Mov Cap-2 Maneuver	181	214	-	257	215	-	-	-	-	-	-	-
Stage 1	456	498	-	545	536	-	-	-	-	-	-	-
Stage 2	537	532	-	606	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	15.2	0.5	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1002	-	-	181	714	257	621	1115	-	-
HCM Lane V/C Ratio	0.027	-	-	0.12	0.114	0.024	0.01	0.006	-	-
HCM Control Delay (s)	8.7	-	-	27.6	10.7	19.4	10.9	8.2	-	-
HCM Lane LOS	A	-	-	D	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.4	0.1	0	0	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 12/12/2022

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	0	50	20	0	25	85	495	1	1	425	20
Future Vol, veh/h	15	0	50	20	0	25	85	495	1	1	425	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	90	92	90	92	90	90	90	90	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	0	54	22	0	28	92	550	1	1	472	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1234	1220	247	972	1230	550	494	0	0	551	0	0
Stage 1	485	485	-	734	734	-	-	-	-	-	-	-
Stage 2	749	735	-	238	496	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	143	179	754	219	177	534	1068	-	-	1017	-	-
Stage 1	533	551	-	411	425	-	-	-	-	-	-	-
Stage 2	403	425	-	745	544	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	127	163	754	190	162	534	1068	-	-	1017	-	-
Mov Cap-2 Maneuver	127	163	-	190	162	-	-	-	-	-	-	-
Stage 1	487	550	-	376	388	-	-	-	-	-	-	-
Stage 2	349	388	-	691	543	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.4	18.5	1.2	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1068	-	-	127	754	190	534	1017	-	-
HCM Lane V/C Ratio	0.087	-	-	0.128	0.072	0.117	0.052	0.001	-	-
HCM Control Delay (s)	8.7	-	-	37.5	10.1	26.4	12.1	8.5	-	-
HCM Lane LOS	A	-	-	E	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.4	0.2	0.4	0.2	0	-	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/12/2022

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	110	50	355	520	5
Future Vol, veh/h	15	110	50	355	520	5
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	19	138	63	444	650	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1220	325	656	0	-	0
Stage 1	650	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Critical Hdwy	6.66	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.538	3.338	2.238	-	-	-
Pot Cap-1 Maneuver	183	666	918	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	170	666	918	-	-	-
Mov Cap-2 Maneuver	170	-	-	-	-	-
Stage 1	445	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	918	-	170	666	-	-
HCM Lane V/C Ratio	0.068	-	0.11	0.206	-	-
HCM Control Delay (s)	9.2	-	28.8	11.8	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.4	0.8	-	-

HCM 6th TWSC
3: Lake Shore & Boyd Lake 12/12/2022

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	75	175	565	480	15
Future Vol, veh/h	15	75	175	565	480	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	79	184	595	505	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1468	253	521	0	-	0
Stage 1	505	-	-	-	-	-
Stage 2	963	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	129	747	1043	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	106	747	1043	-	-	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	471	-	-	-	-	-
Stage 2	369	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	2.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1043	-	106	747	-	-
HCM Lane V/C Ratio	0.177	-	0.149	0.106	-	-
HCM Control Delay (s)	9.2	-	44.8	10.4	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.6	-	0.5	0.4	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/12/2022

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	35	0	0	5	0	410	35	20	620	1
Future Vol, veh/h	0	0	35	0	0	5	0	410	35	20	620	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	92	81	92	92	92	81	81	92	92	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	43	0	0	5	0	506	38	22	765	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	765	-	-	506	-	0	0	544	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	403	0	0	566	0	-	-	1025	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	403	-	-	566	-	-	-	1025	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	11.4	0	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	403	566	1025	-	-
HCM Lane V/C Ratio	-	-	0.107	0.01	0.021	-	-
HCM Control Delay (s)	-	-	15	11.4	8.6	-	-
HCM Lane LOS	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.4	0	0.1	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 12/12/2022

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	25	0	0	20	0	730	10	5	555	5
Future Vol, veh/h	0	0	25	0	0	20	0	730	10	5	555	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	92	97	92	92	92	97	97	92	92	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	26	0	0	22	0	753	11	5	572	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	572	-	-	753	-	0	0	764	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	520	0	0	410	0	-	-	849	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	520	-	-	410	-	-	-	849	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	14.3	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	520	410	849	-	-
HCM Lane V/C Ratio	-	-	0.05	0.053	0.006	-	-
HCM Control Delay (s)	-	-	12.3	14.3	9.3	-	-
HCM Lane LOS	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.2	0	-	-

Background 2040

HCM 6th TWSC
1: Boyd Lake & Valley Oak 10/10/2023

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	55	16	515	620	5
Future Vol, veh/h	6	55	16	515	620	5
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	8	71	21	660	795	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1167	398	801	0	-	0
Stage 1	795	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.88	6.98	4.18	-	-	-
Critical Hdwy Stg 1	5.88	-	-	-	-	-
Critical Hdwy Stg 2	5.88	-	-	-	-	-
Follow-up Hdwy	3.54	3.34	2.24	-	-	-
Pot Cap-1 Maneuver	184	596	805	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	661	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	179	596	805	-	-	-
Mov Cap-2 Maneuver	179	-	-	-	-	-
Stage 1	390	-	-	-	-	-
Stage 2	661	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	805	-	179	596	-	-
HCM Lane V/C Ratio	0.025	-	0.043	0.118	-	-
HCM Control Delay (s)	9.6	-	26	11.8	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.4	-	-

HCM 6th TWSC
1: Boyd Lake & Valley Oak 10/10/2023

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	30	50	750	635	10
Future Vol, veh/h	10	30	50	750	635	10
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	11	33	54	815	690	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1206	345	701	0	-	0
Stage 1	690	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	175	648	885	-	-	-
Stage 1	456	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	164	648	885	-	-	-
Mov Cap-2 Maneuver	164	-	-	-	-	-
Stage 1	428	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	885	-	164	648	-	-
HCM Lane V/C Ratio	0.061	-	0.066	0.05	-	-
HCM Control Delay (s)	9.3	-	28.5	10.9	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	0.2	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 10/10/2023

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	535	5	5	690
Future Vol, veh/h	5	5	535	5	5	690
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	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	6	669	6	6	863

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1116	338	0	0	675	0
Stage 1	672	-	-	-	-	-
Stage 2	444	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	200	655	-	-	905	-
Stage 1	466	-	-	-	-	-
Stage 2	611	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	199	655	-	-	905	-
Mov Cap-2 Maneuver	199	-	-	-	-	-
Stage 1	466	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.1	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	199	655	905	-
HCM Lane V/C Ratio	-	-	0.031	0.01	0.007	-
HCM Control Delay (s)	-	-	23.7	10.5	9	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

HCM 6th TWSC
2: Boyd Lake & Medford 10/10/2023

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	25	770	1	1	680
Future Vol, veh/h	20	25	770	1	1	680
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	0	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	22	27	837	1	1	739

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1210	419	0	0	838	0
Stage 1	838	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	174	580	-	-	786	-
Stage 1	382	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	174	580	-	-	786	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	382	-	-	-	-	-
Stage 2	663	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	174	580	786	-
HCM Lane V/C Ratio	-	-	0.125	0.047	0.001	-
HCM Control Delay (s)	-	-	28.6	11.5	9.6	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0	-

HCM 6th Roundabout
3: Lake Shore & Boyd Lake 10/10/2023

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	13	34	718	858
Demand Flow Rate, veh/h	13	34	746	890
Vehicles Circulating, veh/h	906	708	79	29
Vehicles Exiting, veh/h	13	117	840	713
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.9	5.9	8.3	10.5
Approach LOS	A	A	A	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.941	0.059	0.993	0.007
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	13	34	702	44	884	6
Cap Entry Lane, veh/h	548	670	1322	1322	1383	1383
Entry HV Adj Factor	0.998	0.999	0.962	0.977	0.964	1.000
Flow Entry, veh/h	13	34	675	43	852	6
Cap Entry, veh/h	547	670	1271	1292	1333	1383
V/C Ratio	0.024	0.051	0.531	0.033	0.639	0.004
Control Delay, s/veh	6.9	5.9	8.6	3.0	10.5	2.6
LOS	A	A	A	A	B	A
95th %tile Queue, veh	0	0	3	0	5	0

HCM 6th Roundabout
3: Lake Shore & Boyd Lake 10/10/2023

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	17	197	798	767
Demand Flow Rate, veh/h	17	203	821	790
Vehicles Circulating, veh/h	919	816	35	146
Vehicles Exiting, veh/h	17	40	901	873
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.0	11.0	9.2	10.9
Approach LOS	A	B	A	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.981	0.019	0.986	0.014
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	17	203	805	16	779	11
Cap Entry Lane, veh/h	540	600	1376	1376	1243	1243
Entry HV Adj Factor	0.998	0.970	0.971	1.000	0.970	1.000
Flow Entry, veh/h	17	197	782	16	756	11
Cap Entry, veh/h	540	583	1336	1376	1207	1243
V/C Ratio	0.031	0.338	0.585	0.012	0.627	0.009
Control Delay, s/veh	7.0	11.0	9.3	2.7	11.0	3.0
LOS	A	B	A	A	B	A
95th %tile Queue, veh	0	1	4	0	5	0

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 10/10/2023

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	10	0	575	120	20	645	0
Future Vol, veh/h	0	0	0	0	0	10	0	575	120	20	645	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	92	81	92	92	92	81	81	92	92	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	11	0	710	130	22	796	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	398	-	-	355	-	0	0	840	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	601	0	0	641	0	-	-	791	-	0
Stage 1	0	0	-	0	0	-	0	-	-	-	-	0
Stage 2	0	0	-	0	0	-	0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	-	-	601	-	-	641	-	-	-	791	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.7	0	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	641	791	-
HCM Lane V/C Ratio	-	-	-	0.017	0.027	-
HCM Control Delay (s)	-	-	0	10.7	9.7	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0.1	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 10/10/2023

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	0	0	50	0	700	40	5	805	1
Future Vol, veh/h	0	0	1	0	0	50	0	700	40	5	805	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	1	0	0	54	0	761	43	5	875	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	438	-	-	381	-	0	0	804	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	4.16	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	2.23	-	-
Pot Cap-1 Maneuver	0	0	564	0	0	614	0	-	-	809	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	564	-	-	614	-	-	-	809	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	11.4	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	564	614	809	-	-
HCM Lane V/C Ratio	-	-	0.002	0.089	0.007	-	-
HCM Control Delay (s)	-	-	11.4	11.4	9.5	-	-
HCM Lane LOS	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	-	-	0	0.3	0	-	-

Total 2040

HCM 6th TWSC
1: Boyd Lake & Valley Oak 10/10/2023

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	65	20	550	630	15
Future Vol, veh/h	30	65	20	550	630	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	38	83	26	705	808	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1213	404	827	0	-	0
Stage 1	808	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Critical Hdwy	6.88	6.98	4.18	-	-	-
Critical Hdwy Stg 1	5.88	-	-	-	-	-
Critical Hdwy Stg 2	5.88	-	-	-	-	-
Follow-up Hdwy	3.54	3.34	2.24	-	-	-
Pot Cap-1 Maneuver	171	591	787	-	-	-
Stage 1	394	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	165	591	787	-	-	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	636	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.8	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	787	-	165	591	-	-
HCM Lane V/C Ratio	0.033	-	0.233	0.141	-	-
HCM Control Delay (s)	9.7	-	33.3	12.1	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	0.5	-	-

HCM 6th TWSC
1: Boyd Lake & Valley Oak 10/10/2023

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	40	65	775	670	40
Future Vol, veh/h	25	40	65	775	670	40
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	0	0	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	27	43	71	842	728	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1291	364	771	0	-	0
Stage 1	728	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	154	630	833	-	-	-
Stage 1	436	-	-	-	-	-
Stage 2	531	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	141	630	833	-	-	-
Mov Cap-2 Maneuver	141	-	-	-	-	-
Stage 1	399	-	-	-	-	-
Stage 2	531	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.9	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	833	-	141	630	-	-
HCM Lane V/C Ratio	0.085	-	0.193	0.069	-	-
HCM Control Delay (s)	9.7	-	36.5	11.1	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.7	0.2	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 10/10/2023

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	1	75	5	1	5	25	555	5	5	705	5
Future Vol, veh/h	20	1	75	5	1	5	25	555	5	5	705	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	80	92	80	92	80	80	80	80	92
Heavy Vehicles, %	2	2	2	3	2	3	2	3	3	3	3	2
Mvmt Flow	22	1	82	6	1	6	27	694	6	6	881	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1298	1650	443	1204	1649	350	886	0	0	700	0	0
Stage 1	896	896	-	751	751	-	-	-	-	-	-	-
Stage 2	402	754	-	453	898	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.56	6.54	6.96	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.56	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.56	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.53	4.02	3.33	2.22	-	-	2.23	-	-
Pot Cap-1 Maneuver	119	98	562	139	98	643	760	-	-	886	-	-
Stage 1	301	357	-	367	416	-	-	-	-	-	-	-
Stage 2	596	415	-	553	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	113	94	562	114	94	643	760	-	-	886	-	-
Mov Cap-2 Maneuver	113	94	-	114	94	-	-	-	-	-	-	-
Stage 1	290	355	-	354	401	-	-	-	-	-	-	-
Stage 2	568	400	-	468	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	26.4	0.4	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	760	-	-	112	562	111	643	886	-	-
HCM Lane V/C Ratio	0.036	-	-	0.204	0.145	0.066	0.01	0.007	-	-
HCM Control Delay (s)	9.9	-	-	45.2	12.5	39.7	10.7	9.1	-	-
HCM Lane LOS	A	-	-	E	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.5	0.2	0	0	-	-

HCM 6th TWSC
2: Boyd Lake & Medford 10/11/2023

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	1	50	18	0	22	85	795	1	1	560	20
Future Vol, veh/h	15	1	50	18	0	22	85	795	1	1	560	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	16	1	54	20	0	24	92	864	1	1	609	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1238	1671	316	1356	1682	433	631	0	0	865	0	0
Stage 1	622	622	-	1049	1049	-	-	-	-	-	-	-
Stage 2	616	1049	-	307	633	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	6.96	7.56	6.56	6.96	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	3.33	3.53	4.03	3.33	2.23	-	-	2.23	-	-
Pot Cap-1 Maneuver	131	94	677	107	93	568	941	-	-	767	-	-
Stage 1	439	475	-	241	300	-	-	-	-	-	-	-
Stage 2	442	300	-	675	469	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	116	85	677	90	84	568	941	-	-	767	-	-
Mov Cap-2 Maneuver	116	85	-	90	84	-	-	-	-	-	-	-
Stage 1	396	475	-	217	271	-	-	-	-	-	-	-
Stage 2	382	271	-	619	469	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.5	31.5	0.9	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	941	-	-	113	677	90	568	767	-	-
HCM Lane V/C Ratio	0.098	-	-	0.154	0.08	0.217	0.042	0.001	-	-
HCM Control Delay (s)	9.2	-	-	42.6	10.8	55.8	11.6	9.7	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.5	0.3	0.8	0.1	0	-	-

HCM 6th Roundabout
3: Lake Shore & Boyd Lake 10/10/2023

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	158	34	811	965
Demand Flow Rate, veh/h	165	34	842	1002
Vehicles Circulating, veh/h	1018	818	93	87
Vehicles Exiting, veh/h	71	117	1090	765
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.3	6.7	9.9	14.9
Approach LOS	B	A	A	B

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.948	0.052	0.994	0.006
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	165	34	798	44	996	6
Cap Entry Lane, veh/h	489	599	1305	1305	1312	1312
Entry HV Adj Factor	0.957	0.999	0.962	0.977	0.963	1.000
Flow Entry, veh/h	158	34	768	43	959	6
Cap Entry, veh/h	468	599	1255	1275	1264	1312
V/C Ratio	0.338	0.057	0.612	0.034	0.759	0.005
Control Delay, s/veh	13.3	6.7	10.3	3.1	15.0	2.8
LOS	B	A	B	A	B	A
95th %tile Queue, veh	1	0	4	0	8	0

HCM 6th Roundabout
3: Lake Shore & Boyd Lake 10/10/2023

Intersection	
Intersection Delay, s/veh	18.0
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	2	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	99	197	1092	837
Demand Flow Rate, veh/h	101	203	1125	862
Vehicles Circulating, veh/h	986	1125	40	337
Vehicles Exiting, veh/h	213	40	1047	991
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.1	17.9	16.8	20.4
Approach LOS	B	C	C	C

Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	R	LT	R
Assumed Moves	LTR	LTR	LT	R	LT	R
RT Channelized						
Lane Util	1.000	1.000	0.986	0.014	0.981	0.019
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544	4.544	4.544
Entry Flow, veh/h	101	203	1109	16	846	16
Cap Entry Lane, veh/h	505	438	1369	1369	1045	1045
Entry HV Adj Factor	0.980	0.970	0.971	1.000	0.970	1.000
Flow Entry, veh/h	99	197	1076	16	821	16
Cap Entry, veh/h	495	425	1329	1369	1014	1045
V/C Ratio	0.200	0.463	0.810	0.012	0.810	0.015
Control Delay, s/veh	10.1	17.9	17.1	2.7	20.7	3.6
LOS	B	C	C	A	C	A
95th %tile Queue, veh	1	2	10	0	9	0

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 10/10/2023

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	35	0	0	10	0	655	120	20	840	1
Future Vol, veh/h	0	0	35	0	0	10	0	655	120	20	840	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	92	81	92	92	92	81	81	92	92	81	81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	43	0	0	11	0	809	130	22	1037	1

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	-	-	519	-	-	405	-	0	0	939	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	6.94	-	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	3.32	-	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	502	0	0	595	0	-	-	726	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	502	-	-	595	-	-	-	726	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	11.2	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	502	595	726	-	-
HCM Lane V/C Ratio	-	-	0.086	0.018	0.03	-	-
HCM Control Delay (s)	-	-	12.8	11.2	10.1	-	-
HCM Lane LOS	-	-	B	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	0.1	-	-

HCM 6th TWSC
4: Boyd Lake & Emerald Shore 10/10/2023

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	25	0	0	50	0	970	40	5	940	5
Future Vol, veh/h	0	0	25	0	0	50	0	970	40	5	940	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	27	0	0	54	0	1054	43	5	1022	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	514	-	-	527	-	0	0	1097	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.96	-	-	6.96	-	-	-	4.16	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.33	-	-	3.33	-	-	-	2.23	-	-
Pot Cap-1 Maneuver	0	0	503	0	0	493	0	-	-	626	-	-
Stage 1	0	0	-	0	0	-	0	-	-	-	-	-
Stage 2	0	0	-	0	0	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	503	-	-	493	-	-	-	626	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	13.2	0	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	503	493	626	-	-
HCM Lane V/C Ratio	-	-	0.054	0.11	0.009	-	-
HCM Control Delay (s)	-	-	12.6	13.2	10.8	-	-
HCM Lane LOS	-	-	B	B	B	-	-
HCM 95th %tile Q(veh)	-	-	0.2	0.4	0	-	-

APPENDIX D – Pedestrian Study Area

APPENDIX E – Travel Mode To/From School by Distance

HOW CHILDREN GET TO SCHOOL: SCHOOL TRAVEL PATTERNS FROM 1969 TO 2009

Table 4 allows for a comparison between how parents reported their K-8th grade students usually arrived **to** and departed **from** school 2009. A higher percentage of students usually arrived at school by personal vehicle than left by personal vehicle. The majority of these school departure trips shifted to riding the school bus or walking. More specifically, 12 percent of students usually walked to school and 15 percent usually walked from school while 45 percent usually took the personal vehicle to school and 39 percent usually left school by personal vehicle.

Table 4. Comparison of Usual Travel Mode To and From School for K-8th Grade Students in 2009

Travel mode	2009	
	Travel to school	Travel from school
Personal vehicle	45.3%	39.0%
Walk	11.7%	15.0%
Bicycle	1.0%	1.0%
School bus	39.4%	41.9%
Transit	1.6%	2.0%
Other	1.0%	1.0%
Total	**100%**	**100%**

Table 5 provides a more detailed picture of the information in Table 4 by showing how students usually traveled to and from school by the distance they lived from school in 2009. A comparison of school arrival and departure travel modes in Table 5 reveals a pattern within each distance category; more students arrived to school by personal vehicle than left school by personal vehicle. Across all distance categories, the majority of these school departures shifted away from personal vehicle to riding the school bus or walking. For example, among those students living one-quarter to one-half mile from school, 46 percent arrived by personal vehicle, but 34 percent left school by personal vehicle (Table 5). At the same time, 30 percent of students living this distance from school walked and 21 percent rode the bus to school while 40 percent left school by walking and 23 left riding the school bus.

Table 5. Comparison of Usual Travel Mode To and From School by Distance to School for K-8th Grade Students, 2009

Distance between home and school	Personal vehicle	Walk	Bicycle	School bus	Transit	Other	Total
Trips **TO** school							
Less than ¼ mile	29.9%	55.3%	0.9%	12.5%	0.9%	0.6%	100%
¼ mile up to 1/2 mile	45.5%	30.4%	2.2%	21.1%	0.4%	0.4%	100%
½ mile up to 1 mile	52.4%	15.1%	3.3%	26.9%	1.5%	0.7%	100%
1 mile up to 2 miles	53.4%	4.0%	1.6%	37.7%	2.5%	0.8%	100%
More than 2 miles	43.6%	1.6%	0.1%	51.8%	1.7%	1.3%	100%
Trip **FROM** school							
Less than ¼ mile	23.7%	60.8%	0.9%	13.4%	0.5%	0.7%	100%
¼ mile up to 1/2 mile	34.2%	39.9%	2.2%	22.7%	0.7%	0.3%	100%
½ mile up to 1 mile	44.7%	21.2%	3.4%	27.7%	1.9%	1.2%	100%
1 mile up to 2 miles	44.8%	7.9%	1.6%	42.1%	2.9%	0.8%	100%
More than 2 miles	39.4%	2.6%	0.1%	54.4%	2.3%	1.2%	100%

Appendix F – Crossing Treatments at Uncontrolled Locations

Town of Windsor - Pedestrian Crossing Guidelines

Table 1 - Criteria for Crossing Treatments at Uncontrolled Locations

Roadway Configuration	# of lanes crossed to reach a refuge[1]	# of multiple threat lanes[2] per crossing	Roadway ADT and Posted Speed															
			1,000-9,000 vpd				9,000-12,000 vpd				12,000-15,000 vpd				> 15,000 vpd			
			≤ 30 mph	35 mph	40/45 mph	> 45 mph	≤ 30 mph	35 mph	40/45 mph	> 45 mph	≤ 30 mph	35 mph	40/45 mph	> 45 mph	≤ 30 mph	35 mph	40/45 mph	> 45 mph
2 Lanes (one way street)	2	1	A	B	C	E	A	B	C	E	B	B	C	E	B	C	C	E
2 Lanes (two way street with no median)	2	0	A	B	C	E	A	B	C	E	B	B	C	E	B	C	C	E
3 Lanes w/Raised Median	1 or 2	0 or 1	A	B	D	E	A	C	D	E	B	D	D	E	C	D	D	E
3 Lanes w//Striped Median	3	0 or 1	C	C	D	E	C	C	D	E	C	C	D	E	C	D	D	E
4 Lanes (two way street with no median)	4	2	A	D	D	E	B	D	D	E	B	D	D	E	D	D	D	E
5 Lanes w/Raised Median	2 or 3	2	A	B	D	E	B	D	D	E	B	D	D	E	C	D	D	E
5 Lanes w/Striped Median	5	2	D	D	D	E	D	D	D	E	D	D	D	E	D	D	D	E
6 Lanes (two way street with or without median)	3 to 6	4	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F

Notes:

1. Painted medians can never be considered a refuge for a crossing pedestrian. Similarly, a 4 foot wide raised median next to a left turn lane can only be considered a refuge for pedestrians if the left turning volume is less than 20 vehicles per hour (meaning that in most cases the left turn lane is not occupied while the pedestrian is crossing).
2. A multiple threat lane is defined as a through lane where it is possible for a pedestrian to step out from in front of a stopped vehicle in the adjacent travel lane (either through or turn lane).

Treatment Descriptions: See Also Section 2.2.1 for a detailed list of crossing treatments by category

A ***Install marked crosswalk with enhanced road-side signs***

Specific Guidance : Install marked crosswalk with "State Law - Yield - to Pedestrians In Crosswalk" signs with diagonal down arrows (W16-7P) mounted on the side of the roadway; standard advance pedestrian warning signs (W11-2) may also be used; use S1-1 signs for School Crossing locations.

B ***Install marked crosswalk with enhanced road-side and in-roadway (bollard mounted) signs***

Specific Guidance : Install marked crosswalk with "State Law - Yield - to Pedestrians In Crosswalk" signs with diagonal down arrows (W16-7P) mounted on the side of the roadway; add in-roadway bollards (R1-6); standard advance pedestrian warning signs (W11-2) may also be used; use S1-1 signs for School Crossing locations.

C ***Install marked crosswalk with enhanced signs and geometric improvements to increase pedestrian visibility and reduce exposure***

Specific Guidance : For 2 or 3-lane roadways, install marked crosswalk with "State Law - Yield - to Pedestrians in Crosswalk" signs with diagonal down arrows (W16-7P) mounted on the side of the roadway; add in-roadway bollards (R1-6) or median mounted signs; standard advance pedestrian warning signs (W11-2) may also be used; use S1-1 signs for School Crossing locations. Add neckdowns or median refuge islands to shorten the pedestrian crossing distance and increase pedestrian visibility to motorists.

D ***Install marked crosswalk with enhanced signs, pedestrian activated RRFBs, and geometric improvements to increase pedestrian visibility and reduce exposure***

Specific Guidance : Install raised median refuge island (unless it is a one-way street or one already exists) to shorten the pedestrian crossing distance and increase pedestrian visibility to motorists. [If a median refuge can not be constructed on a two-way street, Go To Treatment F]. *Install marked crosswalk with "State Law - Yield - to Pedestrians In Crosswalk" signs WITH pedestrian activated RRFBs and diagonal down arrows (W16-7P) mounted on the side of the roadway and on median mounted signs; standard advance pedestrian warning signs (W11-2) may also be used; use S1-1 signs for School Crossing locations. Consider adding neckdowns at the crossing if on-street parking exists on the roadway and storm drain considerations will allow. [Note: If pedestrian volume falls above the RRFB limit line on Figure 2, consider Hawk beacon, pedestrian traffic signal, or grade-separated crossing.]*

E ***Do not install marked crosswalk at uncontrolled crossing. Determine if the speed limit can be effectively reduced to 40 or 45 mph AND a raised refuge median can be installed. If so, utilize Treatment D criteria above. If this is not possible, or if pedestrian volume falls above the RRFB limit line on Figure 2, consider HAWK beacon, pedestrian traffic signal, or grade-separated crossing.***

Specific Guidance : Consider HAWK beacon, pedestrian traffic signal or grade-separated crossing; application of these treatments should consider corridor signal progression, existing grades, physical constraints, and other engineering factors.

F ***Do not install marked crosswalk at uncontrolled crossing with 3 or more THROUGH lanes per direction or where the speed limit is > 45 mph and/or there is not a median refuge on a 5-lane crossing. Consider HAWK beacon, pedestrian traffic signal, or grade-separated crossing.***

Specific Guidance : Consider HAWK beacon, pedestrian traffic signal or grade-separated crossing; application of these treatments should consider corridor signal progression, existing grades, physical constraints, and other engineering factors.

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