Incline Residential Tahoe/Southwood
Transportation Study

Prepared for

Greenwood Homes
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Incline Village, NV 89451

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Chapter 1
Introduction

The Incline Village Residential project is located on the southwest corner of SR 28 (Tahoe Boulevard) and Southwood Boulevard in Incline Village, Nevada. The project would consist of 40 multi-family townhomes. The site location is shown in Figure 1.

The purpose of this report is to present an analysis of the traffic and air quality impacts associated withthe proposed project. Initially, existing traffic conditions near the proposed site are discussed. The proposed land uses associated with the project are then assessed in terms of the generation of new traffic. An appropriate distribution of traffic onto the adjacent roadway system is then identified. Usingthis distribution pattern, the forecasted generated trips are assigned to the nearby roadway system to identify the impact on intersection Level of Service (LOS). In addition, the following areas of impact reevaluated:

1. Site access conditions and driveway spacing
2. Traffic signal warrant
3. Regional Vehicle Miles Traveled (VMT) Analysis
4. Air quality impacts

Figure 1
Incline Village Residential - Site Location

Chapter 2
Existing Conditions

The following discussion presents information regarding existing transportation conditions in the studyarea.

ROADWAY CHARACTERISTICS

The project site is served by the following existing roadways:

State Route 28 (Tahoe Boulevard) is the primary highway serving Lake Tahoe's north shore. It is atwo-lane roadway that runs through Incline Village, Nevada from Tahoe City, California to US 50. To the west of Incline Village, State Highway 28 terminates at the junction of State Route 89 in Tahoe City, California. To the east, the highway turns south and continues along the east shore of Lake Tahoe and ends at US 50. Within Incline Village itself, State Highway 28 is designated as Tahoe Boulevard, with a posted speed limit of 35 miles per hour. The section between Village Boulevard and the eastern Northwood Boulevard/Southwood Boulevard intersection contains a center two-way left turn lane; othersections generally provide one lane in each direction, with turn lanes at major intersections.

Village Boulevard is a two-lane roadway that intersects SR 28 and provides access to primarily residential neighborhoods to the south, and residential neighborhoods as well as government offices tothe north. The posted speed limit is 25 miles per hour.

Northwood Boulevard and Southwood Boulevard are two-lane roadways forming a loop roadway around the central Incline Village area. This loop is designated as Southwood Boulevard to the south of SR 28 and Northwood Boulevard to the north of SR 28. To the west of Village Boulevard, the twoboulevards meet at a signalized intersection with SR 28. To the east of Village Boulevard, both meet at anunsignalized intersection with SR 28, controlled by stop signs on the Boulevard approaches to the highway. The posted speed limit is 25 miles per hour.

EXISTING TRAFFIC VOLUMES

This study is based on typical summer traffic conditions. PM turning-movement counts were conducted by LSC staff at the SR 28/Northwood Blvd/Southwood Blvd study intersection from 3:30 PM to 5:30 PM on Thursday, June 3, 2021. PM turning-movement counts were conducted by LSC at the SR 28/Village Blvd study intersection from 3:30 PM to 5:30 PM on Wednesday, June 2, 2021. Nevada Department of Transportation (NDOT) monthly variation was analyzed at the permanent location SR 28 (Tahoe Blvd) 915feet north of Lakeshore Drive/Pinion Drive. In 2019, July was determined to be the peak month. The volumes from our counts were increased using a growth factor of 1.2 to adjust the counts to peak monthconditions. The resulting 'existing no project' peak-hour traffic volumes are shown in Table 1.

Table 1: Incline Village Residential - Peak Hour Intersection Traffic Volumes

Intersection	Northbound			Southbound			Eastbound			Westbound			Total
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Existing No Project													
SR 28/Village Blvd	113	267	86	131	185	73	93	479	104	109	458	120	2218
SR 28/Southwood Blvd/Northwood Blvd (East)	22	21	63	29	15	39	44	611	63	40	561	27	1533
Southwood Blvd/Site Access	0	105	0	0	118	0	0	0	0	0	0	0	223
Project Net Impact													
SR 28/Village Blvd	0	0	0	0	0	0	0	3	0	0	2	0	5
SR 28/Southwood Blvd/Northwood Blvd (East)	3	0	1	0	1	0	0	0	5	2	0	0	12
Southwood Blvd/Site Access	1	0	0	0	0	8	4	0	1	0	0	0	14
Existing Plus Project													
SR 28/Village Blvd	113	267	86	131	185	73	93	482	104	109	460	120	2223
SR 28/Southwood Blvd/Northwood Blvd (East)	25	21	64	29	16	39	44	611	68	42	561	27	1545
Southwood Blvd/Site Access	1	105	0	0	118	8	4	0	1	0	0	0	237

Source: LSC Transportation Consultants, Inc.

EXISTING TRANSIT CONDITIONS

Transit services in the North Shore area are provided through the Tahoe Truckee Area Regional Transportation (TART). The bus service in this area is the TART Mainline. The Mainline Route travels the western shore of Lake Tahoe from Tahoma to the north shore at Incline Village. It operates between 6:00AM and 9:30 PM, providing one run per hour. Existing bus stops are conveniently located along SR 28 at Christmas Tree Village, Raley's, and Northwood Blvd and on Southwood Blvd at the Incline State Park within the vicinity of the project site.

In the summer of 2021, a pilot "microtransit" transit service is being operated, marketed as TART Connect. It provides free rides for passengers making app requests from 8 AM to Midnight 7 days a week. Three zones are being operated, including an Incline Village / Crystal Bay zone that encompassesthe project site.

EXISTING BICYCLE AND PEDESTRIAN CONDITIONS

Bicycle Facilities

Bicycle paths, bicycle routes and bicycle lanes are provided in the vicinity of the project. A Class I bikeway (multipurpose walking and bicycling path) can be found along Village Blvd from College Drive south to Lake Shore Blvd and along the entirety of Lake Shore Blvd. A bikeway is also located starting at the eastern Southwood Blvd/SR 28 intersection that loops around clockwise and ends on Northwood Blvd at the Incline Elementary School. Class II bikeways (bike lanes) can be found along SR 28 from the western Lake Shore Blvd intersection to the eastern Lake Shore Blvd intersection.

Pedestrian Facilities

Within the vicinity of the site, multipurpose walking and bike paths are provided along SR 28 and Southwood Blvd. The SR 28/Northwood Blvd/Southwood Blvd intersection has pedestrian crosswalks on all four sides of the intersection as well as a Rectangular Rapid-Flashing Beacon (RRFB) in the East and West directions. Another RRFB is placed along SR 28 in front of the Raley's driveway. At the SR 28/VillageBlvd intersection, crosswalks can be found on the west, east and south approaches of the signalized intersection.

Overall Non-Auto Access

In summary, the site is served by relatively good transit and bicycle/pedestrian access opportunities. The location near major trip generators (such as shopping) also makes the site relatively conducive to non- auto travel. Specific non-auto reductions are discussed in Chapter 3.

EXISTING AIR QUALITY CONDITIONS

Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance ofthe natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment.

Regional Setting

Many important factors determine local and regional air quality, with the most critical being the quantity, type, and location of pollution sources. Climatic conditions, such as wind speed and direction,temperature gradients, and inversions and precipitation interact with the physical features of the landscape to determine the movement and dispersion of air pollutants.

Climate

The Lake Tahoe Air Basin is surrounded by various mountain ranges within the Sierra Nevada. The Tahoe Basin's climate is cool and dry in the summer and cold and wet in the winter. Temperatures can vary froma daily mean of 60 degrees Fahrenheit (15.6 degrees Celsius) in the summer to about 20 degrees Fahrenheit (-6.7 degrees Celsius) in the winter. Diurnal temperature ranges combine to form characteristics that affect air quality on a daily and seasonal basis. Temperature inversions with the regionare generally caused by nighttime cooling of the land surface, which occurs at a faster rate than the cooling of the overlying air. These inversions can trap air pollutants near their source by limiting vertical mixing. These conditions occur most frequently in the winter.

The enclosed nature of the basin and the large diurnal temperature range combine to form specific air basin characteristics that affect air pollution concentrations on a daily and seasonal basis. Relevant to thepresent discussion are the issues of mixing height and temperature inversions. The "mixing height" is theheight or thickness of the air blanket available for dispersion of airborne pollutants emitted near the ground surface.

Normally, air temperature decreases with an increase in elevation. When a "temperature inversion" occurs, however, temperatures within a layer of air increase with height. The two issues are related inthat the presence of a temperature inversion reduces or lowers the mixing height normally available, thereby lessening the dispersion potential for pollutants in the air basin.

Inversions will trap pollutants near their emission source by precluding vertical mixing processes from dispersing the pollutants. Consequently, potential for high pollutant concentrations is greatest duringstrong, persistent, low-level radiation inversion conditions, which generally occur in the Lake Tahoe region during the winter months.

In the Lake Tahoe Air Basin, inversions are generally caused by nocturnal radiational cooling of the land surface, which occurs at a rate slower than the cooling of the overlying air. During summer months, the morning inversion is broken up by strong surface heating, usually by 9:00 AM to 10:45 AM. Thus, by early morning, mixing heights have typically increased to over 5,000 feet with strong vertical mixing. By mid-evening, the inversion slowly begins to form again, peaking during the early morning.

During winter months, surface heating is less pronounced, and the morning inversion may persist untilnoon (~50% of the time) or later. Consequently, the Lake Tahoe Basin exhibits a high potential for air pollution during the early morning hours, especially during the winter.

Standards and Thresholds

Federal, state, and regional standards exist for ambient air quality in the Tahoe Basin. The air quality plan element of the integrated regional transportation plan focuses on the need for air quality control strategies. The various federal, State of Nevada, and TRPA standards are listed in Table 2.

Table 2: Applicable Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standards		Nevada Standards	TRPA Standards
		Primary	Secondary	Concentration	Concentration
Ozone (O_3)	1 Hour	No Standard	No Standard	No Standard	0.08 ppm
	8 Hour	0.070 ppm	Same as Primary	0.070 ppm	No Standard
Carbon Monoxide (CO)	1 Hour	35 ppm	No Standard	35 ppm	No Standard
	8 Hour	9 ppm	No Standard	9 ppm below 5000' 6 ppm above 5000'	6 ppm
Nitrogen Dioxide (NO_2)	1 Year	53 ppb	Same as Primary	53 ppb	Maintain NO_x emissions at or below 1981 levels
	1 Hour	100 ppb	No Standard	100 ppb	No Standard
Sulfur Dioxide (SO_2)	1 Year	No Standard	No Standard	0.030 ppm	No Standard
	24 Hour	No Standard	No Standard	0.14 ppm	No Standard
	3 Hour	No Standard	0.5 ppm	0.5 ppm	No Standard
	1 Hour	75 ppb	No Standard	75 ppb	No Standard
Particulate Matter (PM_{10})	1 Year	No Standard	No Standard	No Standard	50 $\mu g/m^3$ in the portion of the region within Nevada
	24 Hour	150 $\mu g/m^3$	Same as Primary	150 $\mu g/m^3$	150 $\mu g/m^3$ in the portion of the region within Nevada
Fine Particulate Matter ($PM_{2.5}$)	1 Year	12 $\mu g/m^3$	15 $\mu g/m^3$	12 $\mu g/m^3$	15 $\mu g/m^3$ in the portion of the region within Nevada
	24 Hour	35 $\mu g/m^3$	Same as Primary	35 $\mu g/m^3$	35 $\mu g/m^3$
Sulfates	24 Hour	No Standard	No Standard	No Standard	No Standard
Lead	Rolling 3-month average	0.15 $\mu g/m^3$	Same as Primary	0.15 $\mu g/m^3$	No Standard
Hydrogen Sulfide	1 Hour	No Standard	No Standard	0.08 ppm	No Standard
Vinyl Chloride	24 Hour	No Standard	No Standard		No Standard
Visibility Reducing Particles	8 Hour (Observation)	No Standard	No Standard	No Standard	Regional 97 mi (156 km), 50% of the year 71 mi (115 km), 90% of the year Sub-regional 48 mi (78 km), 50% of the year 19 mi (31 km), 90% of the year

Source: NAAQS Table, United States Environmental Protection Agency (accessed June 2021)

Source: NAC 445B.22097 State standards of quality for ambient air (NRS 445B.210), Nevada Administrative Code (accessed June 2021)

Source: TRPA Regional Plan, Attachment 1: Resolution 82-11 Exhibit A, admended May 23, 2018

Attainment Designations

Air quality in most areas of the Lake Tahoe Air Basin is good. As shown in Table 3, the Lake Tahoe Air Basin met all the federal and state standards. The region was in non-attainment on the California side of the TRPA PM10 standard which is based on 2015 data (the most recent data available) but was shown asattainment on the Nevada side.

Table 3: Lake Tahoe Air Basin Attainment Designations

Pollutant	Federal	Nevada	TRPA
Ozone	Unclassified/Attainment	Unclassified/Attainment	Attainment
Carbon Monoxide	Unclassified/Attainment	Unclassified/Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Unclassified/Attainment	Attainment
Sulfur Dioxide	Unclassified/Attainment	Unclassified/Attainment	–
Particulate Matter (PM10)	Unclassified/Attainment	Unclassified/Attainment	Attainment[1]
Particulate Matter (PM2.5)	Unclassified/Attainment	Unclassified/Attainment	Attainment
Lead	Unclassified/Attainment	Unclassified/Attainment	–
Hydrogen Sulfide	–	Unclassified/Attainment	–
Visibility Reducing Particles	–	–	Attainment

[1]Attainment on Nevada side but non-attainment on California side.

Source: U.S. EPA, June 2021.

Source: Tahoe Regional Planning Agency (TRPA) Threshold Evaluation Report, 2015.

Source: Area Designations Maps / State and National, California Air Resources Board, December 2018.

Chapter 3
Trip Generation, Distribution, and Assignment

TRIP GENERATION

The first step in the analysis of future traffic impacts is to prepare an estimate of the number of trips generated by the existing site and the proposed project. Trip generation is the evaluation of the number of vehicle-trips that will either have an origin or destination at the project site. Daily Vehicle-Trip Ends (DVTE) and Peak Hour Vehicle-Trip Ends (PHVTE) need to be determined in order to analyze the potentialimpacts from the proposed project.

Full Buildout includes construction of the 40 multi-family units. The trip generation analysis for the proposed project land uses is summarized in Table 4.

Standard daily trip generation rates are provided in the Tahoe Regional Planning Agency's (TRPA) *Trip Table* (TRPA, 2020) and peak-hour rates are provided in the Institute of Transportation Engineers (ITE) *Trip Generation, 10th Edition Manual* (ITE, 2017). These standard rates are shown in Table 4.

Reduction for Non-Auto Trips

Non-auto trips, such as trips made to/from the site via bike, walking or transit, reduce the number of vehicle trips generated by the project. *2018 Summer TRPA Travel Mode Share Survey* data was reviewed.Data from the surveys conducted at locations at Incline Village near the Raley's and at the Incline Village Recreation Center. Based on responses from this group (with 60 data points), the non-automotive trip percentage was approximately 40 percent. Due to the project's location relative to commercial and shopping as well as the high school, the connecting bike and pedestrian paths, the nearby employment locations, a reduction of 20 percent non-auto travel is applied to the residential units. The non-auto reduction is less than that found at the commercial center (40 percent) due to the home to work trips and home to recreation trips which were not reflected in the commercial center area.

Trip Generation at Site Driveways

Multiplying the land use quantities by the trip rates and applying reductions for non-auto trips yields thevehicle trips generated at the site driveways for proposed project conditions. As shown in Table 4, the proposed land uses are forecasted to generate a total of approximately 174 one-way daily vehicle trips (DVTE) at the site driveways on a weekday, including 14 PM peak-hour vehicle-trips (9 inbound plus 5 outbound).

TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of site-generated trips is defined based upon the following:

1. The site's location relative to complementary land uses and regional access points.
2. The observed pattern of existing traffic movements.
3. The driveway on SR 28 will be used exclusively for emergency access. As a result, all trips will be to/from the driveway on Southwood Boulevard.

Trip distribution patterns for vehicle trips made to/from the project are estimated and the results areshown in Table 5.

Table 4: Incline Village Residential - Trip Generation

Description	Quantity	Units	ITE Land Use Category	ITE Land Use Code	Trip Generation Rates [1]				Reduction for Non-Auto Access	Vehicle Trips at Site Driveways			
					Daily	PM Peak Hour				Daily	PM Peak Hour		
						In	Out	Total			In	Out	Total
Multi Family Residence	40	DU	Multi Family Housing (Mid-Rise)	221	5.44	Fitted Curve			20%	174	9	5	14

DU= Dwelling Unit

Note 1: TRPA daily rates follow ITE for these land uses. ITE Peak hour rate.

Source: LSC Transportation Consultants, Inc., Tahoe Regional Planning Agency (TRPA) Trip Table, and Institute of Transportation Engineers Trip Generation (10th Edition)

Table 5: Incline Village Residential - Trip Distribution	
To/From	Percent
South on Southwood Blvd	15%
North on Northwood Blvd	10%
East on SR 28	20%
SR 28 Between Village and Northwood/Southwood	20%
West on SR 28	35%
Total	***100%***
Source: LSC Transportation Consultants, Inc.	

The site-generated traffic volumes are assigned through the study intersections by applying the distribution percentages to the peak-hour vehicle trips. The resulting PM peak-hour traffic volumes estimated to be generated by the full buildout of the project are shown in Table 1. The project-generated peak-hour intersection turning movement volumes are then added to the 'no-project' volumes, yielding the 'existing with project' peak-hour intersection traffic volumes presented in Table 1.

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Chapter 4
Level of Service

LEVEL OF SERVICE

LOS is a quantitative and qualitative measure of traffic conditions on isolated sections of roadway or intersections. LOS ranges from "A" (with no congestion) to "F" (where the system fails with gridlock or stop-and-go conditions prevailing). Detailed LOS definitions are included in Appendix A. As is the standardfor traffic engineering analyses, intersection LOS is analyzed based upon the procedures presented in the*Highway Capacity Manual* (Federal Highways Administration, 2016) using the Synchro software application (Version 10.3, Trafficware). The LOS calculations are contained in Appendix B for further reference.

LOS Standards

The TRPA LOS standards for the Lake Tahoe Basin, established by the Tahoe Regional Planning Agency (TRPA),are set forth in the 2019 Regional Transportation Plan with the intent that the Region's highway systemand signalized intersections during peak periods shall not exceed the following:

1. LOS C on rural scenic/recreational roads,
2. LOS D in rural developed areas,
3. LOS D on urban roads, or
4. LOS D for signalized intersections - LOS E may be acceptable during peak periods not to exceedfour hours per day.

The Regional Transportation Plan Mobility 2035 (TMPO/TRPA, 2012) also states that: "These vehicle LOS standards may be exceeded when provisions for multimodal amenities and/ or services (such as transit, bicycling, and walking facilities) are adequate to provide mobility for users at a level that is proportional to the project-generated traffic in relation to overall traffic conditions on affected roadways." (pp. 2 – 10).While the Tahoe Regional Planning Compact looks to "reduce the dependency on the private automobile," there are currently no adopted requirements or standards regarding the quality of service of other travel modes (i.e., transit, biking, or walking) that could potentially reduce the demand on the roadway system.
The TRPA does not have a specific adopted standard for unsignalized intersections.

The Washoe County LOS Standards are set forth in the 2050 Regional Transportation Plan with theintent that roadway facilities do not exceed the following:

1. LOS D for all regional roadway facilities projected to carry less than 27,000 ADT at the latest RTPhorizon
2. LOS E for all regional roadway facilities projected to carry 27,000 or more ADT at the latest RTPhorizon
3. LOS F for:
   a. 4th St/Prater Way – Evans Avenue to 15th St
   b. Plumas St – Plumb Ln to California Ave
   c. Rock Blvd – Glendale Ave to Victorian Ave
   d. Virginia St – Kietzke Ln to S McCarran Blvd
   e. Virginia St – Plumb Ln to Liberty St & 8th St to 17th St
   f. Sun Valley Blvd – 2nd Ave to 5th Ave
   g. Intersection of N Virginia St and Interstate 80 ramps

Existing Year Intersection Level of Service

As shown in Table 6, all study intersections currently attain the LOS thresholds during the existing yearcondition without the project with the exception of SR 28/Southwood Blvd/Northwood Blvd. The stop-controlled intersection of SR 28/Southwood Blvd/Northwood Blvd currently operates at LOS F.

With implementation of the proposed project the new site driveways intersecting SR 28 and Southwood Blvd will operate at an acceptable LOS A. The intersection of SR 28/Southwood Blvd/Northwood Blvd willremain at an unacceptable LOS F with a small increase in delay.

Table 6: Incline Village Residential - Existing Intersection LOS Summary

Intersection	Control Type	LOS Threshold	PM Existing No Project Delay (sec/veh)	PM Existing No Project LOS	PM Existing Plus Project Delay (sec/veh)	PM Existing Plus Project LOS
SR 28/Village Blvd	Signalized	D	15.1	B	15.1	B
SR 28/ Southwood Blvd/ Northwood Blvd (East)	TWSC	D	**99.7**	**F**	**105.4**	**F**
Southwood Blvd/Site Access	TWSC	D	0.0	A	9.7	A

BOLD text indicates that LOS standard is exceeded.

TWSC = Two-Way Stop-Control; AWSC = All-Way Stop-Control

NOTE 1: Level of service for signalized intersections is reported for the total intersection.

NOTE 2: Level of service for roundabouts and other unsignalized intersections is reported for the worst movement.

Source: LSC Transportation Consultants, Inc.

Chapter 5
Transportation Impacts

The project would generate approximately 174 new daily one-way vehicle trips and 14 PM peak-hourvehicle trips (9 inbound plus 5 outbound) at the site access driveway. The following areas of transportation impacts are evaluated in this section:

- Analysis of the Need for a New Traffic Signal
- Intersection Level of Service (LOS)
- Site Access Plans
- Vehicle Miles Traveled (VMT)

TRAFFIC SIGNAL WARRANT ANALYSIS

NDOT has established a series of "warrants" to define conditions in which a traffic signal should be provided. This is to ensure that signals are only provided in locations where the benefit outweighs the impacts of a signal (notably, the increase in traffic delays along the major roadway). The need for a new traffic signal at the stop-controlled SR 28/Northwood Blvd/Southwood Blvd (east) is evaluated using the procedure discussed in NDOT *Access Management System and Standards* (November 2017), which relieson the warrants for a traffic signal as defined in the Manual on Uniform Traffic Control Devices (MUTCD).

The MUTCD provides a series of 8 individual warrants, addressing traffic volumes in various periods, pedestrian conditions, safety conditions and other specific factor. Of these warrants, the first to be metin typical conditions (such as at this location) is the "peak hour warrant." This warrant is based on the volume per hour of the major street (total of both approaches) and the volume per hour on the minor street higher volume approach. These volumes are plotted in a chart; if the plotted value is higher than the specified curve, the location meets the peak-hour warrant. As shown in Figure 2, the existing-plus- project volumes fall below the curve, indicating that a traffic signal is not warranted without or with theproject.

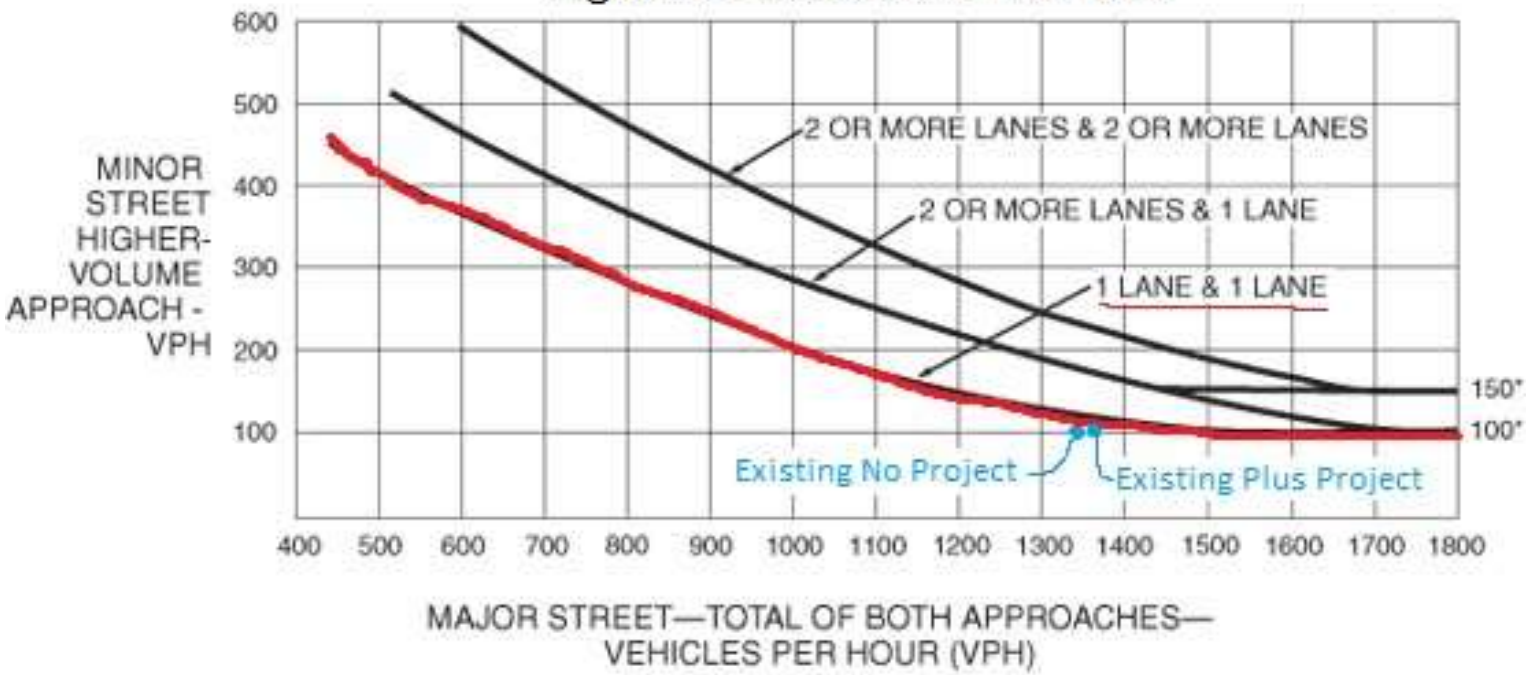
INTERSECTION LEVEL OF SERVICE (LOS)

The site driveway intersection and SR 28/Village operate at an acceptable LOS with the project. As such,no LOS mitigation is required for these intersections.

SR 28/Northwood Blvd/Southwood Blvd (East) operates at an unacceptable LOS F both with and withoutthe project. Even though a traffic signal would improve LOS, it is not warranted at this location.

Additionally, a roundabout would also improve LOS to acceptable levels. While a warrant system specific to roundabouts has not been developed, the signal warrants typically are used as a guideline, which would indicate that a roundabout is not warranted. A roundabout at this location would be an extensive and expensive project, particularly given the grades. In addition, drivers exiting the project onto Southwood and wishing to head west on SR 28 have the option, if they see a long northbound queue at the highway intersection, to make a right turn and access the highway via Village Boulevard. This tends tolimit the increase in delays. Another factor is that the proposed project's traffic would only increase total

Figure 2 - Peak Hour Warrant



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

volumes through the 28/Northwood/ Southwood intersection by 0.8 percent. Given these factors,requiring installation of a roundabout would not be appropriate.

Another option for improving access would be to expand the northbound Southwood approach at SR 28 from the existing one-lane configuration. At present, drivers wishing to make a northbound right-turn movement are often behind drivers making the more difficult northbound through or northbound left movements. To evaluate the overall delay (measured in total vehicle-hours of delay) with an additional lane, LOS was evaluated assuming the additional lanes as shown in Table 7.

Table 7: SR 28/Northwood Blvd/Southwood Blvd Northbound Approach Delay with Additional Lanes

Scenario	Northbound Lane Configuration	Northbound Volume by Movement			Northbound Delay by Movement (sec)			Vehicle Hours of Delay	% Change From Existing
		Left	Through	Right	NBL	NBT	NBR		
Existing No Project	LTR	25	21	64	67.8			1.99	--
Existing Plus Project	LTR	25	21	64	80.3			2.44	23%
Existing Plus Project	LT, R	25	21	64	101.7	101.7	14.7	1.54	-22%
Existing Plus Project	L, TR	25	21	64	87.7	28.2	28.2	1.27	-36%

Source: LSC Transportation Consultants, Inc.

This indicates the following:

- At present, northbound drivers in the peak hour experience a total of 1.99 vehicle-hours of delay.
- The additional traffic generated by the proposed project, with the existing single-lane northbound approach, would increase delay to 2.44 vehicle-hours.
- If a right turn lane is provided (shared left/through and separate right turn lanes), total delaywould be 1.54 vehicle-hours of delay. Alternatively, if a separate left turn lane is provided along with a shared through/right lane, totaldelay would be 1.27 vehicle-hours.

Though the vehicle-hours of delay would be reduced slightly with the addition of a separate left turn lane, the LOS would remain at LOS F.

SITE ACCESS PLANS

Driver sight distance conditions are evaluated at the site access point.

Driver Sight Distance

Driver sight distance was evaluated at the proposed access intersection. According to the NDOT Road Design Guide (2019), there are two types of sight distance standards that should be met at driveways or intersections for low-speed facilities (44 MPH or Less): stopping sight distance and intersection sight distance. Intersection sight distance requirements are meant to ensure that adequate time is provided for the waiting driver at an unsignalized intersection or driveway to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right,

without requiring through traffic to radically alter their speed. Intersection sight distance requirements are based upon the need for a driver to discern a gap of up to 7.5 seconds in oncoming traffic to safely choose an adequate gap. The design intersection sight distance requirements are set forth in Table 9-7 of A Policy on Geometric Design of Highways and Streets (AASHTO Green Book, 2018).

Stopping sight distance is the distance an oncoming driver on the major roadway needs to perceive an object in the travel lane (such as a turning vehicle), react to the object, and come to a safe stop. Stopping sight distance requirement are set forth in the AASHTO Green Book.

LSC staff visited the site and determined the proposed driveway is expected to provide adequate driver stopping sight distance. For intersection sight distance, the Southwood site access is adequate so long as the final landscaping plans do not hinder the intersection sight distance.

Driveway Spacing

The proposed driveway spacing along Southwood Blvd was reviewed. Driveway spacing is adequate and no mitigation needs to be performed.

Site Access Summary

In summary, a review of the site access plans indicates the following:

1. Driver sight distance is acceptable on Southwood Boulevard points so long as the final landscaping plans provide at least 440 feet of corner sight distance.
2. The proposed driveway spacing meets City standards.

VEHICLE MILES TRAVELED (VMT)

VMT analysis was conducted based on TRPA's "*TRPA Project Impact Assessment Guidelines*" (TRPA Draft, June 2021). This project is located in Project Impact Assessment Zone 69. The current project impact assessment process, based on daily vehicle trip ends (DVTE) identifies projects in town and regional centers that produce less than 200 DVTE:1,300 VMT as having an insignificant effect and so not requiring additional analysis." Because the project has less than the 200 DVTE requirement, the project is considered to have an insignificant effect. VMT is calculated but does not have to be considered against the standard of significance.

The projects VMT is calculated as the 'zone VMT per capita' multiplied by the 'zone persons per household' multiplied by the number of proposed units. As shown in Table 8, the resulting VMT from the residential units would total 850 VMT.

Table 8: Incline Village Residential - VMT Analysis

Trip Type	Zone VMT per Capita[1]	Zone Persons per Household	Number of Proposed Units	Average Annual Daily VMT
Residential	9.24	2.30	40	850

Note 1: TRPA zone VMT per Capita for PIA zone 69

Source: LSC Transportation Consultants, Inc.

CONCLUSIONS

- The project is forecasted to generate a total of approximately 174 one-way daily vehicle trips (DVTE) at the site driveways on a weekday, including 14 PM peak-hour vehicle-trips (9 inbound plus 5 outbound).
- The LOS at the site access driveway and SR 28/Village Blvd would remain acceptable with the project.
- The LOS at the SR 28/Northwood Blvd/Southwood Blvd intersection does not meet LOS standards without the project, which would be exacerbated by the proposed project. A review of improvement options indicates that a signal or a roundabout are not warranted. Though the vehicle-hours of delay would be reduced slightly with the addition of a separate northbound left-turn lane, the LOS would remain at LOS F.
- The proposed site access driveway spacing on Southwood Boulevard meets the City Standards.
- The proposed driveway on Southwood Boulevard is expected to provide adequate driver sight distance so long as the final landscaping plans do not hinder the corner sight distance.
- The project is exempt from a full VMT analysis and will generate about 850 total VMT.

Appendix A

LOS DESCRIPTIONS

DESCRIPTIONS OF LEVELS OF SERVICE

The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with level of service A representing the best operating conditions and level of service F the worst.

Level of Service Definitions

In general, the various levels of service are defined as follows for uninterrupted flow facilities:

- **Level of service A** represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

- **Level of service B** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

- **Level of service C** is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

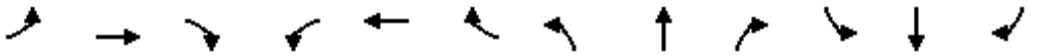
- **Level of Service D** represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

- **Level of service E** represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to “give way” to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

- **Level of service F** is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level of service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow which causes the queue to form, and level of service F is an appropriate designation for such points.

Appendix B

LOS OUTPUT



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	479	104	109	458	120	113	267	86	131	185	73
Future Volume (veh/h)	93	479	104	109	458	120	113	267	86	131	185	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	101	521	113	118	498	130	123	290	93	142	201	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	707	153	298	679	177	415	493	158	336	465	183
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	798	1489	323	793	1430	373	1099	1357	435	1000	1278	502
Grp Volume(v), veh/h	101	0	634	118	0	628	123	0	383	142	0	280
Grp Sat Flow(s),veh/h/ln	798	0	1812	793	0	1803	1099	0	1792	1000	0	1780
Q Serve(g_s), s	5.8	0.0	14.0	7.0	0.0	13.9	4.7	0.0	8.6	6.6	0.0	5.9
Cycle Q Clear(g_c), s	19.7	0.0	14.0	21.0	0.0	13.9	10.6	0.0	8.6	15.2	0.0	5.9
Prop In Lane	1.00		0.18	1.00		0.21	1.00		0.24	1.00		0.28
Lane Grp Cap(c), veh/h	300	0	860	298	0	856	415	0	652	336	0	647
V/C Ratio(X)	0.34	0.00	0.74	0.40	0.00	0.73	0.30	0.00	0.59	0.42	0.00	0.43
Avail Cap(c_a), veh/h	308	0	879	306	0	874	415	0	652	336	0	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	10.5	19.0	0.0	10.5	15.9	0.0	12.7	18.9	0.0	11.9
Incr Delay (d2), s/veh	0.7	0.0	3.2	0.9	0.0	3.2	1.8	0.0	3.9	0.8	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	4.8	1.2	0.0	4.7	1.3	0.0	3.7	1.5	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	0.0	13.7	19.8	0.0	13.6	17.7	0.0	16.6	19.7	0.0	12.3
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h		735			746			506			422	
Approach Delay, s/veh		14.5			14.6			16.9			14.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.0		27.5		22.0		27.5				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		18.0		24.0		18.0		24.0				
Max Q Clear Time (g_c+I1), s		12.6		21.7		17.2		23.0				
Green Ext Time (p_c), s		1.4		1.1		0.2		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	611	63	40	561	27	22	21	63	29	15	39
Future Vol, veh/h	44	611	63	40	561	27	22	21	63	29	15	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	664	68	43	610	29	24	23	68	32	16	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	732	0	0	1534	1519	698	1551	1539	625
Stage 1	-	-	-	-	-	-	794	794	-	711	711	-
Stage 2	-	-	-	-	-	-	740	725	-	840	828	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	945	-	-	873	-	-	95	119	440	92	116	485
Stage 1	-	-	-	-	-	-	381	400	-	424	436	-
Stage 2	-	-	-	-	-	-	409	430	-	360	386	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	945	-	-	873	-	-	71	107	440	60	105	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	71	107	-	60	105	-
Stage 1	-	-	-	-	-	-	362	380	-	402	415	-
Stage 2	-	-	-	-	-	-	341	409	-	271	366	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.6	67.8	99.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	163	945	-	-	873	-	-	117
HCM Lane V/C Ratio	0.707	0.051	-	-	0.05	-	-	0.771
HCM Control Delay (s)	67.8	9	-	-	9.3	-	-	99.7
HCM Lane LOS	F	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	4.2	0.2	-	-	0.2	-	-	4.4

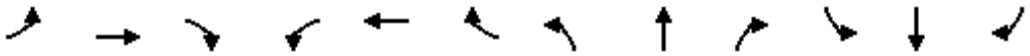
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	105	118	0
Future Vol, veh/h	0	0	0	105	118	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	114	128	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	242	128	128	0	-	0
Stage 1	128	-	-	-	-	-
Stage 2	114	-	-	-	-	-
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	746	922	1458	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	746	922	1458	-	-	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	911	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1458	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	482	104	109	460	120	113	267	86	131	185	73
Future Volume (veh/h)	93	482	104	109	460	120	113	267	86	131	185	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	101	524	113	118	500	130	123	290	93	142	201	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	300	709	153	297	681	177	414	493	158	335	464	182
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.36	0.36	0.36	0.36	0.36	0.36
Sat Flow, veh/h	796	1491	322	791	1431	372	1099	1357	435	1000	1278	502
Grp Volume(v), veh/h	101	0	637	118	0	630	123	0	383	142	0	280
Grp Sat Flow(s),veh/h/ln	796	0	1812	791	0	1803	1099	0	1792	1000	0	1780
Q Serve(g_s), s	5.8	0.0	14.1	7.0	0.0	14.0	4.7	0.0	8.6	6.6	0.0	5.9
Cycle Q Clear(g_c), s	19.8	0.0	14.1	21.1	0.0	14.0	10.6	0.0	8.6	15.2	0.0	5.9
Prop In Lane	1.00		0.18	1.00		0.21	1.00		0.24	1.00		0.28
Lane Grp Cap(c), veh/h	300	0	862	297	0	857	414	0	651	335	0	646
V/C Ratio(X)	0.34	0.00	0.74	0.40	0.00	0.73	0.30	0.00	0.59	0.42	0.00	0.43
Avail Cap(c_a), veh/h	307	0	878	303	0	873	414	0	651	335	0	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	10.5	19.1	0.0	10.5	15.9	0.0	12.8	19.0	0.0	11.9
Incr Delay (d2), s/veh	0.7	0.0	3.3	0.9	0.0	3.2	1.8	0.0	3.9	0.8	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	4.8	1.2	0.0	4.7	1.3	0.0	3.7	1.5	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	0.0	13.8	19.9	0.0	13.7	17.8	0.0	16.7	19.8	0.0	12.4
LnGrp LOS	B	A	B	B	A	B	B	A	B	B	A	B
Approach Vol, veh/h		738			748			506			422	
Approach Delay, s/veh		14.5			14.7			16.9			14.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.0		27.6		22.0		27.6				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		18.0		24.0		18.0		24.0				
Max Q Clear Time (g_c+I1), s		12.6		21.8		17.2		23.1				
Green Ext Time (p_c), s		1.4		1.1		0.2		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			15.1									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Future Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	664	74	46	610	29	27	23	70	32	17	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	738	0	0	1543	1528	701	1561	1551	625
Stage 1	-	-	-	-	-	-	797	797	-	717	717	-
Stage 2	-	-	-	-	-	-	746	731	-	844	834	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	945	-	-	868	-	-	94	117	439	91	114	485
Stage 1	-	-	-	-	-	-	380	399	-	421	434	-
Stage 2	-	-	-	-	-	-	405	427	-	358	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	945	-	-	868	-	-	69	105	439	59	102	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	105	-	59	102	-
Stage 1	-	-	-	-	-	-	361	379	-	400	411	-
Stage 2	-	-	-	-	-	-	335	404	-	269	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	80.3	105.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	155	945	-	-	868	-	-	115
HCM Lane V/C Ratio	0.771	0.051	-	-	0.053	-	-	0.794
HCM Control Delay (s)	80.3	9	-	-	9.4	-	-	105.4
HCM Lane LOS	F	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	4.8	0.2	-	-	0.2	-	-	4.6

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1	1	105	118	8
Future Vol, veh/h	4	1	1	105	118	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1	1	114	128	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	249	133	137	0	-	0
Stage 1	133	-	-	-	-	-
Stage 2	116	-	-	-	-	-
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	739	916	1447	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	738	916	1447	-	-	-
Mov Cap-2 Maneuver	738	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1447	-	768	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.5	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Future Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	-	-	150	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	664	74	46	610	29	27	23	70	32	17	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	738	0	0	1543	1528	701	1561	1551	625
Stage 1	-	-	-	-	-	-	797	797	-	717	717	-
Stage 2	-	-	-	-	-	-	746	731	-	844	834	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	945	-	-	868	-	-	94	117	439	91	114	485
Stage 1	-	-	-	-	-	-	380	399	-	421	434	-
Stage 2	-	-	-	-	-	-	405	427	-	358	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	945	-	-	868	-	-	69	105	439	59	102	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	105	-	59	102	-
Stage 1	-	-	-	-	-	-	361	379	-	400	411	-
Stage 2	-	-	-	-	-	-	335	404	-	269	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	51.1	105.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	82	439	945	-	-	868	-	-	115
HCM Lane V/C Ratio	0.61	0.158	0.051	-	-	0.053	-	-	0.794
HCM Control Delay (s)	101.7	14.7	9	-	-	9.4	-	-	105.4
HCM Lane LOS	F	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	2.8	0.6	0.2	-	-	0.2	-	-	4.6

Intersection	
Int Delay, s/veh	9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Future Vol, veh/h	44	611	68	42	561	27	25	21	64	29	16	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	-	150	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	664	74	46	610	29	27	23	70	32	17	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	738	0	0	1543	1528	701	1561	1551	625
Stage 1	-	-	-	-	-	-	797	797	-	717	717	-
Stage 2	-	-	-	-	-	-	746	731	-	844	834	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	945	-	-	868	-	-	94	117	439	91	114	485
Stage 1	-	-	-	-	-	-	380	399	-	421	434	-
Stage 2	-	-	-	-	-	-	405	427	-	358	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	945	-	-	868	-	-	69	105	439	59	102	485
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	105	-	59	102	-
Stage 1	-	-	-	-	-	-	361	379	-	400	411	-
Stage 2	-	-	-	-	-	-	335	404	-	269	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.6	41.7	105.4
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	69	246	945	-	-	868	-	-	115
HCM Lane V/C Ratio	0.394	0.376	0.051	-	-	0.053	-	-	0.794
HCM Control Delay (s)	87.7	28.2	9	-	-	9.4	-	-	105.4
HCM Lane LOS	F	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.5	1.7	0.2	-	-	0.2	-	-	4.6