

Windermere  
Traffic Impact Study  
(LSC #184640)  
February 4, 2019

<sup>1</sup> See comment letter.

<sup>2</sup> SP-19-003

Traffic Engineer's Statement

The traffic report and supporting information were prepared under my responsible charge and they conform with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

A handwritten signature in black ink, appearing to read "James R. Hodsdon", written over a horizontal line.


2/4/2019  
Date

# Summary of Comments on TRAFFIC REDLINES - LSC Response.pdf

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Page: 1

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 Number: 1      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 10:39:40 AM

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[See comment letter.](#)


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:39:15 PM  
See comment letter for LSC response

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 Number: 2      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 12:46:10 PM

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[SP-19-003](#)

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:39:02 PM  
The information has been added to the updated report as requested

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February 4, 2019

Todd Stephens  
Windsor Ridge Homes  
4164 Austin Bluffs Parkway, Suite 361  
Colorado Springs, CO 80918

RE: Windermere  
El Paso County, CO  
Traffic Impact Study  
LSC #184640

Dear Mr. Stephens:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the Windermere residential development. As shown on Figure 1, the site is located north of North Carefree Circle between Marksheffel Road and Antelope Ridge Drive in El Paso County, Colorado. The site is planned to contain 202 single-family homes. Site access is proposed to Antelope Ridge Drive and Marksheffel Road.

## REPORT CONTENTS

This report presents:

- The existing roadway and traffic conditions in the site's vicinity including the roadway widths, surface conditions, lane geometries, traffic controls, and posted speed limits.
- Current traffic volume data.
- Estimates of projected 2040 background traffic volumes.
- The projected average weekday and peak-hour vehicle-trips to be generated by the proposed development.
- The assignment of the projected site-generated traffic volumes to the area roadways.
- The projected short-term total traffic volumes on the area roadways.
- The projected levels of service at the key intersections in the vicinity of the site.
- The recommendations for roadway improvements to mitigate the traffic impacts.
- The recommended street classifications for the internal streets within the proposed development.
- The project's obligation to the County roadway improvement fee program.

## LAND USE AND ACCESS

As shown on Figure 1, the site is located north of North Carefree Circle between Marksheffel Road and Antelope Ridge Drive. The Chateau at Antelope Ridge residential development is located just north of the site. There are also existing single-family homes west of the site.

Figure 2 shows the site land use and access plan. The site is planned to contain 202 single-family homes. Access to the site is planned at two full-movement access points to Antelope Ridge Drive. The south access point would align with the existing south intersection of Pronghorn Meadows Circle. The north access is located about 755 feet north of the south intersection of Pronghorn Meadows/Antelope Ridge and about 675 feet south of the north intersection of Pronghorn Meadows/Antelope Ridge. An additional access is proposed to Marksheffel Road about 1,105 feet north of North Carefree Circle. This access was assumed to be a full-movement access in the short term; however, it will likely need to be restricted with any future widening of Marksheffel Road. This report assumes the access to Marksheffel Road has been restricted to three-quarter movement (left-in/right-in/right-out only) by 2040.

Letter of Intent says it will be RI/RO. Left turns in or out will not be supported if criteria are not met.

## ROADWAY AND TRAFFIC CONDITIONS

The roadways in the site's vicinity are shown on Figure 1 and are described below.

**North Carefree Circle** is a six-lane Principal Arterial. In the vicinity of Antelope Ridge Drive, North Carefree Circle has a posted limit of 35 miles per hour (mph).


**Marksheffel Road** is a Principal Arterial extending north from the City of Fountain to Woodmen Road. Marksheffel Road is planned to ultimately be widened to six lanes and extended north and west from Woodmen Road to connect to Research Parkway at Black Forest Road. Marksheffel Road is shown as a six-lane Principal Arterial through the site on the El Paso County MTCP. Marksheffel Road is planned to be constructed north from Woodmen Road to Vollmer Road in the short-term future.

and Expressway for 2060 Corridor Preservation Plan

**Antelope Ridge Drive** is an Urban Residential Collector that extends north from North Carefree Circle to about one-half mile north of Stetson Hills Boulevard. In the vicinity of the site, Antelope Ridge Drive has one through lane in each direction and a striped center median. The posted speed limit on Antelope Ridge Drive is 35 mph. The intersection of Antelope Ridge Drive/North Carefree Circle is currently stop-sign controlled.


**Marksheffel Road** extends north from C&S Road to just north of Woodmen Road. The El Paso County 2040 Major Transportation Corridor Plan shows Marksheffel Road as a future six-lane Principal Arterial. Marksheffel has two through lanes in each direction plus a raised median south of North Carefree Circle and one through lane in each direction north of North Carefree Circle. The posted speed limit adjacent to the site is 50 mph.

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 Number: 1      Author: dsdrice      Subject: Cloud+      Date: 3/20/2019 10:26:35 AM

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Letter of Intent says it will be RI/RO. Left turns in or out will not be supported if criteria are not met.


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:39:30 PM  
The access to Marksheffel Road is no longer proposed

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 Number: 2      Author: dsdrice      Subject: Highlight      Date: 3/20/2019 10:42:25 AM

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through


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:39:58 PM  
The text has been corrected in the updated report

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 Number: 3      Author: dsdrice      Subject: Callout      Date: 3/20/2019 10:41:03 AM

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and Expressway for 2060 Corridor Preservation Plan

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:40:13 PM  
The additional information has been included in the updated report as requested

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## Intersection Sight Distance

### North Carefree Circle/Antelope Ridge Drive

The intersection sight distance from the southbound approach to the west along North Carefree at the intersection of North Carefree and Antelope Ridge Drive does not meet the sight distance criteria contained in *A Policy on Geometric Design of Highways and Streets* pp. 657-663 (published by AASHTO) for design speeds of 40 mph or 45 mph. The field-measured sight distance is about 425 to 475 feet and the AASHTO standard is about 568 feet for passenger vehicles given the geometric conditions and an assumed 40-mph design speed (the posted speed is 35 mph). The raised center median is about 17 feet wide including the eastbound left-turn lane. The raised center median to the west contains landscaping rock, which contributes to some extent to the limited sight distance.

### Site Access Points

- The access point locations on Antelope Ridge Drive meet ECM criteria for stopping sight distance and intersection sight distance.
- The proposed Marksheffel access sight distance to/from the north meets ECM sight distance criteria.

- The sight distance to/from the south on Marksheffel Road should be checked as part of the first step in the design process for this intersection. Sight distance must meet City of Colorado Springs *Traffic Criteria Manual* standards and should account for the number of lanes eastbound left-turning vehicles must cross when turning left onto northbound Marksheffel, as well as the design speed of northbound Marksheffel.

## Crash History


Provide the sight distance. <sup>1</sup>

No crashes were reported to the Colorado State Patrol (CSP) at the intersection of North Carefree Circle and Antelope Ridge Drive between 2016 and February 2019.

## Existing Traffic Volumes


Figure 3 shows the existing morning, mid-afternoon (3:00-4:00 p.m.) and late afternoon peak-hour traffic volumes at the intersection of North Carefree Circle/Antelope Ridge Drive and the south Antelope Ridge Drive/Pronghorn Meadows Circle intersection. Figure 3 also shows the existing morning and late afternoon peak-hour traffic volumes on Marksheffel Road adjacent to the location of the proposed right-in/right-out-only access. The average weekday traffic volumes shown are estimates by LSC based on traffic counts conducted by LSC in August 2018 and January 2019. The traffic count reports are attached.

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 Number: 1      Author: dsdrice      Subject: Cloud+      Date: 3/20/2019 10:56:52 AM

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Provide the sight distance.

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:40:20 PM

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The access to Marksheffel Road is no longer proposed

## Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

<b>Table 1</b> <b>Intersection Levels of Service Delay Ranges</b>			
Level of Service	Signalized Intersections		Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	V/C <sup>(1)</sup>	Average Control Delay (seconds per vehicle) <sup>(2)</sup>
A	10.0 sec or less	less than 0.60	10.0 sec or less
B	10.1-20.0 sec	0.60-0.69	10.1-15.0 sec
C	20.1-35.0 sec	0.70-0.79	15.1-25.0 sec
D	35.1-55.0 sec	0.80-0.89	25.1-35.0 sec
E	55.1-80.0 sec	0.90-0.99	35.1-50.0 sec
F	80.1 sec or more	1.00 and greater	50.1 sec or more
(1) Source: <i>Transportation Research Circular 212</i> (2) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F regardless of the projected average control delay per vehicle.			

The intersections of North Carefree Circle/Antelope Ridge Drive and the south Antelope Ridge Drive/Pronghorn Meadows Circle intersection have been analyzed to determine the existing levels of service based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6<sup>th</sup> Edition* by the Transportation Research Board. The results of the level of service analysis are shown in Figure 3. The level of service reports are attached.

The southbound left-turn movement at intersection of North Carefree Circle/Antelope Ridge Drive is currently operating at LOS F during the morning peak hour and LOS C during the midday peak hour and the afternoon peak hour. These are based on *Highway Capacity Manual* procedures analysis and not actual delay measured in the field. The limited sight distance at this intersection may have an effect on delay. The limited sight distance also likely has an effect on motorists' decisions to not use this left-turn movement. If the sight distance were better and/or if the intersection were signalized, the volume of left turns would likely be higher.

All movements at the two-way, stop-sign-controlled Pronghorn Meadows Circle/Antelope Ridge Drive south intersection are currently operating at a level of service C or better during the peak hours.



## **2040 BACKGROUND TRAFFIC**

Figure 4 shows the projected 2040 background traffic volumes. Background traffic is the traffic estimated to be on the roadways without the Windermere traffic. The estimates assume the extension of North Carefree Circle east of Marksheffel Road. Background through traffic estimates for North Carefree Circle may be conservative as traffic increases and the extension of North Carefree Circle into Banning Lewis Ranch will depend largely on the level of growth within Banning Lewis Ranch in this area. Note, the 2040 background traffic volumes account for additional latent southbound left-turn demand at North Carefree/Antelope Ridge Drive, assuming a signal or alternative improvement will be in place improving the level of service for this turning movement.

## **TRIP GENERATION**

The site-generated vehicle-trips were estimated using the nationally published trip generation rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 2 shows the current trip generation estimate. The midday trip generation estimate is based on hourly variation of traffic data recently released by the Institute of Transportation Engineers.

As shown in Table 2, Windermere is projected to generate about 1,907 new vehicle-trips on the average weekday, with about one-half of the vehicles entering and one-half of the vehicles exiting in a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 37 vehicles would enter and 112 vehicles would exit the site. During the midday peak hour, which occurs from 3:00 p.m. to 4:00 pm, about 67 vehicles would enter and 59 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:30 and 6:30 p.m., about 126 vehicles would enter and 74 vehicles would exit the site.

## **DIRECTIONAL DISTRIBUTION AND ASSIGNMENT**

The estimated directional distribution of the site-generated traffic volumes on the adjacent roadways is an important factor in determining the traffic impacts of the site. Figure 5 shows the specific distribution estimates for the short-term and long-term site-generated traffic volumes, respectively. The estimates are based on the following factors: the location of the site with respect to the regional residential employment, commercial, and activity centers and the balance of the Colorado Springs area; the land use proposed for the site; the proposed access system for the site; and the roadway system serving the site. The short-term distribution estimates assume the existing street network and the long-term distribution estimates assume the extension of Barnes Road and North Carefree Circle east of Marksheffel Road into Banning Lewis Ranch.

When the distribution percentages (from Figure 5) are applied to the trip generation estimates (from Table 2), the site-generated traffic volumes on the adjacent roadways can be determined.

Figure 6 shows the short-term site-generated traffic volumes. Figure 7 shows the long-term site-generated traffic volumes.

### **SHORT-TERM TOTAL TRAFFIC**

Figure 8 shows the projected short-term total traffic volumes. The short-term total traffic volumes are the sum of the existing traffic volumes (from Figure 3) plus the short-term site-generated traffic volumes (from Figure 6). The short-term total traffic volumes identify the short-term impacts of the development.

### **2040 TOTAL TRAFFIC**

Figure 9 shows the projected 2040 total traffic volumes. The 2040 total traffic volumes are the sum of the 2040 background traffic volumes (from Figure 4) plus the long-term site-generated traffic volumes (from Figure 7).

### **PROJECTED INTERSECTION LEVELS OF SERVICE**

The intersection of North Carefree/Antelope Ridge and the south intersection of Antelope Ridge/Pronghorn Meadows were analyzed to determine the projected levels of service for the short-term total and 2040 background and total traffic volumes based on the unsignalized intersection analysis procedures from the *Highway Capacity Manual 6<sup>th</sup> Edition*. Figures 4, 8, and 9 show the level of service analysis results. The level of service reports are attached.

#### **North Carefree/Antelope Ridge**

The southbound left turn from the stop-sign-controlled North Carefree Circle/Antelope Ridge Drive intersection is currently operating at a LOS F during the morning peak hours. With the addition of the projected short-term site-generated traffic this movement is projected to operate at LOS E during the afternoon peak hour. By 2040, the southbound left-turn and right-turn and eastbound left-turn movements are projected to operate at LOS F during peak hours based on both background and total traffic volumes (with or without this project). If signalized, this intersection is projected to operate at a satisfactory level of service. There may also be viable alternatives to signalization of this intersection to improve the level of service.

#### **Antelope Ridge Full-Movement Access Points**

The proposed full-movement site access points to Antelope Ridge Drive are projected to operate at LOS D or better for all movements during the peak hours as stop-sign-controlled intersections based on the short-term and 2040 total traffic volumes.

### **Marksheffel Access**

The proposed site access to Marksheffel Road is projected to operate at LOS D or better for all movements during the peak hours as a full-movement stop-sign-controlled intersection based on the short-term total traffic volumes. By 2040 it was assumed that this access would be restricted to left-in/right-in/right-out only. Based on the lane geometry and projected 2040 total traffic volumes shown on Figure 9, all movements at this intersection are projected to operate at LOS D or better during the peak hours.

### **QUEUING ANALYSIS**

A queuing analysis was performed using Synchro/SimTraffic to determine if the existing turn lanes at the intersection of North Carefree Circle and Antelope Ridge Drive will be sufficient to accommodate the projected queues based on the 2040 total traffic volumes. The analysis assumed the intersection of North Carefree/Antelope Ridge has been signalized. The 2040 total morning peak-hour traffic volumes were entered into the Synchro model. The simulation was run five times. The queuing reports are attached.

#### **What would the queues be without the signal?**<sup>1</sup>

Based on the projected 2040 total traffic morning peak-hour volumes, the projected maximum eastbound left-turn queue on North Carefree Circle approaching Antelope Ridge Drive is about 256 feet. The existing eastbound left-turn lane is about 350 feet long.

### **TRAFFIC SIGNAL WARRANT ANALYSIS**


The intersection of North Carefree Circle/Antelope Ridge Drive has been analyzed to determine if either an Eight-Hour or a Four-Hour Vehicular Volume Traffic Signal Warrant would be met based on the short-term or 2040 total traffic volumes. Tables 3 and 4 show a detailed analysis for the short-term and 2040 total traffic volumes, respectively.

The traffic signal warrant analysis was performed based on eight hours of manual traffic counts conducted at the intersection of North Carefree/Antelope Ridge in August 2018. Future off-peak traffic volumes were based on hourly variation of traffic data recently released by the Institute of Transportation Engineers. The minor approach volume for the short-term traffic signal warrant analysis includes all the southbound left-turn vehicles plus about 25 percent of the southbound right-turning vehicles. This is based on the assumption that if this intersection were signalized these vehicles would reroute their trips and make a left turn toward Marksheffel Road. The 2040 background and total traffic volumes shown in Figures 4 and 9 already assume this shift in the existing traffic pattern so the minor approach volumes shown in Table 4 include only the southbound left-turn movements.

As shown on Table 3, only two of hours analyzed are projected to meet the threshold for the Eight-Hour Vehicular Volume Traffic Signal Warrant and only one of the hours analyzed is projected to meet the threshold for the Four-Hour Vehicular Volume Traffic Signal Warrant based


**Address the Marksheffel/North Carefree intersection. Is the impact from this development < B.4.1 requirements (would create impeded traffic flows and/or excessive congestion; when added project traffic is determined to create potential safety problems?)**

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 Number: 1      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 10:58:22 AM

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What would the queues be without the signal?

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:40:42 PM  
The additional information has been included in the updated report as requested

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 Number: 2      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 11:30:05 AM

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Address the Marksheffel/North Carefree intersection. Is the impact from this development < B.4.1 requirements (would create impeded traffic flows and/or excessive congestion; when added project traffic is determined to create potential safety problems?)

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:41:11 PM  
Analysis of the intersection of Marksheffel/North Carefree has been included in the updated report

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on the short-term total traffic volumes. As shown on Table 4, by 2040 the signal would likely meet a Four-Hour Vehicular Volume Traffic Signal Warrant but not an Eight-Hour Vehicular Volume Traffic Signal Warrant.

Another of the MUTCD traffic signal warrants is Crash Experience, however, no crashes have been reported at the intersection between 2016 and February 2019.

Note: Once a signal warrant (or warrants) is satisfied, this does not mean that a signal will necessarily be installed. The decision to install a traffic signal rests with El Paso County.

## **SUBDIVISION STREET CLASSIFICATIONS**

Figure 10 shows the recommended classification for all of the internal streets within Windermere. All of the internal streets should be classified as either Urban Local or Urban Local (Low Volume).

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Trip Generation**

- Windermere is projected to generate about 1,907 new vehicle-trips on the average weekday, with about one-half of the vehicles entering and one-half of the vehicles exiting in a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 37 vehicles would enter and 112 vehicles would exit the site. During the midday peak hour, which occurs from 3:00 to 4:00 p.m., about 67 vehicles would enter and 59 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:30 and 6:30 p.m., about 126 vehicles would enter and 74 vehicles would exit the site.

### **Projected Levels of Service**

- The southbound left turn from the stop-sign-controlled North Carefree Circle/Antelope Ridge Drive intersection is currently operating at a LOS F during the morning peak hours. With the addition of the projected short-term site-generated traffic this movement is projected to operate at LOS E during the afternoon peak hour. By 2040, the southbound left-turn and right-turn and eastbound left-turn movements are projected to operate at LOS F during peak hours based on both background and total traffic volumes (with or without this project). If signalized, this intersection is projected to operate at a satisfactory level of service. There may also be viable alternatives to the conventional, four-leg signalized intersection to improve the level of service.

- The proposed full-movement site access points to Antelope Ridge Drive are projected to operate at LOS D or better for all movements during the peak hours as stop-sign-controlled intersections based on the short-term and 2040 total traffic volumes.
- The proposed access to Marksheffel Road is projected to operate at LOS D or better during the peak hours as a stop-sign-controlled intersection based on the short-term and 2040 total traffic volumes. The short-term analysis assumed this access as a full-movement intersection and the 2040 analysis assumed this access restricted to left-in/right-in/right-out only.

verify

1

### Intersection Sight Distance

- The sight distance to/from the south on Marksheffel Road should be checked as part of the first step in the design process for this intersection. Please refer to the sight distance section of this report for additional detail. The access point locations on Antelope Ridge Drive meet ECM criteria for stopping sight distance and intersection sight distance and the proposed Marksheffel access sight distance to/from the north meets ECM sight distance criteria.

A deviation is not likely to be approved without this information.

2

### Traffic Signal Warrant

- The intersection of North Carefree Circle/Antelope Ridge Drive is not projected to meet an Eight-Hour or Four-Hour Vehicular Volume Traffic Signal Warrant based on the projected short-term total traffic volumes. By 2040 a Four-Hour Vehicular Volume warrant is projected to be met but not prior based on assumed linear growth rates in through traffic. The timing of a warrant being met will depend in part on the growth in through traffic on North Carefree Circle. Refer to the Traffic Signal Warrant Analysis section of this report for additional detail.

### Roadway Improvements


what about acceleration lane?

- LSC recommends a southbound right-turn deceleration lane and northbound left-turn lane be provided at the proposed access on Marksheffel Road. These lanes would not be needed until this access is constructed with Phase 3 of development. Although the timing of Marksheffel improvements north of North Carefree Circle are not known at this time, the upgrade to Marksheffel could potentially occur concurrent with or prior to Phase 3 of this development. In either case, these turn lanes could be incorporated into the design of the Marksheffel improvements, with the developer providing the difference in cost to incorporate the turn lanes.
- Based on the short-term and 2040 total traffic volumes, the projected level of service, and the criteria contained in the El Paso County *Engineering Criteria Manual* (ECM) (and the City *Traffic Criteria Manual*), a southbound right-turn deceleration lane is **not** projected to be warranted on Marksheffel Road approaching the proposed right-in/right-out-only site access point.

The lanes will likely be required with Phase 1 if the access is approved.


4

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 Number: 1      Author: dsdrice      Subject: Cloud+      Date: 3/20/2019 11:31:06 AM

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[verify](#)


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:41:18 PM  
The access to Marksheffel Road is no longer proposed

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 Number: 2      Author: dsdrice      Subject: Cloud+      Date: 3/20/2019 11:32:20 AM

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[A deviation is not likely to be approved without this information.](#)


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:41:26 PM  
The access to Marksheffel Road is no longer proposed

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 Number: 3      Author: dsdrice      Subject: Callout      Date: 3/20/2019 11:36:46 AM

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[what about acceleration lane?](#)


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:41:33 PM  
The access to Marksheffel Road is no longer proposed

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 Number: 4      Author: dsdrice      Subject: Cloud+      Date: 3/20/2019 11:35:10 AM

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[The lanes will likely be required with Phase 1 if the access is approved.](#)

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:41:38 PM  
The access to Marksheffel Road is no longer proposed

- Based on the short-term total traffic volumes and the criteria contained in the ECM, a southbound left-turn lane is projected to be warranted on Antelope Ridge Drive approaching the north site access point. A southbound left-turn lane would not be required approaching the south access point; however, in the vicinity of the site Antelope Ridge Drive has an existing painted median. Antelope Ridge should be restriped to provide southbound left-turn lanes approaching both site access points. Based on a design speed of 40 mph the left-turn lanes should be 180 feet long plus a 160-foot taper.
- Based on the short-term and 2040 total traffic volumes and the criteria contained in the ECM, northbound right-turn deceleration lanes are **not** projected to be warranted on Antelope Ridge Drive approaching the site access points.
- In order to mitigate the intersection sight distance deficiency at North Carefree/Antelope Ridge Drive until through volumes are sufficiently high for a traffic signal warrant to be met, and/or as potential alternatives to signalization, the County could consider the following:
  - Reducing eastbound North Carefree to two-through lanes and utilizing the width of the inside lane to create a wider median area. This wider median could be used for a two-stage left-turning movement for southbound left turns. A variation of this concept that might be considered is the use of a “channelized T” configuration (the access on the south side of the intersection would become a right-in/right-out). The relatively short distance to the Marksheffel intersection may eliminate this option from consideration or require a variation to the traditional channelized T (which uses a left-turn acceleration lane).
  - Another option could be to convert the intersection to a “three-quarter movement” by prohibiting the southbound left turn and enhancing the U-turn capability at the intersection to the west. The left-turn lane queuing would need to be evaluated, and treatments could be investigated to deal with the competing northbound right turns, but there are three through lanes and an acceleration lane just east of the Akers intersection, which easily accommodates U-turns of most vehicles. Installation of a raised northbound right-turn island would separate westbound U-turning traffic from northbound right-turning traffic, eliminating this conflict. This concept could be considered a variation of the “Michigan Left” where motorists are forced to turn right and are provided a downstream opportunity to complete a U-turn as opposed to being offered a left-turn opportunity at an intersection.
- Figure 10 shows the recommended classification for all of the internal streets within Windermere. All of the internal streets should be classified as either Urban Local or Urban Local (Low Volume).



### **Marksheffel/North Carefree Intersection**

Until North Carefree Circle is extended east of Marksheffel Road and a southbound left-turn lane is constructed as part of that extension, a north-facing "U Turn Prohibited" sign (for southbound traffic) may need to be installed in the center median north of the intersection on the southbound approach.

### **County Road Free Program**

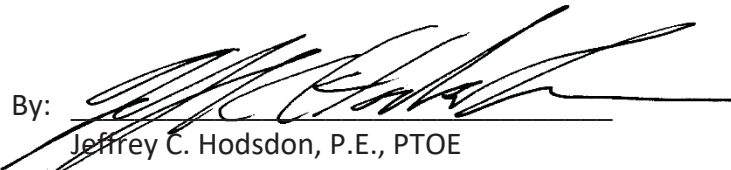
The applicant will be required to participate in the County Road Impact Fee Program. Assuming this development joins the ten-mil PID, the building permit fee portion is \$923 per single-family dwelling unit. The net fee for the proposed 202 lots would be \$186,446.

\* \* \* \* \*

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By:   
Jeffrey C. Hodsdon, P.E., PTOE  
Principal

JCH/KDF:bjwb

Enclosures: Table 2-4  
Figures 1-10  
Traffic Count Reports  
Level of Service Reports

<p>Table 2</p> <p>Trip Generation Estimate</p> <p>Windermere</p>
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Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>							Total Trips Generated						
			Average Weekday Traffic	Morning Peak Hour		School Peak Hour <sup>(2)</sup>		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		School Peak Hour		Afternoon Peak Hour	
				In	Out	In	Out	In	Out		In	Out	In	Out	In	Out
210	Single-Family Detached Housing	202 DU <sup>(3)</sup>	9.44	0.19	0.56	0.33	0.29	0.62	0.37	1,907	37	112	67	59	126	74

Notes:

(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)

(2) Based on 2018 ITE data on the hourly distribution of vehicle trips for Land Use 210 from 3:00 to 4:00 PM

(3) DU = dwelling unit

Source: LSC Transportation Consultants, Inc.

**Table 3**  
**Windermere**  
**Traffic Signal Warrant Analysis of North Carefree Circle/Antelope Ridge Drive**  
**MUTCD Warrants 1 and 2**  
**Short-Term Total Traffic**

Traffic Volumes										Warrant 1, Eight Hour Vehicular Volume Evaluation <sup>(5)</sup>								Warrant 2, Four Hour Vehicular Volume Evaluation <sup>(5)</sup>			
Hour	Existing <sup>(1)</sup>		Site-Generated Traffic <sup>(4)</sup>					Estimated Short-Term Total Volume		Warrant Thresholds		Warrant Threshold Met?		Existing		Short-Term		Warrant Threshold Minor	Warrant Threshold	Warrant Threshold Minor	Warrant Threshold
	Major <sup>(2)</sup>	Minor <sup>(3)</sup>	EB LT	WB TH	WB RT	SB LT	SB RT	Major <sup>(2)</sup>	Minor <sup>(3)</sup>	Condition A	Condition B	Existing	Short-Term	A	B	A	B	Minimum	Met?	Minimum	Met?
6:30-7:30 AM	596	141	6	3	4	3	19	609	144	600	150	900	75	No	No	No	No	292	No	286	No
7:30-8:30 AM	620	227	12	6	8	6	33	646	233	600	150	900	75	Yes	No	Yes	No	282	No	272	No
or																					
7:00 - 8:00 AM	834	260	15	7	10	7	38	866	267	600	150	900	75	Yes	No	Yes	No	192	Yes	184	Yes
11:00 AM - Noon	368	41	21	3	14	3	17	406	44	600	150	900	75	No	No	No	No	406	No	387	No
Noon - 1:00 PM	433	41	21	3	15	3	18	472	44	600	150	900	75	No	No	No	No	374	No	354	No
2:00 - 3:00 PM	617	54	27	4	18	4	20	666	58	600	150	900	75	No	No	No	No	283	No	264	No
3:00-4:00 PM	702	199	27	4	19	4	20	752	203	600	150	900	75	Yes	No	Yes	No	249	No	224	No
4:00 - 5:00 PM	826	60	50	4	35	4	25	915	64	600	150	900	75	No	No	No	No	194	No	171	No
5:00 - 6:00 PM	896	63	39	4	27	4	24	966	67	600	150	900	75	No	No	No	No	176	No	159	No
														2	0	2	0		1		1
														No	No	No	No		No		No

Notes:

- (1) Based on counts by LSC in August 2018.
- (2) North Carefree Circle eastbound and westbound left-turn, through, and right-turn volumes.
- (3) Antelope Ridge Drive southbound left-turn volume plus 25% of the southbound right-turn volume.  
 (25% of the southbound right-turn vehicles were assumed to reroute their trips and make a left turn towards Marksheffel Road if this intersection were to be signalized.)
- (4) Off-peak site-generated traffic volumes are based on 2018 ITE data on the hourly distribution of vehicle trips for Land Use 210.
- (5) Thresholds are based on 2 or more lanes on major approach and 1 lane on minor approach.

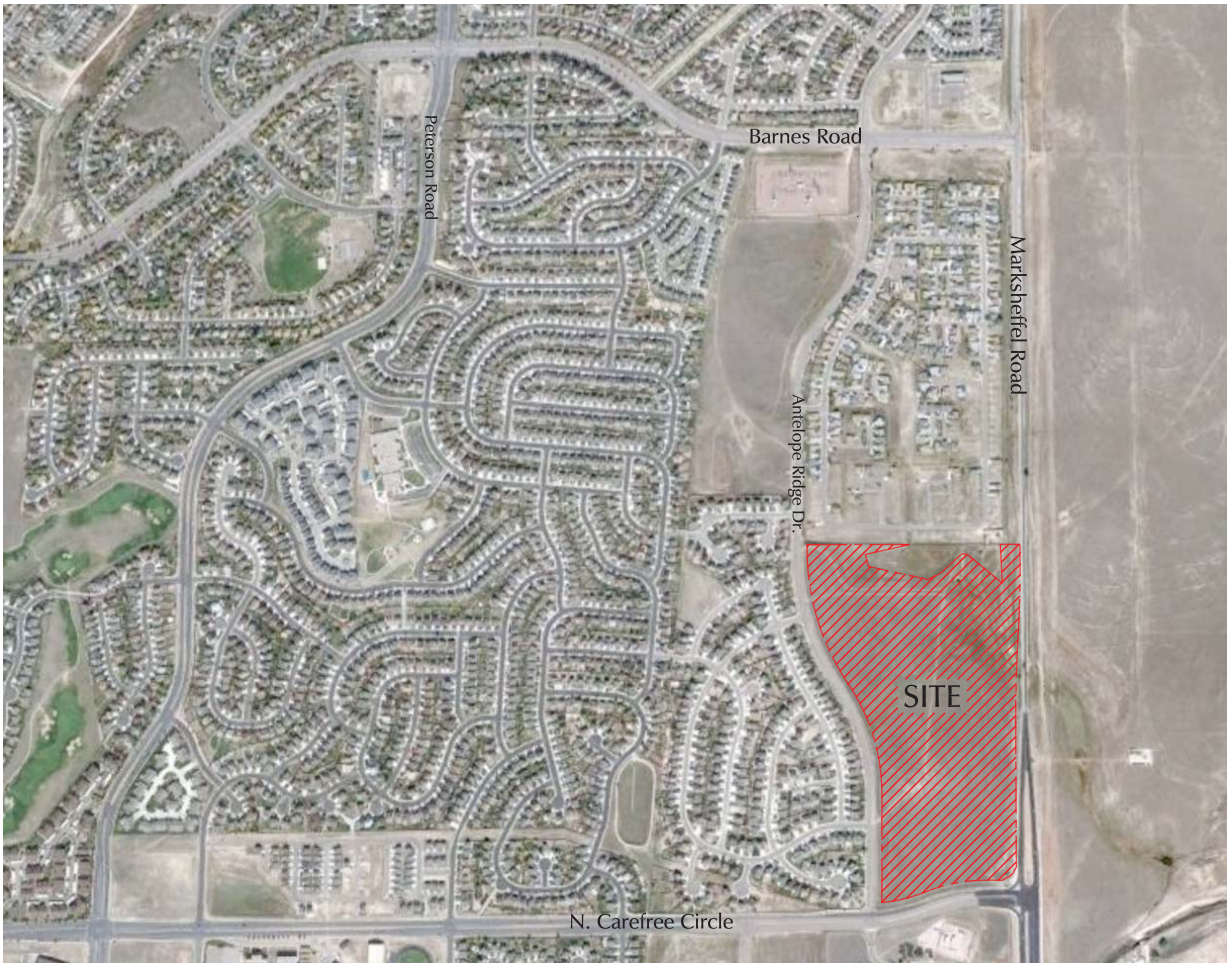
Source: LSC Transportation Consultants, Inc.

Table 4  
Windermere  
Traffic Signal Warrant Analysis of North Carefree Circle/Antelope Ridge Drive  
**MUTCD Warrants 1 and 2**  
2040 Total Traffic

Warrant 1, Eight Hour Vehicular Volume Evaluation <sup>(5)</sup>																						Warrant 2, Four Hour Vehicular Volume Evaluation <sup>(5)</sup>			
Hour	Traffic Volumes								Warrant Thresholds				Warrant Threshold Met?				2040 Background		2040 Total						
	2040 Background Traffic		Site-Generated Traffic <sup>(4)</sup>					Estimated 2040 Total Volume		Condition A		Condition B		2040 Background		2040 Total		Warrant Threshold Minor	Warrant Threshold Minor	Warrant Threshold Minor	Warrant Threshold Minor				
	Major <sup>(2)</sup>	Minor <sup>(3)</sup>	EB LT	WB TH	WB RT	SB LT	SB RT	Major <sup>(2)</sup>	Minor <sup>(3)</sup>	Major	Minor	Major	Minor	A	B	A	B	Minimum	Met?	Minimum	Met?				
6:30-7:30 AM	1517	144	5	3	5	6	17	1530	150	600	150	900	75	No	Yes	No	Yes	80	Yes	80	Yes				
7:30-8:30 AM	1259	234	11	5	10	11	29	1280	245	600	150	900	75	Yes	Yes	Yes	Yes	94	Yes	92	Yes				
11:00 AM - Noon	1040	52	18	3	17	6	14	1075	58	600	150	900	75	No	No	No	No	138	No	128	No				
Noon - 1:00 PM	1260	55	18	3	17	6	16	1295	61	600	150	900	75	No	No	No	No	94	No	91	No				
2:00 - 3:00 PM	1429	69	23	3	22	7	18	1474	76	600	150	900	75	No	No	No	Yes	80	No	80	No				
3:00-4:00 PM	2020	213	23	3	22	7	18	2065	220	600	150	900	75	Yes	Yes	Yes	Yes	80	Yes	80	Yes				
4:00 - 5:00 PM	2238	75	44	4	42	9	22	2324	84	600	150	900	75	No	No	No	Yes	80	No	80	Yes				
5:00 - 6:00 PM	3118	69	34	4	33	8	21	3185	77	600	150	900	75	No	No	No	Yes	80	No	80	No				
														2	3	2	6			3		4			
														No	No	No	No			No		Yes			

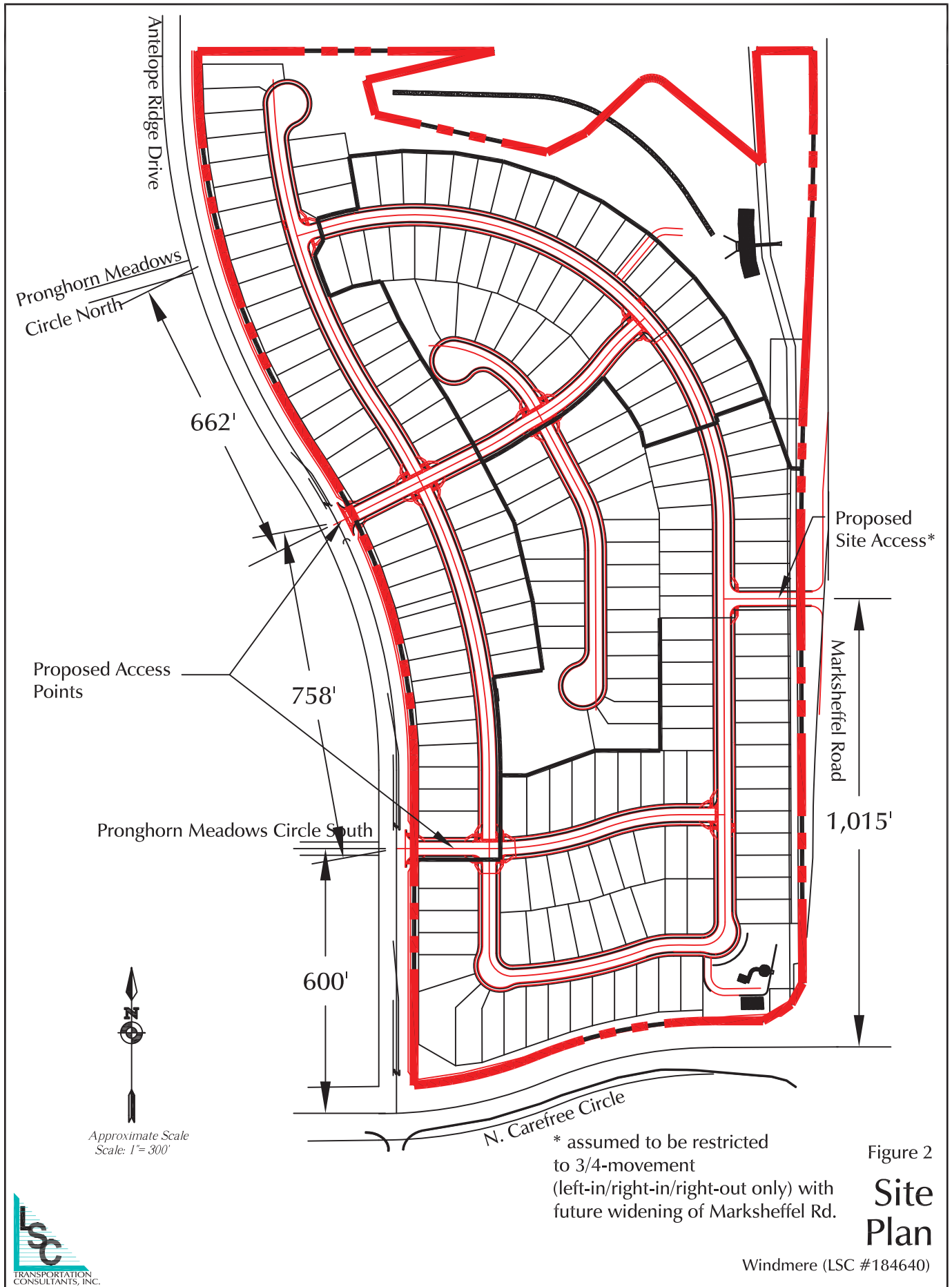
- Notes:
- (1) Based on counts by LSC in August 2018.
  - (2) North Carefree Circle eastbound and westbound left-turn, through, and right-turn volumes.
  - (3) Antelope Ridge Drive southbound left-turn volume only.
  - (4) Off-peak site-generated traffic volumes are based on 2018 ITE data on the hourly distribution of vehicle trips for Land Use 210.
  - (5) Thresholds are based on 2 or more lanes on major approach and 1 lane on minor approach.

Source: LSC Transportation Consultants, Inc.




Approximate Scale  
Scale: 1"= 1,000'

Figure 1  
Vicinity  
Map  
Windmere (LSC #184640)






---


 Number: 1      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 12:20:13 PM

---

[Provide Marksheffel Link ADT.](#)


 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:42:44 PM  
Average weekday traffic volumes on Marksheffel Road are included in the updated report as requested

---

 Number: 2      Author: dsdrice      Subject: Callout      Date: 3/20/2019 12:21:46 PM

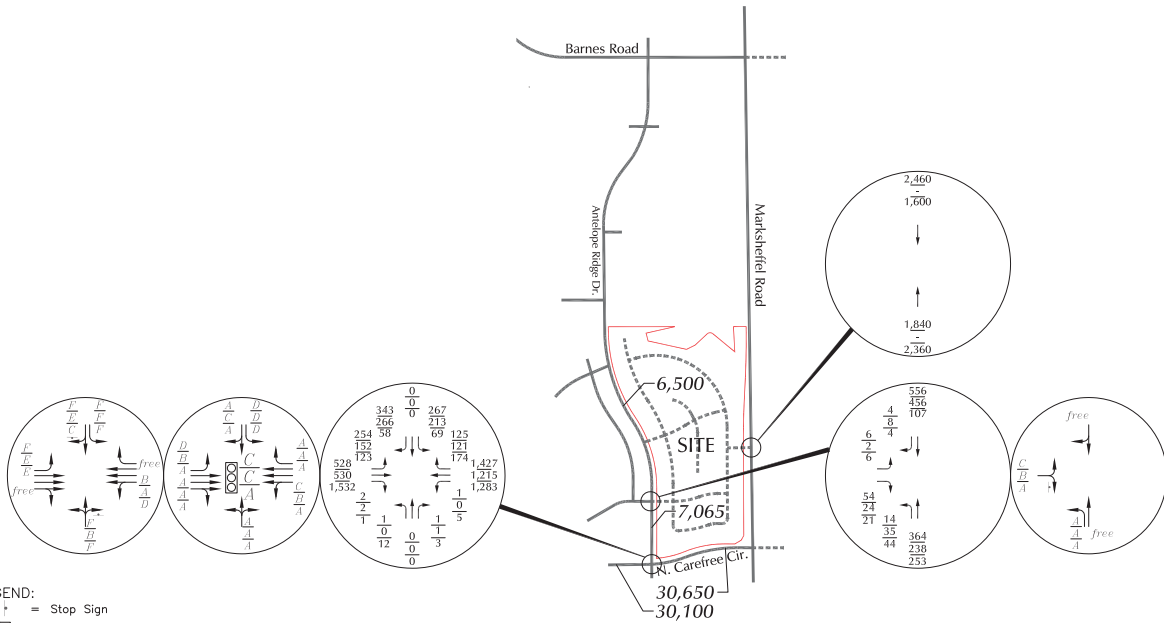
---

[Provide LOS for Marksheffel/ N. Carefree](#)

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:43:07 PM  
Level of service analysis at the intersection of Marksheffel/North Carefree has been included in the updated report as requested

---



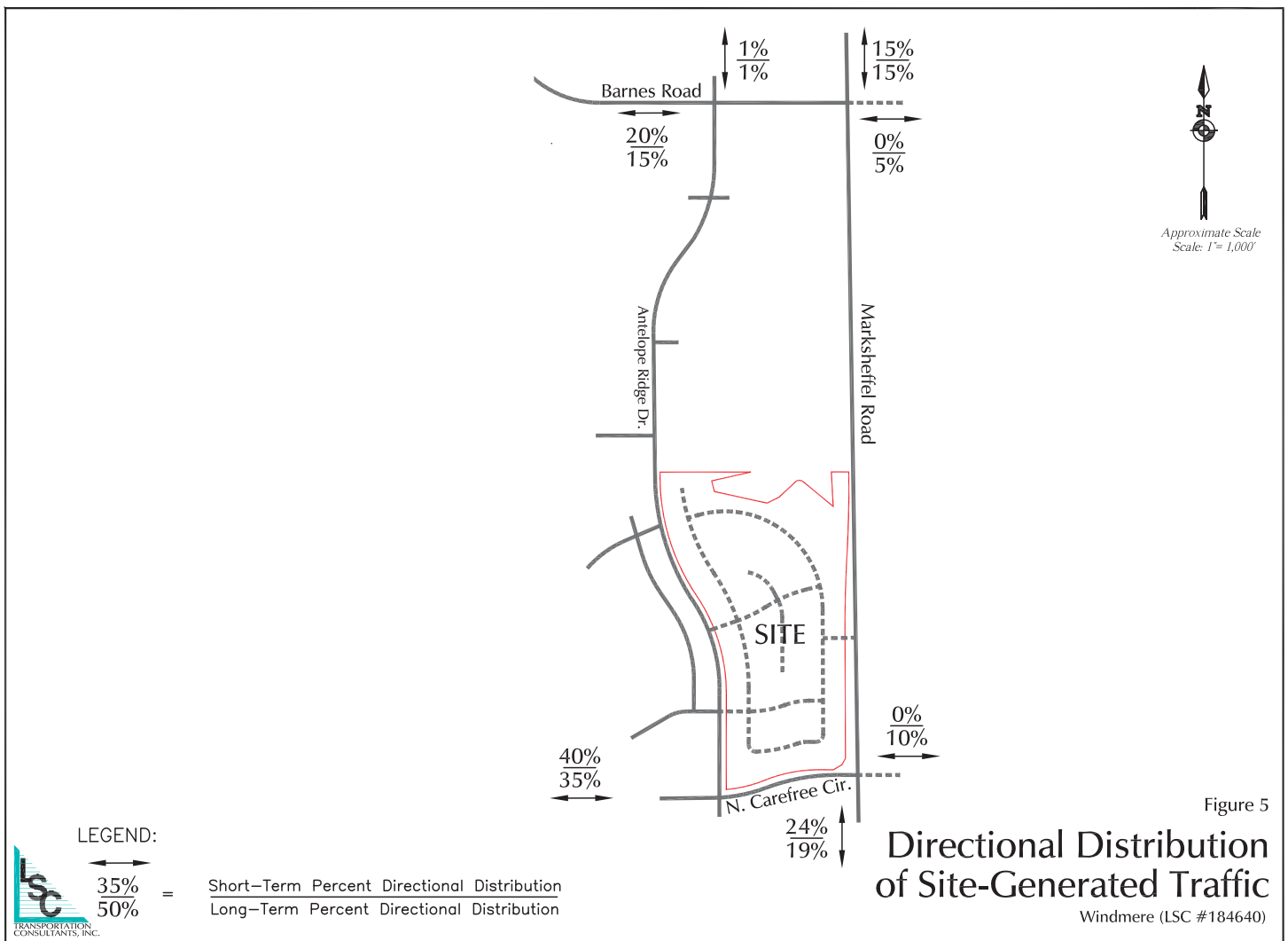


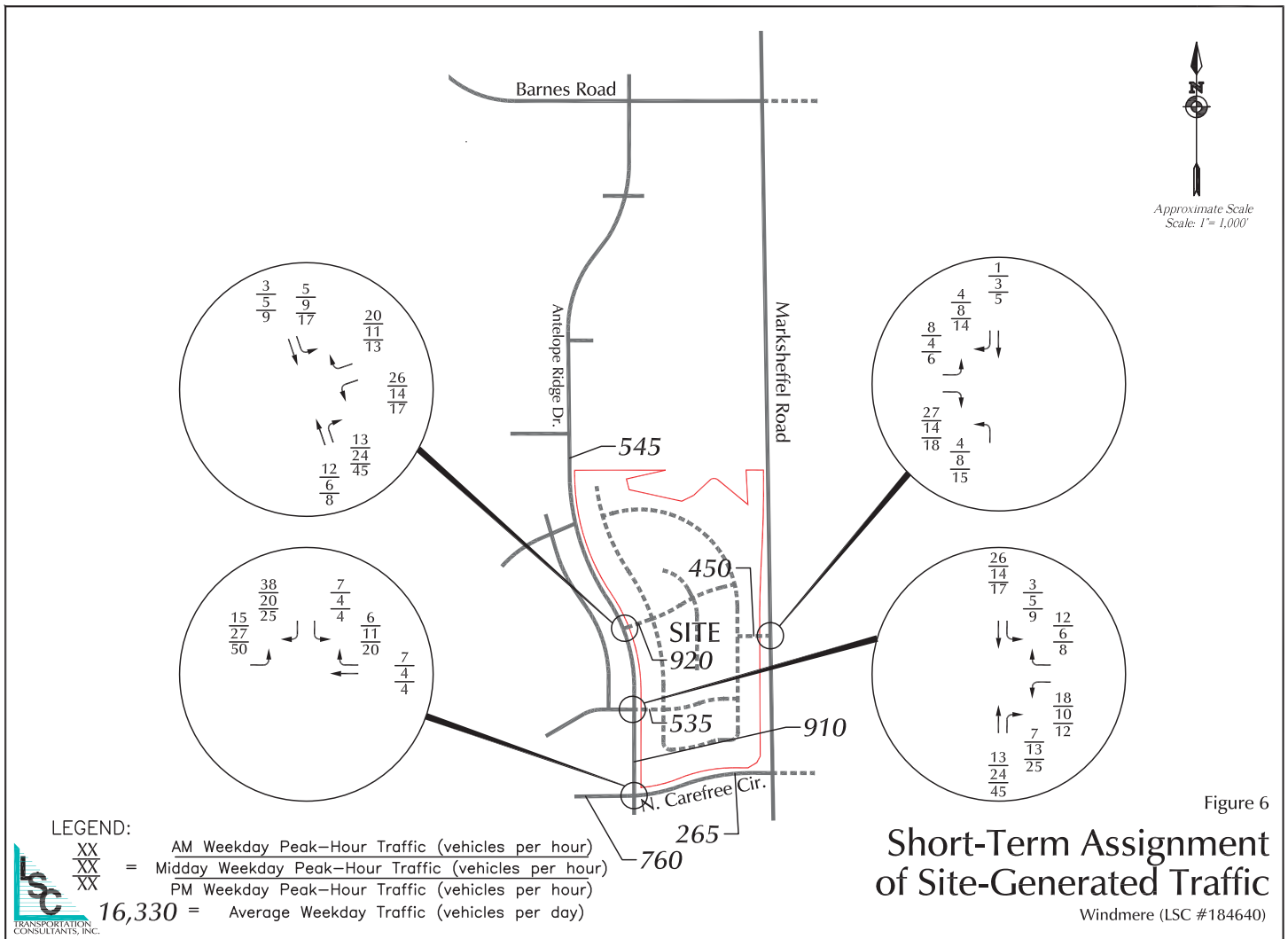
LEGEND:

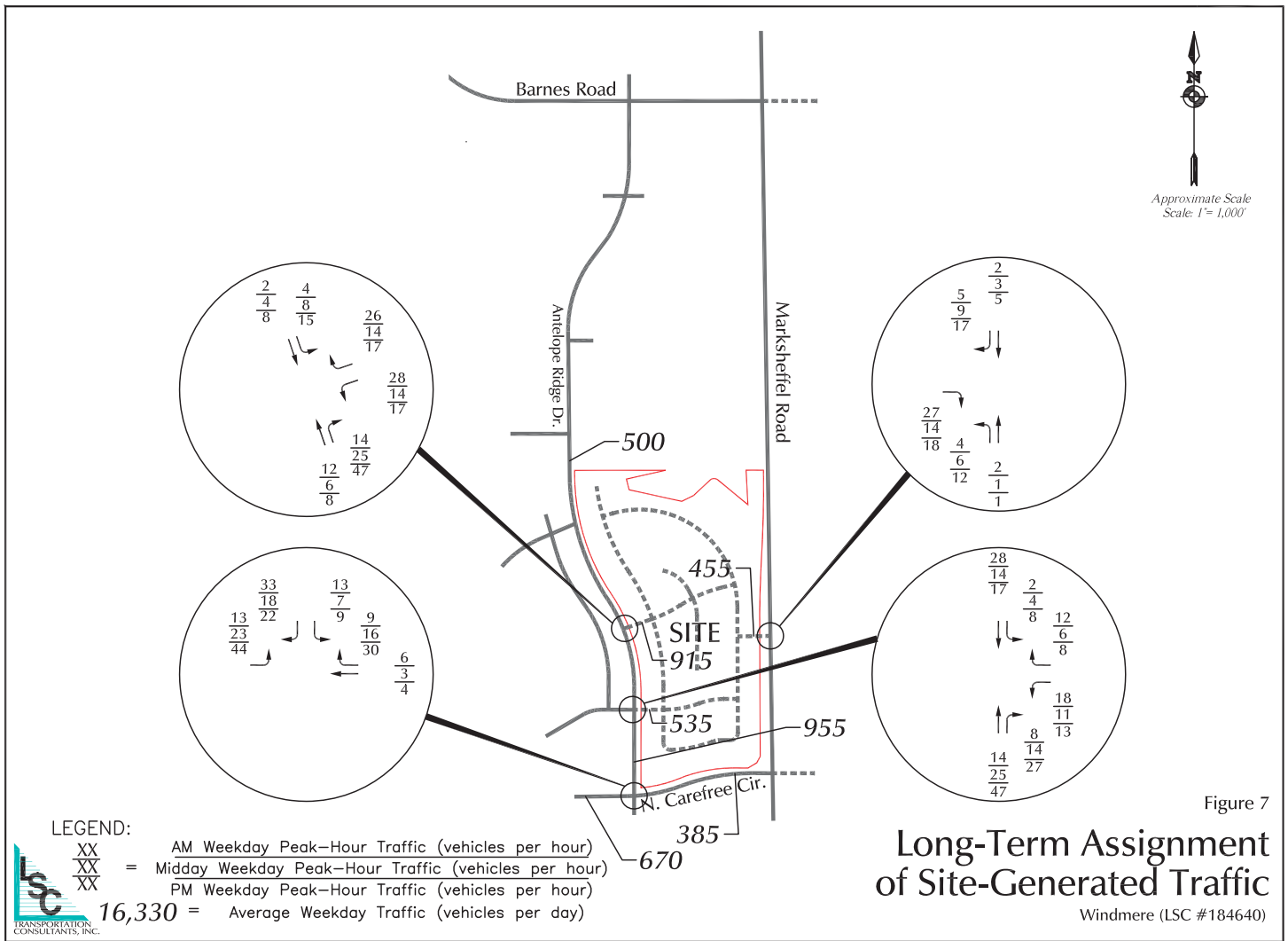
- ↑ = Stop Sign
- ⊞ = Traffic Signal
- XX = AM Weekday Peak-Hour Traffic (vehicles per hour)
- XX = Midday Weekday Peak-Hour Traffic (vehicles per hour)
- XX = PM Weekday Peak-Hour Traffic (vehicles per hour)
- $\frac{A}{B}$  = Individual Movement Peak-Hour Level of Service
- $\frac{A}{B}$  = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
- $\frac{A}{B}$  = PM Individual Movement Peak-Hour Level of Service
- $\frac{A}{C}$  = AM Entire Intersection Peak-Hour Level of Service
- $\frac{A}{C}$  = Entire Intersection Peak-Hour Level of Service (3:00-4:00pm)
- $\frac{A}{D}$  = PM Entire Intersection Peak-Hour Level of Service
- 16,330 = Average Weekday Traffic (vehicles per day)

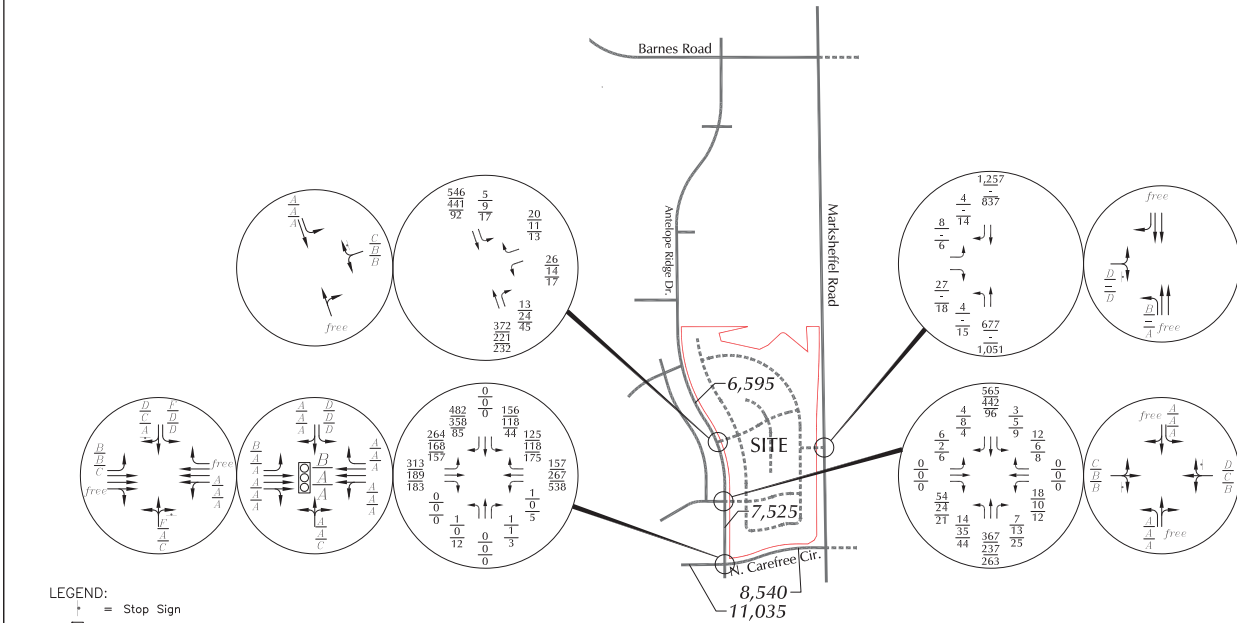
Figure 4  
Year 2040 Background Traffic,  
Lane Geometry, Traffic Control  
and Levels of Service

Windmere (LSC #184640)





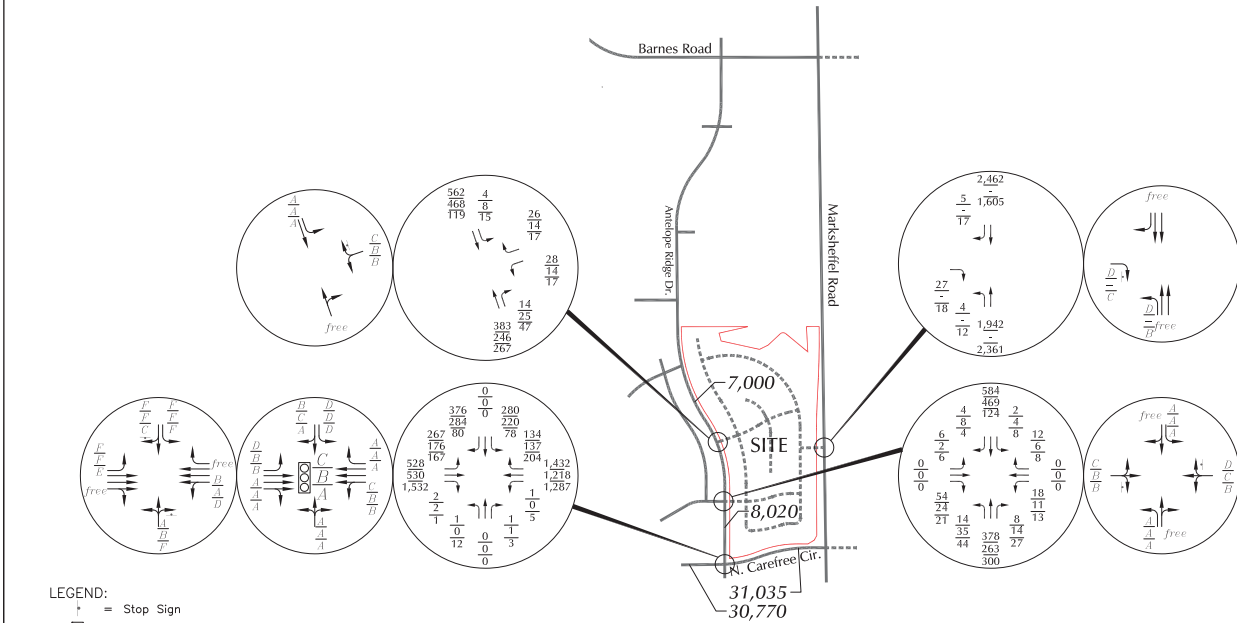




- LEGEND:**
- ↑ = Stop Sign
  - ⊞ = Traffic Signal
  - XX = AM Weekday Peak-Hour Traffic (vehicles per hour)
  - XX = Midday Weekday Peak-Hour Traffic (vehicles per hour)
  - XX = PM Weekday Peak-Hour Traffic (vehicles per hour)
  - $\frac{A}{B}$  = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
  - $\frac{A}{C}$  = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
  - $\frac{A}{D}$  = AM Entire Intersection Peak-Hour Level of Service
  - $\frac{A}{C}$  = Intersection Peak-Hour Level of Service (3:00-4:00pm)
  - $\frac{A}{D}$  = PM Entire Intersection Peak-Hour Level of Service
  - 16,330 = Average Weekday Traffic (vehicles per day)



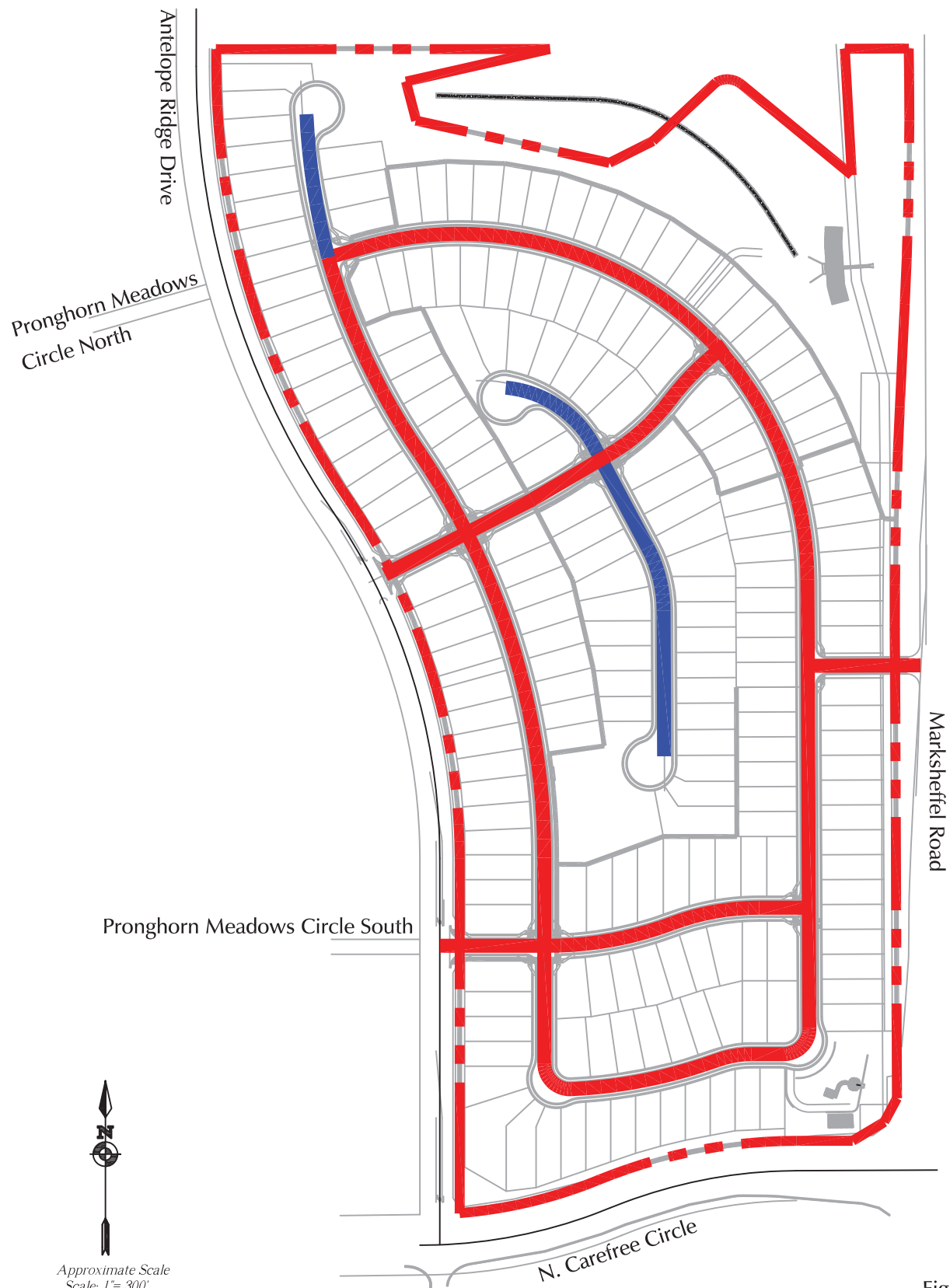
Figure 8  
**Short-Term Total Traffic,  
Lane Geometry, Traffic Control  
and Levels of Service**  
Windmere (LSC #184640)



LEGEND:

- ↑ = Stop Sign
- ⊞ = Traffic Signal
- XX = AM Weekday Peak-Hour Traffic (vehicles per hour)
- XX = Midday Weekday Peak-Hour Traffic (vehicles per hour)
- XX = PM Weekday Peak-Hour Traffic (vehicles per hour)
- A = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
- B = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
- C = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
- D = Individual Movement Peak-Hour Level of Service (3:00-4:00pm)
- A = AM Entire Intersection Peak-Hour Level of Service (3:00-4:00pm)
- B = PM Entire Intersection Peak-Hour Level of Service (3:00-4:00pm)
- C = PM Entire Intersection Peak-Hour Level of Service (3:00-4:00pm)
- D = PM Entire Intersection Peak-Hour Level of Service (3:00-4:00pm)
- 16,330 = Average Weekday Traffic (vehicles per day)

Figure 9  
Year 2040 Total Traffic,  
Lane Geometry, Traffic Control  
and Levels of Service  
Windmere (LSC #184640)



LEGEND:

- = Urban Local
- = Urban Local (low volume)



Figure 10  
**Street  
Classifications**  
Windmere (LSC #184640)

# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr AM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				Westbound				Antelope Ridge Dr Northbound				S Pronghorn Meadows Dr Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	0	17	1	0	0	0	0	0	3	10	0	0	1	0	8	0	40
06:45	0	37	0	0	0	0	0	0	1	25	0	0	1	0	16	0	80
Total	0	54	1	0	0	0	0	0	4	35	0	0	2	0	24	0	120
07:00	0	39	0	0	0	0	0	0	2	47	0	0	0	0	12	0	100
07:15	0	72	0	0	0	0	0	0	6	86	0	0	2	0	16	0	182
07:30	0	184	1	0	0	0	0	0	3	157	0	0	0	0	17	0	362
07:45	0	198	3	0	0	0	0	0	3	61	0	0	4	0	9	0	278
Total	0	493	4	0	0	0	0	0	14	351	0	0	6	0	54	0	922
08:00	0	61	1	0	0	0	0	0	4	8	0	0	1	0	4	0	79
08:15	0	21	0	0	0	0	0	0	1	18	0	0	1	0	7	0	48
Grand Total	0	629	6	0	0	0	0	0	23	412	0	0	10	0	89	0	1169
Apprch %	0	99.1	0.9	0	0	0	0	0	5.3	94.7	0	0	10.1	0	89.9	0	
Total %	0	53.8	0.5	0	0	0	0	0	2	35.2	0	0	0.9	0	7.6	0	



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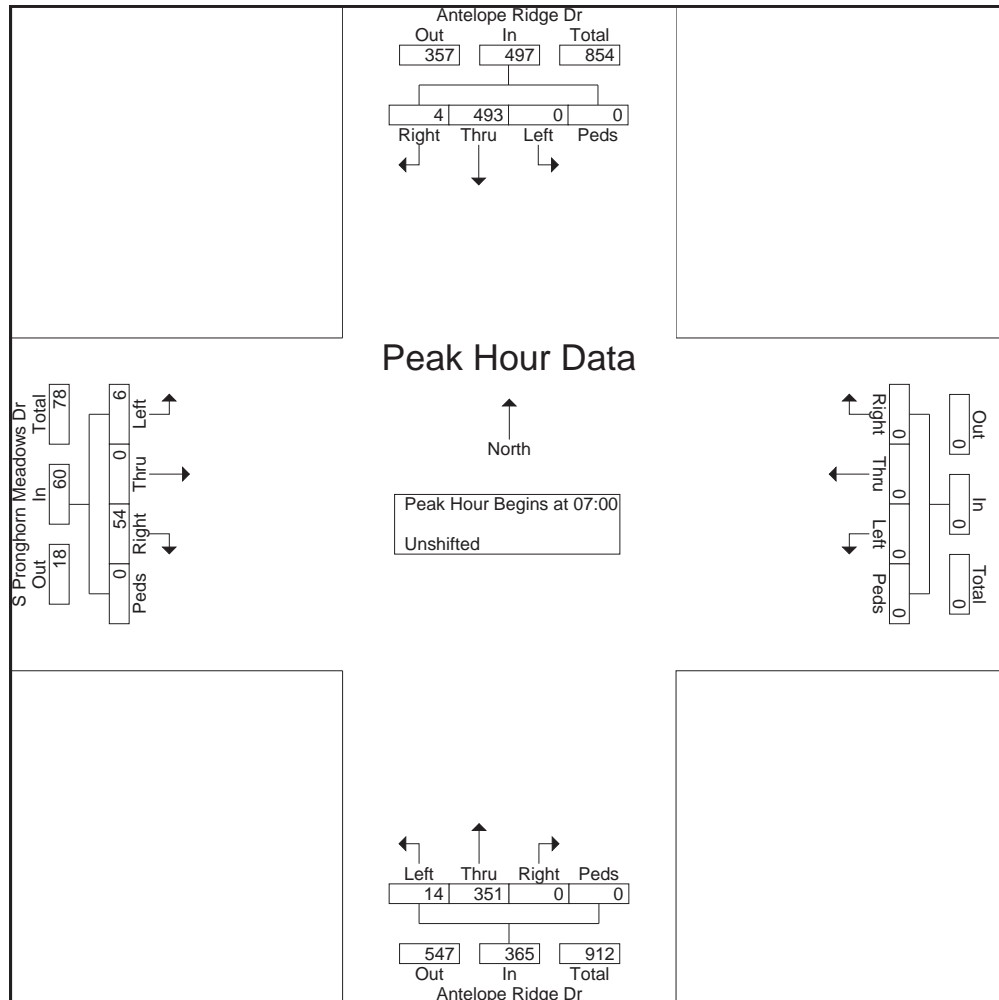
File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr AM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 2

	Antelope Ridge Dr Southbound					Westbound					Antelope Ridge Dr Northbound					S Pronghorn Meadows Dr Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 6:30:00 AM to 8:15:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 7:00:00 AM																					
7:00:00 AM	0	39	0	0	39	0	0	0	0	0	2	47	0	0	49	0	0	12	0	12	100
7:15:00 AM	0	72	0	0	72	0	0	0	0	0	6	86	0	0	92	2	0	16	0	18	182
7:30:00 AM	0	184	1	0	185	0	0	0	0	0	3	157	0	0	160	0	0	17	0	17	362
7:45:00 AM	0	198	3	0	201	0	0	0	0	0	3	61	0	0	64	4	0	9	0	13	278
Total Volume	0	493	4	0	497	0	0	0	0	0	14	351	0	0	365	6	0	54	0	60	922
% App. Total	0	99.2	0.8	0		0	0	0	0		3.8	96.2	0	0		10	0	90	0		
PHF	.000	.622	.333	.000	.618	.000	.000	.000	.000	.000	.583	.559	.000	.000	.570	.375	.000	.794	.000	.833	.637



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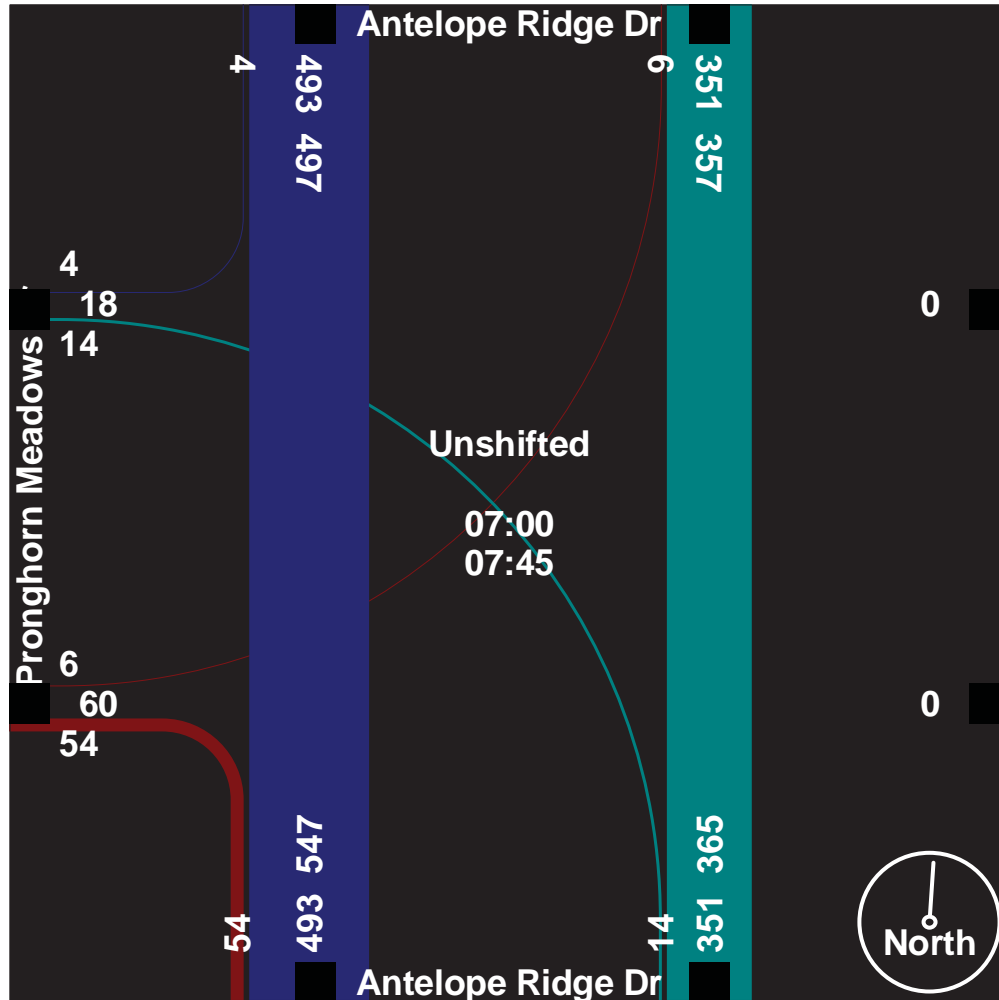
719-633-2868

File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr AM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 3



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545 E Pikes Peak Ave, Suite 210

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719-633-2868

File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr PM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				Westbound				Antelope Ridge Dr Northbound				S Pronghorn Meadows Dr Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	0	27	2	0	0	0	0	0	12	37	0	0	1	0	7	0	86
16:15	0	19	4	0	0	0	0	0	13	42	0	0	0	0	5	0	83
16:30	0	24	0	0	0	0	0	0	8	30	0	0	2	0	7	0	71
16:45	0	12	5	0	0	0	0	0	9	51	0	0	0	0	8	0	85
Total	0	82	11	0	0	0	0	0	42	160	0	0	3	0	27	0	325
17:00	0	21	0	0	0	0	0	0	8	63	0	0	2	0	6	0	100
17:15	0	26	3	0	0	0	0	0	14	67	0	0	1	0	4	0	115
17:30	0	24	0	0	0	0	0	0	6	43	0	0	1	0	7	0	81
17:45	0	36	1	0	0	0	0	0	16	42	0	0	2	0	4	0	101
Total	0	107	4	0	0	0	0	0	44	215	0	0	6	0	21	0	397
Grand Total	0	189	15	0	0	0	0	0	86	375	0	0	9	0	48	0	722
Apprch %	0	92.6	7.4	0	0	0	0	0	18.7	81.3	0	0	15.8	0	84.2	0	
Total %	0	26.2	2.1	0	0	0	0	0	11.9	51.9	0	0	1.2	0	6.6	0	

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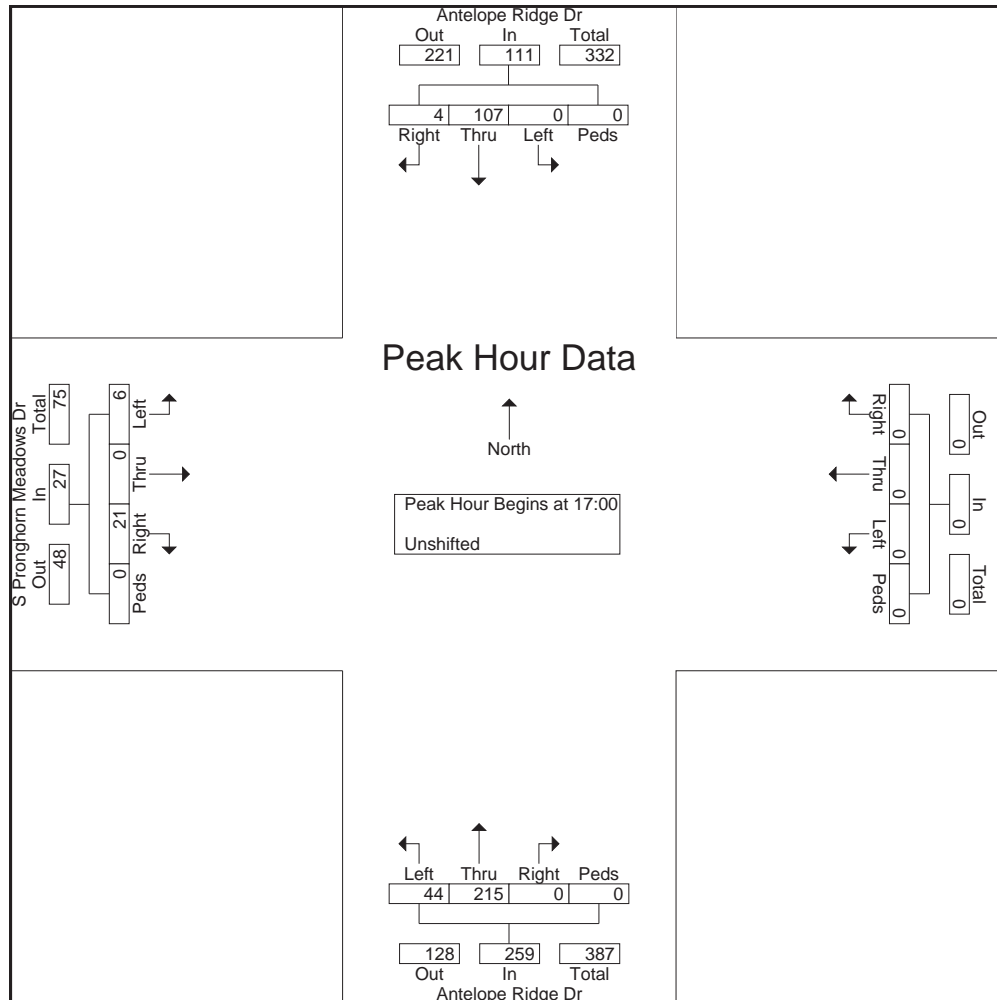
File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr PM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 2

	Antelope Ridge Dr Southbound					Westbound					Antelope Ridge Dr Northbound					S Pronghorn Meadows Dr Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 17:00																					
17:00	0	21	0	0	21	0	0	0	0	0	8	63	0	0	71	2	0	6	0	8	100
17:15	0	26	3	0	29	0	0	0	0	0	14	67	0	0	81	1	0	4	0	5	115
17:30	0	24	0	0	24	0	0	0	0	0	6	43	0	0	49	1	0	7	0	8	81
17:45	0	36	1	0	37	0	0	0	0	0	16	42	0	0	58	2	0	4	0	6	101
Total Volume	0	107	4	0	111	0	0	0	0	0	44	215	0	0	259	6	0	21	0	27	397
% App. Total	0	96.4	3.6	0		0	0	0	0		17	83	0	0		22.2	0	77.8	0		
PHF	.000	.743	.333	.000	.750	.000	.000	.000	.000	.000	.688	.802	.000	.000	.799	.750	.000	.750	.000	.844	.863



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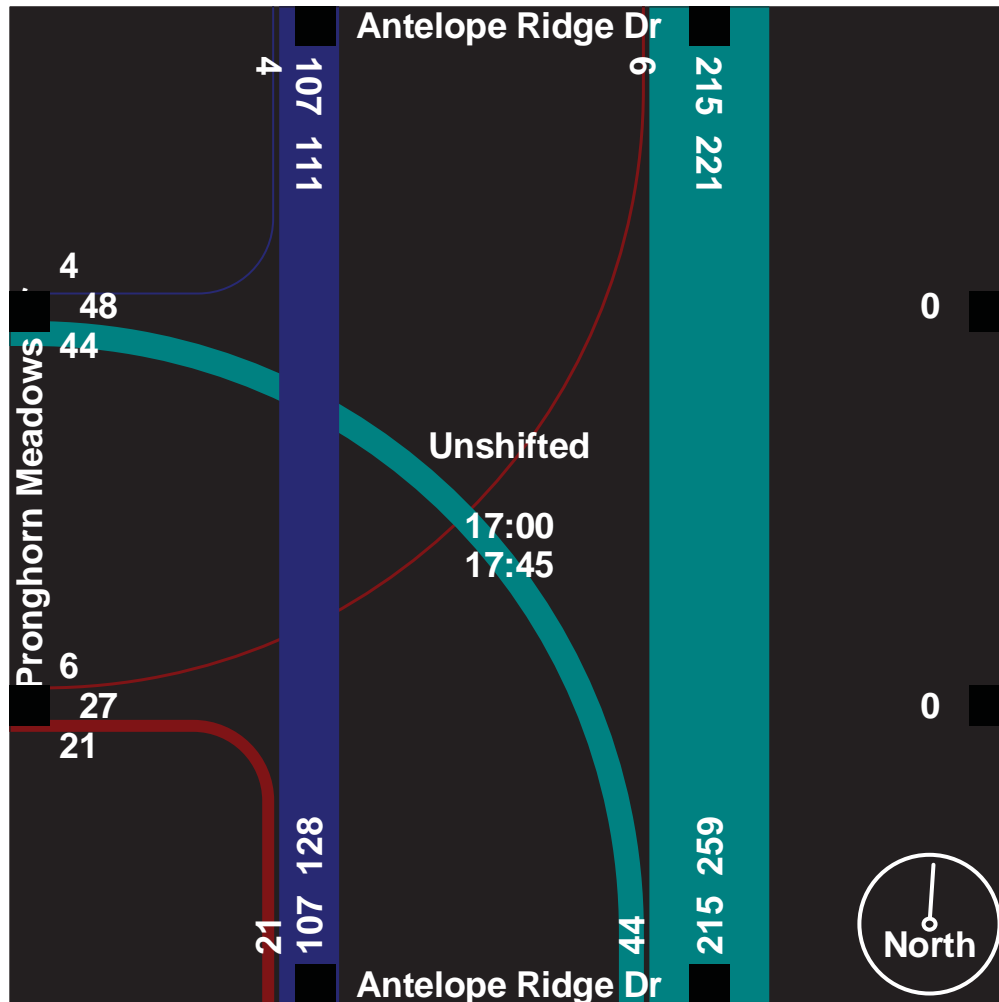
719-633-2868

File Name : Antelope Ridge Dr - S Pronghorn Meadows Dr PM

Site Code : 00184640

Start Date : 8/15/2018

Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

Colorado Springs, CO 80905

719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir AM

Site Code : 184640

Start Date : 8/14/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				N Carefree Cir Westbound				CSU Access Northbound				N Carefree Cir Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	20	0	13	0	0	22	0	0	0	0	0	0	8	46	1	0	110
06:45	27	0	18	0	0	26	11	0	0	0	0	0	16	55	2	0	155
Total	47	0	31	0	0	48	11	0	0	0	0	0	24	101	3	0	265
07:00	31	0	36	0	0	48	17	0	1	0	0	0	34	87	0	0	254
07:15	30	0	63	0	1	40	20	1	0	0	0	0	66	95	1	0	317
07:30	34	0	165	0	0	29	58	1	0	0	1	0	103	73	0	0	464
07:45	54	0	180	0	0	33	24	0	0	0	0	0	46	58	1	0	396
Total	149	0	444	0	1	150	119	2	1	0	1	0	249	313	2	0	1431
08:00	20	0	46	0	0	34	6	0	0	0	1	0	16	43	0	0	166
08:15	17	0	15	0	0	38	7	0	0	0	0	0	10	39	2	0	128
Grand Total	233	0	536	0	1	270	143	2	1	0	2	0	299	496	7	0	1990
Apprch %	30.3	0	69.7	0	0.2	64.9	34.4	0.5	33.3	0	66.7	0	37.3	61.8	0.9	0	
Total %	11.7	0	26.9	0	0.1	13.6	7.2	0.1	0.1	0	0.1	0	15	24.9	0.4	0	

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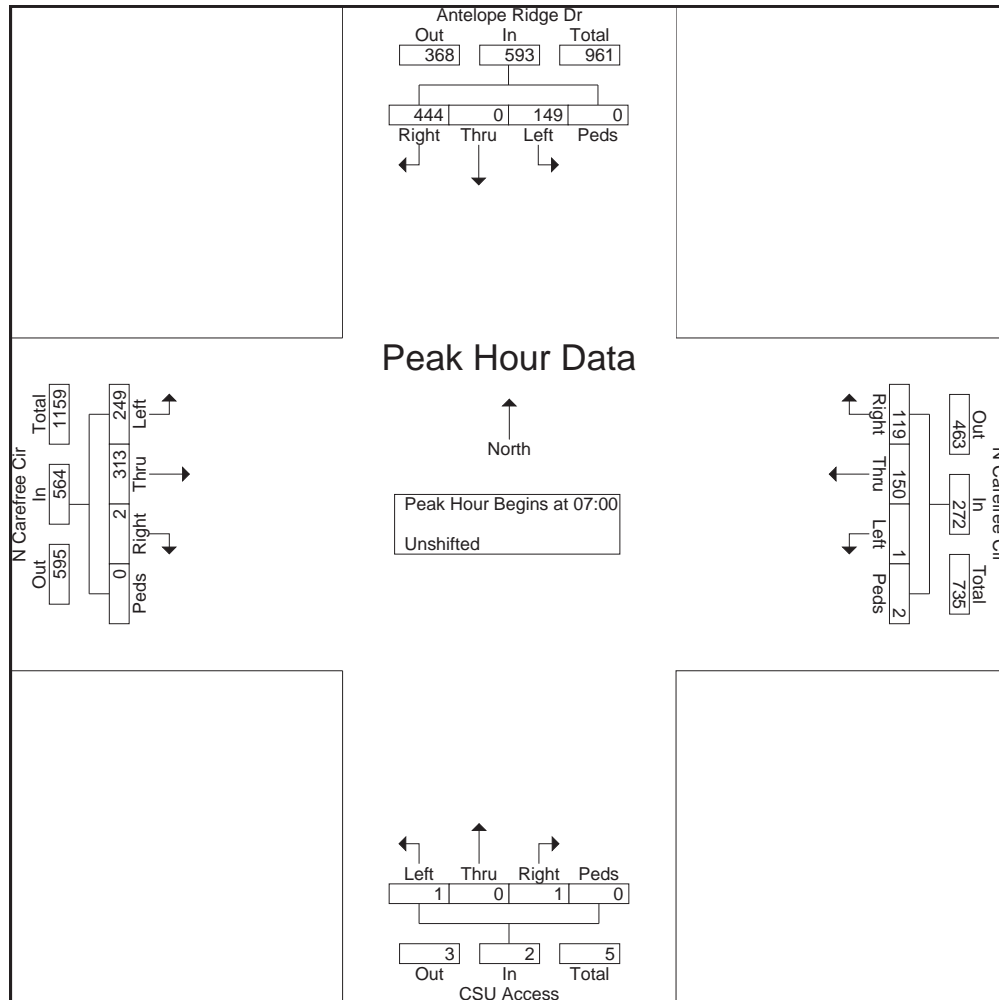
File Name : Antelope Ridge Dr -N Carefree Cir AM

Site Code : 184640

Start Date : 8/14/2018

Page No : 2

	Antelope Ridge Dr Southbound					N Carefree Cir Westbound					CSU Access Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 6:30:00 AM to 8:15:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 7:00:00 AM																					
7:00:00 AM	31	0	36	0	67	0	48	17	0	65	1	0	0	0	1	34	87	0	0	121	254
7:15:00 AM	30	0	63	0	93	1	40	20	1	62	0	0	0	0	0	66	95	1	0	162	317
7:30:00 AM	34	0	165	0	199	0	29	58	1	88	0	0	1	0	1	103	73	0	0	176	464
7:45:00 AM	54	0	180	0	234	0	33	24	0	57	0	0	0	0	0	46	58	1	0	105	396
Total Volume	149	0	444	0	593	1	150	119	2	272	1	0	1	0	2	249	313	2	0	564	1431
% App. Total	25.1	0	74.9	0		0.4	55.1	43.8	0.7		50	0	50	0		44.1	55.5	0.4	0		
PHF	.690	.000	.617	.000	.634	.250	.781	.513	.500	.773	.250	.000	.250	.000	.500	.604	.824	.500	.000	.801	.771



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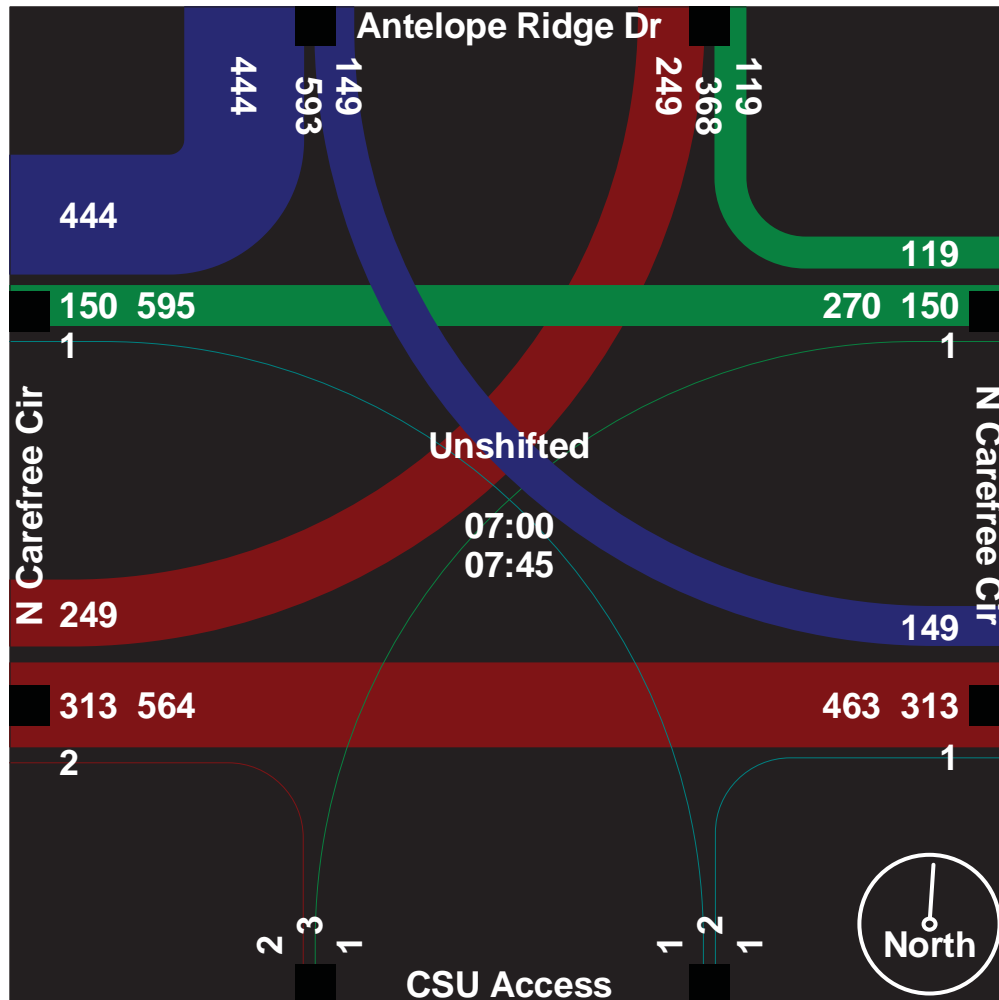
719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir AM

Site Code : 184640

Start Date : 8/14/2018

Page No : 3





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719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir Noon

Site Code : 00184640

Start Date : 8/14/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				N Carefree Cir Westbound				CSU Access Northbound				N Carefree Cir Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
11:00	10	0	18	0	1	36	5	1	2	0	1	0	8	34	0	0	116
11:15	5	0	11	0	0	42	5	0	1	1	0	0	24	29	0	0	118
11:30	7	0	12	0	0	33	7	0	0	0	0	0	13	40	1	1	114
11:45	5	0	16	0	0	35	6	0	1	0	0	0	17	32	0	1	113
Total	27	0	57	0	1	146	23	1	4	1	1	0	62	135	1	2	461
12:00	6	0	12	0	0	30	5	0	0	0	0	0	12	37	0	0	102
12:15	9	0	14	0	0	51	3	0	0	0	0	0	17	50	0	1	145
12:30	3	0	19	0	0	51	7	0	0	0	0	0	16	43	0	0	139
12:45	10	0	7	0	0	44	10	0	0	0	0	0	20	36	1	0	128
Total	28	0	52	0	0	176	25	0	0	0	0	0	65	166	1	1	514
Grand Total	55	0	109	0	1	322	48	1	4	1	1	0	127	301	2	3	975
Apprch %	33.5	0	66.5	0	0.3	86.6	12.9	0.3	66.7	16.7	16.7	0	29.3	69.5	0.5	0.7	
Total %	5.6	0	11.2	0	0.1	33	4.9	0.1	0.4	0.1	0.1	0	13	30.9	0.2	0.3	

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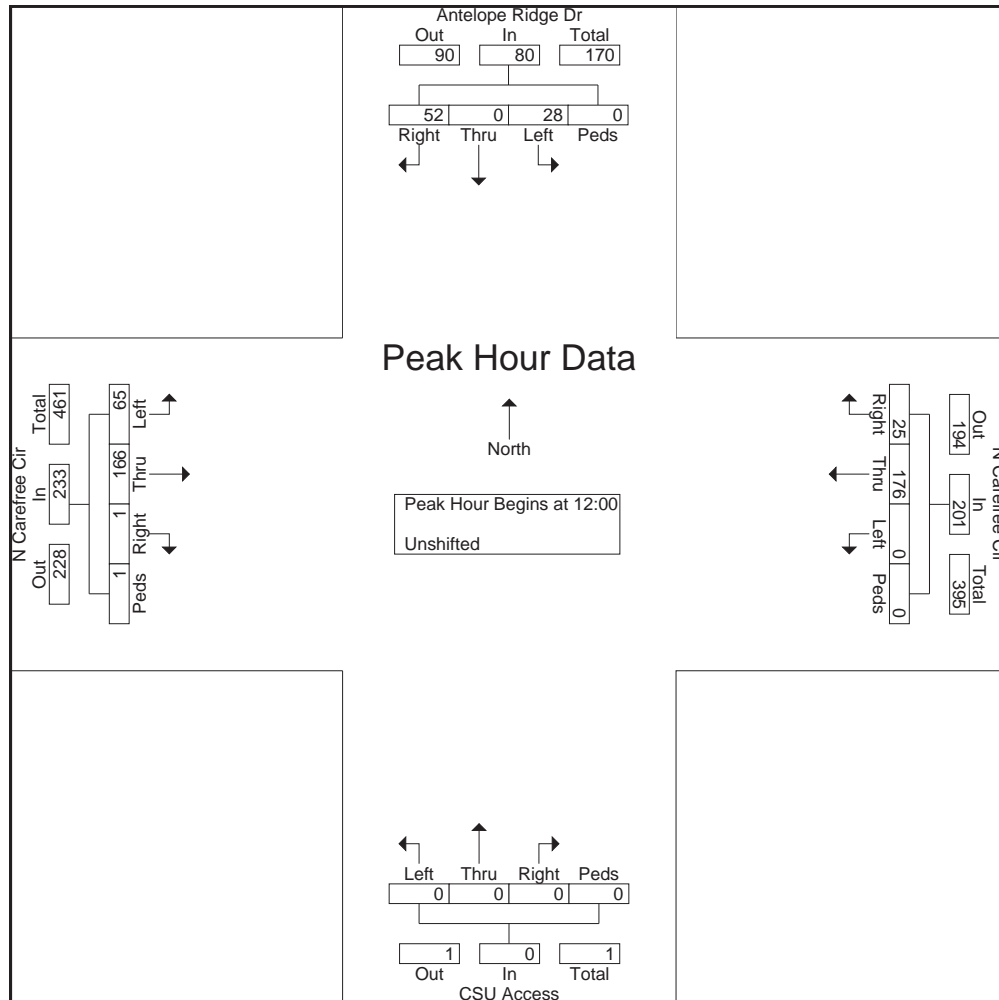
File Name : Antelope Ridge Dr -N Carefree Cir Noon

Site Code : 00184640

Start Date : 8/14/2018

Page No : 2

	Antelope Ridge Dr Southbound					N Carefree Cir Westbound					CSU Access Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 to 12:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00																					
12:00	6	0	12	0	18	0	30	5	0	35	0	0	0	0	0	12	37	0	0	49	102
12:15	9	0	14	0	23	0	51	3	0	54	0	0	0	0	0	17	50	0	1	68	145
12:30	3	0	19	0	22	0	51	7	0	58	0	0	0	0	0	16	43	0	0	59	139
12:45	10	0	7	0	17	0	44	10	0	54	0	0	0	0	0	20	36	1	0	57	128
Total Volume	28	0	52	0	80	0	176	25	0	201	0	0	0	0	0	65	166	1	1	233	514
% App. Total	35	0	65	0		0	87.6	12.4	0		0	0	0	0		27.9	71.2	0.4	0.4		
PHF	.700	.000	.684	.000	.870	.000	.863	.625	.000	.866	.000	.000	.000	.000	.000	.813	.830	.250	.250	.857	.886



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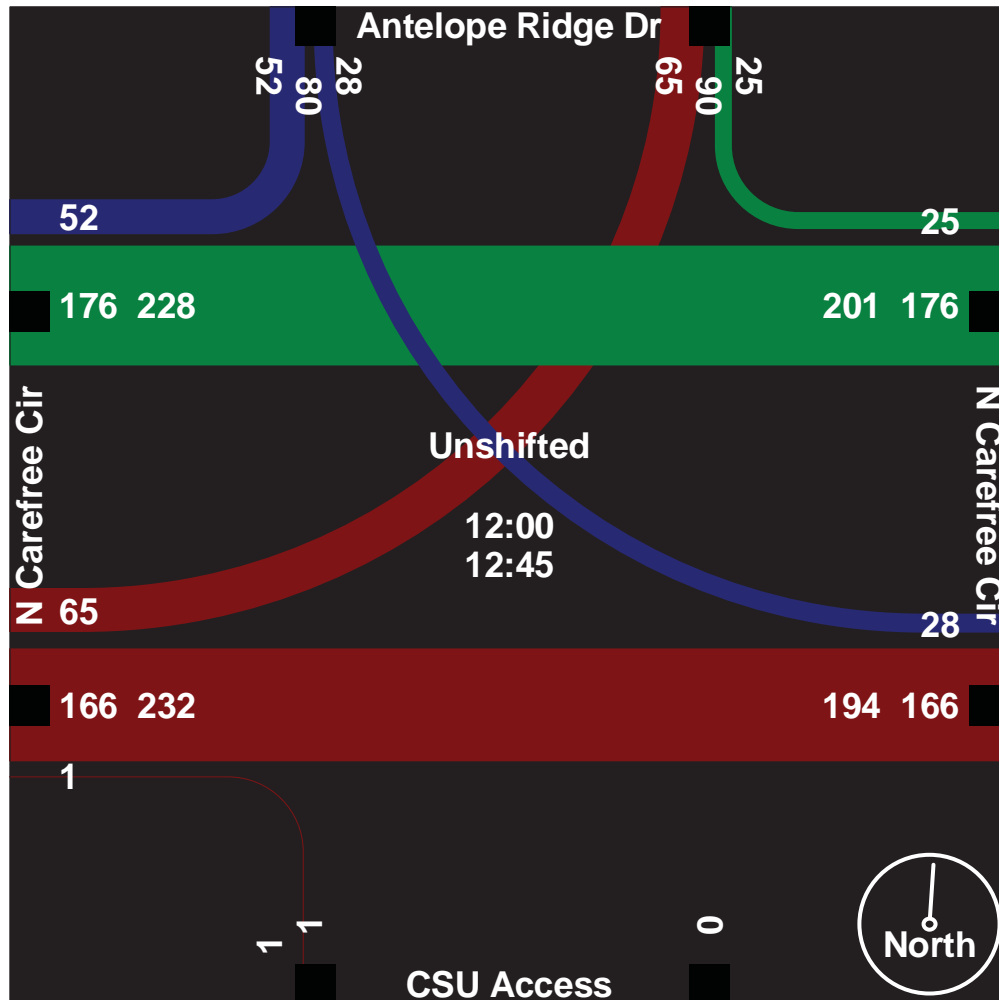
719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir Noon

Site Code : 00184640

Start Date : 8/14/2018

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719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir Schl

Site Code : 00184640

Start Date : 8/15/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				N Carefree Cir Westbound				CSU Access Northbound				N Carefree Cir Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
14:00	7	0	7	0	0	49	8	0	0	0	0	0	19	40	1	0	131
14:15	3	0	16	1	0	43	24	0	1	0	0	0	25	40	1	0	154
14:30	14	0	12	0	0	48	20	0	1	0	0	0	48	42	0	0	185
14:45	12	0	37	0	0	57	23	0	0	0	0	0	59	70	0	1	259
Total	36	0	72	1	0	197	75	0	2	0	0	0	151	192	2	1	729
15:00	33	0	87	0	0	62	28	0	0	0	0	0	26	43	0	0	279
15:15	20	0	82	0	0	46	38	0	0	0	0	0	50	58	0	0	294
15:30	31	0	94	0	0	85	19	0	0	0	0	0	40	45	1	0	315
15:45	30	0	75	0	0	70	22	0	0	0	1	0	25	43	1	0	267
Total	114	0	338	0	0	263	107	0	0	0	1	0	141	189	2	0	1155
Grand Total	150	0	410	1	0	460	182	0	2	0	1	0	292	381	4	1	1884
Apprch %	26.7	0	73.1	0.2	0	71.7	28.3	0	66.7	0	33.3	0	43.1	56.2	0.6	0.1	
Total %	8	0	21.8	0.1	0	24.4	9.7	0	0.1	0	0.1	0	15.5	20.2	0.2	0.1	

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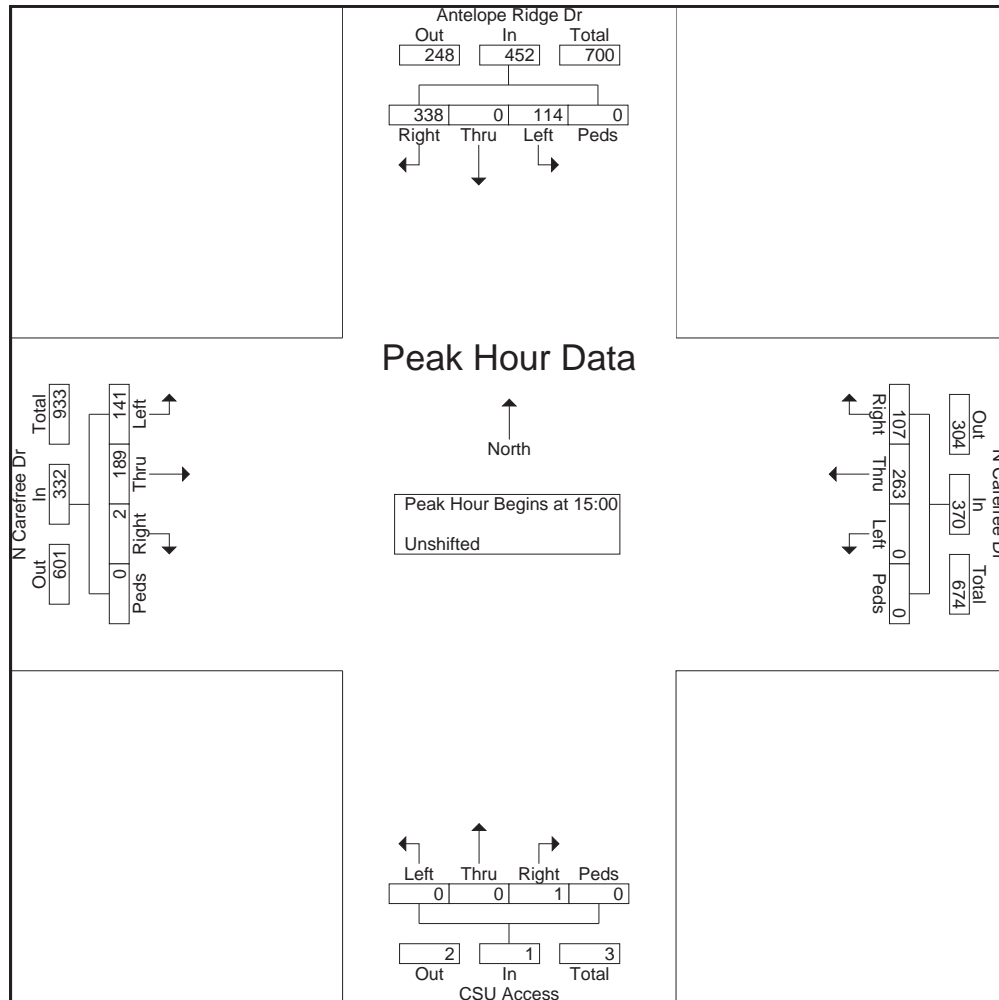
File Name : Antelope Ridge Dr -N Carefree Cir Schl

Site Code : 00184640

Start Date : 8/15/2018

Page No : 2

	Antelope Ridge Dr Southbound					N Carefree Cir Westbound					CSU Access Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 2:00:00 PM to 3:45:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 3:00:00 PM																					
3:00:00 PM	33	0	87	0	120	0	62	28	0	90	0	0	0	0	0	26	43	0	0	69	279
3:15:00 PM	20	0	82	0	102	0	46	38	0	84	0	0	0	0	0	50	58	0	0	108	294
3:30:00 PM	31	0	94	0	125	0	85	19	0	104	0	0	0	0	0	40	45	1	0	86	315
3:45:00 PM	30	0	75	0	105	0	70	22	0	92	0	0	1	0	1	25	43	1	0	69	267
Total Volume	114	0	338	0	452	0	263	107	0	370	0	0	1	0	1	141	189	2	0	332	1155
% App. Total	25.2	0	74.8	0		0	71.1	28.9	0		0	0	100	0		42.5	56.9	0.6	0		
PHF	.864	.000	.899	.000	.904	.000	.774	.704	.000	.889	.000	.000	.250	.000	.250	.705	.815	.500	.000	.769	.917



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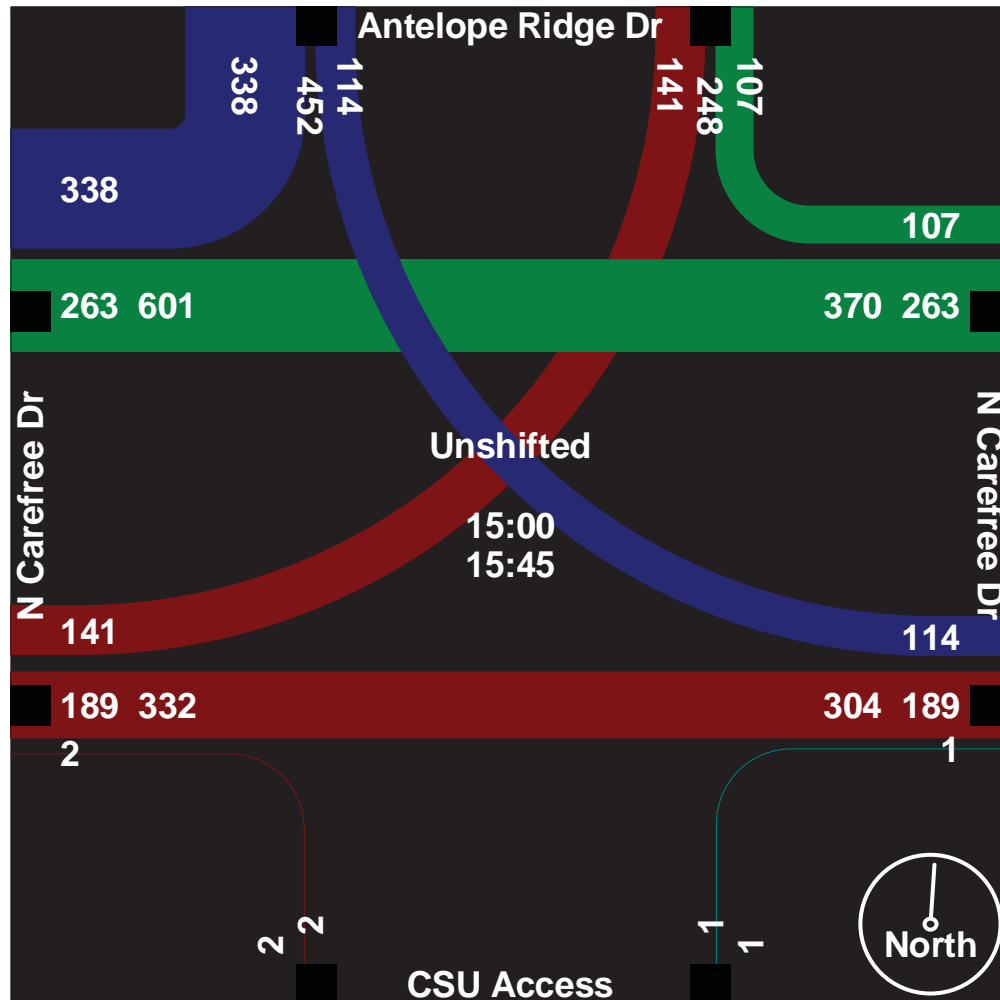
719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir Schl

Site Code : 00184640

Start Date : 8/15/2018

Page No : 3



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719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir PM

Site Code : 00184640

Start Date : 8/14/2018

Page No : 1

## Groups Printed- Unshifted

	Antelope Ridge Dr Southbound				N Carefree Cir Westbound				CSU Access Northbound				N Carefree Cir Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
16:00	15	0	21	0	0	94	22	0	0	0	0	0	19	35	1	0	207
16:15	11	0	17	0	0	90	28	0	0	0	0	0	21	36	0	0	203
16:30	3	0	16	0	2	123	34	0	0	0	0	0	19	52	0	0	249
16:45	14	0	15	1	3	141	34	0	5	0	0	0	31	40	1	0	285
Total	43	0	69	1	5	448	118	0	5	0	0	0	90	163	2	0	944
17:00	12	0	20	0	0	143	42	0	7	0	3	0	28	53	0	0	308
17:15	11	0	9	0	0	127	45	0	0	0	0	0	29	38	0	0	259
17:30	10	0	19	0	0	105	19	0	0	0	0	0	30	45	0	0	228
17:45	10	0	32	0	0	94	22	0	2	0	0	0	33	43	0	1	237
Total	43	0	80	0	0	469	128	0	9	0	3	0	120	179	0	1	1032
Grand Total	86	0	149	1	5	917	246	0	14	0	3	0	210	342	2	1	1976
Apprch %	36.4	0	63.1	0.4	0.4	78.5	21.1	0	82.4	0	17.6	0	37.8	61.6	0.4	0.2	
Total %	4.4	0	7.5	0.1	0.3	46.4	12.4	0	0.7	0	0.2	0	10.6	17.3	0.1	0.1	

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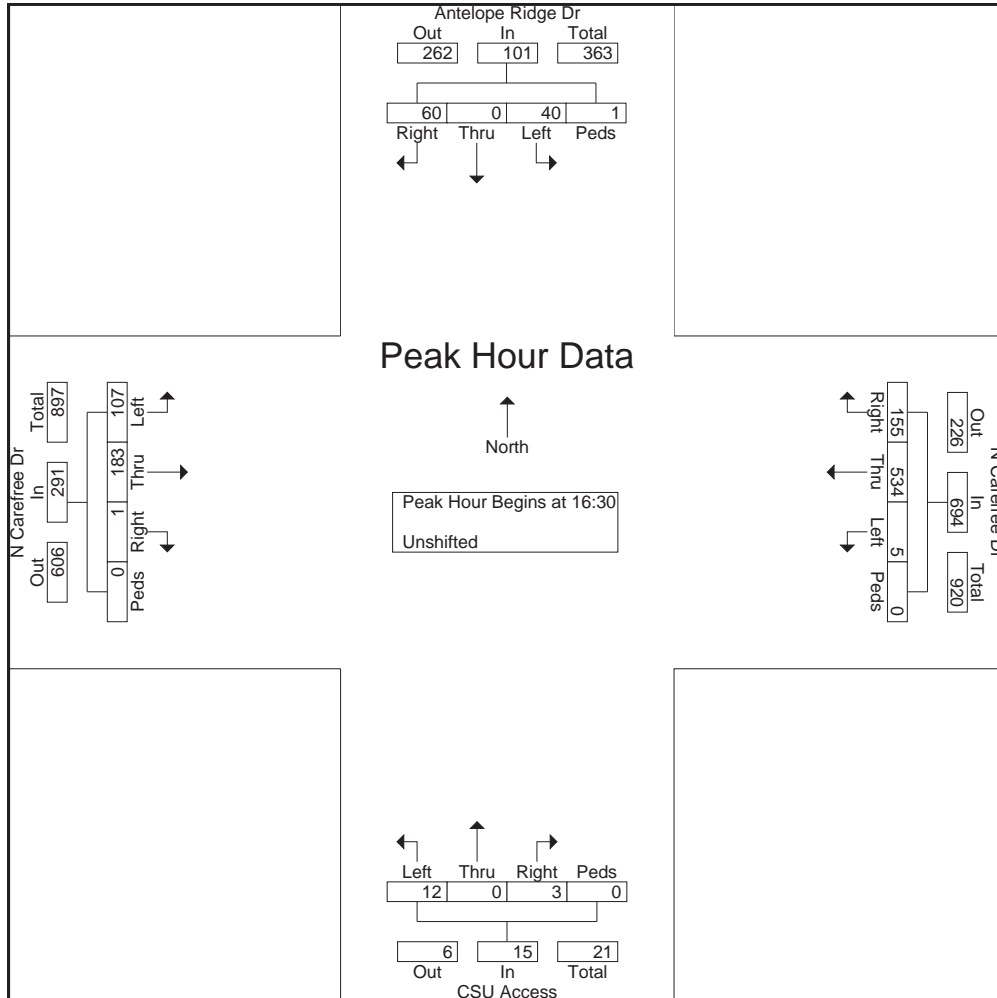
File Name : Antelope Ridge Dr -N Carefree Cir PM

Site Code : 00184640

Start Date : 8/14/2018

Page No : 2

	Antelope Ridge Dr Southbound					N Carefree Cir Westbound					CSU Access Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	3	0	16	0	19	2	123	34	0	159	0	0	0	0	0	19	52	0	0	71	249
16:45	14	0	15	1	30	3	141	34	0	178	5	0	0	0	5	31	40	1	0	72	285
17:00	12	0	20	0	32	0	143	42	0	185	7	0	3	0	10	28	53	0	0	81	308
17:15	11	0	9	0	20	0	127	45	0	172	0	0	0	0	0	29	38	0	0	67	259
Total Volume	40	0	60	1	101	5	534	155	0	694	12	0	3	0	15	107	183	1	0	291	1101
% App. Total	39.6	0	59.4	1		0.7	76.9	22.3	0		80	0	20	0		36.8	62.9	0.3	0		
PHF	.714	.000	.750	.250	.789	.417	.934	.861	.000	.938	.429	.000	.250	.000	.375	.863	.863	.250	.000	.898	.894





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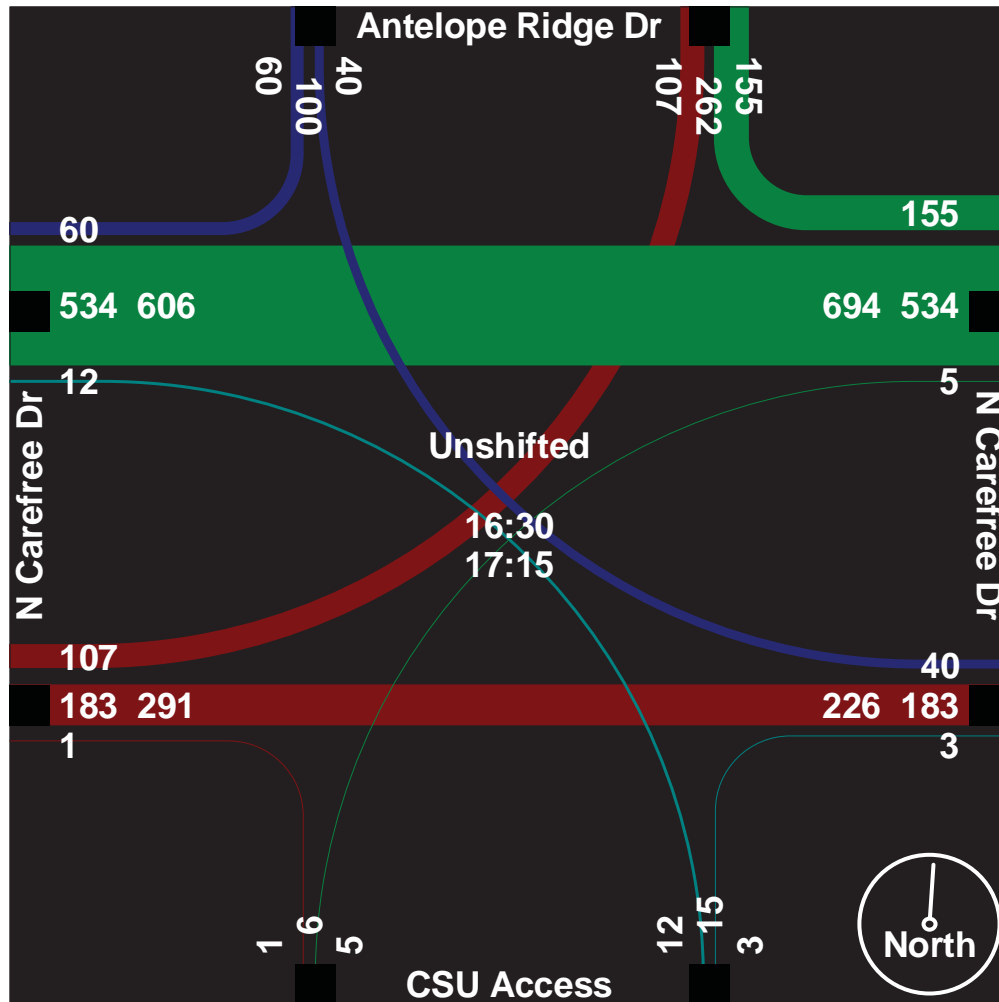
719-633-2868

File Name : Antelope Ridge Dr -N Carefree Cir PM

Site Code : 00184640

Start Date : 8/14/2018

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# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210

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719-633-2868

File Name : Marksheffel Rd - N Carefree Cir AM

Site Code : 00184640

Start Date : 1/31/2019

Page No : 1

## Groups Printed- Unshifted

	Marksheffel Rd Southbound				Westbound				Marksheffel Rd Northbound				N Carefree Cir Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
06:30	0	314	7	0	0	0	0	0	27	144	0	0	3	0	70	0	565
06:45	0	328	9	0	0	0	0	0	33	125	0	0	2	0	80	0	577
Total	0	642	16	0	0	0	0	0	60	269	0	0	5	0	150	0	1142
07:00	0	320	15	0	0	0	0	0	54	171	0	0	2	0	93	1	656
07:15	0	282	14	0	0	0	0	0	75	179	0	2	2	0	118	0	672
07:30	0	298	18	0	0	0	0	0	74	165	0	0	6	0	93	0	654
07:45	0	279	30	0	0	0	0	0	63	143	0	0	9	0	119	1	644
Total	0	1179	77	0	0	0	0	0	266	658	0	2	19	0	423	2	2626
08:00	0	211	17	0	0	0	0	0	39	153	0	0	7	0	49	0	476
08:15	0	212	15	0	0	0	0	0	26	133	0	1	5	0	55	0	447
Grand Total	0	2244	125	0	0	0	0	0	391	1213	0	3	36	0	677	2	4691
Apprch %	0	94.7	5.3	0	0	0	0	0	24.3	75.5	0	0.2	5	0	94.7	0.3	
Total %	0	47.8	2.7	0	0	0	0	0	8.3	25.9	0	0.1	0.8	0	14.4	0	

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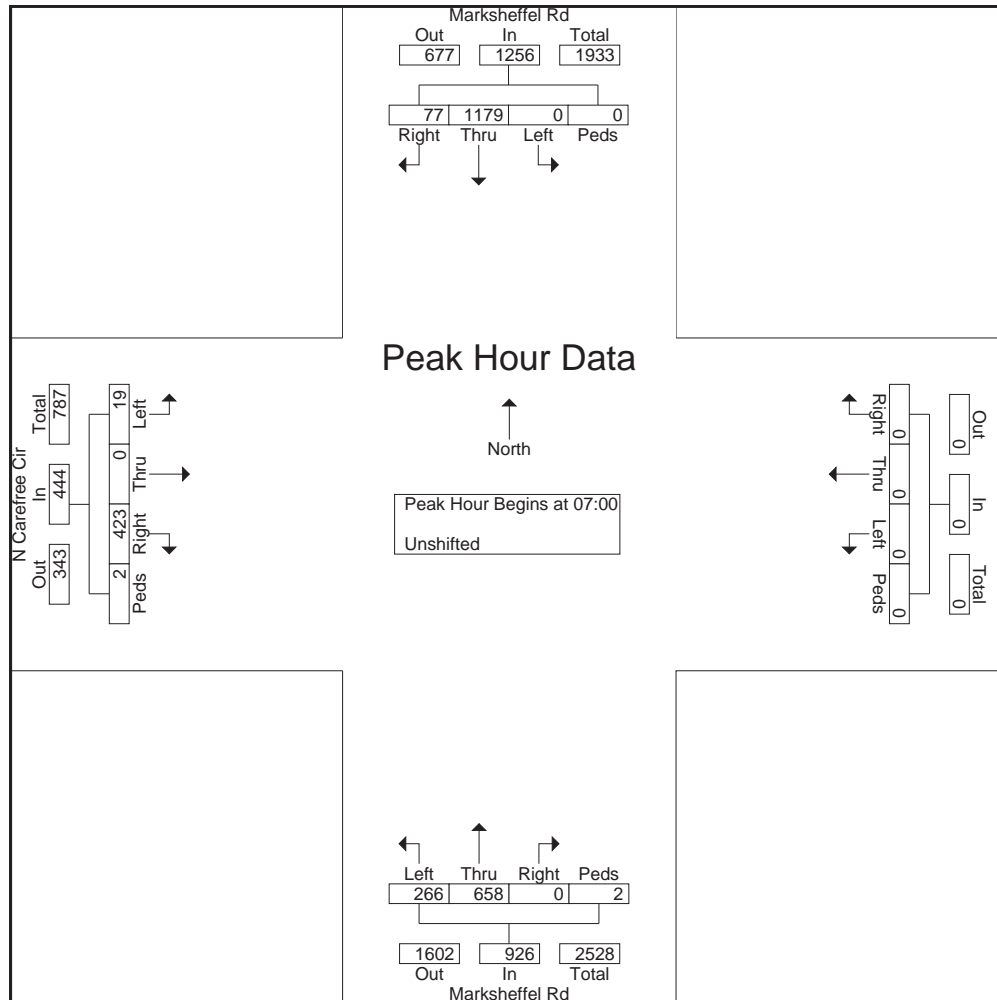
File Name : Marksheffel Rd - N Carefree Cir AM

Site Code : 00184640

Start Date : 1/31/2019

Page No : 2

	Marksheffel Rd Southbound					Westbound					Marksheffel Rd Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	320	15	0	335	0	0	0	0	0	54	171	0	0	225	2	0	93	1	96	656
07:15	0	282	14	0	296	0	0	0	0	0	75	179	0	2	256	2	0	118	0	120	672
07:30	0	298	18	0	316	0	0	0	0	0	74	165	0	0	239	6	0	93	0	99	654
07:45	0	279	30	0	309	0	0	0	0	0	63	143	0	0	206	9	0	119	1	129	644
Total Volume	0	1179	77	0	1256	0	0	0	0	0	266	658	0	2	926	19	0	423	2	444	2626
% App. Total	0	93.9	6.1	0		0	0	0	0		28.7	71.1	0	0.2		4.3	0	95.3	0.5		
PHF	.000	.921	.642	.000	.937	.000	.000	.000	.000	.000	.887	.919	.000	.250	.904	.528	.000	.889	.500	.860	.977



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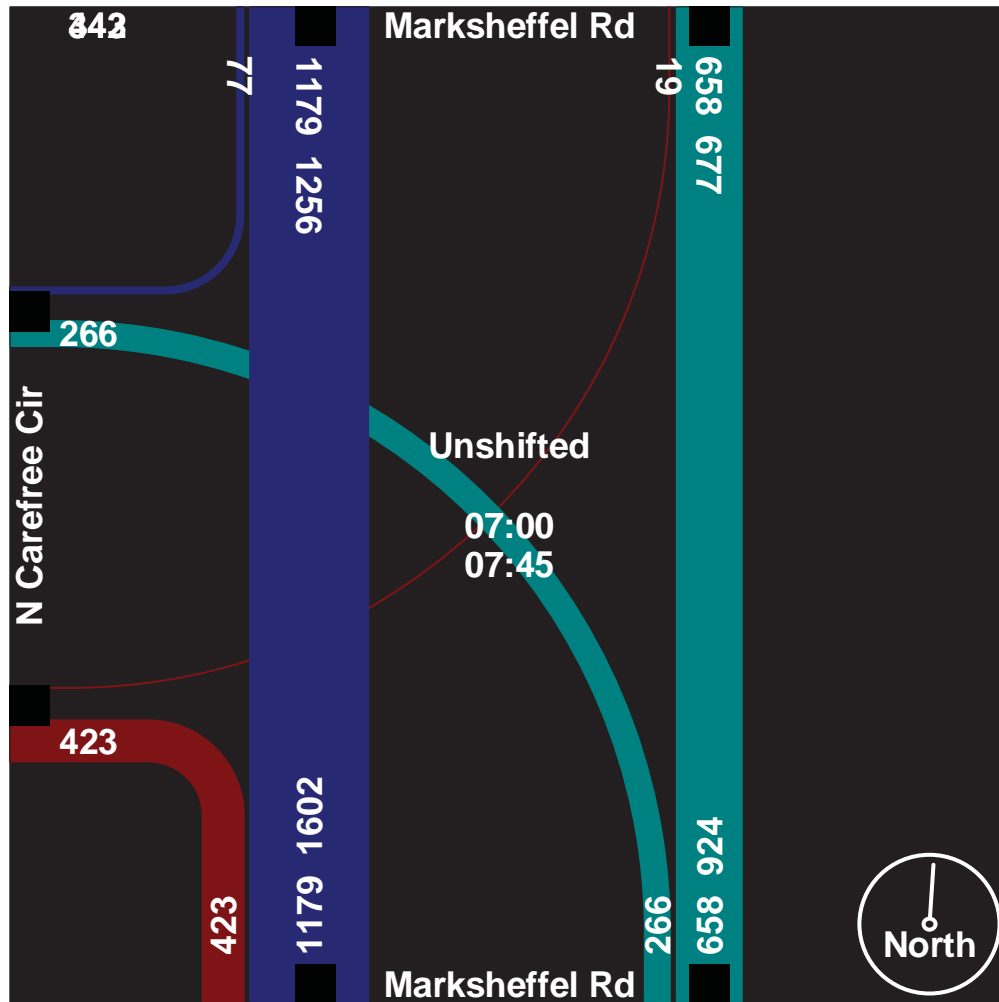
719-633-2868

File Name : Marksheffel Rd - N Carefree Cir AM

Site Code : 00184640

Start Date : 1/31/2019

Page No : 3



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545 E Pikes Peak Ave, Suite 210

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719-633-2868

File Name : Marksheffel Rd - N Carefree Cir PM

Site Code : 00184640

Start Date : 1/30/2019

Page No : 1

## Groups Printed- Unshifted

	Marksheffel Rd Southbound				Westbound				Marksheffel Rd Northbound				N Carefree Cir Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
16:00	0	169	11	0	0	0	0	0	101	265	0	0	12	0	62	0	620
16:15	0	145	14	0	0	0	0	0	112	281	0	1	10	0	49	0	612
16:30	0	172	24	0	0	0	0	0	165	283	0	0	2	0	39	0	685
16:45	0	163	30	0	0	0	0	0	142	229	0	0	3	0	50	1	618
Total	0	649	79	0	0	0	0	0	520	1058	0	1	27	0	200	1	2535
17:00	0	190	24	0	0	0	0	0	153	262	0	1	5	0	58	3	696
17:15	0	198	31	0	0	0	0	0	120	261	0	0	6	0	54	0	670
17:30	0	191	27	0	0	0	0	0	104	231	0	0	5	0	48	0	606
17:45	0	145	26	0	0	0	0	0	58	189	0	0	13	0	45	0	476
Total	0	724	108	0	0	0	0	0	435	943	0	1	29	0	205	3	2448
Grand Total	0	1373	187	0	0	0	0	0	955	2001	0	2	56	0	405	4	4983
Apprch %	0	88	12	0	0	0	0	0	32.3	67.6	0	0.1	12	0	87.1	0.9	
Total %	0	27.6	3.8	0	0	0	0	0	19.2	40.2	0	0	1.1	0	8.1	0.1	

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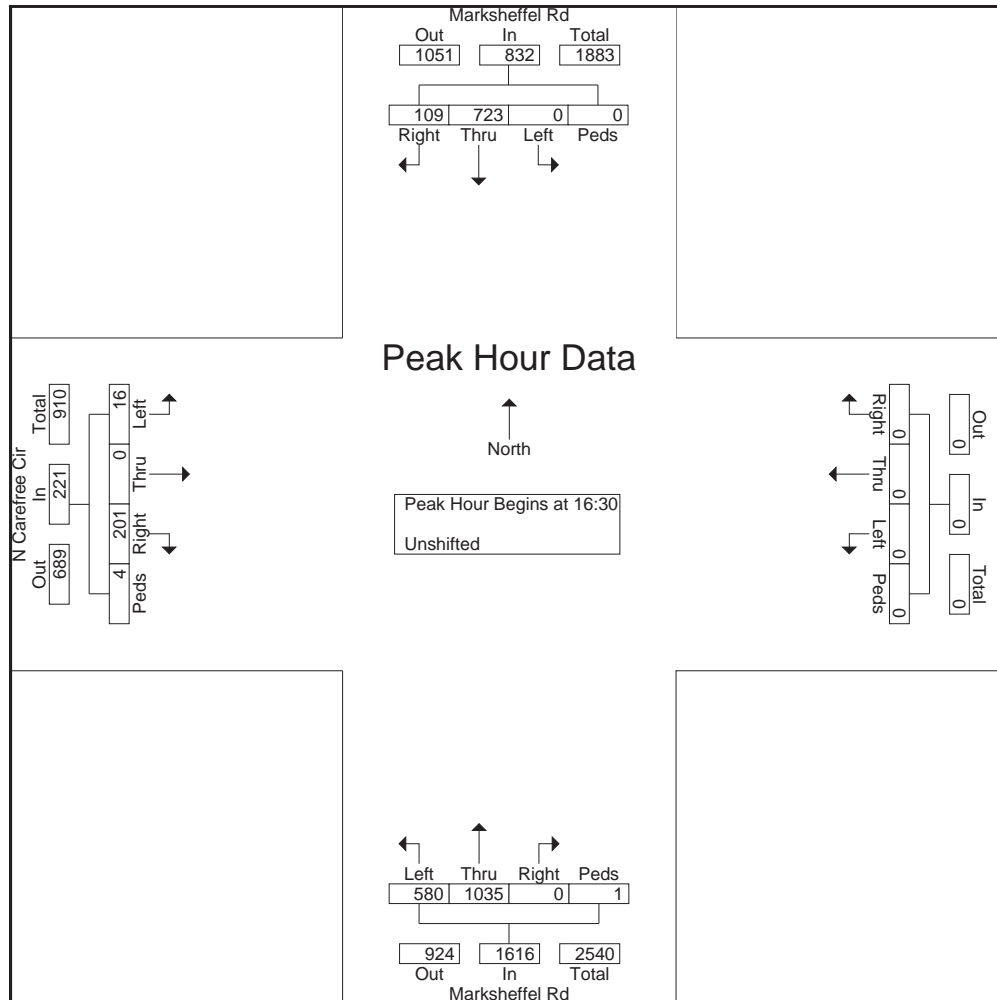
File Name : Marksheffel Rd - N Carefree Cir PM

Site Code : 00184640

Start Date : 1/30/2019

Page No : 2

	Marksheffel Rd Southbound					Westbound					Marksheffel Rd Northbound					N Carefree Cir Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:30																					
16:30	0	172	24	0	196	0	0	0	0	0	165	283	0	0	448	2	0	39	0	41	685
16:45	0	163	30	0	193	0	0	0	0	0	142	229	0	0	371	3	0	50	1	54	618
17:00	0	190	24	0	214	0	0	0	0	0	153	262	0	1	416	5	0	58	3	66	696
17:15	0	198	31	0	229	0	0	0	0	0	120	261	0	0	381	6	0	54	0	60	670
Total Volume	0	723	109	0	832	0	0	0	0	0	580	1035	0	1	1616	16	0	201	4	221	2669
% App. Total	0	86.9	13.1	0		0	0	0	0		35.9	64	0	0.1		7.2	0	91	1.8		
PHF	.000	.913	.879	.000	.908	.000	.000	.000	.000	.000	.879	.914	.000	.250	.902	.667	.000	.866	.333	.837	.959



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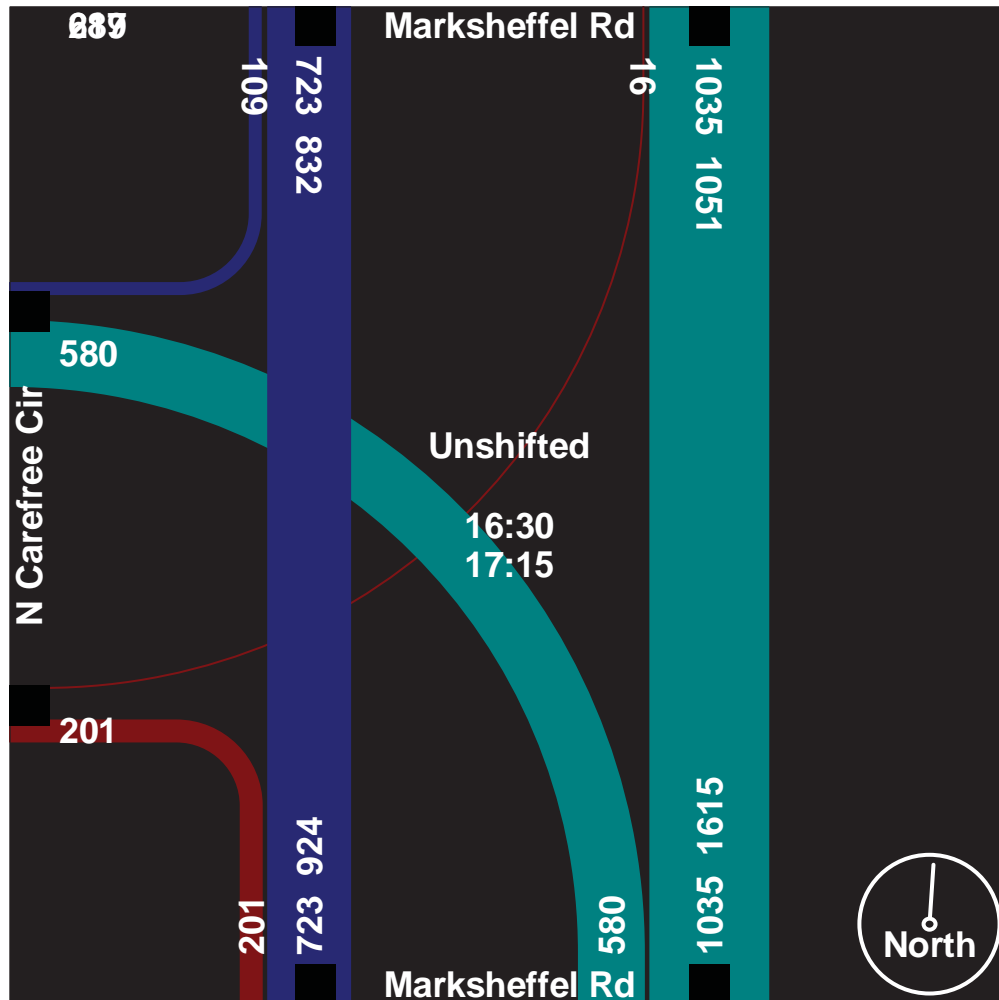
719-633-2868

File Name : Marksheffel Rd - N Carefree Cir PM

Site Code : 00184640

Start Date : 1/30/2019

Page No : 3



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Existing Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	24.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱ ↑↑↑			↱ ↑↑↑		↱		↱		↱	↱	
Traffic Vol, veh/h	249	313	2	1	150	119	1	0	1	149	0	444
Future Vol, veh/h	249	313	2	1	150	119	1	0	1	149	0	444
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	78	78	78	50	50	50	74	74	74
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	311	391	3	1	192	153	2	0	2	201	0	600

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	345	0	0	394	0	0	1094	1362	197	972	1210	96
Stage 1	-	-	-	-	-	-	1015	1015	-	194	194	-
Stage 2	-	-	-	-	-	-	79	347	-	778	1016	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	804	-	-	759	-	-	225	147	690	267	181	802
Stage 1	-	-	-	-	-	-	194	314	-	705	739	-
Stage 2	-	-	-	-	-	-	847	633	-	325	314	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	804	-	-	759	-	-	40	90	690	~ 186	111	802
Mov Cap-2 Maneuver	-	-	-	-	-	-	40	90	-	~ 186	111	-
Stage 1	-	-	-	-	-	-	119	192	-	432	738	-
Stage 2	-	-	-	-	-	-	213	632	-	~ 199	192	-


Approach	EB	WB	NB	SB
HCM Control Delay, s	5.4	0	55	51.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	76	804	-	-	759	-	-	186	802
HCM Lane V/C Ratio	0.053	0.387	-	-	0.002	-	-	1.083	0.748
HCM Control Delay (s)	55	12.3	-	-	9.8	0	-	141.8	21.5
HCM Lane LOS	F	B	-	-	A	A	-	F	C
HCM 95th %tile Q(veh)	0.2	1.8	-	-	0	-	-	9.7	7

Notes												
~: Volume exceeds capacity			\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon			




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 Number: 1      Author: dsdrice      Subject: Text Box      Date: 3/20/2019 12:45:47 PM

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Note: [Synchro reports not reviewed with this submittal.](#)

 Author: Kirstin      Subject: Sticky Note      Date: 6/5/2020 12:43:12 PM  
noted





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HCM 6th TWSC  
24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir

Existing Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	14	354	539	4
Future Vol, veh/h	6	54	14	354	539	4
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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	57	57	67	67
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	61	25	621	804	6

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1478	807	810
Stage 1	807	-	-
Stage 2	671	-	-
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	139	381	816
Stage 1	439	-	-
Stage 2	508	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	135	381	816
Mov Cap-2 Maneuver	135	-	-
Stage 1	425	-	-
Stage 2	508	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.2	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	816	-	322	-	-
HCM Lane V/C Ratio	0.03	-	0.212	-	-
HCM Control Delay (s)	9.5	-	19.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Existing Traffic  
3:00 - 4:00 PM

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑			↰ ↑↑↑	↰		↰			↰	↰	
Traffic Vol, veh/h	141	189	2	0	263	107	0	0	1	114	0	338
Future Vol, veh/h	141	189	2	0	263	107	0	0	1	114	0	338
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	89	89	89	100	100	100	90	90	90
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	145	195	2	0	296	120	0	0	1	127	0	376

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	416	0	0	197	0	0	604	902	99	664	783	148
Stage 1	-	-	-	-	-	-	486	486	-	296	296	-
Stage 2	-	-	-	-	-	-	118	416	-	368	487	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	745	-	-	937	-	-	433	276	796	403	324	744
Stage 1	-	-	-	-	-	-	448	549	-	603	667	-
Stage 2	-	-	-	-	-	-	804	590	-	574	549	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	745	-	-	937	-	-	182	222	796	342	261	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	182	222	-	342	261	-
Stage 1	-	-	-	-	-	-	361	442	-	485	667	-
Stage 2	-	-	-	-	-	-	398	590	-	462	442	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.7	0	9.5	16.4
HCM LOS			A	C






Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	796	745	-	-	937	-	-	342	744
HCM Lane V/C Ratio	0.001	0.195	-	-	-	-	-	0.37	0.505
HCM Control Delay (s)	9.5	11	-	-	0	-	-	21.6	14.7
HCM Lane LOS	A	B	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0	0.7	-	-	0	-	-	1.7	2.9

HCM 6th TWSC  
24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir

Existing Traffic  
3:00 - 4:00 PM

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	24	35	213	428	8
Future Vol, veh/h	2	24	35	213	428	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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	70	70	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	24	50	304	428	8

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	836	432	436
Stage 1	432	-	-
Stage 2	404	-	-
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	337	624	1124
Stage 1	655	-	-
Stage 2	674	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	322	624	1124
Mov Cap-2 Maneuver	322	-	-
Stage 1	626	-	-
Stage 2	674	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	1.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1124	-	582	-	-
HCM Lane V/C Ratio	0.044	-	0.045	-	-
HCM Control Delay (s)	8.4	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Existing Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑			↰ ↑↑↑		↰		↰		↰	↰	
Traffic Vol, veh/h	107	183	1	5	534	155	12	0	3	40	0	60
Future Vol, veh/h	107	183	1	5	534	155	12	0	3	40	0	60
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	38	38	38	78	78	78
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	119	203	1	5	568	165	32	0	8	51	0	77

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	733	0	0	204	0	0	679	1185	102	897	1020	284
Stage 1	-	-	-	-	-	-	442	442	-	578	578	-
Stage 2	-	-	-	-	-	-	237	743	-	319	442	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	529	-	-	930	-	-	392	188	793	296	235	610
Stage 1	-	-	-	-	-	-	479	575	-	390	499	-
Stage 2	-	-	-	-	-	-	684	420	-	614	575	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	529	-	-	930	-	-	281	144	793	241	180	610
Mov Cap-2 Maneuver	-	-	-	-	-	-	281	144	-	241	180	-
Stage 1	-	-	-	-	-	-	371	446	-	302	495	-
Stage 2	-	-	-	-	-	-	592	416	-	471	446	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.1	0.1	17.7	16.6
HCM LOS			C	C






Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	323	529	-	-	930	-	-	241	610
HCM Lane V/C Ratio	0.122	0.225	-	-	0.006	-	-	0.213	0.126
HCM Control Delay (s)	17.7	13.8	-	-	8.9	0	-	23.9	11.8
HCM Lane LOS	C	B	-	-	A	A	-	C	B
HCM 95th %tile Q(veh)	0.4	0.9	-	-	0	-	-	0.8	0.4

HCM 6th TWSC  
24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir

Existing Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	21	44	218	79	4
Future Vol, veh/h	6	21	44	218	79	4
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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	80	80	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	21	55	273	82	4

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	467	84	86
Stage 1	84	-	-
Stage 2	383	-	-
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	554	975	1510
Stage 1	939	-	-
Stage 2	689	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	534	975	1510
Mov Cap-2 Maneuver	534	-	-
Stage 1	905	-	-
Stage 2	689	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1510	-	824	-	-
HCM Lane V/C Ratio	0.036	-	0.033	-	-
HCM Control Delay (s)	7.5	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	33.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑ ↱			↰ ↑↑↑ ↱		↰		↰		↰	↰	
Traffic Vol, veh/h	264	313	2	1	157	125	1	0	1	156	0	482
Future Vol, veh/h	264	313	2	1	157	125	1	0	1	156	0	482
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	78	78	78	50	50	50	74	74	74
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	330	391	3	1	201	160	2	0	2	211	0	651

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	361	0	0	394	0	0	1135	1416	197	1019	1257	101
Stage 1	-	-	-	-	-	-	1053	1053	-	203	203	-
Stage 2	-	-	-	-	-	-	82	363	-	816	1054	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	790	-	-	759	-	-	213	136	690	251	170	796
Stage 1	-	-	-	-	-	-	183	301	-	695	732	-
Stage 2	-	-	-	-	-	-	844	623	-	308	301	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	790	-	-	759	-	-	26	79	690	~ 168	99	796
Mov Cap-2 Maneuver	-	-	-	-	-	-	26	79	-	~ 168	99	-
Stage 1	-	-	-	-	-	-	107	175	-	404	731	-
Stage 2	-	-	-	-	-	-	153	622	-	~ 179	175	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.8	0	83.2	70.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	50	790	-	-	759	-	-	168	796
HCM Lane V/C Ratio	0.08	0.418	-	-	0.002	-	-	1.255	0.818
HCM Control Delay (s)	83.2	12.8	-	-	9.8	0	-	207.8	26.4
HCM Lane LOS	F	B	-	-	A	A	-	F	D
HCM 95th %tile Q(veh)	0.2	2.1	-	-	0	-	-	12	9

Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	6	0	54	18	0	12	14	367	7	3	565	4
Future Vol, veh/h	6	0	54	18	0	12	14	367	7	3	565	4
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	100	88	92	92	92	75	75	92	92	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	61	20	0	13	19	489	8	3	753	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1300	1297	756	1323	1295	493	758	0	0	497	0	0
Stage 1	762	762	-	531	531	-	-	-	-	-	-	-
Stage 2	538	535	-	792	764	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	138	162	408	133	162	576	853	-	-	1067	-	-
Stage 1	397	414	-	532	526	-	-	-	-	-	-	-
Stage 2	527	524	-	382	413	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	132	158	408	111	158	576	853	-	-	1067	-	-
Mov Cap-2 Maneuver	132	158	-	111	158	-	-	-	-	-	-	-
Stage 1	388	413	-	520	514	-	-	-	-	-	-	-
Stage 2	504	512	-	324	412	-	-	-	-	-	-	-





Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.4		32.3		0.3		0	
HCM LOS	C		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	853	-	-	337	164	1067	-
HCM Lane V/C Ratio	0.022	-	-	0.202	0.199	0.003	-
HCM Control Delay (s)	9.3	-	-	18.4	32.3	8.4	-
HCM Lane LOS	A	-	-	C	D	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.7	0	-



HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

Short-Term Total Traffic  
AM Peak Hour





Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	20	372	13	5	546
Future Vol, veh/h	26	20	372	13	5	546
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	75	92	92	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	22	496	14	5	728
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1241	503	0	0	510	0
Stage 1	503	-	-	-	-	-
Stage 2	738	-	-	-	-	-
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	193	569	-	-	1055	-
Stage 1	607	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	192	569	-	-	1055	-
Mov Cap-2 Maneuver	192	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	21.3	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	270	1055	-	
HCM Lane V/C Ratio	-	-	0.185	0.005	-	
HCM Control Delay (s)	-	-	21.3	8.4	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.7	0	-	

HCM 6th TWSC  
30: Marksheffel & Site Access

Short-Term Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	27	4	677	1258	4
Future Vol, veh/h	8	27	4	677	1258	4
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	-	285	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	100	91	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	29	4	744	1258	4

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2012	631	1262
Stage 1	1260	-	-
Stage 2	752	-	-
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	58	425	549
Stage 1	231	-	-
Stage 2	465	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	58	425	549
Mov Cap-2 Maneuver	58	-	-
Stage 1	229	-	-
Stage 2	465	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.4	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	549	-	174	-	-
HCM Lane V/C Ratio	0.007	-	0.219	-	-
HCM Control Delay (s)	11.6	-	31.4	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

# Timings 4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	264	313	1	157	125	1	0	156	0
Future Volume (vph)	264	313	1	157	125	1	0	156	0
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	2	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	60.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	30.0
Total Split (%)	66.7%	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	60.0	60.0		60.0	60.0		20.0	20.0	20.0
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.22	0.22	0.22
v/c Ratio	0.42	0.12		0.06	0.14		0.02	0.67	0.71
Control Delay	10.1	6.1		6.1	1.6		0.0	41.9	6.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.1	6.1		6.1	1.6		0.0	41.9	6.1
LOS	B	A		A	A		A	D	A
Approach Delay		7.9		4.1					14.9
Approach LOS		A		A					B

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
3:00 - 4:00 PM

Intersection												
Int Delay, s/veh	8.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱ ↑↑↑			↰ ↑↑↑			↰ ↱			↱ ↰		
Traffic Vol, veh/h	168	189	2	0	267	118	0	0	1	118	0	358
Future Vol, veh/h	168	189	2	0	267	118	0	0	1	118	0	358
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	89	89	89	100	100	100	90	90	90
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	173	195	2	0	300	133	0	0	1	131	0	398

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	433	0	0	197	0	0	662	975	99	724	843	150
Stage 1	-	-	-	-	-	-	542	542	-	300	300	-
Stage 2	-	-	-	-	-	-	120	433	-	424	543	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	732	-	-	937	-	-	401	250	796	372	299	742
Stage 1	-	-	-	-	-	-	410	518	-	599	664	-
Stage 2	-	-	-	-	-	-	802	580	-	531	518	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	732	-	-	937	-	-	152	191	796	304	228	742
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	191	-	304	228	-
Stage 1	-	-	-	-	-	-	313	396	-	458	664	-
Stage 2	-	-	-	-	-	-	372	580	-	405	396	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.4	0	9.5	17.8
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	796	732	-	-	937	-	-	304	742
HCM Lane V/C Ratio	0.001	0.237	-	-	-	-	-	0.431	0.536
HCM Control Delay (s)	9.5	11.4	-	-	0	-	-	25.5	15.3
HCM Lane LOS	A	B	-	-	A	-	-	D	C
HCM 95th %tile Q(veh)	0	0.9	-	-	0	-	-	2.1	3.2

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	2	0	24	10	0	6	35	237	13	5	442	8
Future Vol, veh/h	2	0	24	10	0	6	35	237	13	5	442	8
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	92	92	92	70	70	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	24	11	0	7	50	339	14	5	442	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	906	909	446	914	906	346	450	0	0	353	0	0
Stage 1	456	456	-	446	446	-	-	-	-	-	-	-
Stage 2	450	453	-	468	460	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	257	275	612	254	276	697	1110	-	-	1206	-	-
Stage 1	584	568	-	591	574	-	-	-	-	-	-	-
Stage 2	589	570	-	575	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	245	262	612	235	262	697	1110	-	-	1206	-	-
Mov Cap-2 Maneuver	245	262	-	235	262	-	-	-	-	-	-	-
Stage 1	558	566	-	564	548	-	-	-	-	-	-	-
Stage 2	557	544	-	550	564	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.9		17.2		1		0.1	
HCM LOS	B		C					





Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1110	-	-	549 313	1206	-	-
HCM Lane V/C Ratio	0.045	-	-	0.047 0.056	0.005	-	-
HCM Control Delay (s)	8.4	-	-	11.9 17.2	8	-	-
HCM Lane LOS	A	-	-	B C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1 0.2	0	-	-

HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

Short-Term Total Traffic  
3:00 - 4:00 PM

Intersection

Int Delay, s/veh 0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	11	221	24	9	441
Future Vol, veh/h	14	11	221	24	9	441
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	70	92	92	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	12	316	26	10	441















Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	790	329	0
Stage 1	329	-	-
Stage 2	461	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	359	712	-
Stage 1	729	-	-
Stage 2	635	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	356	712	-
Mov Cap-2 Maneuver	356	-	-
Stage 1	723	-	-
Stage 2	635	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	456	1217
HCM Lane V/C Ratio	-	-	0.06	0.008
HCM Control Delay (s)	-	-	13.4	8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

# Timings 4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
3:00 - 4:00 PM

							
Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	168	189	267	118	0	118	0
Future Volume (vph)	168	189	267	118	0	118	0
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA
Protected Phases		2	6		8		4
Permitted Phases	2			6		4	
Detector Phase	2	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
Act Effct Green (s)	65.8	65.8	65.8	65.8	14.2	14.2	14.2
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.16	0.16	0.16
v/c Ratio	0.22	0.05	0.08	0.11	0.00	0.58	0.52
Control Delay	5.6	4.0	4.0	1.2	0.0	44.7	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	4.0	4.0	1.2	0.0	44.7	2.5
LOS	A	A	A	A	A	D	A
Approach Delay		4.7	3.2				12.9
Approach LOS		A	A				B
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 90							
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green							
Natural Cycle: 40							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.58							
Intersection Signal Delay: 7.5				Intersection LOS: A			
Intersection Capacity Utilization 52.3%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑			↰ ↑↑↑		↰		↰		↰	↰	
Traffic Vol, veh/h	157	183	1	5	538	175	12	0	3	44	0	85
Future Vol, veh/h	157	183	1	5	538	175	12	0	3	44	0	85
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	38	38	38	78	78	78
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	174	203	1	5	572	186	32	0	8	56	0	109

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	758	0	0	204	0	0	791	1320	102	1011	1134	286
Stage 1	-	-	-	-	-	-	552	552	-	582	582	-
Stage 2	-	-	-	-	-	-	239	768	-	429	552	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	515	-	-	930	-	-	338	156	793	254	201	608
Stage 1	-	-	-	-	-	-	404	513	-	388	497	-
Stage 2	-	-	-	-	-	-	682	409	-	528	513	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	515	-	-	930	-	-	203	102	793	184	132	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	102	-	184	132	-
Stage 1	-	-	-	-	-	-	267	340	-	257	492	-
Stage 2	-	-	-	-	-	-	554	405	-	346	340	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	7.1	0.1	23.1	19.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	238	515	-	-	930	-	-	184	608
HCM Lane V/C Ratio	0.166	0.339	-	-	0.006	-	-	0.307	0.179
HCM Control Delay (s)	23.1	15.5	-	-	8.9	0	-	33	12.2
HCM Lane LOS	C	C	-	-	A	A	-	D	B
HCM 95th %tile Q(veh)	0.6	1.5	-	-	0	-	-	1.2	0.6



Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	6	0	21	12	0	8	44	263	25	9	96	4
Future Vol, veh/h	6	0	21	12	0	8	44	263	25	9	96	4
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	92	92	92	80	80	80	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	21	13	0	9	55	329	31	9	100	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	579	590	102	586	577	345	104	0	0	360	0	0
Stage 1	120	120	-	455	455	-	-	-	-	-	-	-
Stage 2	459	470	-	131	122	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	426	420	953	422	427	698	1488	-	-	1199	-	-
Stage 1	884	796	-	585	569	-	-	-	-	-	-	-
Stage 2	582	560	-	873	795	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	406	401	953	399	408	698	1488	-	-	1199	-	-
Mov Cap-2 Maneuver	406	401	-	399	408	-	-	-	-	-	-	-
Stage 1	851	790	-	563	548	-	-	-	-	-	-	-
Stage 2	554	539	-	847	789	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		12.8		1		0.7	
HCM LOS	B		B					





Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1488	-	-	733	482	1199	-
HCM Lane V/C Ratio	0.037	-	-	0.037	0.045	0.008	-
HCM Control Delay (s)	7.5	-	-	10.1	12.8	8	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-

HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

Short-Term Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	13	232	45	17	92
Future Vol, veh/h	17	13	232	45	17	92
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	80	92	92	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	14	290	49	18	96






Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	447	315	0
Stage 1	315	-	-
Stage 2	132	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	569	725	-
Stage 1	740	-	-
Stage 2	894	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	560	725	-
Mov Cap-2 Maneuver	560	-	-
Stage 1	729	-	-
Stage 2	894	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	621	1220
HCM Lane V/C Ratio	-	-	0.053	0.015
HCM Control Delay (s)	-	-	11.1	8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

















HCM 6th TWSC  
30: Marksheffel & Site Access

Short-Term Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	18	15	1051	842	14
Future Vol, veh/h	6	18	15	1051	842	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	285	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	18	15	1051	842	14
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1930	428	856	0	-	0
Stage 1	849	-	-	-	-	-
Stage 2	1081	-	-	-	-	-
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	65	576	782	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	64	576	782	-	-	-
Mov Cap-2 Maneuver	64	-	-	-	-	-
Stage 1	374	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	26.4	0.1		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	782	-	192	-	-	
HCM Lane V/C Ratio	0.019	-	0.125	-	-	
HCM Control Delay (s)	9.7	-	26.4	-	-	
HCM Lane LOS	A	-	D	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-	

# Timings 4: Antelope Ridge Dr. & North Carefree

Short-Term Total Traffic  
PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	157	183	5	538	175	12	0	44	0
Future Volume (vph)	157	183	5	538	175	12	0	44	0
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	2	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	15.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	65.0	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	74.0	74.0		74.0	74.0		9.1	9.1	9.1
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.10	0.10	0.10
v/c Ratio	0.27	0.05		0.15	0.14		0.28	0.41	0.23
Control Delay	4.1	2.3		2.4	0.7		25.0	45.6	1.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	4.1	2.3		2.4	0.7		25.0	45.6	1.1
LOS	A	A		A	A		C	D	A
Approach Delay		3.1		2.0			25.0		16.2
Approach LOS		A		A			C		B

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 4.7

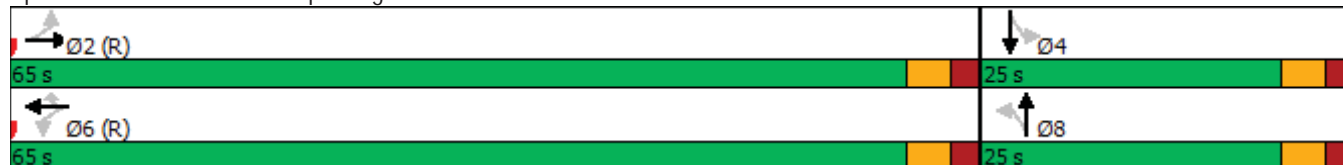
Intersection LOS: A

Intersection Capacity Utilization 39.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

2040 Background Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	35.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑			↰ ↑↑↑	↰			↰		↰	↰	
Traffic Vol, veh/h	254	528	2	1	1427	125	1	0	1	267	0	343
Future Vol, veh/h	254	528	2	1	1427	125	1	0	1	267	0	343
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	95	80	78	95	78	50	50	50	74	74	74
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	318	556	3	1	1502	160	2	0	2	361	0	464

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1662	0	0	559	0	0	1797	2858	280	2362	2699	751
Stage 1	-	-	-	-	-	-	1194	1194	-	1504	1504	-
Stage 2	-	-	-	-	-	-	603	1664	-	858	1195	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	~ 187	-	-	635	-	-	85	17	611	~ 38	21	~ 305
Stage 1	-	-	-	-	-	-	146	258	-	~ 89	183	-
Stage 2	-	-	-	-	-	-	413	152	-	~ 290	258	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 187	-	-	635	-	-	-	0	611	-	0	~ 305
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	146	0	-	~ 89	178	-
Stage 2	-	-	-	-	-	-	-	148	-	-	0	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	137.6	0.1		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	- ~ 187	-	-	-	635	-	-	-	305
HCM Lane V/C Ratio	- 1.698	-	-	-	0.002	-	-	-	1.52
HCM Control Delay (s)	- \$ 379.7	-	-	-	10.7	0.1	-	-	281.2
HCM Lane LOS	- F	-	-	-	B	A	-	-	F
HCM 95th %tile Q(veh)	- 21.8	-	-	-	0	-	-	-	26.4






Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th TWSC  
24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir

2040 Background Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	54	14	364	556	4
Future Vol, veh/h	6	54	14	364	556	4
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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	57	57	67	67
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	61	25	639	830	6

















Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1522	833	836
Stage 1	833	-	-
Stage 2	689	-	-
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	130	369	798
Stage 1	427	-	-
Stage 2	498	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	126	369	798
Mov Cap-2 Maneuver	126	-	-
Stage 1	414	-	-
Stage 2	498	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.9	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	798	-	309	-	-
HCM Lane V/C Ratio	0.031	-	0.221	-	-
HCM Control Delay (s)	9.7	-	19.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

# Timings 4: Antelope Ridge Dr. & North Carefree

2040 Background Traffic  
AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	254	528	1	1427	125	1	0	267	0
Future Volume (vph)	254	528	1	1427	125	1	0	267	0
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	20.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	22.2%	61.1%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	52.8	52.8		33.9	33.9		27.2	27.2	27.2
Actuated g/C Ratio	0.59	0.59		0.38	0.38		0.30	0.30	0.30
v/c Ratio	0.89	0.19		0.84	0.24		0.01	0.84	0.63
Control Delay	48.0	9.3		32.2	7.5		0.0	47.4	10.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.0	9.3		32.2	7.5		0.0	47.4	10.0
LOS	D	A		C	A		A	D	A
Approach Delay		23.3		29.8					26.4
Approach LOS		C		C					C

## Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



Intersection												
Int Delay, s/veh	216.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↑↑↑			↰ ↑↑↑	↰		↰	↰		↰	↰	
Traffic Vol, veh/h	152	530	2	0	1215	121	0	0	1	213	0	266
Future Vol, veh/h	152	530	2	0	1215	121	0	0	1	213	0	266
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	89	95	89	100	100	100	90	90	90
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	157	546	2	0	1279	136	0	0	1	237	0	296






Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1415	0	0	548	0	0	1373	2276	274	1811	2141	640
Stage 1	-	-	-	-	-	-	861	861	-	1279	1279	-
Stage 2	-	-	-	-	-	-	512	1415	-	532	862	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	248	-	-	643	-	-	154	40	617	~ 84	48	360
Stage 1	-	-	-	-	-	-	248	371	-	~ 128	235	-
Stage 2	-	-	-	-	-	-	468	202	-	458	370	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	248	-	-	643	-	-	14	15	617	~ 41	18	360
Mov Cap-2 Maneuver	-	-	-	-	-	-	14	15	-	~ 41	18	-
Stage 1	-	-	-	-	-	-	91	136	-	~ 47	235	-
Stage 2	-	-	-	-	-	-	84	202	-	~ 168	136	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	0	10.8	\$ 1067.8
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	617	248	-	-	643	-	-	41	360
HCM Lane V/C Ratio	0.002	0.632	-	-	-	-	-	5.772	0.821
HCM Control Delay (s)	10.8	41.5	-	-	0	-	-	\$ 2341.8	47.6
HCM Lane LOS	B	E	-	-	A	-	-	F	E
HCM 95th %tile Q(veh)	0	3.9	-	-	0	-	-	27.7	7.2

Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				



Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	24	35	238	456	8
Future Vol, veh/h	2	24	35	238	456	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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	70	70	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	24	50	340	456	8
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	900	460	464	0	-	0
Stage 1	460	-	-	-	-	-
Stage 2	440	-	-	-	-	-
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	309	601	1097	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	295	601	1097	-	-	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.8	1.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1097	-	557	-	-	
HCM Lane V/C Ratio	0.046	-	0.047	-	-	
HCM Control Delay (s)	8.4	-	11.8	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

# Timings 4: Antelope Ridge Dr. & North Carefree

2040 Background Traffic  
3:00 - 4:00 PM



Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	152	530	1215	121	0	213	0
Future Volume (vph)	152	530	1215	121	0	213	0
Turn Type	pm+pt	NA	NA	Perm	NA	Perm	NA
Protected Phases	5	2	6		8		4
Permitted Phases	2			6		4	
Detector Phase	5	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	10.0	15.0	15.0	15.0	10.0	10.0	10.0
Total Split (s)	10.0	60.0	50.0	50.0	30.0	30.0	30.0
Total Split (%)	11.1%	66.7%	55.6%	55.6%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None
Act Effect Green (s)	60.0	60.0	48.5	48.5	20.0	20.0	20.0
Actuated g/C Ratio	0.67	0.67	0.54	0.54	0.22	0.22	0.22
v/c Ratio	0.53	0.16	0.47	0.15	0.00	0.75	0.64
Control Delay	13.9	6.3	14.1	2.7	0.0	47.1	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	6.3	14.1	2.7	0.0	47.1	22.1
LOS	B	A	B	A	A	D	C
Approach Delay		8.0	13.0				33.2
Approach LOS		A	B				C

## Intersection Summary

Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 15.7  
 Intersection Capacity Utilization 64.7%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service C

## Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

2040 Background Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	85.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱ ↑↑↑			↱↑↑			↱			↱		
Traffic Vol, veh/h	123	1532	1	5	1283	174	12	0	3	69	0	58
Future Vol, veh/h	123	1532	1	5	1283	174	12	0	3	69	0	58
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	38	38	38	78	78	78
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	137	1702	1	5	1365	185	32	0	8	88	0	74

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1550	0	0	1703	0	0	2533	3537	852	2330	3352	683
Stage 1	-	-	-	-	-	-	1977	1977	-	1375	1375	-
Stage 2	-	-	-	-	-	-	556	1560	-	955	1977	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	213	-	-	177	-	-	~ 29	6	260	~ 40	8	338
Stage 1	-	-	-	-	-	-	40	106	-	110	211	-
Stage 2	-	-	-	-	-	-	441	171	-	253	106	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	213	-	-	177	-	-	~ 9	2	260	~ 16	2	338
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 9	2	-	~ 16	2	-
Stage 1	-	-	-	-	-	-	~ 14	38	-	~ 39	161	-
Stage 2	-	-	-	-	-	-	262	130	-	~ 88	38	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.6	1.8	\$ 1846.2	\$ 1373.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	11	213	-	-	177	-	-	16	338
HCM Lane V/C Ratio	3.589	0.642	-	-	0.03	-	-	5.529	0.22
HCM Control Delay (s)	\$ 1846.2	48	-	-	26	2	\$ 2513.2	18.6	
HCM Lane LOS	F	E	-	-	D	A	-	F	C
HCM 95th %tile Q(veh)	6	3.8	-	-	0.1	-	-	11.9	0.8






Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th TWSC  
24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir

2040 Background Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	21	44	253	107	4
Future Vol, veh/h	6	21	44	253	107	4
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	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	80	80	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	21	55	316	111	4

















Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	539	113	115
Stage 1	113	-	-
Stage 2	426	-	-
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	503	940	1474
Stage 1	912	-	-
Stage 2	659	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	484	940	1474
Mov Cap-2 Maneuver	484	-	-
Stage 1	878	-	-
Stage 2	659	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	1.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1474	-	777	-	-
HCM Lane V/C Ratio	0.037	-	0.035	-	-
HCM Control Delay (s)	7.5	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

# Timings 4: Antelope Ridge Dr. & North Carefree

2040 Background Traffic  
PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	123	1532	5	1283	174	12	0	69	0
Future Volume (vph)	123	1532	5	1283	174	12	0	69	0
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	65.0	55.0	55.0	55.0	25.0	25.0	25.0	25.0
Total Split (%)	11.1%	72.2%	61.1%	61.1%	61.1%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	71.2	72.2		58.9	58.9		10.9	11.1	11.1
Actuated g/C Ratio	0.79	0.80		0.65	0.65		0.12	0.12	0.12
v/c Ratio	0.40	0.42		0.44	0.17		0.17	0.52	0.24
Control Delay	6.6	4.1		9.4	1.8		2.5	47.1	2.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	6.6	4.1		9.4	1.8		2.5	47.1	2.5
LOS	A	A		A	A		A	D	A
Approach Delay		4.3		8.5			2.5		26.7
Approach LOS		A		A			A		C

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	42											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↱ ↑↑↑			↱↑↑	↱		↱			↱	↱	
Traffic Vol, veh/h	267	528	2	1	1432	134	1	0	1	280	0	376
Future Vol, veh/h	267	528	2	1	1432	134	1	0	1	280	0	376
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	350	-	-	-	-	155	-	-	-	350	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	95	80	78	95	78	50	50	50	74	74	74
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	334	556	3	1	1507	172	2	0	2	378	0	508

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1679	0	0	559	0	0	1831	2907	280	2399	2736	754
Stage 1	-	-	-	-	-	-	1226	1226	-	1509	1509	-
Stage 2	-	-	-	-	-	-	605	1681	-	890	1227	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	~ 183	-	-	635	-	-	81	15	611	~ 36	20	~ 304
Stage 1	-	-	-	-	-	-	138	249	-	~ 88	182	-
Stage 2	-	-	-	-	-	-	411	149	-	~ 277	249	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 183	-	-	635	-	-	-	0	611	-	0	~ 304
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	138	0	-	~ 88	176	-
Stage 2	-	-	-	-	-	-	-	144	-	-	0	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	162.7	0.1		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	- ~ 183	-	-	-	635	-	-	-	304
HCM Lane V/C Ratio	- 1.824	-	-	-	0.002	-	-	-	1.671
HCM Control Delay (s)	- \$ 434.7	-	-	-	10.7	0.1	-	-	\$ 346
HCM Lane LOS	- F	-	-	-	B	A	-	-	F
HCM 95th %tile Q(veh)	- 24	-	-	-	0	-	-	-	31.6

Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	6	0	54	18	0	12	14	378	8	2	584	4
Future Vol, veh/h	6	0	54	18	0	12	14	378	8	2	584	4
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	100	88	92	92	92	92	75	92	92	75	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	61	20	0	13	15	504	9	2	779	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1330	1328	781	1355	1326	509	783	0	0	513	0	0
Stage 1	785	785	-	539	539	-	-	-	-	-	-	-
Stage 2	545	543	-	816	787	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	132	155	395	127	156	564	835	-	-	1052	-	-
Stage 1	386	404	-	527	522	-	-	-	-	-	-	-
Stage 2	523	520	-	371	403	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	127	152	395	106	153	564	835	-	-	1052	-	-
Mov Cap-2 Maneuver	127	152	-	106	153	-	-	-	-	-	-	-
Stage 1	379	403	-	518	513	-	-	-	-	-	-	-
Stage 2	502	511	-	313	402	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.9	33.8	0.3	0
HCM LOS	C	D		





Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	835	-	-	326	157	1052	-
HCM Lane V/C Ratio	0.018	-	-	0.209	0.208	0.002	-
HCM Control Delay (s)	9.4	-	-	18.9	33.8	8.4	-
HCM Lane LOS	A	-	-	C	D	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.8	0	-

HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

2040 Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	26	383	14	4	562
Future Vol, veh/h	28	26	383	14	4	562
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	75	92	92	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	28	511	15	4	749

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1276	519	0
Stage 1	519	-	-
Stage 2	757	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	184	557	-
Stage 1	597	-	-
Stage 2	463	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	183	557	-
Mov Cap-2 Maneuver	183	-	-
Stage 1	595	-	-
Stage 2	463	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	270	1041
HCM Lane V/C Ratio	-	-	0.217	0.004
HCM Control Delay (s)	-	-	22	8.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0



HCM 6th TWSC  
30: Marksheffel & Site Access

2040 Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↕	↕	↗
Traffic Vol, veh/h	0	27	4	1942	2462	5
Future Vol, veh/h	0	27	4	1942	2462	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	285	-	-	280
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	0	28	4	2044	2592	5

















Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1296	2597	0 - 0
Stage 1	- -	-	- - -
Stage 2	- -	-	- - -
Critical Hdwy	- 6.94	4.14	- - -
Critical Hdwy Stg 1	- -	-	- - -
Critical Hdwy Stg 2	- -	-	- - -
Follow-up Hdwy	- 3.32	2.22	- - -
Pot Cap-1 Maneuver	0 153	164	- - -
Stage 1	0 -	-	- - -
Stage 2	0 -	-	- - -
Platoon blocked, %			- - -
Mov Cap-1 Maneuver	- 153	164	- - -
Mov Cap-2 Maneuver	- -	-	- - -
Stage 1	- -	-	- - -
Stage 2	- -	-	- - -

Approach	EB	NB	SB
HCM Control Delay, s	33.8	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	164	-	153	-	-
HCM Lane V/C Ratio	0.026	-	0.186	-	-
HCM Control Delay (s)	27.5	-	33.8	-	-
HCM Lane LOS	D	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

# Timings 4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic  
AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	267	528	1	1432	134	1	0	280	0
Future Volume (vph)	267	528	1	1432	134	1	0	280	0
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	4.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	20.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	22.2%	61.1%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%	38.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	52.3	52.3		32.9	32.9		27.7	27.7	27.7
Actuated g/C Ratio	0.58	0.58		0.37	0.37		0.31	0.31	0.31
v/c Ratio	0.90	0.19		0.86	0.26		0.01	0.86	0.68
Control Delay	50.7	9.5		34.2	7.5		0.0	50.0	12.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	50.7	9.5		34.2	7.5		0.0	50.0	12.5
LOS	D	A		C	A		A	D	B
Approach Delay		24.9		31.4					28.5
Approach LOS		C		C					C

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 28.9

Intersection LOS: C

Intersection Capacity Utilization 78.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic  
3:00 - 4:00 PM







Intersection												
Int Delay, s/veh	321.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱ ↲	↰ ↱ ↲		↰ ↱ ↲	↰ ↱ ↲	↰ ↱ ↲		↰ ↱ ↲		↰ ↱ ↲	↰ ↱ ↲	
Traffic Vol, veh/h	176	530	2	0	1218	137	0	0	1	220	0	284
Future Vol, veh/h	176	530	2	0	1218	137	0	0	1	220	0	284
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	89	95	89	100	100	100	90	90	90
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	181	546	2	0	1282	154	0	0	1	244	0	316

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1436	0	0	548	0	0	1422	2345	274	1862	2192	641
Stage 1	-	-	-	-	-	-	909	909	-	1282	1282	-
Stage 2	-	-	-	-	-	-	513	1436	-	580	910	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	242	-	-	643	-	-	143	36	617	~ 78	45	360
Stage 1	-	-	-	-	-	-	230	352	-	~ 127	234	-
Stage 2	-	-	-	-	-	-	468	197	-	428	352	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	242	-	-	643	-	-	7	9	617	~ 30	11	360
Mov Cap-2 Maneuver	-	-	-	-	-	-	7	9	-	~ 30	11	-
Stage 1	-	-	-	-	-	-	58	89	-	~ 32	234	-
Stage 2	-	-	-	-	-	-	58	197	-	~ 108	89	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	0	10.8	\$ 1547.5
HCM LOS			B	F





Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	617	242	-	-	643	-	-	30	360
HCM Lane V/C Ratio	0.002	0.75	-	-	-	-	-	8.148	0.877
HCM Control Delay (s)	10.8	54.1	-	-	0	-	-	\$ 3473.1	55.9
HCM Lane LOS	B	F	-	-	A	-	-	F	F
HCM 95th %tile Q(veh)	0	5.3	-	-	0	-	-	29.9	8.4

Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	24	11	0	6	35	263	14	4	469	8
Future Vol, veh/h	2	0	24	11	0	6	35	263	14	4	469	8
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	92	92	92	70	70	92	92	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	24	12	0	7	50	376	15	4	469	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	968	972	473	977	969	384	477	0	0	391	0	0
Stage 1	481	481	-	484	484	-	-	-	-	-	-	-
Stage 2	487	491	-	493	485	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	233	252	591	230	254	664	1085	-	-	1168	-	-
Stage 1	566	554	-	564	552	-	-	-	-	-	-	-
Stage 2	562	548	-	558	552	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	240	591	212	242	664	1085	-	-	1168	-	-
Mov Cap-2 Maneuver	222	240	-	212	242	-	-	-	-	-	-	-
Stage 1	540	552	-	538	527	-	-	-	-	-	-	-
Stage 2	531	523	-	534	550	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.2		18.8		1		0.1					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1085	-	-	524	279	1168	-	-				
HCM Lane V/C Ratio	0.046	-	-	0.05	0.066	0.004	-	-				
HCM Control Delay (s)	8.5	-	-	12.2	18.8	8.1	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-				

HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

2040 Total Traffic  
3:00 - 4:00 PM

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	14	246	25	8	468
Future Vol, veh/h	14	14	246	25	8	468
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	70	92	92	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	15	351	27	9	468
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	851	365	0	0	378	0
Stage 1	365	-	-	-	-	-
Stage 2	486	-	-	-	-	-
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	330	680	-	-	1180	-
Stage 1	702	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	327	680	-	-	1180	-
Mov Cap-2 Maneuver	327	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	618	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.7	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	442	1180	-	
HCM Lane V/C Ratio	-	-	0.069	0.007	-	
HCM Control Delay (s)	-	-	13.7	8.1	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

# Timings

## 4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic

3:00 - 4:00 PM



Lane Group	EBL	EBT	WBT	WBR	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	176	530	1218	137	0	220	0
Future Volume (vph)	176	530	1218	137	0	220	0
Turn Type	pm+pt	NA	NA	Perm	NA	Perm	NA
Protected Phases	5	2	6		8		4
Permitted Phases	2			6		4	
Detector Phase	5	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	5.0	5.0	5.0
Minimum Split (s)	10.0	15.0	15.0	15.0	10.0	10.0	10.0
Total Split (s)	10.0	60.0	50.0	50.0	30.0	30.0	30.0
Total Split (%)	11.1%	66.7%	55.6%	55.6%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None
Act Effect Green (s)	59.7	59.7	48.2	48.2	20.3	20.3	20.3
Actuated g/C Ratio	0.66	0.66	0.54	0.54	0.23	0.23	0.23
v/c Ratio	0.62	0.16	0.47	0.17	0.00	0.76	0.67
Control Delay	18.4	6.4	14.3	2.6	0.0	47.5	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	6.4	14.3	2.6	0.0	47.5	24.2
LOS	B	A	B	A	A	D	C
Approach Delay		9.4	13.1				34.4
Approach LOS		A	B				C

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 16.5

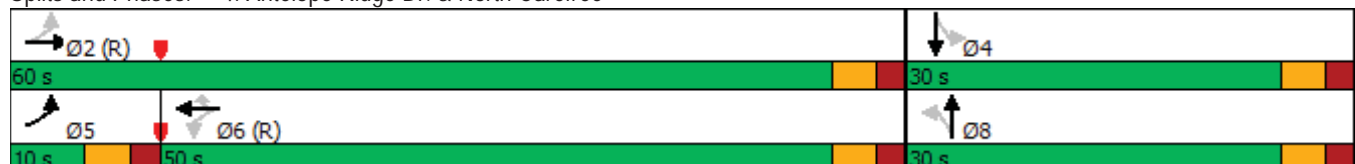
Intersection LOS: B

Intersection Capacity Utilization 65.2%

ICU Level of Service C


Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



HCM 6th TWSC  
4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	288.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	167	1532	1	5	1287	204	12	0	3	78	0	80
Future Vol, veh/h	167	1532	1	5	1287	204	12	0	3	78	0	80
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	345	-	-	-	-	155	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	94	94	94	38	38	38	78	78	78
Heavy Vehicles, %	1	2	2	2	2	1	2	2	2	1	2	1
Mvmt Flow	186	1702	1	5	1369	217	32	0	8	100	0	103

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1586	0	0	1703	0	0	2633	3671	852	2432	3454	685
Stage 1	-	-	-	-	-	-	2075	2075	-	1379	1379	-
Stage 2	-	-	-	-	-	-	558	1596	-	1053	2075	-
Critical Hdwy	5.32	-	-	5.34	-	-	6.44	6.54	7.14	6.42	6.54	7.12
Critical Hdwy Stg 1	-	-	-	-	-	-	7.34	5.54	-	7.32	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-	6.72	5.54	-
Follow-up Hdwy	3.11	-	-	3.12	-	-	3.82	4.02	3.92	3.81	4.02	3.91
Pot Cap-1 Maneuver	204	-	-	177	-	-	~ 25	5	260	~ 34	7	337
Stage 1	-	-	-	-	-	-	34	94	-	109	210	-
Stage 2	-	-	-	-	-	-	439	165	-	220	94	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	204	-	-	177	-	-	~ 3	0	260	~ 6	0	337
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 3	0	-	~ 6	0	-
Stage 1	-	-	-	-	-	-	~ 3	8	-	~ 10	147	-
Stage 2	-	-	-	-	-	-	214	116	-	~ 19	8	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	2.2	\$ 5725	\$ 4080.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	4	204	-	-	177	-	-	6	337
HCM Lane V/C Ratio	9.868	0.91	-	-	0.03	-	-	16.667	0.304
HCM Control Delay (s)	\$ 5725	89.7	-	-	26	2.5	\$ 8244.1	20.3	
HCM Lane LOS	F	F	-	-	D	A	-	F	C
HCM 95th %tile Q(veh)	6.7	7.3	-	-	0.1	-	-	14.4	1.3

Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon						

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	6	0	21	13	0	8	44	300	27	8	124	4
Future Vol, veh/h	6	0	21	13	0	8	44	300	27	8	124	4
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	-	-	-	-	-	-	80	-	-	80	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	92	92	92	80	80	80	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	21	14	0	9	55	375	34	8	129	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	654	666	131	660	651	392	133	0	0	409	0	0
Stage 1	147	147	-	502	502	-	-	-	-	-	-	-
Stage 2	507	519	-	158	149	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
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	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	380	380	919	376	388	657	1452	-	-	1150	-	-
Stage 1	856	775	-	552	542	-	-	-	-	-	-	-
Stage 2	548	533	-	844	774	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	362	363	919	355	371	657	1452	-	-	1150	-	-
Mov Cap-2 Maneuver	362	363	-	355	371	-	-	-	-	-	-	-
Stage 1	823	770	-	531	521	-	-	-	-	-	-	-
Stage 2	520	513	-	819	769	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.5		13.8		0.9		0.5	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1452	-	-	685	430	1150	-
HCM Lane V/C Ratio	0.038	-	-	0.039	0.053	0.007	-
HCM Control Delay (s)	7.6	-	-	10.5	13.8	8.2	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-







HCM 6th TWSC  
25: Antelope Ridge Dr. & North Site Access

2040 Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	17	267	47	15	119
Future Vol, veh/h	17	17	267	47	15	119
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	-	-	-	80	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	80	92	92	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	18	334	51	16	124

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	516	360	0
Stage 1	360	-	-
Stage 2	156	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	519	684	-
Stage 1	706	-	-
Stage 2	872	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	512	684	-
Mov Cap-2 Maneuver	512	-	-
Stage 1	696	-	-
Stage 2	872	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.9
HCM LOS	B		






Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	586	1173
HCM Lane V/C Ratio	-	-	0.063	0.014
HCM Control Delay (s)	-	-	11.6	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 6th TWSC  
30: Marksheffel & Site Access

2040 Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	12	2361	1605	17
Future Vol, veh/h	0	18	12	2361	1605	17
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	285	-	-	180
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	18	12	2361	1605	17

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	803	1622
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	2.22
Pot Cap-1 Maneuver	0	326	397
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	326	397
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.7	0.1	0
HCM LOS	C		

















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	397	-	326	-	-
HCM Lane V/C Ratio	0.03	-	0.055	-	-
HCM Control Delay (s)	14.3	-	16.7	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

# Timings

## 4: Antelope Ridge Dr. & North Carefree

2040 Total Traffic

PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	167	1532	5	1287	204	12	0	78	0
Future Volume (vph)	167	1532	5	1287	204	12	0	78	0
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	15.0	15.0	15.0	15.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	65.0	55.0	55.0	55.0	25.0	25.0	25.0	25.0
Total Split (%)	11.1%	72.2%	61.1%	61.1%	61.1%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effect Green (s)	68.2	68.2		55.0	55.0		11.8	11.8	11.8
Actuated g/C Ratio	0.76	0.76		0.61	0.61		0.13	0.13	0.13
v/c Ratio	0.55	0.44		0.47	0.20		0.16	0.56	0.31
Control Delay	10.8	4.8		10.8	1.9		2.3	47.4	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.8	4.8		10.8	1.9		2.3	47.4	5.6
LOS	B	A		B	A		A	D	A
Approach Delay		5.4		9.6			2.3		26.2
Approach LOS		A		A			A		C

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 8.3

Intersection LOS: A

Intersection Capacity Utilization 74.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Antelope Ridge Dr. & North Carefree



## Queuing and Blocking Report

## Intersection: 4: Antelope Ridge Dr. &amp; North Carefree

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	T	TR	LT	T	T	R	LTR	L	TR
Maximum Queue (ft)	256	116	107	96	271	294	332	180	31	244	116
Average Queue (ft)	117	63	31	41	142	165	187	71	3	152	70
95th Queue (ft)	219	110	78	83	278	308	342	187	19	240	101
Link Distance (ft)		356	356	356	930	930	930		134		498
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	350							155		350	
Storage Blk Time (%)							13	0			
Queuing Penalty (veh)							18	0			