

# LSC Responses to TIS Redline Comments



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## Windermere Zone Change Traffic Impact Study PCD File No.: P229 & SP223 (LSC #S224091) January 25, 2024

### Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport 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 Paul Stept', written over a horizontal line.


2/5/2024  
Date

# LSC Responses to TIS Redline Comments

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Page: 1

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 Number: 1      Author: Jeff Rice - EPC Engineering Review      Subject: Text Box      Date: 4/24/2024 9:36:44 AM

[Why is this page so huge?](#)

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 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:56:11 AM  
LSC Response: Corrected in the updated TIS.

## PEDESTRIAN AND BICYCLE ACCESS

Sidewalks are planned on all of the streets interior to the Windermere development. Sidewalks are also planned adjacent to the site along Antelope Ridge Drive and North Carefree Circle, but not along Marksheffel Road.

## ROADWAY AND TRAFFIC CONDITIONS

The roadways in the site's vicinity are shown in Figure 1 and are described below. Copies of the *2016 El Paso County Major Transportation Corridors Plan (MTCP) 2040 Roadway Plan* and *2016 MTCP 2060 Corridor Preservation Plan* with the site location identified on them have been attached to this report.

**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 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. Marksheffel Road is ultimately planned to 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 adjacent to the site on the *2016 El Paso County Major Transportation Corridors Plan (MTCP) 2040 Roadway Plan* and as an Expressway on the *2016 MTCP 2060 Corridor Preservation Plan*. Marksheffel Road is planned to be constructed north from Woodmen Road to Vollmer Road in the short-term future.

**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.

## Sight Distance Analysis

Figure 3 shows the stopping sight-distance analysis at the site-access points to **Lake** Mardale Lane (Urban Local). Intersection sight-distance analysis was not analyzed for these intersections as guidance from the *Colorado Department of Transportation 2018 Roadway Design Guide and A Policy on Geometric Design of Highway and Street, 7th Edition* published by AASHTO indicate that intersection sight distance is not applicable to local urban/residential streets. See the attached Appendix A for further details. Based on a design speed of 25 miles per hour (mph) and the criteria contained in Table 2-17 of the *Engineering Criteria Manual (ECM)*, the required stopping sight distance approaching the access points is 155 feet. As shown in Figure 3, the stopping sight distance can be met at both of the proposed access points. The line of sight for the intersection



Number: 1  
Lake

Author: Jeff Rice - EPC Engineering Review

Date: 4/24/2024 9:59:39 AM

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Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:56:20 AM  
LSC Response: The text has been revised.

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As shown in Table 2, the 9-acre portion of the Windermere proposed to be rezoned is projected to generate about 1,080 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 18 vehicles would enter and 54 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 50 vehicles would enter and 36 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 6 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 estimate is based on 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 6) are applied to the trip-generation estimates (from Table 2), the site-generated traffic volumes on the adjacent roadways can be determined. Figures 7a and 7b show the short-term site-generated traffic volumes for Windermere Filing No. 1 (recently approved and recorded) and the 9-acre parcel currently proposed to be rezoned, respectively. Figure 7c shows the sum of the volumes from Figures 7a and 7b. Figures 8a and 8b show the long-term site-generated traffic volumes for Windermere Filing No. 1 (recently approved and recorded) and the 9-acre parcel currently proposed to be rezoned, respectively. Figure 8c shows the sum of the volumes from Figures 8a and 8b.

### SHORT-TERM TOTAL TRAFFIC

Please indicate year of short-term. <sup>1</sup>

Figure 9 shows the projected short-term total traffic volumes. The short-term total traffic volumes are the sum of the existing traffic volumes (from Figure 4) plus the short-term traffic volumes estimated to be generated by development of Windermere Filing No. 1 and the 9-acre parcel currently proposed to be rezoned (from Figure 7c). The short-term total traffic volumes identify the short-term impacts of the development.

Please include excerpt of this study. Please highlight the total traffic of short term. <sup>2</sup>

<sup>3</sup>

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☰ Number: 1 Author: HaoVo Subject: Callout Date: 4/19/2024 1:26:37 PM

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Please indicate year of short-term.

↻ Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:56:30 AM

LSC Response: The additional information has been provided as requested.

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📄 Number: 2 Author: HaoVo Subject: Highlight Date: 4/19/2024 1:27:54 PM

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by development of Windermere Filing No. 1

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☰ Number: 3 Author: HaoVo Subject: Callout Date: 4/19/2024 1:28:33 PM

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Please include excerpt of this study. Please highlight the total traffic of short term.

↻ Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:04 AM

LSC Response: Key pages from the *Windermere Traffic Impact Study* dated August 31, 2020 have been attached. Note that this study is for the entire Windermere Preliminary Plan area including the parcel currently proposed to be rezoned. A TIS was not prepared for just Filing No. 1.

Please include  
excerpt of this study.  
Please highlight the  
total traffic of long  
term.

## 2044 TOTAL TRAFFIC

Figure 10 shows the projected 2044 total traffic volumes. The 2044 total traffic volumes are the sum of the 2044 background traffic volumes (from Figure 5) plus the long-term traffic volumes estimated to be generated by the development of Windermere Filing No. 1 and the 9-acre parcel currently proposed to be rezoned (from Figure 8c).

## PROJECTED INTERSECTION LEVELS OF SERVICE

The intersections of North Carefree/Marksheffel, North Carefree/Antelope Ridge, Antelope Ridge/Pronghorn Meadows (south)/Mardale Lane, and Antelope Ridge/Borrowdale Lane were analyzed to determine the projected levels of service for the short-term total and 2044 background and total traffic volumes, based on the unsignalized intersection analysis procedures from the *Highway Capacity Manual 6<sup>th</sup> Edition* and/or the Synchro signalized intersection procedures. Figures 5, 9, and 10 show the level of service analysis results. The level of service reports are attached.

### North Carefree Circle/Marksheffel Road

The intersection of North Carefree/Marksheffel was recently converted to traffic-signal control by the City of Colorado Springs. As a signalized intersection it is projected to operate at an overall LOS D or better during the peak hours, based on the projected short-term and 2044 total traffic volumes. By 2044, the northbound and eastbound left-turn movements are projected to operate at LOS E during the morning peak hour. These movements have projected delays in the LOS E range simply because they arrive at the traffic signal at the beginning of the red phase at an intersection with many phases and a long cycle length. These movements would not be considered “failing” since their volume-to-capacity ratios are less than one. The justification is that to progress through traffic along an arterial corridor, the traffic signal offsets and left-turn phase times have been adjusted to favor the through band, which can result in higher delay for the left-turn movements even though there is sufficient capacity for them.

### North Carefree Circle/Antelope Ridge Drive


The previous version of this report recommended the intersection of North Carefree/Antelope Ridge be reconfigured as an interim/temporary channelize “T” intersection. In August 2023, the City of Colorado Springs indicated that an escrow of \$100,000 toward the cost of installation of a traffic signal will be required rather than the temporary channelized T intersection. The City has also indicated that a signal-warrants study was done in January of 2023 for this intersection and that both peak-hour signal warrants (3A & 3B) meet the signal warrants. This intersection is projected to operate at LOS D or better during the peak hours as a signal-controlled intersection, based on the projected short-term total and 2044 total traffic volumes.

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Number: 1 Author: HaoVo Subject: Callout Date: 4/19/2024 1:37:31 PM

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Please include excerpt of this study. Please highlight the total traffic of long term.

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:27 AM

LSC Response: Key pages from the *Windermere Traffic Impact Study* dated August 31, 2020 have been attached. Note that this study is for the entire Windermere Preliminary Plan area including the parcel currently proposed to be rezoned. A TIS was not prepared for just Filing No. 1



**Table 2  
Trip Generation Estimate  
Windermere**

Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>				Total Trips Generated					
			Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out	Average Weekday Traffic	Morning Peak Hour In	Morning Peak Hour Out	Afternoon Peak Hour In	Afternoon Peak Hour Out
<b>Trip Generation Estimate Based on the Currently Proposed Site Plan</b>												
215	Single Family Attached Housing	150 DU <sup>(2)</sup>	7.20	0.12	0.36	0.34	0.23	1,080	18	54	50	36
<b>Trip Generation Estimate From the Windermere Zone Change Traffic Impact Study, March 15, 2023</b>												
220	Multifamily Housing (Low-Rise)	277 DU <sup>(2)</sup>	6.74	0.10	0.30	0.32	0.19	1,867	27	84	89	52
<b>Change (decrease) in trip generation estimate</b>								<b>-787</b>	<b>-9</b>	<b>-30</b>	<b>-39</b>	<b>-16</b>
Notes:												
(1) Source: "Trip Generation, 11th Edition, 2021" by the Institute of Transportation Engineers (ITE)												
(2) DU = dwelling unit												
(3) KSF = thousand square feet of floor space												
Source: LSC Transportation Consultants, Inc.											Dec-23	


Replace or add approved trip generation for this area (40 SFD DU?) At this point Windermere Filing 1 traffic should be background (as implied by the table) and the previous study for the zone change is only informational.

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Number: 1 Author: Jeff Rice - EPC Engineering Review Subject: Callout Date: 4/24/2024 3:06:17 PM

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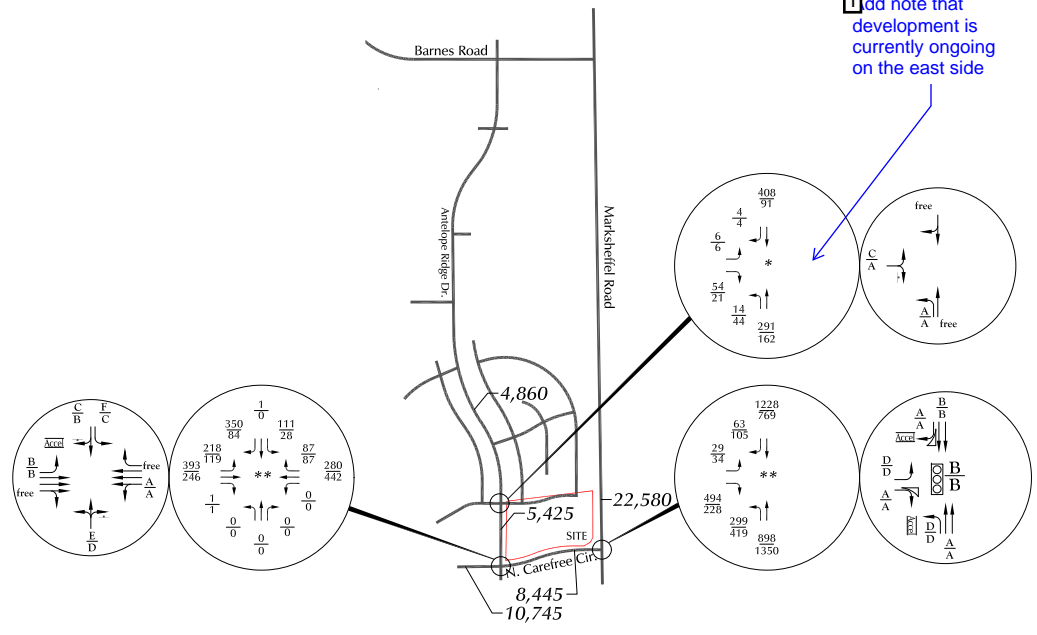
Replace or add approved trip generation for this area (40 SFD DU?) At this point Windermere Filing 1 traffic should be background (as implied by the table) and the previous study for the zone change is only informational.

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:36 AM  
LSC Response: Revised as requested.

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1. Add note that development is currently ongoing on the east side



LEGEND:  
 + = Stop Sign  
 [Symbol] = Traffic Signal  
 XX = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 XX = PM Weekday Peak-Hour Traffic (vehicles per hour)  
 A = AM Individual Movement Peak-Hour Level of Service  
 C = PM Individual Movement Peak-Hour Level of Service  
 A = AM Entire Intersection Peak-Hour Level of Service  
 D = PM Entire Intersection Peak-Hour Level of Service  
 16,330 = Average Weekday Traffic (vehicles per day)

\* Based on counts August 2018  
 \*\* Based on counts March 2022


Figure 4  
 Existing Traffic,  
 Lane Geometry, Traffic Control  
 and Levels of Service  
 Windermere Zone Change (LSC #S224091)

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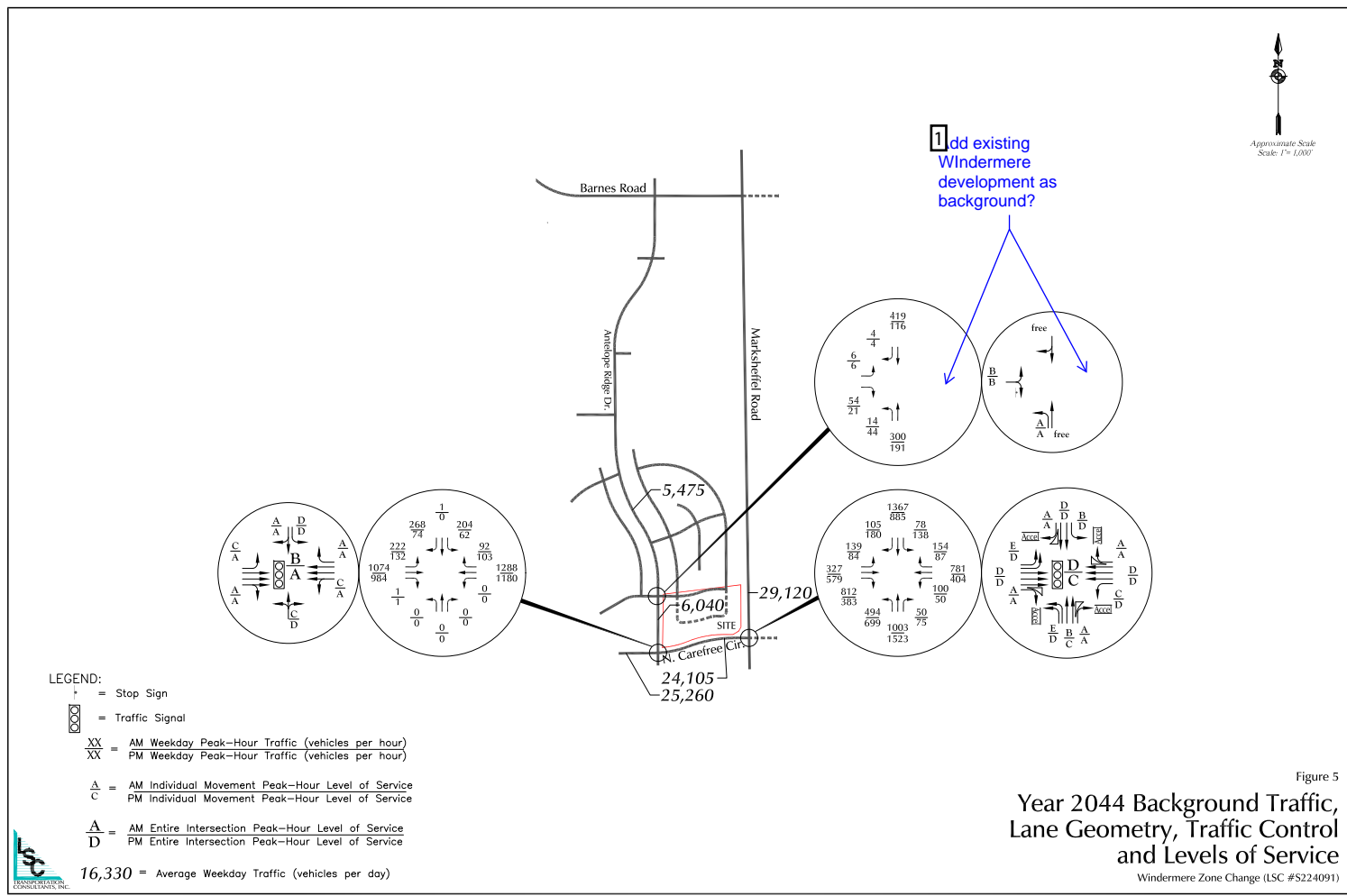
Number: 1 Author: Jeff Rice - EPC Engineering Review Subject: Callout Date: 4/24/2024 11:17:25 AM

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Add note that development is currently ongoing on the east side

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:42 AM  
LSC Response: Revised as requested.

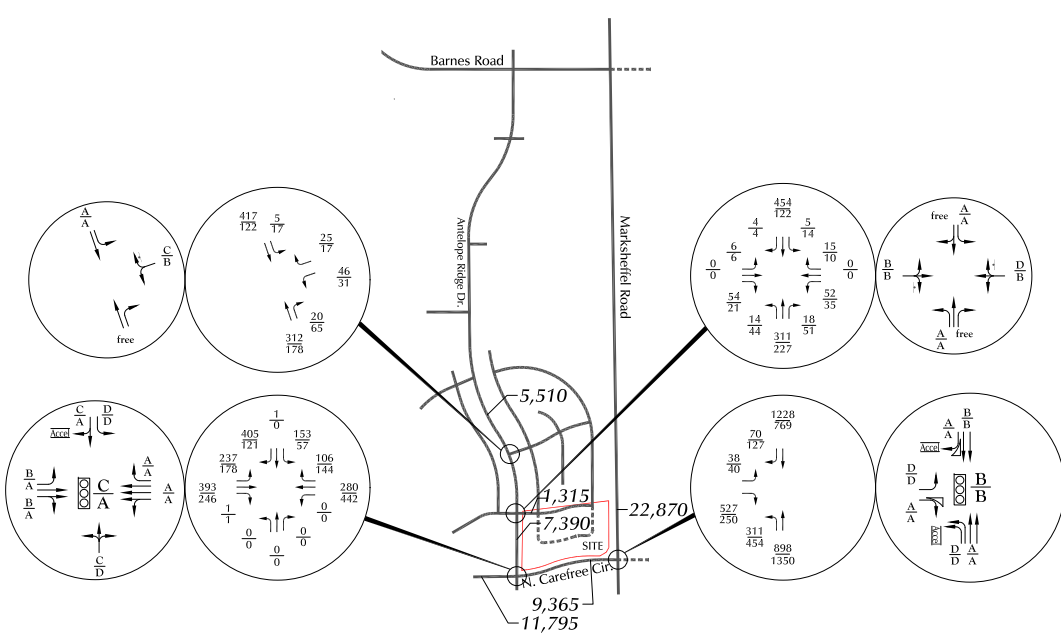
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Add existing WIndermere development as background?

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:51 AM  
LSC Response: Revised as requested.

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- LEGEND:
- + = Stop Sign
  - ⊗ = Traffic Signal
  - XX = AM Weekday Peak-Hour Traffic (vehicles per hour)
  - XX = PM Weekday Peak-Hour Traffic (vehicles per hour)
  - A = AM Individual Movement Peak-Hour Level of Service
  - C = PM Individual Movement Peak-Hour Level of Service
  - A = AM Entire Intersection Peak-Hour Level of Service
  - D = PM Entire Intersection Peak-Hour Level of Service
  - 16,330 = Average Weekday Traffic (vehicles per day)

1 please indicate year of short-term.

Figure 9  
**Short-Term Total Traffic, Lane Geometry, Traffic Control and Levels of Service**  
 Windermere Zone Change (LSC #S224091)




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Number: 1 Author: HaoVo Subject: Callout Date: 4/19/2024 1:26:51 PM

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Please indicate year of short-term.

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:57:59 AM

LSC Response: The additional information has been added as requested.

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Intersection: 4: Antelope Ridge Dr. & North Carefree

Movement	EB	EB	EB	EB	B20	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	TR	T	LT	T	T	R	L	TR
Maximum Queue (ft)	202	154	131	298	4	346	352	389	103	280	129
Average Queue (ft)	97	58	31	151	0	135	156	159	30	157	59
95th Queue (ft)	168	115	87	270	3	310	333	336	72	252	97
Link Distance (ft)		355	355	355	652	930	930	930	930		503
Upstream Blk Time (%)				0							
Queuing Penalty (veh)				0							
Storage Bay Dist (ft)	350									330	
Storage Blk Time (%)										0	
Queuing Penalty (veh)										0	

Intersection: 24: Antelope Ridge Dr. & S. Pronghorn Meadow Cir/Mardale Ln

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	58	64	35	23
Average Queue (ft)	30	26	7	1
95th Queue (ft)	52	50	29	8
Link Distance (ft)	156	285		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			80	80
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0
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300? 1

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Number: 1 Author: Jeff Rice - EPC Engineering Review Subject: Callout Date: 6/10/2024 1:55:12 PM

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300?

 Author: Kirstin Ferrin Subject: Sticky Note Date: 6/11/2024 9:58:17 AM  
LSC Response: The storage bay distance has been updated in the analysis.

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