



### Engineering Review

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## Bent Grass Residential Filing No. 2 Traffic Impact Study (LSC #194460) May 22, 2019

### 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 blue ink, appearing to read 'R. Byrd', written over a horizontal line.

7/31/19  
Date



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July 31, 2019

Jim Byers  
8605 Explorer Dr, Suite 250  
Colorado Springs, CO 80920

RE: Bent Grass Residential Filing No. 2  
El Paso County, Colorado  
Traffic Impact Analysis  
LSC #184910

Dear Jim:

LSC Transportation Consultants, Inc. has prepared this traffic impact study for the Bent Grass Residential Filing No. 2. The site is located about one-half mile west of the intersection of Meridian Road and Bent Grass Meadows Drive in El Paso County, Colorado. Figure 1 shows the site location. LSC has completed the following studies in the vicinity of the site:

*Bent Grass Subdivision PUD Traffic Impact Analysis* October 6, 2006  
*Bent Grass East Commercial – Preliminary Plan* January 25, 2013  
*Bent Grass East Commercial – Report Supplement #2* March 14, 2013  
*Bent Grass Subdivision Filing 1 Updated Traffic Impact Analysis* July 14, 2014  
*Bent Grass East Commercial Filing No. 2 Updated Traffic Impact Analysis* July 17, 2014  
*Falcon Dental East Commercial Filing No. 2A* March 7, 2016  
*Bent Grass Meadows Drive/Meridian Road Traffic Signal Warrant Analysis* October 2, 2017  
*Bent Grass East Commercial/Bent Grass Meadows Drive & Meridian Road Transportation Memorandum* March 21, 2019  
*Falcon Marketplace Traffic Impact Analysis* October 23, 2017 (September 5, 2018 Revision)

## REPORT CONTENTS

The report contains the following:

- 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, etc.
- The existing traffic volumes on the study area roadways
- The projected average weekday and peak-hour vehicle-trips to be generated by the site at buildout

- The assignment of the projected additional site-generated traffic volumes to the study area roadways and intersections
- The projected short-term and long-term total traffic volumes on the study area roadway network
- The projected levels of service at the intersections of Meridian Road/Bent Grass Meadows Drive, Woodmen frontage road/Bent Grass Meadows Drive, Woodmen Road/Golden Sage Drive and at the site access points to Bent Grass Meadows Drive
- A vehicle queueing analysis at the key study area intersections
- Recommendations for roadway improvements and phasing of these improvements

## LAND USE

Figure 2 shows the existing, currently proposed and future land uses in the vicinity of the site. The area south of Bent Grass Meadows Drive includes 104 existing single-family homes that are part of Bent Grass Residential Filing No 1 and the Bent Grass East Commercial development. The Bent Grass East Commercial development is partially developed with a gas station with convenience store, a veterinary clinic, and a dental clinic.

Bent Grass Residential Filing No. 2 is planned to include an additional 179 lots for single family homes just west of the existing Filing No. 1 lots. Bent Grass Meadows Drive is planned to be completed between the existing sections located north of the Woodmen frontage road and west of Meridian. Two full-movement access points are proposed to the new section of Bent Grass Meadows Drive. Figure 2 shows the location of the proposed access points.

## EXISTING ROADWAY AND TRAFFIC CONDITIONS

### Area Roadways

The roadways in the study area are identified below, followed by a brief description. Figure 1 shows the roadway system.

- **Meridian Road** is shown on the *El Paso County 2040 Major Transportation Corridors Plan* and the *Preserved Corridor Network Plan* as a four-lane Principal Arterial. Meridian Road was recently expanded from two lanes to four lanes between Woodmen Road and Rolling Thunder and may soon be connected to US Highway 24. The posted speed limit is 55 miles per hour (mph).
- **Bent Grass Meadows Drive** is a Non-Residential Collector that currently extends north from the Woodmen North frontage road for about 2,000 feet and west from Meridian Road for about one-half mile. Bent Grass Meadows Drive will be extended further west and then curve south to connect to the existing section north of the Woodmen frontage road with this development. The Bent Grass Meadows Drive/Meridian Road intersection is planned to be signalized in the short-term future **once warrants for signalization are satisfied.**

with this project? 

- **Woodmen Road** is shown on the El Paso County 2040 Major Transportation Corridors Plan and the Preserved Corridor Network Plan as a four-lane Expressway in the vicinity of the site. The posted speed limit on Woodmen Road in the vicinity of Golden Sage Road is 55 mph.
- **Woodmen frontage road** is a paved two-lane frontage road along the north side of Woodmen Road. The Woodmen frontage road extends west from just west of Meridian Road to its current terminus west of Golden Sage Road. The posted speed limit on the Woodmen frontage road is 30 mph.

### Existing Traffic Conditions

Figure 3 shows the existing morning and afternoon peak-hour traffic volumes at the intersections of Meridian Road/Bent Grass Meadows Drive, Woodmen frontage road/Bent Grass Meadows Drive and Woodmen Road/Golden Sage Road. The traffic volumes are from traffic counts conducted September 2018, March 2017 and May 2019. The traffic count reports are attached.

### Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or 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 2 shows the level of service delay ranges.

<b>Table 1</b>			
<b>Intersection Levels of Service Delay Ranges</b>			
<b>Level of Service</b>	<b>Signalized Intersections</b>		<b>Unsignalized Intersections</b>
	<b>Average Control Delay (seconds per vehicle)</b>	<b>V/C<sup>(1)</sup></b>	<b>Average Control Delay (seconds per vehicle)<sup>(2)</sup></b>
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 Meridian Road/Bent Grass Meadows Drive and Woodmen frontage road/Bent Grass Meadows Drive were analyzed to determine the existing levels of service based on the unsignalized method of analysis procedures found in the *Highway Capacity Manual, 6<sup>th</sup> Edition* by the Transportation Research Board. The intersection of Woodmen Road/Golden Sage Drive was analyzed using Synchro. Figure 3 shows the level of service analysis results. The level of service reports are attached.

The eastbound left-turn movement at the stop-sign-controlled intersection of Meridian/Bent Grass Meadows is currently operating at LOS F during the morning peak hour and LOS E during the afternoon peak hour. The eastbound right-turn movement is currently operating at LOS D during the morning peak hour and LOS B during the afternoon peak hour.

All movements at the intersection of the Woodmen frontage road/Bent Grass Meadows Drive are currently operating at LOS B or better during the peak hours.

All movements at the signal-controlled intersection of Woodmen/Golden Sage are currently operating at LOS D or better during the peak hours.

#### **TEMPORARY 7-ELEVEN ACCESS**

The access to 7-Eleven on Bent Grass Meadows Drive was permitted and constructed as a temporary access and will be allowed to remain open with continued use subject to reevaluation should the following occur (from the deviation report submitted):

*...traffic operational problems caused by increased traffic volumes begin to occur 2) crash experience of 5 or more crashes during a one-year time period of type that could be corrected through access closure or 3) the volume "trigger points" established in this deviation are reached. Should any of these occur, traffic engineering evaluation of the access would be conducted to determine if 1) the operational and/or problems either occurring or imminently likely with additional traffic volumes are caused by motorists turning in and out of the access 2) the problems can be remedied through design and modification of the access or 3) as a last resort, the access must be closed.*

*Volume trigger points proposed are peak hour volumes using Bent Grass Meadows Drive just west of Meridian Road. A trigger volume of 200 entering and 200 exiting peak hour trips is the point at which reevaluation should occur as per the foregoing. This 200 is comprised on 89 entering and 89 exiting trips generated by the convenience store/gas station and 110 trips entering and 110 trips exiting to be generated by other commercial lots within the Preliminary Plan area.*

*To develop the triggers identified above, the SimTraffic traffic simulation model used in the Preliminary Plan traffic study was modified for short term conditions with the proposed temporary access point. Traffic volumes in addition to the projected convenience store traffic volumes were loaded into the model and operations were*

*simulated numerous times to identify the most logical volume trigger point. The trigger point has been based on 1) the point at which the eastbound left turn queue extending back from the Meridian/Bent Grass Meadows intersection backed through the temporary access intersection and average of about five percent of the time during the afternoon peak hour and/or 2) the westbound left turn queue at the temporary site access exceeded one or two vehicles. Queues regularly backing through the site access intersection have the potential to cause different operational and safety problems. Westbound queues at the site access extending back more than one or two vehicle lengths for a period of time can restrict the available distance for traffic turning from Meridian onto Bent Grass to maneuver to the right of these queued left turning vehicles or stop safely at the back of the left turn queue. This queue should be monitored most closely, however the simulation model indicated limited queue occurrence and short queue length and duration due to low opposing volumes arriving from the west along Bent Grass Meadows Drive. This analysis is based on several analysis parameters. These can be found in the attached Synchro analysis sheets. The results can be seen in the attached SimTraffic analysis results printouts. The analysis model used two-stage left turns from Bent Grass Meadows to northbound Meridian Road.*

As shown on Figure 4, 402 vehicles were counted on Bent Grass Meadows Drive just west of Meridian Road (219 eastbound vehicles and 183 westbound vehicles) during the morning peak hour.

## **BACKGROUND TRAFFIC**

Background traffic is the traffic estimated to be on the roadways without the Bent Grass Residential Filing No. 2 traffic. The short-term (Year 2020) background traffic volumes are shown in Figure 4. The background traffic volumes are based on the existing traffic volumes shown in Figure 3 with a portion of the volumes assumed to be rerouted with the construction of Bent Grass Meadows Drive between the existing sections located north of the Woodmen frontage road and west of Meridian Road. The short-term background traffic volumes also include additional traffic projected to be generated by buildout of the Bent Grass East Commercial development. Through traffic on Meridian Road was assumed to grow based on two percent growth per year.

Figure 5 shows the projected 2040 background traffic volumes. These volumes were estimated by LSC, based on previous work completed in the area by LSC including other Bent Grass Meadows developments and the Falcon Marketplace. The 2040 background traffic volumes assume buildout of the area north of Woodmen Road and west of Meridian Road.

## **TRIP GENERATION**

Estimates of the vehicle-trips generated by Bent Grass Residential Filing No. 2 have been made using the nationally published trip generation rates found in *Trip Generation, 10th Edition* by the Institute of Transportation Engineers (ITE). The results of the trip generation estimate are shown in Table 2.

Bent Grass Residential Filing No. 2 can be expected to generate about 1,690 vehicle-trips on the average weekday, with about half entering and half 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 33 vehicles would enter, and 99 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 112 additional vehicles would enter, and 66 vehicles would exit the site.

## **TRIP DISTRIBUTION AND ASSIGNMENT**

The estimated directional distribution of the site-generated traffic volumes on the adjacent roadways is an important factor in determining the site's traffic impacts. Figure 6 shows the directional distribution estimates for the site-generated traffic. The estimates have been based on the following factors: the land use proposed for the site and its location, the existing and planned street and roadway system in the vicinity; and the existing/projected traffic volumes.

Trips with destination and/or origins with area bound by Woodmen Road on the south and Meridian Road on the east have been assigned separately. In the short term, a portion of the trips generated by Bent Grass Residential Filing No. 2 are estimated to travel to and from Bent Grass East Commercial development located on the southwest corner of Meridian Road and Bent Grass Meadows Drive. In the future an additional portion of the trips by Bent Grass Residential Filing No. 2 are estimated to travel to and from the future elementary school located just east of the site, to and from the future retail development planned on the northwest corner of Meridian Road and Bent Grass Meadows Drive and to and from the Falcon Marketplace to be located on the northwest corner of Woodmen Road and Meridian Road. Appendix Tables 1 and 2 show the internal trip assumptions and calculations.

When the external trip distribution percentages (from Figure 6) are applied to the trip generation estimates (from Table 2), the resulting site-generated traffic volumes can be determined. Figure 7 shows the short-term site-generated traffic volume estimates. The short-term site-generated traffic volumes assume Bent Grass Meadows Drive has been constructed between Meridian Road and the Woodmen frontage road.

Figure 8 shows the long-term site-generated traffic volumes. The long-term site-generated traffic volumes assume buildout of the areas north of Woodmen Road and west of Meridian Road.

## **TOTAL TRAFFIC**

Figure 9 shows the projected short-term total traffic volumes at the site access points and key area intersections. The short-term total traffic volumes are the sum of the short-term background traffic volumes from Figure 4 plus the short-term site-generated traffic volumes from Figure 7.

Figure 10 shows the projected 2040 total traffic volumes at the site access points and key area intersections. The 2040 total traffic volumes are the sum of the 2040 background traffic volumes from Figure 5 plus the long-term site-generated traffic volumes from Figure 8.

## **PROJECTED LEVELS OF SERVICE**

The site access points and key area intersections were analyzed to determine the projected levels of service based on the unsignalized method of analysis procedures found in *the Highway Capacity Manual, 6th Edition* by the Transportation Research Board or using Synchro. Figures 4, 5, 9 and 10 show the level of service analysis results. The level of service technical reports are attached.

### **Meridian/Bent Grass Meadows**

The intersection of Meridian/Bent Grass Meadows is currently two-way, stop-sign controlled. It is our understanding that this intersection will be required to be converted to traffic signal control with any additional development within Bent Grass East Commercial located southwest of this intersection. It is likely that this intersection would need to be converted to signal control even without additional development once Bent Grass Meadows Drive is constructed between the two existing sections north of the Woodmen frontage road and west of Meridian Road. As a signal-controlled intersection all movements are projected to operate at LOS D or better during the peak hours based on both short-term and 2040 total traffic volumes.

Per El Paso County requirement, the following are three potential alternatives to a conventional, signalized, full-movement intersection, for which analysis results are presented in the preceding paragraph. These include modern roundabout, unsignalized “channelized T” type intersection, and a “channelized T” type intersection with a directional traffic signal.

### **Modern Roundabout Intersection**

A modern roundabout intersection at Bent Grass Meadows Drive/Meridian Road would be a multi-lane roundabout.

#### **Advantages**

- The delay for the side-street left turn (eastbound approach) would improve from LOS F to LOS C in the short term.



- Generally, modern roundabouts have safety advantages over signal-controlled intersections. This is because crashes tend to be lower speed, there are fewer conflict points, and the types (angle) of crashes tend to be those which generally result in less severe accidents. Granted, conventional T intersections have significantly fewer conflict points than four-leg conventional intersections.
- A roundabout may be more aesthetically appealing than a traditional signal-controlled intersection and may have generally lower traffic noise levels.
- Long-term operation and maintenance cost is likely to be lower with a roundabout than a traffic signal.

#### Disadvantages

- It would likely be difficult, if not impossible, to fit a multi-lane roundabout at this location given the limited ROW available on the east side of the intersection.
- The projected afternoon level of service for the northbound through movement is projected to be worse with the roundabout than with signal control.
- The travel speed through the intersection compared with a signalized intersection during the signal green phase would be slower for through traffic on Meridian Road. This may adversely affect travel times along the corridor. Also, if and when signalized intersections in the Meridian Road corridor are put into coordination, a roundabout would likely disrupt coordination.

#### Channelized T Intersection

The channelized T type intersection allows for an intersection with generally lower overall and side-street delay than with a conventional T intersection and with fewer stops for the through traffic on the major roadway when compared to a conventional signalized T intersection. An example of a channelized T-type intersection is at the intersection of US Highway 24 and Garrett Road near Falcon (El Paso County). That particular intersection is signalized with a “directional signal,” but a channelized T at some locations can also operate as an unsignalized intersection with Stop-sign control on the minor street (Note: the analysis for this intersection indicates LOS F for the side-street left turn if not signalized). The raised median configuration would allow for “free” (no stopping) movement for the northbound through movement through the intersection. The eastbound left turn would cross the southbound lanes and into a channelized northbound left-turn acceleration lane for merging into northbound through traffic. This left-turn acceleration lane would need to be added on Meridian Road.

### Advantages

- The intersection of Meridian/Bent Grass Meadows could likely operate at a satisfactory level of service as a stop sign-controlled intersection for longer as an unsignalized, channelized T intersection than if it were to remain a conventional T intersection.
- Signal control would be required to maintain an acceptable level of service, the channelized T configuration would result in lower delay for through traffic especially for the northbound traffic which would operate as a free movement. The overall intersection delay is projected to be better with a channelized T intersection.
- There is the potential, depending on the time of day and traffic volumes, to allow for a longer side-street signal phase due to one-way signal progression and no red phase for northbound traffic.

### Disadvantages

- The channelized T configuration may only be viable until (and if) a dual eastbound left turn lane is needed and/or Meridian Road is widened to six lanes (however, either may not occur for many years).
- The channelized T configuration may be confusing for some drivers and the merging movement into southbound traffic requires a more complex movement than with a signal. However, most motorists entering the intersection from the east would be regular users and would quickly learn to navigate the intersection.
- A channelized T intersection would require the construction of raised channelizing medians on Meridian Road and the ongoing maintenance of those medians. This would add significant cost to the project.
- The section of Meridian Road between this intersection and the Woodmen Hills Drive/Meridian Road intersection would need to be designed to accommodate a northbound left-turn acceleration lane from Bent Grass Meadows Drive a taper, and a northbound left-turn lane approaching Woodmen Hills Drive. Based on a posted speed limit of 55 mph, the El Paso County *Engineering Criteria Manual* (ECM) requires a 960-foot-long acceleration lane plus a 222-foot taper. Based on a design speed of 60 mph, the ECM requires a 290-foot-long left-turn deceleration lane approaching Woodmen Hills Drive plus storage length. The current lane length is about 700 feet plus a standard-length taper. The total length of the acceleration lane, lane tapers, and existing northbound left-turn lane for Woodmen Hills would be between 2,100 feet (1,880 if a continuous lane with a shared 222' taper length). The total distance between the intersections is about 2,000 feet (centerline to centerline).

- A channelized T can be more difficult for pedestrians than a conventional signalized intersection. However, there may be ways to better accommodate pedestrians – such as adding a pedestrian-only phase for southbound traffic. More research would be needed regarding pedestrian accommodation.

### **Woodmen/Golden Sage**

All movements at the intersection of Woodmen/Golden Sage are projected to operate at LOS D or better during the peak hours based on the projected short-term total traffic volumes. By 2040 the southbound 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.

### **Woodmen frontage road/Golden Sage**

The intersection of the Woodmen frontage road/Golden Sage is currently stop sign controlled. All movements at this intersection are projected to operate at LOS B or better during the peak hours based on the projected short-term total traffic volumes. By 2040 the westbound approach is projected to operate at LOS E during the morning peak hour and LOS F during the afternoon peak hour. All movements are projected to operate at LOS C or better if this intersection is converted to either traffic signal control or reconstructed as a modern roundabout.

### **Woodmen frontage road/Bent Grass Meadows**

All movements at the stop sign-controlled intersection of the Woodmen frontage road/Bent Grass Meadows are projected to operate at LOS C or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

### **Site Access Points**

Both full-movement site access points to Bent Grass Meadows Drive are projected to operate at LOS B or better for all movements as stop sign-controlled intersections based on the short-term and 2040 total traffic volumes.

### **VEHICLE QUEUING ANALYSIS**

A queuing analysis was performed using Synchro/SimTraffic for the key approach turning movements at the key area intersection to determine the projected queue lengths based on the projected total traffic volumes. The short-term and 2040 total peak-hour traffic volumes were

entered into the Synchro model. The simulation was run five times. The queuing reports are attached.

The projected maximum northbound left-turn queue on Meridian Road approaching Bent Grass Meadows Drive is about 238 feet based on the short-term total afternoon peak hour volume and 436 feet based on the 2040 total afternoon peak hour volume. This queue could be accommodated by the existing 700-foot left-turn lane.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Trip Generation**

- Bent Grass Residential Filing No. 2 can be expected to generate about 1,690 vehicle-trips on the average weekday, with about half entering and half exiting in a 24-hour period. During the morning peak hour about 33 vehicles would enter, and 99 vehicles would exit the site. During the afternoon peak hour about 112 additional vehicles would enter, and 66 vehicles would exit the site.

### **Level of Service**

- The eastbound left-turn movement at the stop-sign-controlled intersection of Meridian/Bent Grass Meadows is currently operating at LOS F during the morning peak hour and LOS E during the afternoon peak hour. If signalized, all movements are projected to operate at LOS D or better during the peak hours based on the projected short-term and 2040 total traffic volumes. The Level of Service section above also discusses potential alternative traffic control options.
- All movements at the intersection of Woodmen/Golden Sage are projected to operate at LOS D or better during the peak hours based on the projected short-term total traffic volumes. By 2040 the southbound and eastbound left-turn movements are projected to operate at LOS E during the morning peak hour.
- All movements at the stop sign-controlled intersection of the Woodmen frontage road/Golden Sage are projected to operate at LOS B or better during the peak hours based on the projected short-term total traffic volumes. By 2040 alternate intersection control such as a traffic signal or a modern roundabout will likely be needed to maintain an acceptable level of service for this intersection.
- The intersection of the Woodmen frontage road/Bent Grass Meadows and the site access points to Bent Grass Meadows are projected to operate at LOS C or better for all movements during the peak hours at stop-sign controlled intersections based on the projected short-term and 2040 total traffic volumes.

### **Temporary 7-Eleven Access Evaluation**

- The access to 7-Eleven on Bent Grass Meadows Drive was permitted and constructed as a temporary access and will be allowed to remain open with continued use subject to reevaluation. A trigger volume of 200 entering and 200 exiting peak hour trips using Bent Grass Meadows Drive just west of Meridian Road was established as the point at which reevaluation should occur as per the foregoing. As shown on Figure 4, 402 vehicles were counted on Bent Grass Meadows Drive just west of Meridian Road (219 eastbound vehicles and 183 westbound vehicles) during the morning peak hour. The temporary access will likely need to be closed with either additional development within the Bent Grass East Commercial or the completion of Bent Grass Meadows Drive between the two existing sections.

### **Roadway Improvements**

- Table 4 identifies the future roadway improvements that will be needed in the vicinity of the site. Table 4 also gives a recommended trigger for when each improvement will be needed.
- There is currently a 700-foot long single northbound left-turn lane on Meridian Road approaching Bent Grass Meadows Drive. A vehicle queueing analysis indicates that this intersection could continue to operate with a single left-turn lane, based on the short-term and 2040 total traffic volumes.

Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

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

JCH:KDF/bjwb

Enclosures: Tables 1, 3, 4, and 5  
Figures 1-10  
Crash Reports  
Traffic Count Report  
Level of Service Reports  
Queueing Reports

**Table 2**  
**Trip Generation Estimate**  
**Bent Grass Residential Filing No. 2**

Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>						Total Trips Generated			
			Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	
				In	Out	In	Out		In	Out	In	Out
210	Single-Family Detached Housing	179 DU <sup>(2)</sup>	9.44	0.19	0.56	0.62	0.37	1,690	33	99	112	66
Notes: (1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE) (2) DU = dwelling unit												
Source: LSC Transportation Consultants, Inc.												

Verify

**Table 3**  
**Level of Service Comparison**  
 Bent Grass Meadows Drive/Meridian Road

Scenario		Short-Term Total Traffic							2040 Total Traffic						
		AM Peak							AM Peak						
		Eastbound		Northbound		Southbound		Overall	Eastbound		Northbound		Southbound		Overall
		Left	Right	Left	Through	Through	Right		Left	Right	Left	Through	Through	Right	
Stop-Sign Control With Channelized "T" Configuration	Delay	1213.2	67.2	35.8	Free	Free	Free	---	>6000	165.7	186.8	Free	Free	Free	---
	LOS	F	F	E					F	F	F				
Modern Roundabout	Delay	17.2	37	5.9	6.4	15	20.9	16.6	18.5	33.1	6.1	6.7	17	25.3	17.9
	LOS	C	E	A	A	C	C	C	D	F	A	A	D	Free	E
Conventional Signal Control	Delay	40.7	20	28.4	4.5	20.9	2.3	17	---	---	---	---	---	---	---
	LOS	D	B	C	A	C	A	B	---	---	---	---	---	---	---
Conventional Signal Control With Free Eastbound Right	Delay	41.6	0.3	28.5	4.4	20.4	2.2	15	54	0.3	52.2	3.3	29.6	3.4	23.5
	LOS	D	A	C	A	C	A	B	D	A	D	A	C	A	C
Signal Control With Channelized "T" Configuration	Delay	40.6	19.9	28.5	Free	20.9	2.3	16.1	54	0.3	52.2	Free	29.6	3.4	23.0
	LOS	D	B	C		C	A	B	D	A	D		C	A	C

Scenario		PM Peak							PM Peak						
		Eastbound		Northbound		Southbound		Overall	Eastbound		Northbound		Southbound		Overall
		Left	Right	Left	Through	Through	Right		Left	Right	Left	Through	Through	Right	
		381.7	17.0	14.5	Free	Free	Free	---	5567.1	45.2	47.7	Free	Free	Free	---
Stop-Sign Control With Channelized "T" Configuration	LOS	F	C	B					F	E	E				
Modern Roundabout	Delay	8.9	10.1	11.3	13.8	7.7	8.7	10.7	8.9	10.1	11.3	13.8	7.8	8.7	10.7
	LOS	A	B	B	B	A	A	B	E	C	E	F	B	C	E
Conventional Signal Control	Delay	46.4	8.1	11.5	7.5	13.9	2.5	12.2	---	---	---	---	---	---	---
	LOS	D	A	B	A	B	A	B	---	---	---	---	---	---	---
Conventional Signal Control With Free Eastbound Right	Delay	46.4	0.3	11.5	7.5	13.9	2.5	11.5	53.8	8.9	47.3	9.4	32.7	4.0	25.0
	LOS	D	A	B	A	B	A	B	D	A	D	A	C	A	C
Signal Control With Channelized "T" Configuration	Delay	46.4	8.1	11.1	Free	14.2	2.5	9.4	53.8	8.9	47.3	Free	32.7	4.0	21.8
	LOS	D	A	B		B	A	A	D	A	D		C	A	C

Source: LSC Transportation Consultants, Inc.

Table 4 Improvements Bent Grass Residential Filing No. 2				
Description		Trigger	Timing	Responsibility
Meridian Road/Bent Grass Meadows Road				
Signalize Meridian/Bent Grass Meadows	Remove existing stop-sign and replace with traffic signal control.	When warrant(s) are met -- 2 of the 3 conditions of the "Crash Experience" warrant are currently met. The current number of reported crashes (susceptible to correction with a signal) exceeds the threshold as do the associated traffic volume thresholds.	With opening of the approved expansion of the veterinary clinic or Once El Paso County determines that the remaining condition within the Crash Experience Warrant has been met (determines that alternatives have failed to reduce crash frequency) and determines that a signal should be installed.	Bent Grass Metro District
Right-turn acceleration lane on Meridian at Bent Grass Meadows	ECM criteria indicates the acceleration lane would need to be 960 feet long plus a 222-foot taper based on the design speed of 60 mph. Note that Owl Lane is located approximately 925 feet south of Bent Grass Meadows Drive. Therefore, the lane would be a continuous acceleration/deceleration lane between Bent Grass Meadows Drive and Owl Lane.	ECM criteria has been exceeded. A deviation was previously approved waiving this requirement with the development of Bent Grass Residential Filing 1 and Bent Grass East Commercial Filing 2A. Additional development will either require the submittal and approval of a new deviation or construction of this improvement. (Notes: The installation of the traffic signal will regularly stop southbound traffic allowing eastbound right turns to enter southbound Meridian Road without an acceleration lane. The LOS analysis indicates significant improvement of the LOS with the signal. The crash data does not indicate a safety issue with the current eastbound right movement without the accel lane. Several costly improvements may be needed to build the accel lane -- including burying the overhead power lines south to Owl Place, reconstructing the ditch section along the west side of Meridian Road, and reworking the radius at Meridian Road. This intersection is similar to the Meridian/Woodmen Hills, Meridian/Stapleton, and Meridian/Londonderry intersections to the north in that [or "to the extent that"] southbound right acceleration lanes have not been added. If the County ultimately wants a raised right-turn island on this southwest corner of the Bent Grass Meadows/Meridian Road intersection in conjunction with an accel lane, this would likely need to be accomplished later with the overall widening of Bent Grass Meadows just west of Meridian Road.	Accel lane construction or a deviation -- with any development beyond the approved expansion of the veterinary clinic and expansion of parking for the dental clinic.	Bent Grass Metro District
Bent Grass Meadows Dr				
Construct Bent Grass Meadows Drive between the existing sections located north of the Woodmen frontage road and west of Meridian Road	Construct Bent Grass Meadows Drive as a Non-Residential Collector	With any development west of Bent Grass Residential Filing No. 1	With the currently proposed Bent Grass Residential Filing No. 2	Bent Grass Developer/District
Restrict westbound left-turn at 7-Eleven access	Remove the striping for the left-turn bay at the 7-Eleven access, restripe for two sets of dual yellow lines as shown in Figure 9. If trigger for closure of westbound left-in is reached prior to the trigger for access closure, install No Left Turn signs and reflective, plastic delineators within the painted center median across the 7-Eleven access.	When westbound left-turn queue exceeds the length of the existing lane.	"With 50% percent development of the remaining vacant parcels within Bent Grass East Commercial beyond the approved expansion of the veterinary clinic and expansion of parking for the dental clinic.  or  With the completion of Bent Grass Meadows Dr between the Woodmen frontage road and Meridian Road	Bent Grass Metro District
Close 7-Eleven Access	Remove the existing curb cut.	When the eastbound right-turn queue approaching Meridian Road blocks the access and/or if motorists exiting from the 7-Eleven access and turning into the eastbound left-turn lane approaching Meridian Road regularly impede/block the adjacent eastbound right-turn lane approaching Meridian Road.	With 50% percent development of the remaining vacant parcels within Bent Grass East Commercial beyond the approved expansion of the veterinary clinic and expansion of parking for the dental clinic.  or  With the completion of Bent Grass Meadows Dr between the Woodmen frontage road and Meridian Road	Bent Grass Metro District
Woodmen frontage road/Bent Grass Meadows Dr				
Eastbound left-turn lane on Woodmen frontage road approaching Bent Grass Meadows Dr.	ECM criteria indicates the left-turn lane would need to be 315 feet long (155 feet of deceleration length plus 160 feet of storage length) plus a 160-foot taper based on the design speed of 40 mph.	When the eastbound left-turn volume exceeds 25 vehicles per hour	With the completion of Bent Grass Meadows Dr between the Woodmen frontage road and Meridian Road	Bent Grass Developer/District
Woodmen/Golden Sage				
Lengthening of the current eastbound single left-turn deceleration lane on Woodmen approaching Golden Sage Road	Provide a 240-foot transition taper (20:1 taper ratio), 290 feet of deceleration distance plus sufficient vehicle stacking distance. CURRENT: 175-foot taper plus a 465-foot left-turn lane which translates to a 175-foot taper, 290-foot deceleration distance, and 175 feet of stacking distance. SHORT TERM: Adequate stacking is available in the current turn lane - calculated queue length 204 feet. LONG TERM: Lengthen single left-turn lane and/or future implementation of dual left-turn lanes (if capacity needs dictate). If a dual left is implemented in the future, consideration will need to be given to the configuration on Golden Sage and at the Golden Sage/Woodmen Frontage Road intersection to receive the dual left-turn movement.	The estimated "trigger" of 40 PM peak hour eastbound left turns above the estimated short term total volume (from Figure 16a of the TIS) approximately translates to and additional 589 directional ADT for residential trips making this turning movement (based on the ITE single family trip ratio). This estimated threshold may be reached with a combination of site-generated trips and background trips.	AS NEEDED TO MAINTAIN ADEQUATE LEVEL OF SERVICE AND VEHICLE STACKING DISTANCE. " This is estimated to be when the eastbound left turn turning volume reaches approximately 200 vehicles per hour during the PM peak. This translates to about 40 vehicles per hour over the estimated short term total volume from Figure 16a of the Falcon Marketplace TIS. Note: Short term total volumes assume the Meridian extension to Highway 24 to be open.	Bent Grass Developer/District - Bent Grass will pay its pro-rata share by (based on total traffic volumes) of the cost of the improvement. Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen and Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements.
Southbound exclusive right-turn lane on Golden Sage Road approaching Woodmen Road	A continuous right-turn lane within the 150 feet between the Woodmen Frontage Road and Woodmen Road	The estimated "trigger" of 5-30 AM peak hour southbound right turns above the estimated short term total volume (from Figure 16a of the Falcon Marketplace TIS) approximately translates to an additional 85-510 directional ADT for residential trips making this turning movement (based on the ITE single family trip ratio). This estimated threshold may be reached with a combination of site-generated trips and background trips.	AS NEEDED TO MAINTAIN ADEQUATE LEVEL OF SERVICE AND VEHICLE STACKING DISTANCE. " A preliminary trigger could be a southbound right turn volume of about 150-175 vehicles per hour. This translates to about 5 to 30 vehicles per hour over the projected short term volume from Figure 16a of the Falcon Marketplace TIS. This may be conservative due to the westbound right turn acceleration lane on Woodmen Road. Additional study may indicate a higher threshold based on empirical data collection and analysis.	Bent Grass Developer/District - Bent Grass will pay its pro-rata share by (based on total traffic volumes) of the cost of the improvement.Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen and Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements
Signalization of Golden Sage Road/Woodmen Frontage Road or reconstruction as a modern roundabout; Future additional laneage may be necessary at this intersection to accommodate vehicle queues and for traffic operations.	Remove existing stop-signs and replace with traffic signal control or reconstruct as modern roundabout	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues. Fair-share participation by the development or the district on behalf of the district members.	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues.	Bent Grass Developer/District - Bent Grass will pay its pro-rata share by (based on total traffic volumes) of the cost of the improvement. Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen and Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements.
Source: LSC Transportation Consultants, Inc.				



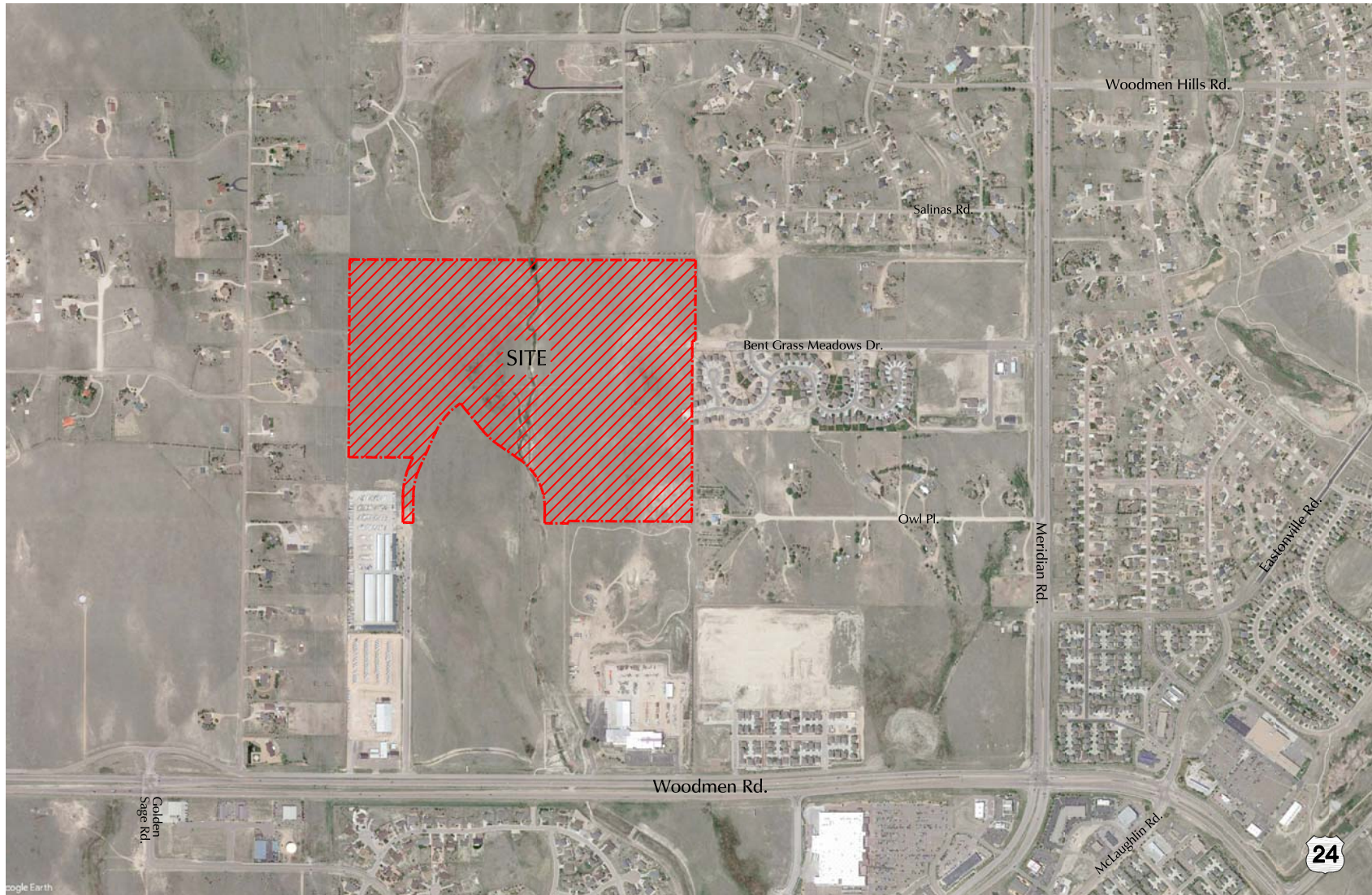
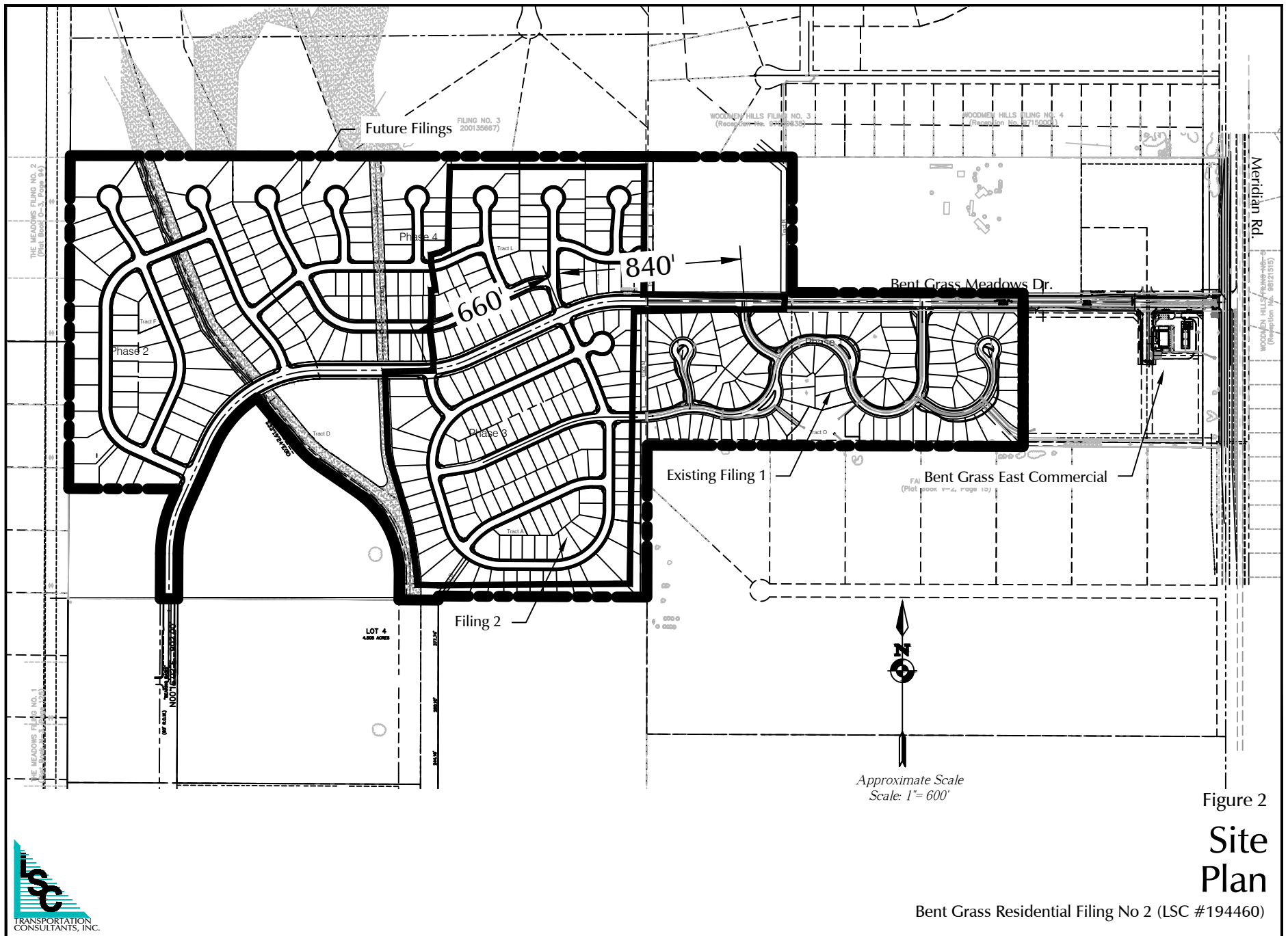


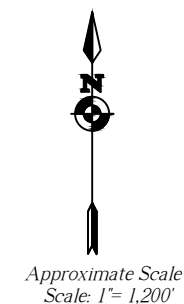
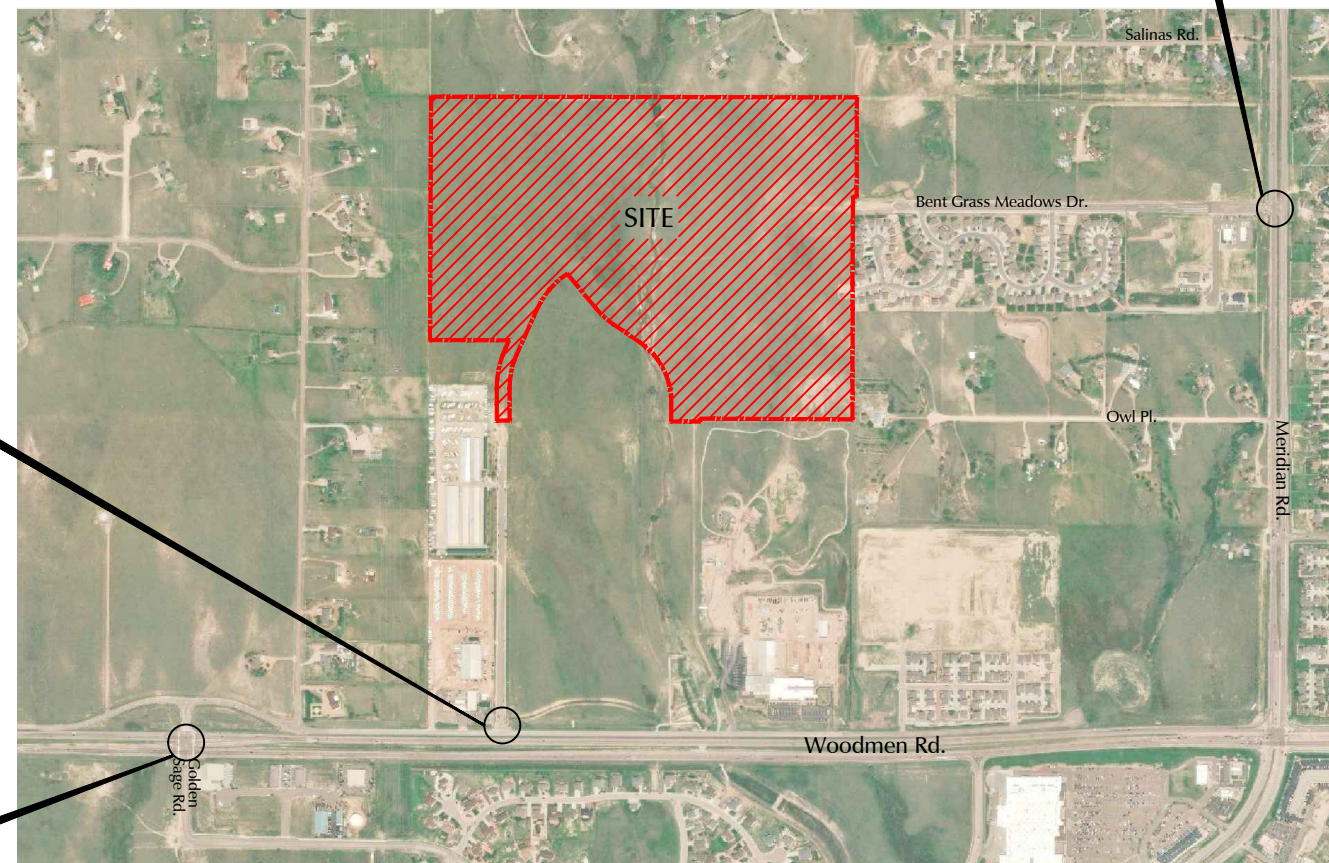
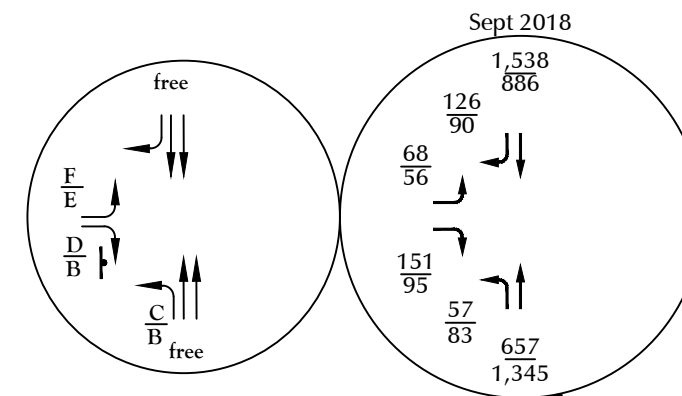
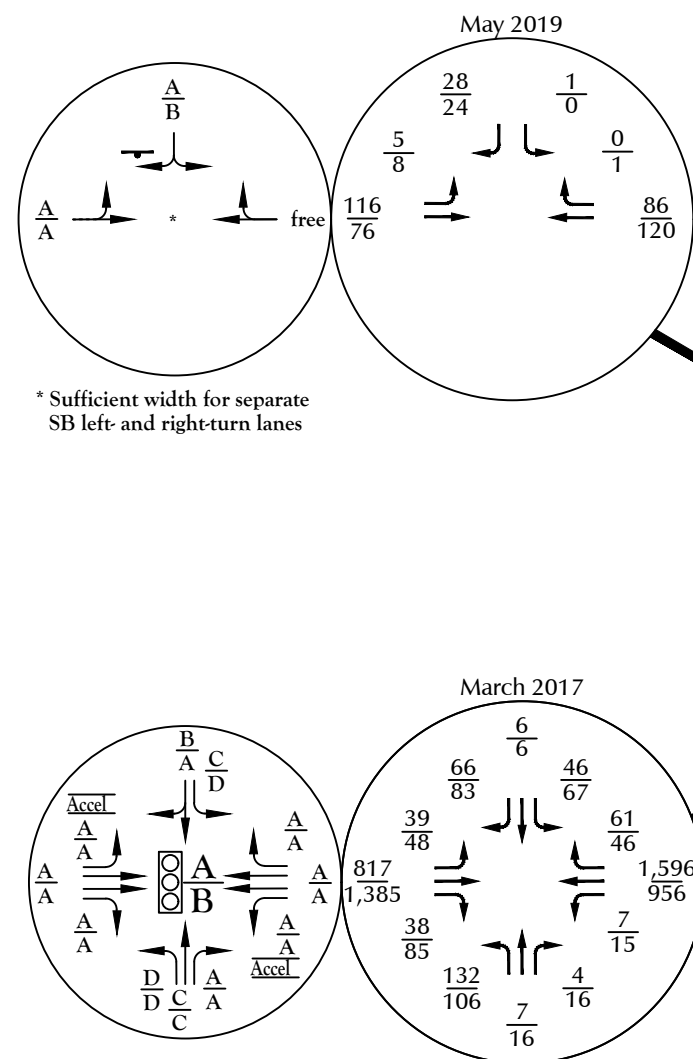
Figure 1

# Vicinity Map

Bent Grass Residential Filing No 2 (LSC #194460)







LEGEND:

⊥ = Stop Sign

⊞ = Traffic Signal

XX = AM Weekday Peak-Hour Traffic (vehicles per hour)

XX = PM Weekday Peak-Hour Traffic (vehicles per hour)

$\frac{A}{B}$  = AM Individual Movement Peak-Hour Level of Service

$\frac{B}{C}$  = PM Individual Movement Peak-Hour Level of Service

$\frac{C}{C}$  = AM Entire Intersection Peak-Hour Level of Service

$\frac{C}{C}$  = PM Entire Intersection Peak-Hour Level of Service

X,XXX = Average Daily Traffic (vehicles per day)

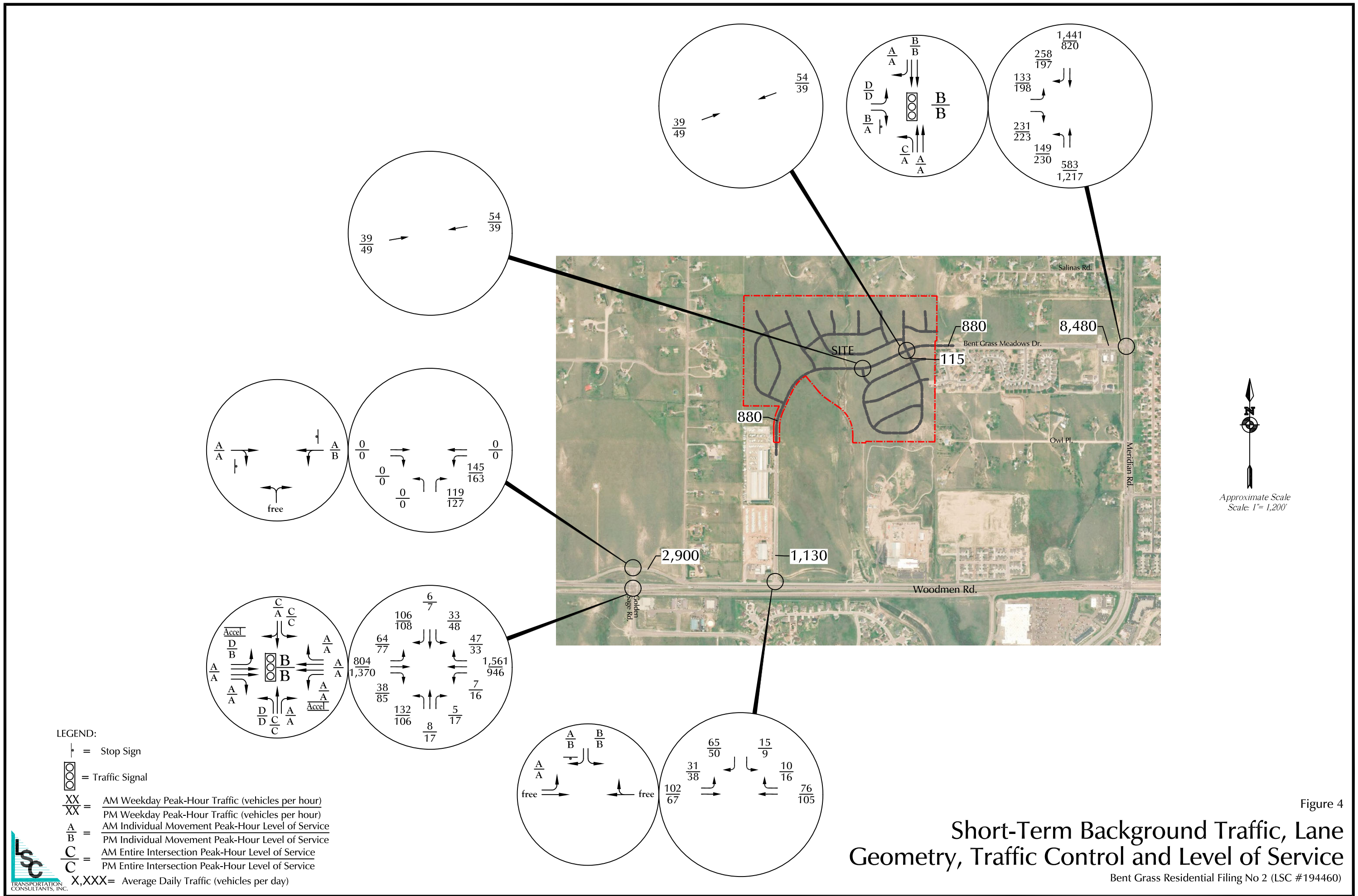


Figure 3

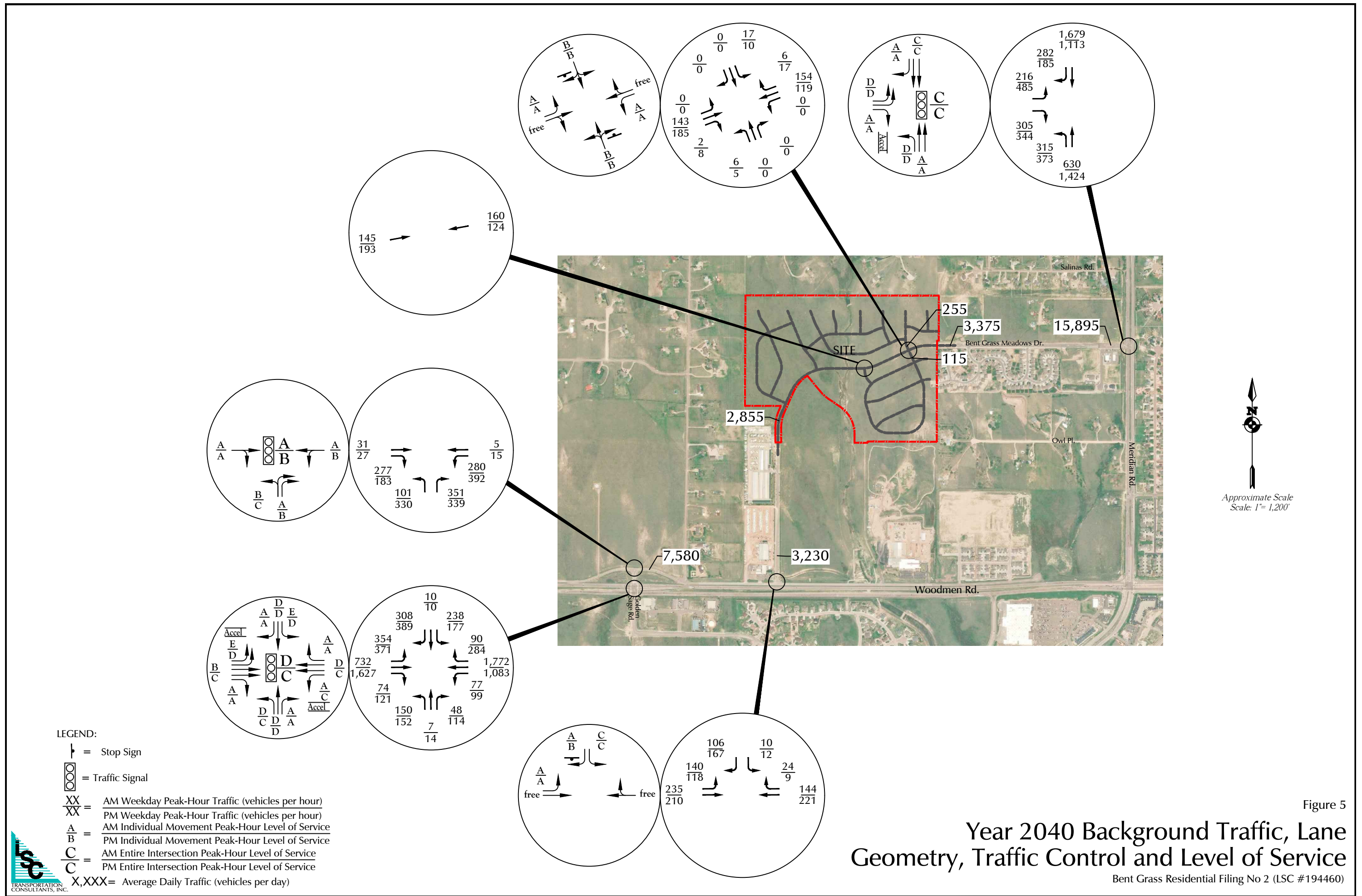
# Existing Traffic, Lane Geometry, Traffic Control and Level of Service

Bent Grass Residential Filing No 2 (LSC #194460)

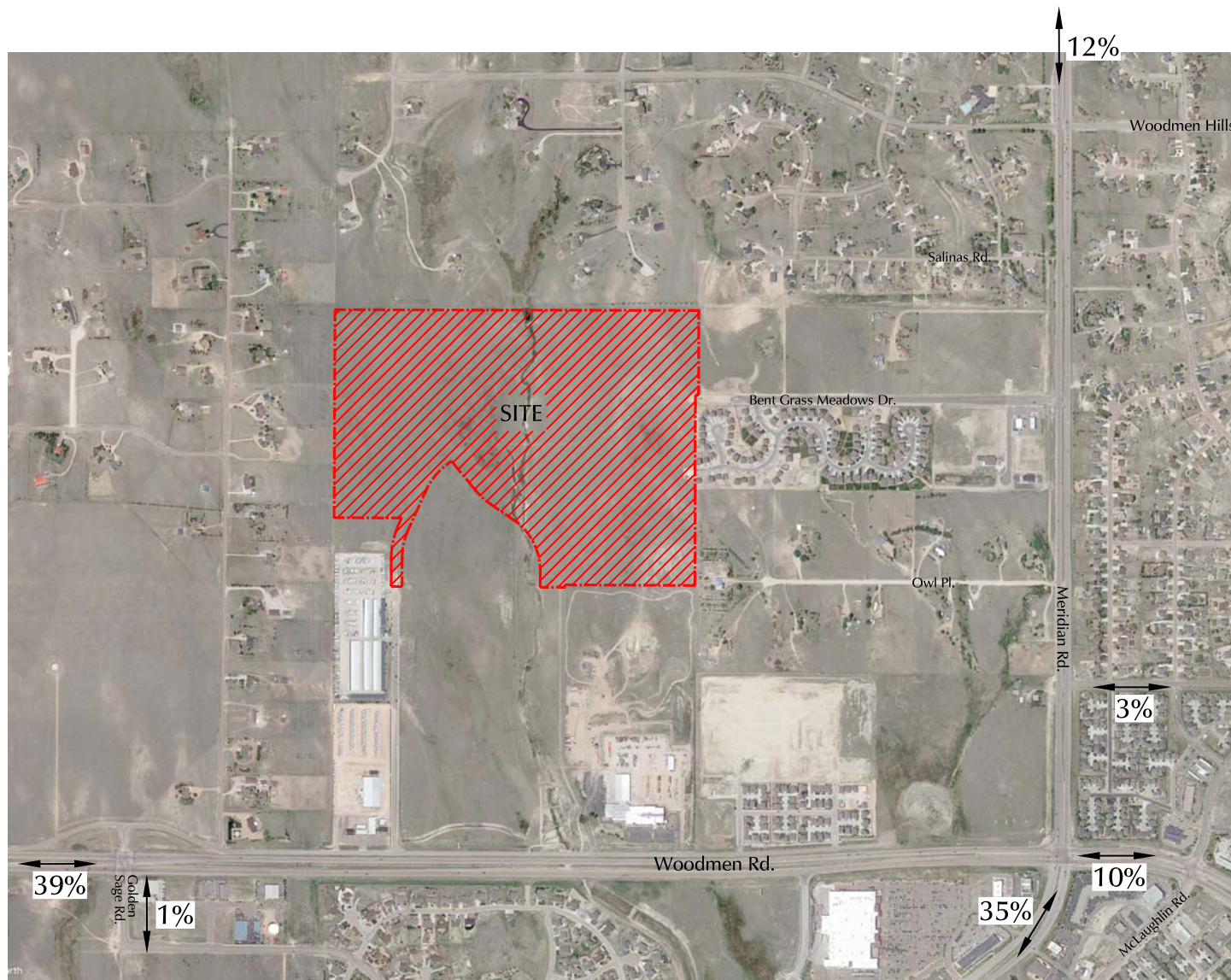












Approximate Scale  
Scale: 1" = 1,200'

Figure 6

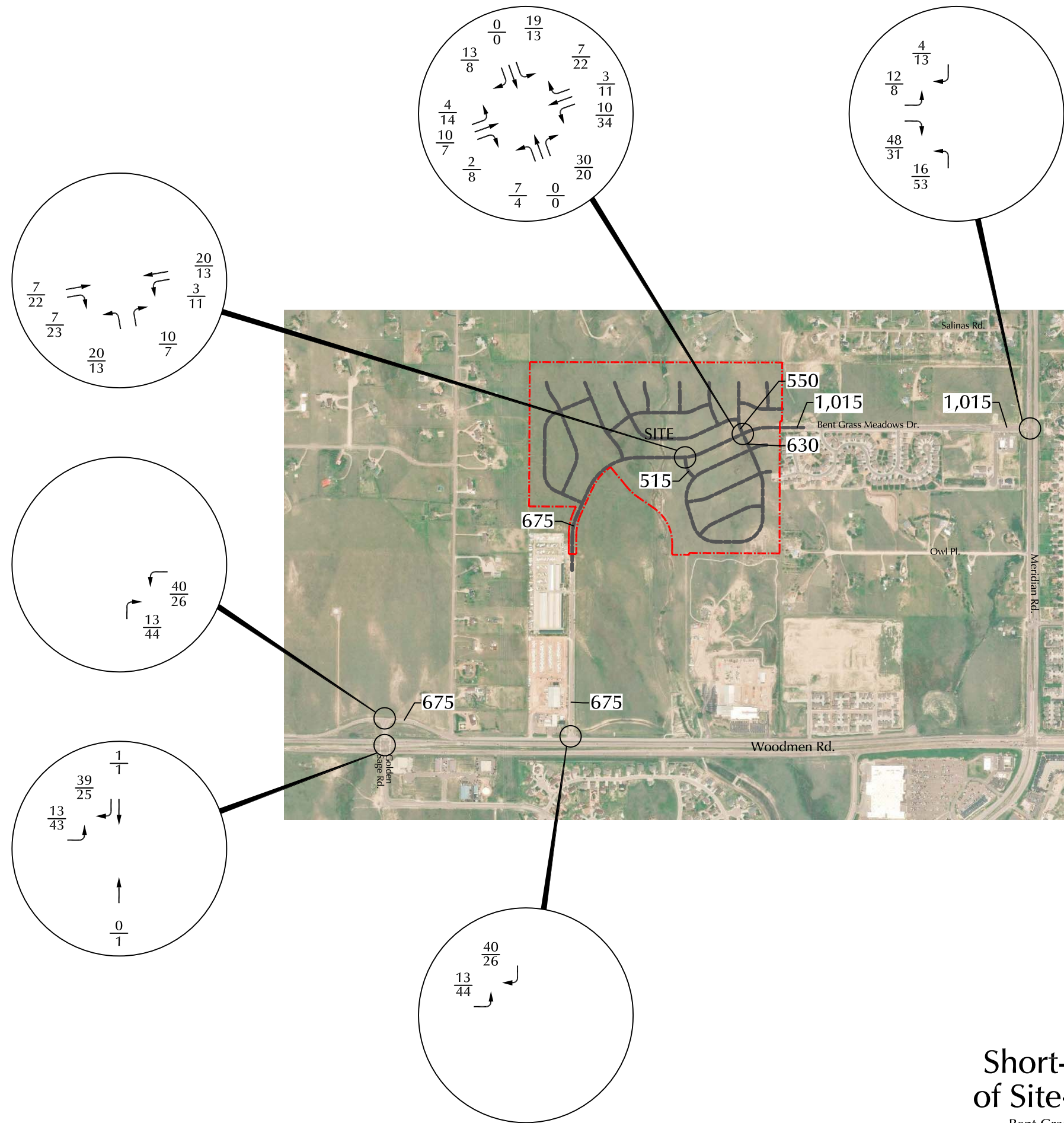
## Directional Distribution of Site-Generated Traffic

Bent Grass Residential Filing No 2 (LSC #194460)



LEGEND:

XX% = Percent Directional Distribution



Approximate Scale  
Scale: 1"= 1,200'


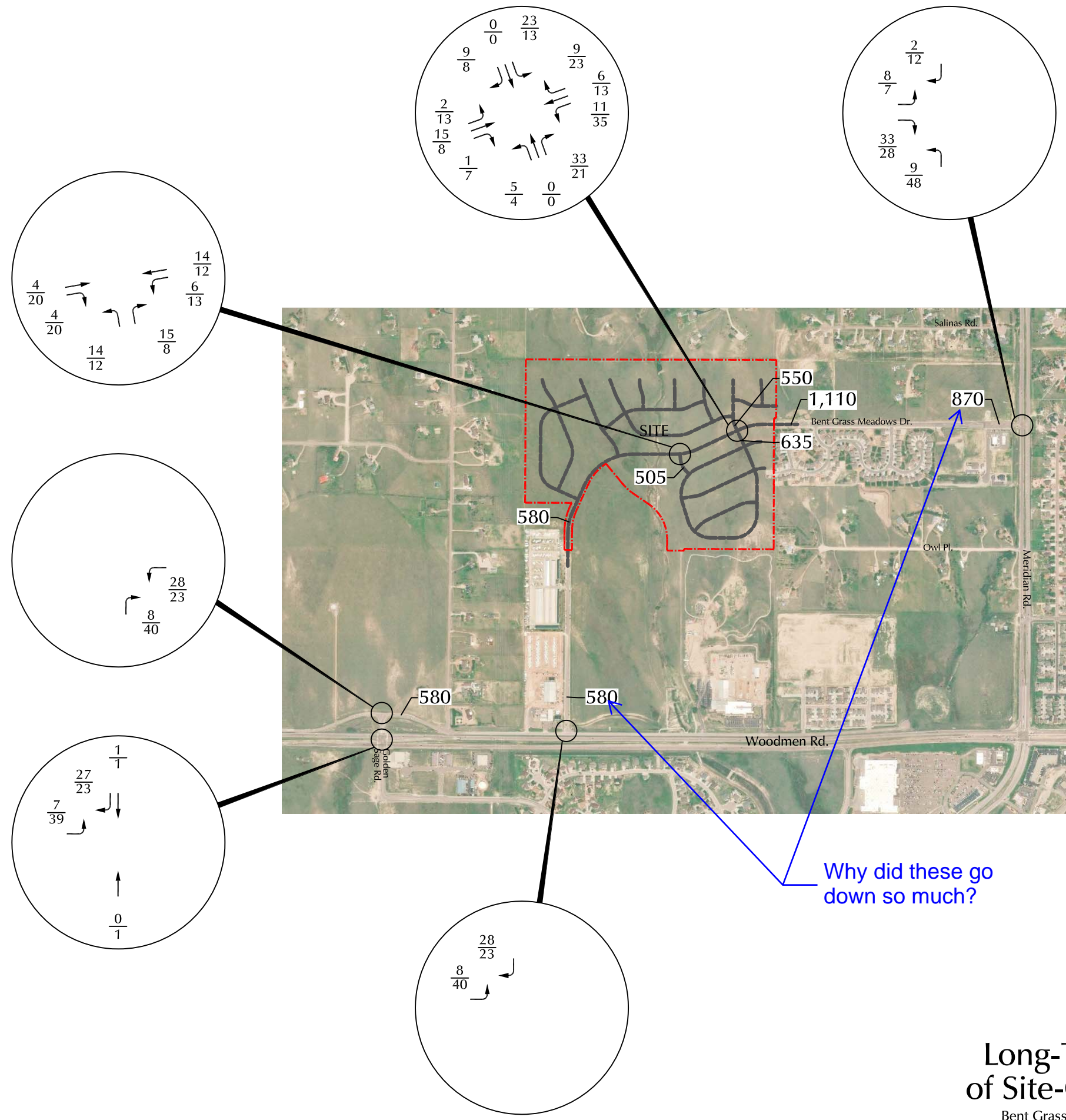
LEGEND:  
  $\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)  
 X,XXX= Average Daily Traffic (vehicles per day)

Figure 7  
**Short-Term Assignment  
 of Site-Generated Traffic**  
 Bent Grass Residential Filing No 2 (LSC #194460)





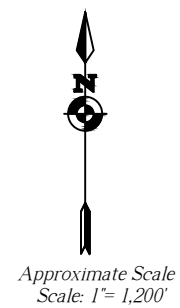
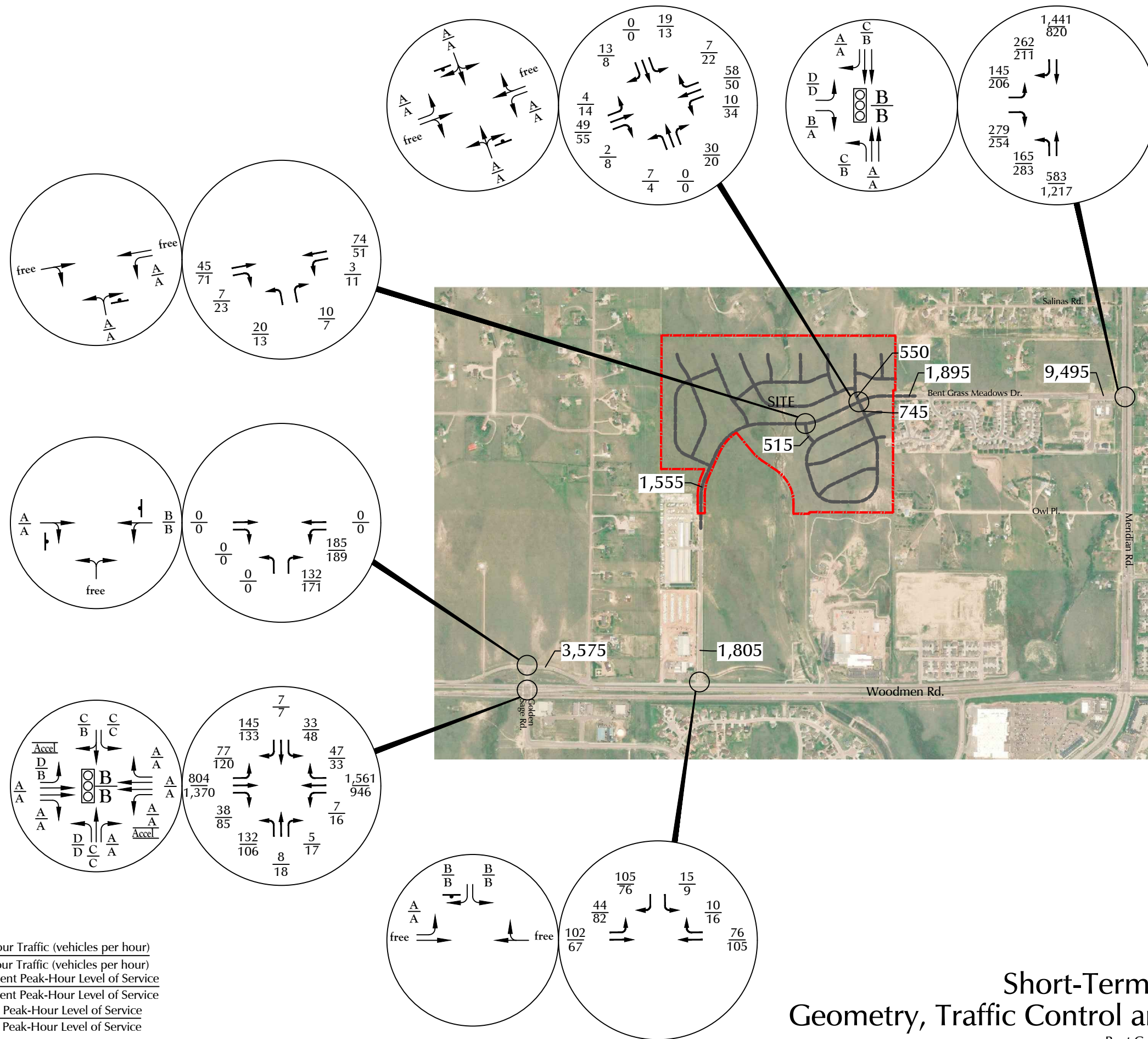
Approximate Scale  
Scale: 1"= 1,200'

**LEGEND:**

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)  
 X,XXX= Average Daily Traffic (vehicles per day)

Figure 8  
**Long-Term Assignment  
 of Site-Generated Traffic**  
 Bent Grass Residential Filing No 2 (LSC #194460)





**LEGEND:**

⊥ = Stop Sign

⓪ = Traffic Signal

XX = AM Weekday Peak-Hour Traffic (vehicles per hour)

XX = PM Weekday Peak-Hour Traffic (vehicles per hour)

$\frac{A}{B}$  = AM Individual Movement Peak-Hour Level of Service

$\frac{A}{B}$  = PM Individual Movement Peak-Hour Level of Service

$\frac{C}{C}$  = AM Entire Intersection Peak-Hour Level of Service

$\frac{C}{C}$  = PM Entire Intersection Peak-Hour Level of Service

X,XXX= Average Daily Traffic (vehicles per day)



Figure 9

## Short-Term Total Traffic, Lane Geometry, Traffic Control and Level of Service

Bent Grass Residential Filing No 2 (LSC #194460)



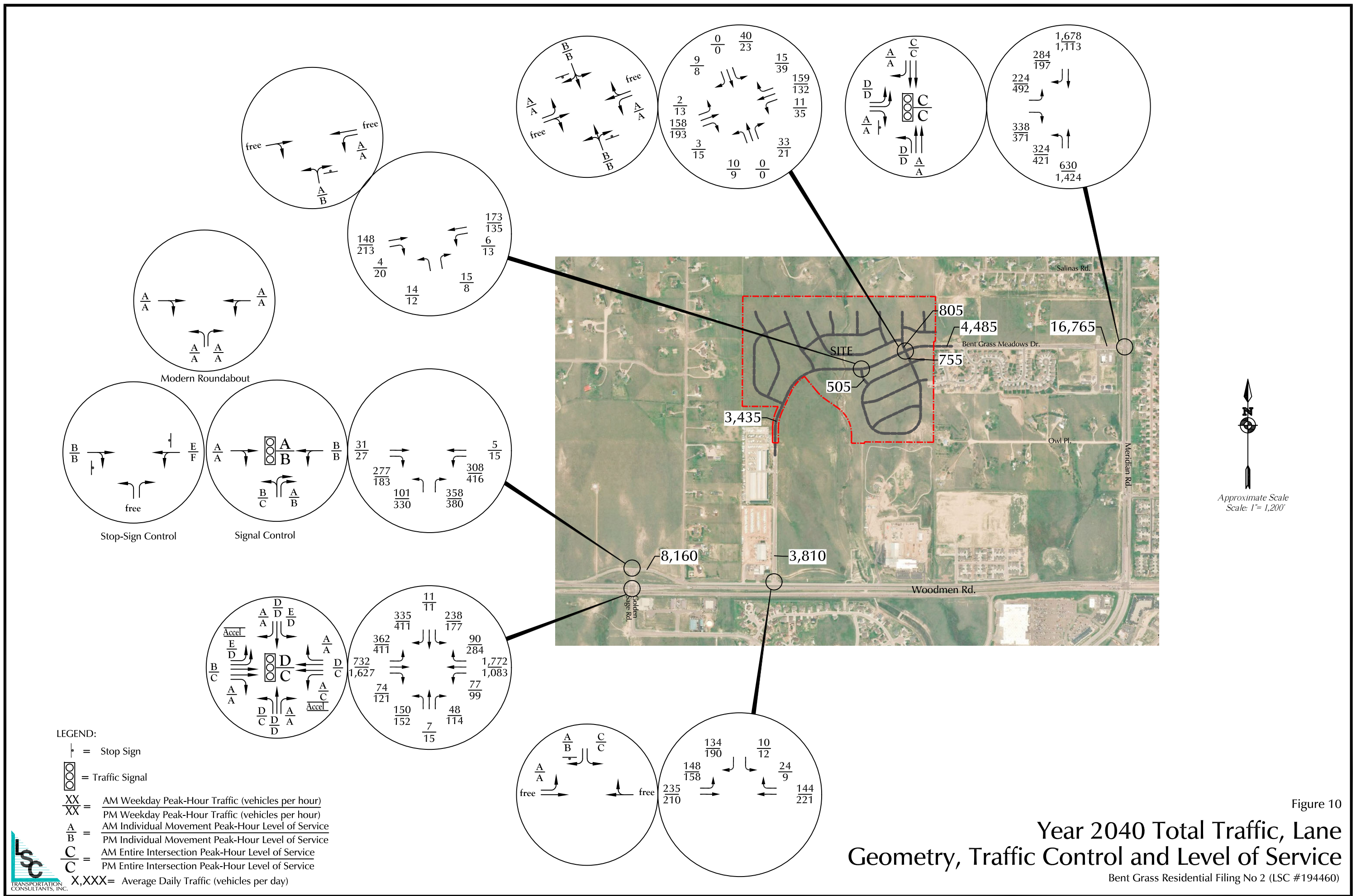


Figure 10  
**Year 2040 Total Traffic, Lane  
 Geometry, Traffic Control and Level of Service**  
 Bent Grass Residential Filing No 2 (LSC #194460)

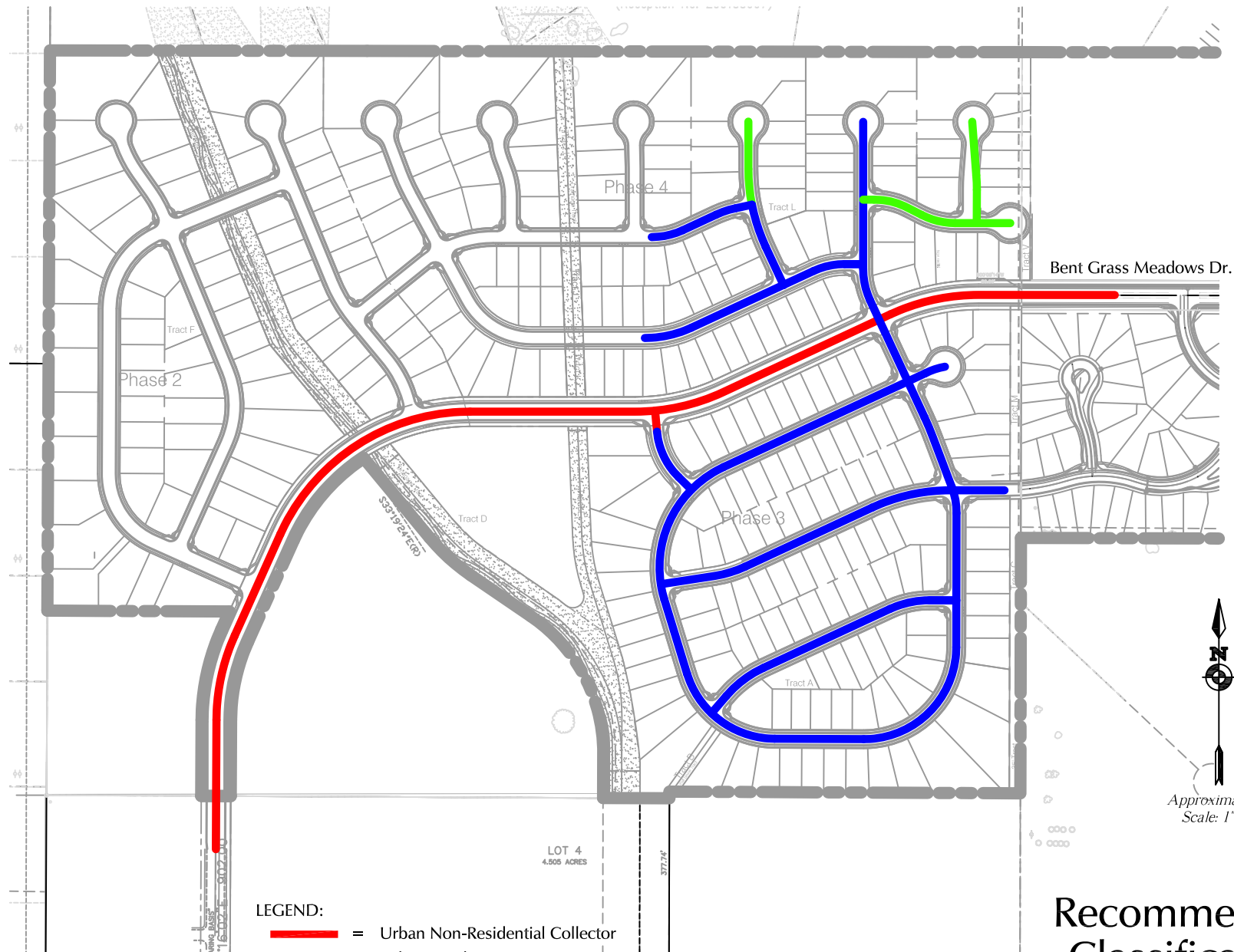


Figure 11

## Recommended Classifications

Bent Grass Residential Filing No 2 (LSC #194460)



# LSC Transportation Consultants, Inc.

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Colorado Springs, CO 80905

719-633-2868

File Name

Site Code

Start Date

Page #

## Groups Printed- Unshifted

	Bent Grass Meadows Southbound					Woodmen Frontage Rd Westbound					Northbound					Woodmen Frontage Rd Eastbound					
Start Time	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Int. Total
06:30 AM	1	0	20	0	21	0	14	0	0	14	0	0	0	0	0	0	37	0	0	37	72
06:45 AM	0	0	6	0	6	0	15	0	0	15	0	0	0	0	0	1	49	0	0	50	71
Total	1	0	26	0	27	0	29	0	0	29	0	0	0	0	0	1	86	0	0	87	143
07:00 AM	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	0	14	0	0	14	38
07:15 AM	0	0	2	0	2	0	33	0	0	33	0	0	0	0	0	4	16	0	0	20	55
07:30 AM	0	0	3	0	3	0	24	0	0	24	0	0	0	0	0	2	6	0	0	8	35
07:45 AM	0	0	2	0	2	0	23	0	0	23	0	0	0	0	0	0	8	0	0	8	33
Total	0	0	7	0	7	0	104	0	0	104	0	0	0	0	0	6	44	0	0	50	161
08:00 AM	0	0	1	0	1	0	12	0	0	12	0	0	0	0	0	2	9	0	0	11	24
08:15 AM	0	0	13	0	13	0	14	0	0	14	0	0	0	0	0	0	11	0	0	11	38



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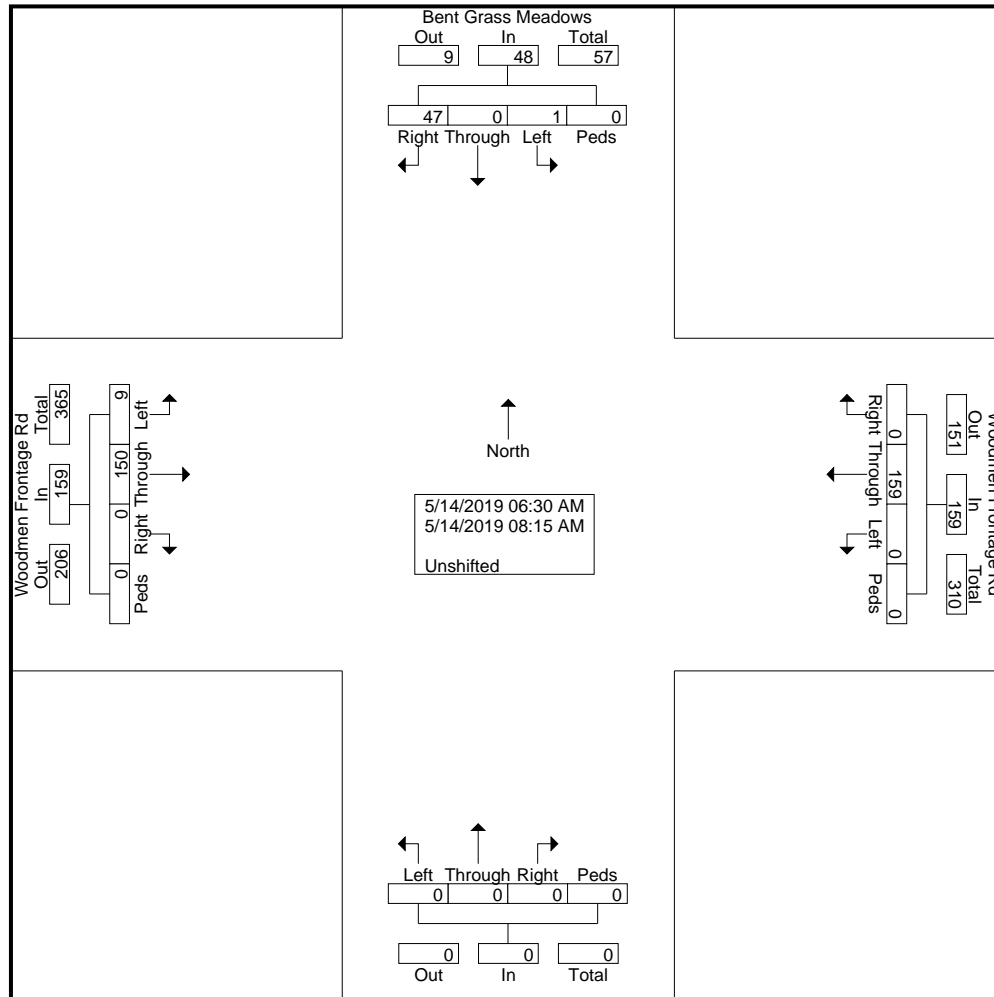
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## Groups Printed- Unshifted

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	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Int. Total
Grand Total	1	0	47	0	48	0	159	0	0	159	0	0	0	0	0	9	150	0	0	159	366
Apprch %	2.1	0	97.9	0		0	100	0	0		0	0	0	0		5.7	94.3	0	0		
Total %	0.3	0	12.8	0	13.1	0	43.4	0	0	43.4	0	0	0	0	0	2.5	41	0	0	43.4	



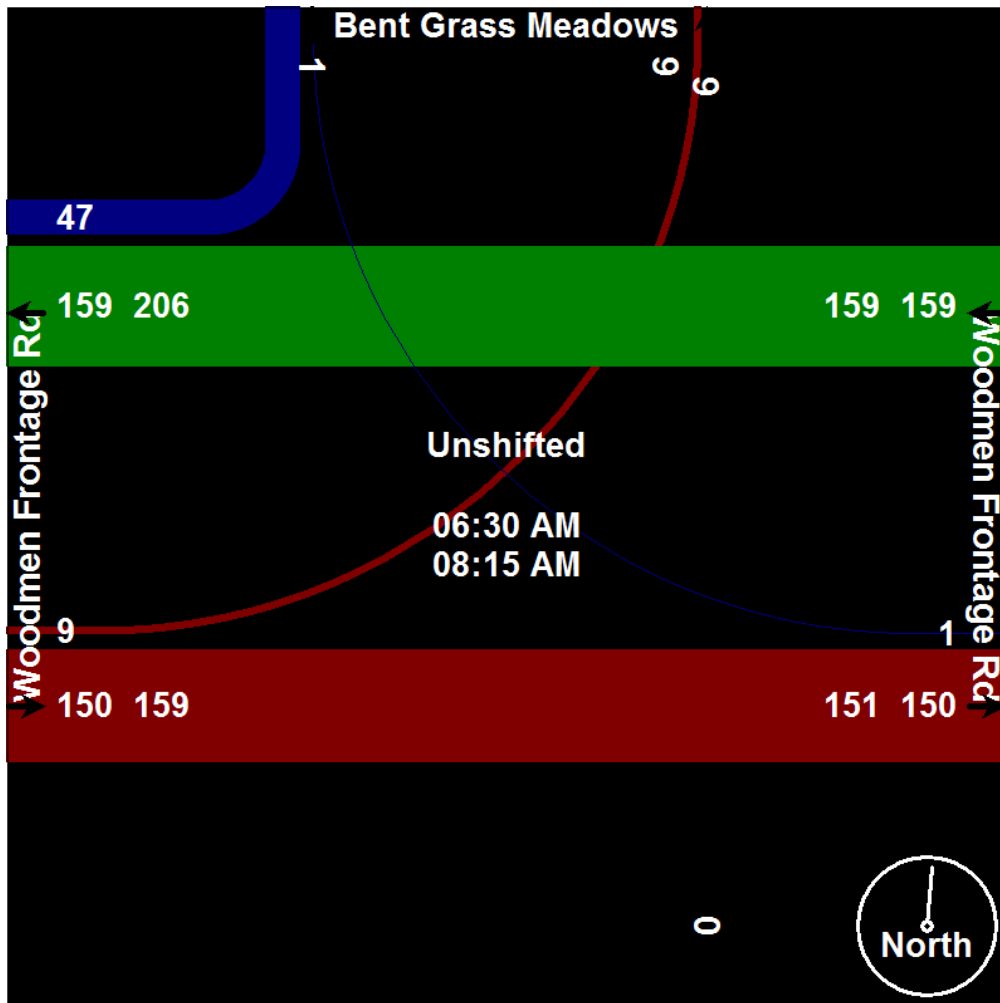


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	Bent Grass Meadows Southbound					Woodmen Frontage Rd Westbound					Northbound					Woodmen Frontage Rd Eastbound					
Start Time	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	2	0	2	0	13	0	0	13	0	0	0	0	0	3	14	0	0	17	32
04:15 PM	0	0	4	0	4	0	11	0	0	11	0	0	0	0	0	1	21	0	0	22	37
04:30 PM	0	0	20	0	20	0	10	0	0	10	0	0	0	0	0	3	16	0	0	19	49
04:45 PM	0	0	12	0	12	0	10	1	0	11	0	0	0	0	0	2	24	0	0	26	49
Total	0	0	38	0	38	0	44	1	0	45	0	0	0	0	0	9	75	0	0	84	167
05:00 PM	0	0	7	0	7	0	10	0	0	10	0	0	0	0	0	0	18	0	0	18	35
05:15 PM	0	0	3	0	3	0	17	0	0	17	0	0	0	0	0	3	17	0	0	20	40
05:30 PM	0	0	2	0	2	0	83	1	0	84	0	0	0	0	0	3	17	0	0	20	106
05:45 PM	0	0	3	0	3	0	25	0	0	25	0	0	0	0	0	1	16	0	0	17	45
Total	0	0	15	0	15	0	135	1	0	136	0	0	0	0	0	7	68	0	0	75	226





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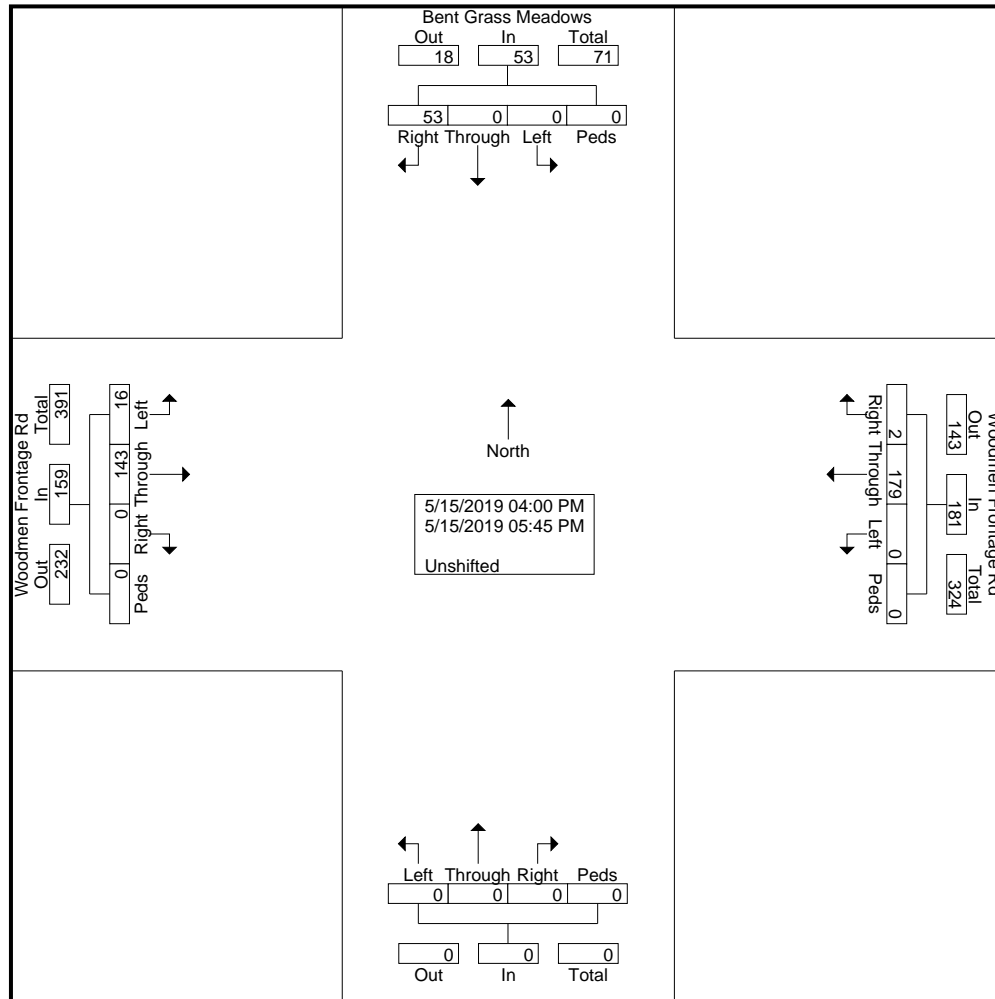
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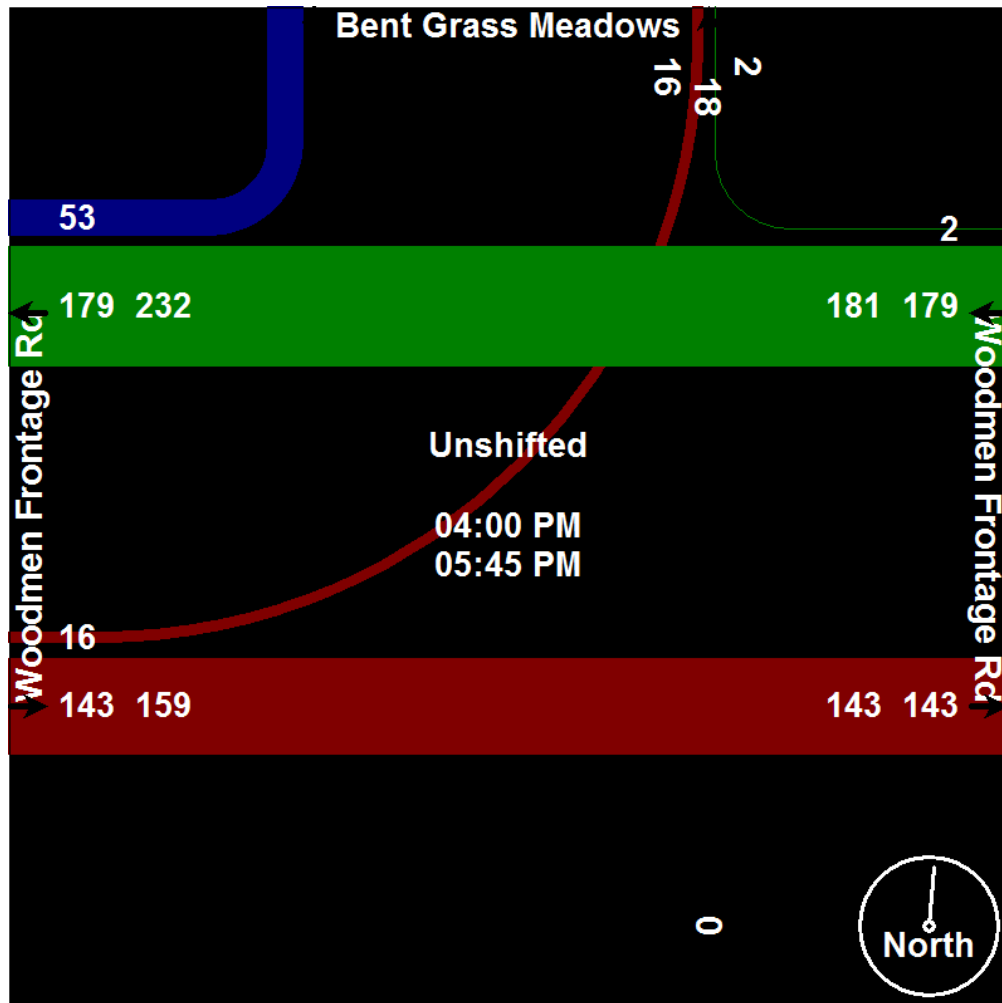
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	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	Left	Through	Right	Peds	App. Total	
Grand Total	0	0	53	0	53	0	179	2	0	181	0	0	0	0	0	16	143	0	0	159	393
Apprch %	0	0	100	0		0	98.9	1.1	0		0	0	0	0		10.1	89.9	0	0		
Total %	0	0	13.5	0	13.5	0	45.5	0.5	0	46.1	0	0	0	0	0	4.1	36.4	0	0	40.5	





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LSC Transportation Consultants, Inc.  
**545 E. Pikes Peak Ave., #210**

LSC Transportation Consultants, Inc. **Colorado Springs, CO 80903** : Golden Sage Rd - Woodmen Rd AM  
 (719) 633-2868 Site Code : 00164350  
 Start Date : 03/08/2017  
 Page No : 1

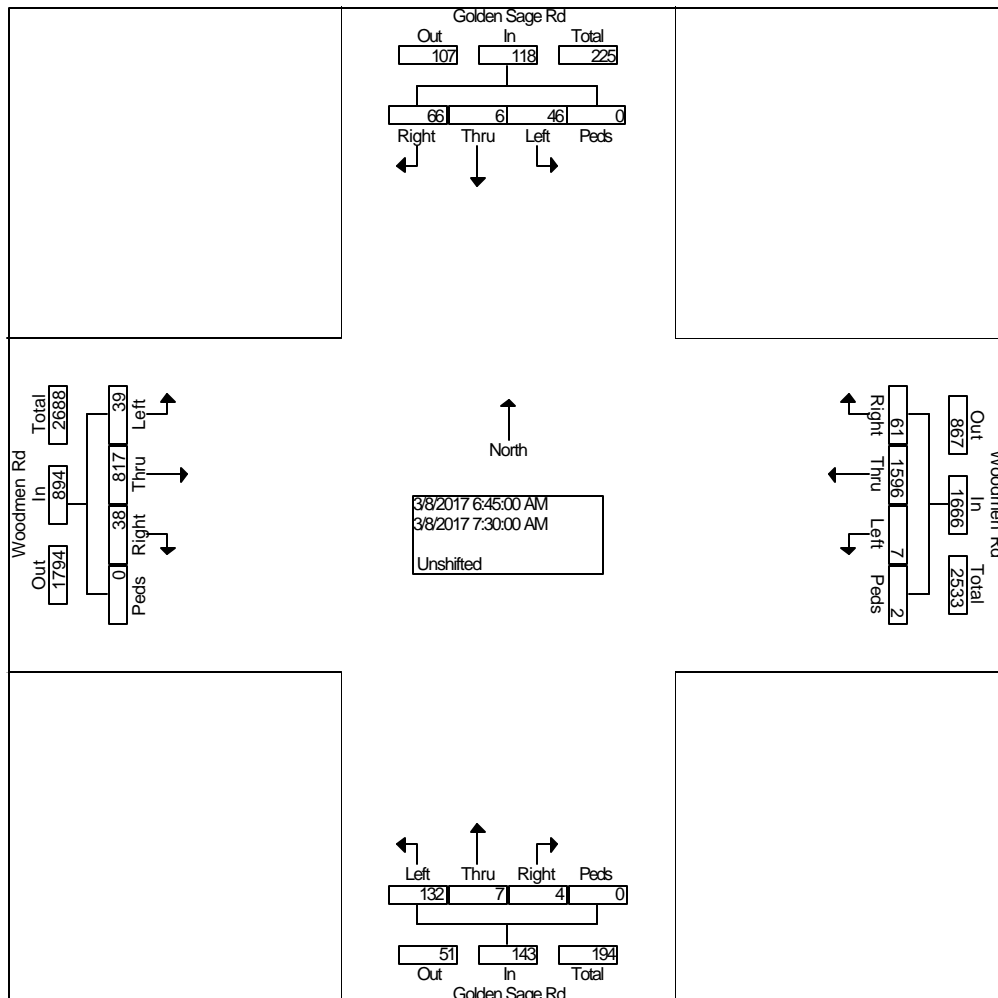
Groups Printed- Unshifted

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Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	10	0	11	0	32	368	0	0	1	4	18	0	3	151	27	0	625
06:45 AM	15	0	11	0	28	307	0	0	0	1	31	0	10	186	16	0	605
Total	25	0	22	0	60	675	0	0	1	5	49	0	13	337	43	0	1230
07:00 AM	13	2	11	0	6	459	1	0	2	3	34	0	10	212	10	0	763
07:15 AM	17	3	13	0	15	434	3	1	2	2	38	0	10	211	5	0	754
07:30 AM	21	1	11	0	12	396	3	1	0	1	29	0	8	208	8	0	699
07:45 AM	12	2	3	0	4	289	3	0	2	0	27	0	17	166	14	0	539
Total	63	8	38	0	37	1578	10	2	6	6	128	0	45	797	37	0	2755
08:00 AM	8	1	2	0	6	256	1	0	1	1	15	0	10	154	11	0	466
08:15 AM	9	0	8	0	16	326	3	0	0	0	17	0	2	153	18	0	552
Grand Total	105	9	70	0	119	2835	14	2	8	12	209	0	70	1441	109	0	5003
Apprch %	57.1	4.9	38.0	0.0	4.0	95.5	0.5	0.1	3.5	5.2	91.3	0.0	4.3	89.0	6.7	0.0	
Total %	2.1	0.2	1.4	0.0	2.4	56.7	0.3	0.0	0.2	0.2	4.2	0.0	1.4	28.8	2.2	0.0	

LSC Transportation Consultants, Inc.  
**545 E. Pikes Peak Ave., #210**  
**Colorado Springs, CO 80903**  
**(719) 633-2868**

File Name : Golden Sage Rd - Woodmen Rd AM  
 Site Code : 00164350  
 Start Date : 03/08/2017  
 Page No : 2

	Golden Sage Rd From North					Woodmen Rd From East					Golden Sage Rd From South					Woodmen Rd From West					
Start Time	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	06:45 AM																				
Volume	66	6	46	0	118	61	15	7	2	1666	4	7	13	0	143	38	81	39	0	894	2821
Percent	55.9	5.1	39.0	0.0		3.7	95.8	0.4	0.1		2.8	4.9	92.3	0.0		4.3	91.4	4.4	0.0		
07:00 Volume	13	2	11	0	26	6	45	1	0	466	2	3	34	0	39	10	21	10	0	232	763
Peak Factor																					0.924
High Int.	07:15 AM					07:00 AM					07:15 AM					07:00 AM					
Volume	17	3	13	0	33	6	45	1	0	466	2	2	38	0	42	10	21	10	0	232	
Peak Factor					0.894					0.894					0.851					0.963	



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**Colorado Springs, CO 80903**  
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Project Name : Golden Sage Rd - Woodmen Rd PM  
 Site Code : 00164350  
 Start Date : 03/07/2017  
 Page No : 1

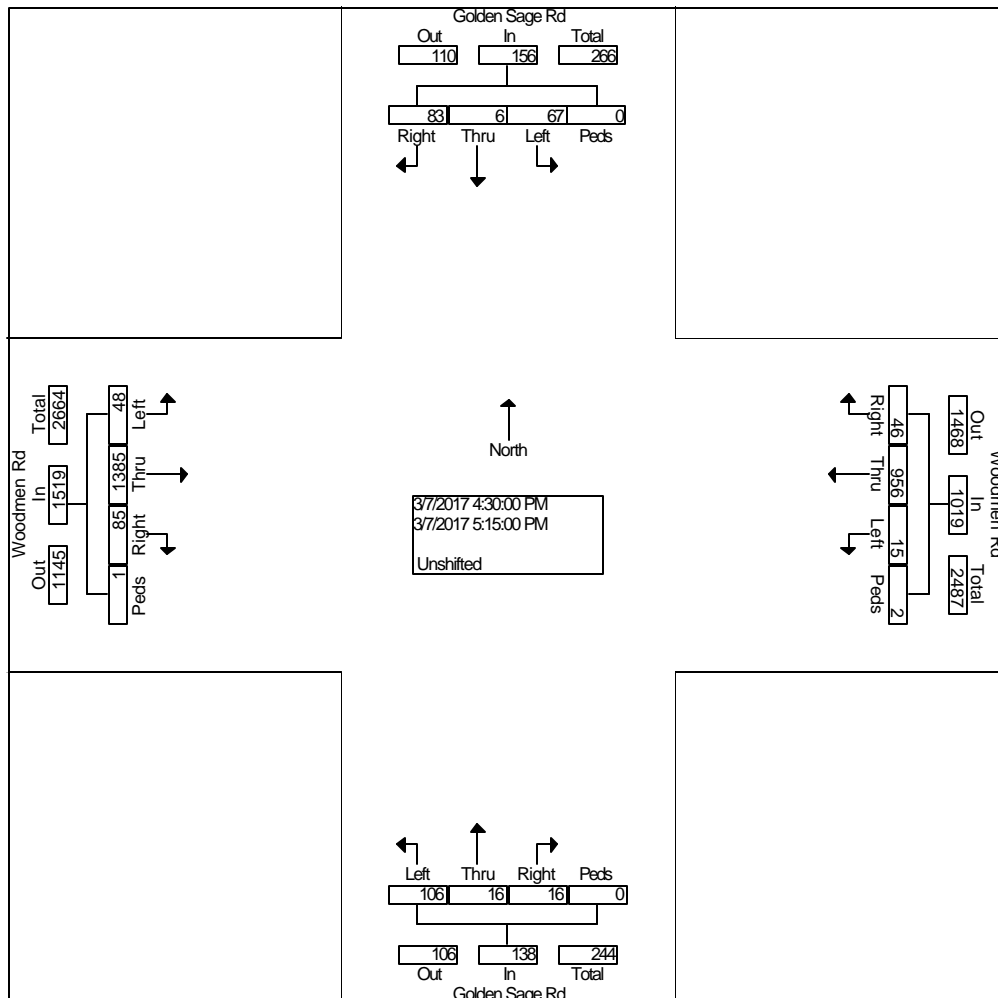
Groups Printed- Unshifted

	Golden Sage Rd From North				Woodmen Rd From East				Golden Sage Rd From South				Woodmen Rd From West				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	16	3	7	0	9	243	5	0	2	2	21	0	14	319	25	0	666
04:15 PM	19	4	18	0	10	234	1	1	3	2	16	0	28	324	15	0	675
04:30 PM	14	0	16	0	10	249	1	0	3	4	15	0	18	340	16	0	686
04:45 PM	21	1	15	0	16	233	2	1	3	4	27	0	20	313	10	0	666
Total	70	8	56	0	45	959	9	2	11	12	79	0	80	1296	66	0	2693
05:00 PM	17	3	15	0	14	264	2	0	2	3	24	0	20	355	13	0	732
05:15 PM	31	2	21	0	6	210	10	1	8	5	40	0	27	377	9	1	748
05:30 PM	30	2	40	0	7	178	2	1	5	3	14	0	17	381	6	0	686
05:45 PM	9	3	13	0	6	172	1	0	1	2	14	0	16	294	7	0	538
Total	87	10	89	0	33	824	15	2	16	13	92	0	80	1407	35	1	2704
Grand Total	157	18	145	0	78	1783	24	4	27	25	171	0	160	2703	101	1	5397
Apprch %	49.1	5.6	45.3	0.0	4.1	94.4	1.3	0.2	12.1	11.2	76.7	0.0	5.4	91.2	3.4	0.0	
Total %	2.9	0.3	2.7	0.0	1.4	33.0	0.4	0.1	0.5	0.5	3.2	0.0	3.0	50.1	1.9	0.0	

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**Colorado Springs, CO 80903**  
**(719) 633-2868**

Project Name : Golden Sage Rd - Woodmen Rd PM  
 Site Code : 00164350  
 Start Date : 03/07/2017  
 Page No : 2

	Golden Sage Rd From North					Woodmen Rd From East					Golden Sage Rd From South					Woodmen Rd From West					
Start Time	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Rig ht	Thr u	Lef t	Pe ds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	83	6	67	0	156	46	95	15	2	1019	16	16	10	0	138	85	13	48	1	1519	2832
Percent	53.2	3.8	42.9	0.0		4.5	93.8	1.5	0.2		11.6	11.6	76.8	0.0		5.6	91.2	3.2	0.1		
05:15 Volume	31	2	21	0	54	6	21	10	1	227	8	5	40	0	53	27	37	9	1	414	748
Peak Factor																					0.947
High Int.	05:15 PM					05:00 PM					05:15 PM					05:15 PM					
Volume	31	2	21	0	54	14	26	2	0	280	8	5	40	0	53	27	37	9	1	414	
Peak Factor	0.72					0.91					0.65					0.91					
	2					0					1					7					



# LSC Transportation Consultants, Inc.

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File Name : Meridian Rd - Bent Grass Meadows Dr AM 9-18

Site Code : 154561

Start Date : 9/12/2018

Page No : 1

## Groups Printed- Unshifted

	Meridian Rd Southbound				Westbound				Meridian Rd Northbound				Bent Grass 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	286	26	0	0	0	0	0	10	71	0	0	7	0	32	0	432
06:45	0	319	36	1	0	0	0	0	15	137	0	0	10	0	38	0	556
Total	0	605	62	1	0	0	0	0	25	208	0	0	17	0	70	0	988
07:00	0	426	24	0	0	0	0	0	9	121	0	0	13	0	37	0	630
07:15	0	443	29	0	0	0	0	0	13	195	0	0	16	0	41	0	737
07:30	0	372	33	0	0	0	0	0	19	179	0	0	17	0	30	0	650
07:45	0	297	40	0	0	0	0	0	16	162	0	0	22	0	43	0	580
Total	0	1538	126	0	0	0	0	0	57	657	0	0	68	0	151	0	2597
08:00	0	256	19	0	0	0	0	0	21	154	0	0	17	0	21	0	488
08:15	0	284	25	0	0	0	0	0	10	136	0	0	21	0	27	0	503
Grand Total	0	2683	232	1	0	0	0	0	113	1155	0	0	123	0	269	0	4576
Apprch %	0	92	8	0	0	0	0	0	8.9	91.1	0	0	31.4	0	68.6	0	
Total %	0	58.6	5.1	0	0	0	0	0	2.5	25.2	0	0	2.7	0	5.9	0	



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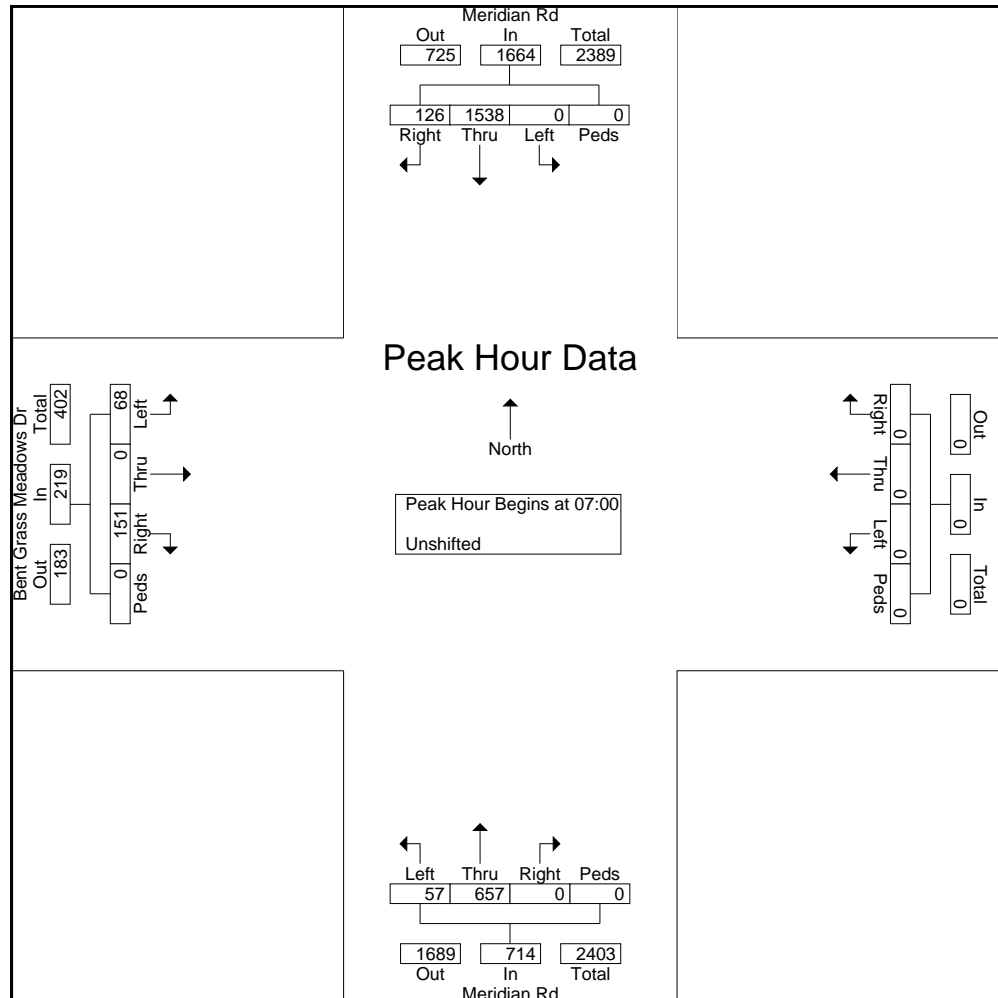
File Name : Meridian Rd - Bent Grass Meadows Dr AM 9-18

Site Code : 154561

Start Date : 9/12/2018

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	Meridian Rd Southbound					Westbound					Meridian Rd Northbound					Bent Grass 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 06:30 to 08:15 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00																					
07:00	0	426	24	0	450	0	0	0	0	0	9	121	0	0	130	13	0	37	0	50	630
07:15	0	<b>443</b>	29	0	<b>472</b>	0	0	0	0	0	13	<b>195</b>	0	0	<b>208</b>	16	0	41	0	57	<b>737</b>
07:30	0	372	33	0	405	0	0	0	0	0	<b>19</b>	179	0	0	198	17	0	30	0	47	650
07:45	0	297	<b>40</b>	0	337	0	0	0	0	0	16	162	0	0	178	<b>22</b>	0	<b>43</b>	0	<b>65</b>	580
Total Volume	0	1538	126	0	1664	0	0	0	0	0	57	657	0	0	714	68	0	151	0	219	2597
% App. Total	0	92.4	7.6	0		0	0	0	0		8	92	0	0		31.1	0	68.9	0		
PHF	.000	.868	.788	.000	.881	.000	.000	.000	.000	.000	.750	.842	.000	.000	.858	.773	.000	.878	.000	.842	.881



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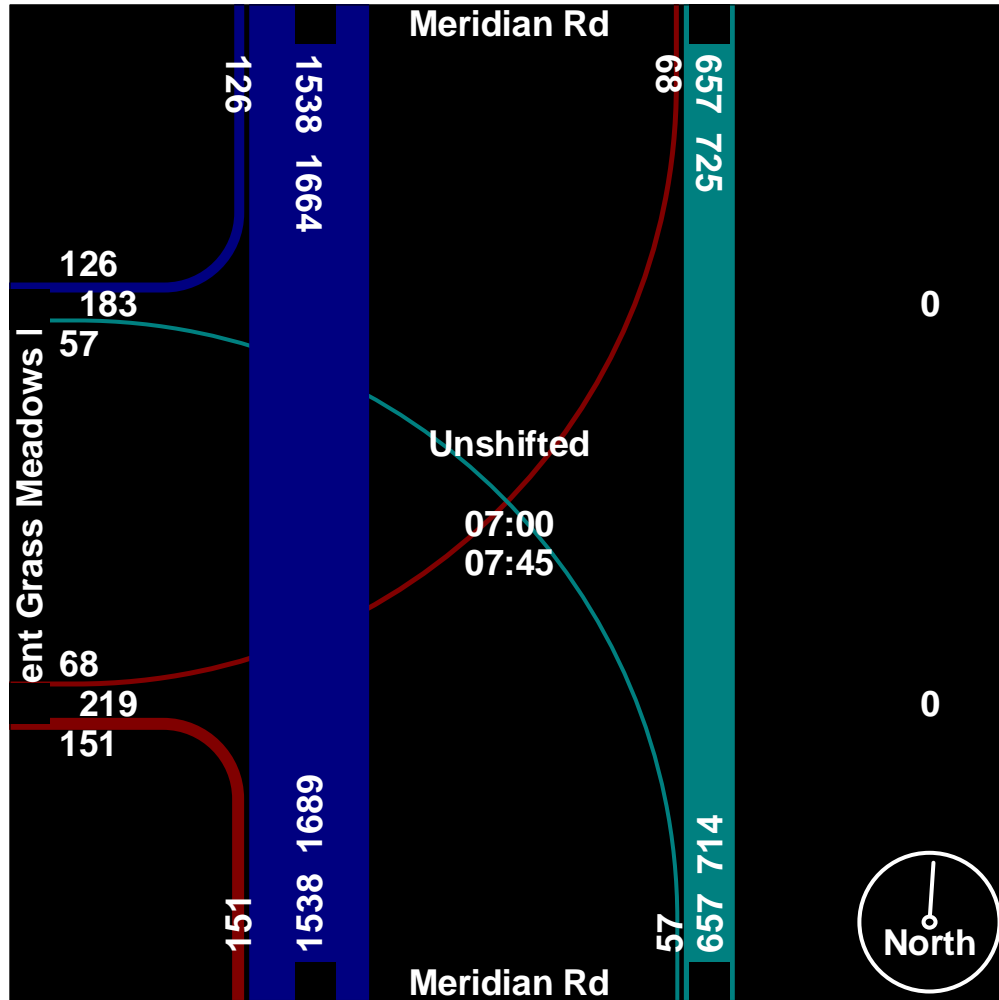
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File Name : Meridian Rd - Bent Grass Meadows Dr AM 9-18

Site Code : 154561

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File Name : Meridian Rd - Bent Grass Meadows PM 9-18

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**Groups Printed- Unshifted**

	<b>Meridian Rd Southbound</b>				<b>Westbound</b>				<b>Meridian Rd Northbound</b>				<b>Bent Grass Meadows Eastbound</b>				
<b>Start Time</b>	<b>Left</b>	<b>Thru</b>	<b>Right</b>	<b>Peds</b>	<b>Left</b>	<b>Thru</b>	<b>Right</b>	<b>Peds</b>	<b>Left</b>	<b>Thru</b>	<b>Right</b>	<b>Peds</b>	<b>Left</b>	<b>Thru</b>	<b>Right</b>	<b>Peds</b>	<b>Int. Total</b>
16:15	0	192	21	0	0	0	0	0	20	295	0	0	15	0	25	0	568
16:30	0	213	19	0	0	0	0	0	22	344	0	0	12	0	15	0	625
16:45	0	197	19	0	0	0	0	0	19	332	0	0	20	0	23	0	610
Total	0	602	59	0	0	0	0	0	61	971	0	0	47	0	63	0	1803
17:00	0	223	27	0	0	0	0	0	16	347	0	0	11	0	25	0	649
17:15	0	214	19	0	0	0	0	0	25	348	0	0	16	0	28	0	650
17:30	0	252	25	0	0	0	0	0	23	318	0	0	9	0	19	0	646
17:45	0	179	27	0	0	0	0	0	19	328	0	0	15	0	22	0	590
Total	0	868	98	0	0	0	0	0	83	1341	0	0	51	0	94	0	2535
18:00	0	169	25	0	0	0	0	0	18	321	0	0	11	0	28	0	572
Grand Total	0	1639	182	0	0	0	0	0	162	2633	0	0	109	0	185	0	4910
Apprch %	0	90	10	0	0	0	0	0	5.8	94.2	0	0	37.1	0	62.9	0	
Total %	0	33.4	3.7	0	0	0	0	0	3.3	53.6	0	0	2.2	0	3.8	0	

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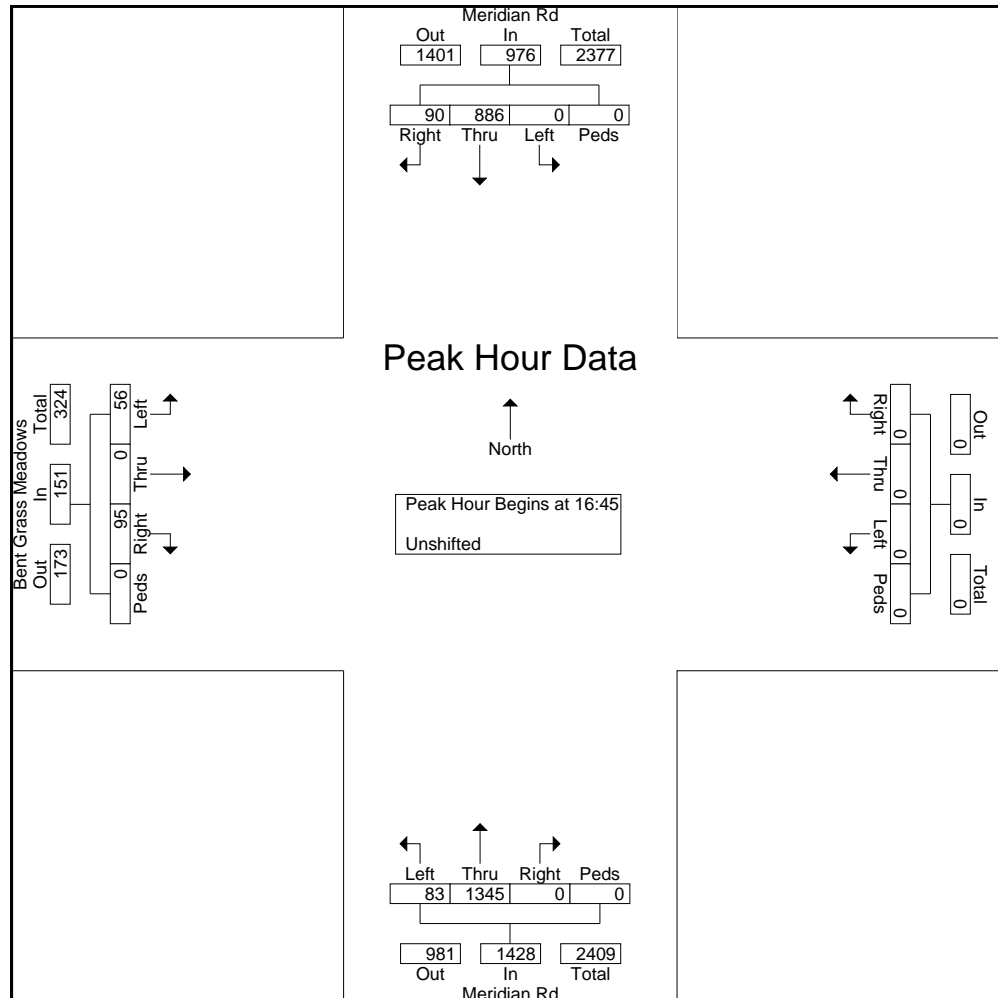
File Name : Meridian Rd - Bent Grass Meadows PM 9-18

Site Code : 154561

Start Date : 9/12/2018

Page No : 2

	Meridian Rd Southbound					Westbound					Meridian Rd Northbound					Bent Grass Meadows 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 16:15 to 18:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:45																					
16:45	0	197	19	0	216	0	0	0	0	0	19	332	0	0	351	20	0	23	0	43	610
17:00	0	223	27	0	250	0	0	0	0	0	16	347	0	0	363	11	0	25	0	36	649
17:15	0	214	19	0	233	0	0	0	0	0	25	348	0	0	373	16	0	28	0	44	650
17:30	0	252	25	0	277	0	0	0	0	0	23	318	0	0	341	9	0	19	0	28	646
Total Volume	0	886	90	0	976	0	0	0	0	0	83	1345	0	0	1428	56	0	95	0	151	2555
% App. Total	0	90.8	9.2	0		0	0	0	0		5.8	94.2	0	0		37.1	0	62.9	0		
PHF	.000	.879	.833	.000	.881	.000	.000	.000	.000	.000	.830	.966	.000	.000	.957	.700	.000	.848	.000	.858	.983



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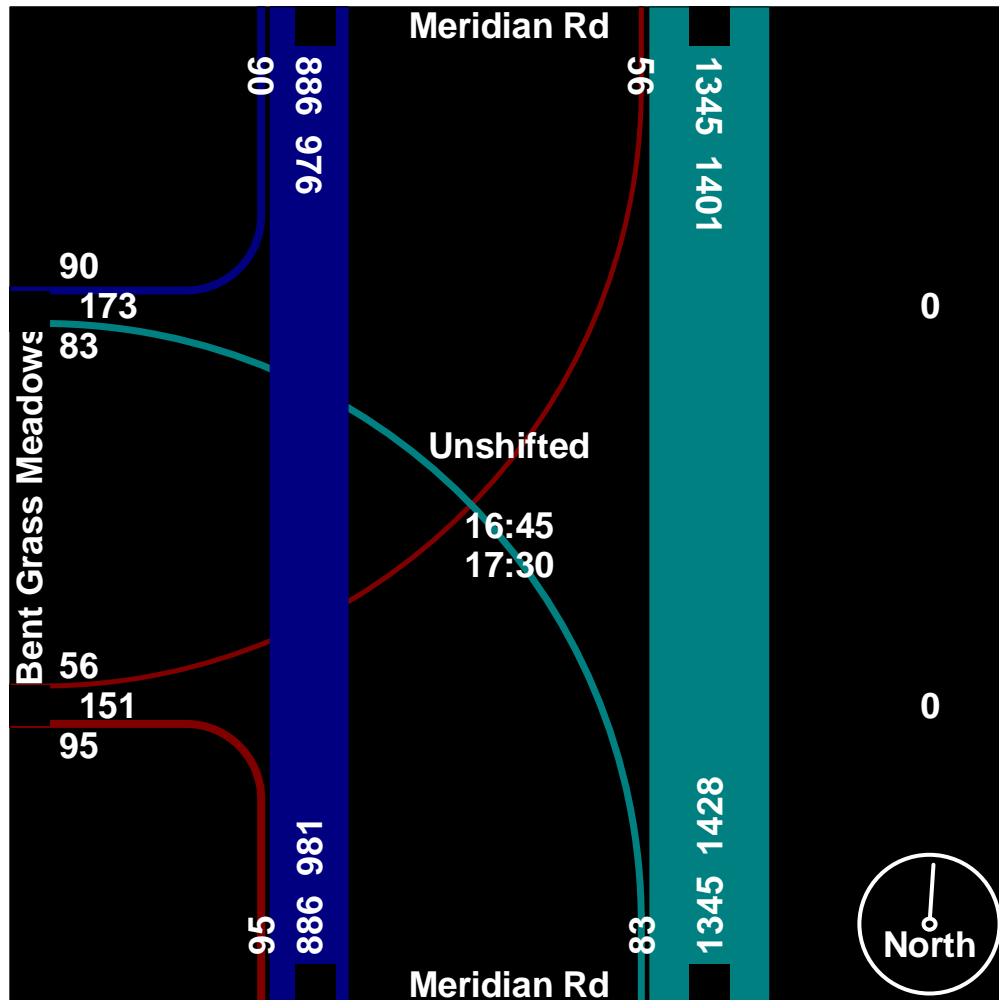
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File Name : Meridian Rd - Bent Grass Meadows PM 9-18

Site Code : 154561







Start Date : 9/12/2018

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HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

Existing Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	68	151	57	657	1538	126
Future Vol, veh/h	68	151	57	657	1538	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	700	-	-	330
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	86	86	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	157	66	764	1748	143

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2262	874	1891	0	-	0
Stage 1	1748	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	~ 35	293	312	-	-	-
Stage 1	125	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 28	293	312	-	-	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	99	-	-	-	-	-
Stage 2	565	-	-	-	-	-























Approach	EB	NB	SB
HCM Control Delay, s	68.5	1.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	312	-	82	293	-	-
HCM Lane V/C Ratio	0.212	-	0.864	0.537	-	-
HCM Control Delay (s)	19.6	-	152.4	30.7	-	-
HCM Lane LOS	C	-	F	D	-	-
HCM 95th %tile Q(veh)	0.8	-	4.5	3	-	-

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

Timings  
25: Golden Sage & Woodmen

Existing Traffic  
AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	43	545	26	3	1230	50	106	7	2	27	11
Future Volume (vph)	43	545	26	3	1230	50	106	7	2	27	11
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	62.7	65.1	65.1	63.5	65.1	65.1	13.4	12.4	12.4	12.0	12.0
Actuated g/C Ratio	0.75	0.78	0.78	0.76	0.78	0.78	0.16	0.15	0.15	0.14	0.14
v/c Ratio	0.17	0.21	0.02	0.00	0.50	0.04	0.53	0.03	0.01	0.13	0.19
Control Delay	7.7	3.8	1.5	4.7	5.6	1.4	41.1	29.1	0.0	31.3	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	3.8	1.5	4.7	5.6	1.4	41.1	29.1	0.0	31.3	14.5
LOS	A	A	A	A	A	A	D	C	A	C	B
Approach Delay		3.9			5.4			39.7			20.3
Approach LOS		A			A			D			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 83.5

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 7.4

Intersection LOS: A

Intersection Capacity Utilization 54.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage & Woodmen







HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

Existing Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	116	86	0	1	28
Future Vol, veh/h	5	116	86	0	1	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	100	100	35	35
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	141	86	0	3	80

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	86	0	0 239 86
Stage 1	-	-	- 86 -
Stage 2	-	-	- 153 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1510	-	- 749 973
Stage 1	-	-	- 937 -
Stage 2	-	-	- 875 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1510	-	- 746 973
Mov Cap-2 Maneuver	-	-	- 746 -
Stage 1	-	-	- 933 -
Stage 2	-	-	- 875 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1510	-	-	-	963
HCM Lane V/C Ratio	0.004	-	-	-	0.086
HCM Control Delay (s)	7.4	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3









HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

Existing Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	95	83	1345	886	90
Future Vol, veh/h	56	95	83	1345	886	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	700	-	-	330
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	96	96	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	110	86	1401	886	90























Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1759	443	976
Stage 1	886	-	-
Stage 2	873	-	-
Critical Hdwy	6.84	6.94	4.14
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.22
Pot Cap-1 Maneuver	76	562	703
Stage 1	363	-	-
Stage 2	369	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	67	562	703
Mov Cap-2 Maneuver	167	-	-
Stage 1	319	-	-
Stage 2	369	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.9	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	703	-	167	562	-	-
HCM Lane V/C Ratio	0.123	-	0.39	0.197	-	-
HCM Control Delay (s)	10.8	-	39.7	13	-	-
HCM Lane LOS	B	-	E	B	-	-
HCM 95th %tile Q(veh)	0.4	-	1.7	0.7	-	-

Timings  
25: Golden Sage & Woodmen

Existing Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	48	1385	85	15	956	46	106	16	16	67	6
Future Volume (vph)	48	1385	85	15	956	46	106	16	16	67	6
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	58.1	61.1	61.1	59.1	61.1	61.1	16.3	15.3	15.3	15.3	15.3
Actuated g/C Ratio	0.68	0.71	0.71	0.69	0.71	0.71	0.19	0.18	0.18	0.18	0.18
v/c Ratio	0.14	0.60	0.08	0.09	0.38	0.04	0.68	0.08	0.08	0.38	0.32
Control Delay	7.2	8.0	1.3	7.2	5.9	1.6	47.2	29.1	4.1	35.3	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	8.0	1.3	7.2	5.9	1.6	47.2	29.1	4.1	35.3	9.5
LOS	A	A	A	A	A	A	D	C	A	D	A
Approach Delay		7.6			5.7			40.0			20.6
Approach LOS		A			A			D			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 86

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 10.1

Intersection LOS: B

Intersection Capacity Utilization 58.7%

ICU Level of Service B





Analysis Period (min) 15

Splits and Phases: 25: Golden Sage & Woodmen















HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

Existing Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	76	120	1	0	24
Future Vol, veh/h	8	76	120	1	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	36	36	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	76	333	3	0	24
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	336	0	-	0	427	335
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	92	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1223	-	-	-	584	707
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1223	-	-	-	580	707
Mov Cap-2 Maneuver	-	-	-	-	580	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	932	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.8	0		10.3		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1223	-	-	-	707	
HCM Lane V/C Ratio	0.007	-	-	-	0.034	
HCM Control Delay (s)	8	-	-	-	10.3	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

# Timings 3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Background Traffic  
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	133	231	149	583	1441	258
Future Volume (vph)	133	231	149	583	1441	258
Turn Type	pm+pt	Perm	pm+pt	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	7	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	65.0	50.0	50.0
Total Split (%)	27.8%	27.8%	16.7%	72.2%	55.6%	55.6%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	11.6	11.6	60.1	60.1	46.8	46.8
Actuated g/C Ratio	0.14	0.14	0.74	0.74	0.57	0.57
v/c Ratio	0.55	0.60	0.64	0.26	0.81	0.28
Control Delay	41.1	13.8	24.2	4.2	19.2	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	13.8	24.2	4.2	19.2	2.2
LOS	D	B	C	A	B	A
Approach Delay	23.8			8.2	16.6	
Approach LOS	C			A	B	

## Intersection Summary

Cycle Length: 90  
Actuated Cycle Length: 81.7  
Natural Cycle: 75  
Control Type: Semi Act-Uncoord  
Maximum v/c Ratio: 0.81  
Intersection Signal Delay: 15.2  
Intersection Capacity Utilization 68.0%  
Analysis Period (min) 15























Intersection LOS: B  
ICU Level of Service C

Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr



# Timings 25: Golden Sage & Woodmen

Short-Term Background Traffic  
AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	64	804	38	7	1561	47	132	8	5	33	6
Future Volume (vph)	64	804	38	7	1561	47	132	8	5	33	6
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	58.1	61.1	61.1	59.1	61.1	61.1	15.2	14.2	14.2	14.2	14.2
Actuated g/C Ratio	0.68	0.72	0.72	0.70	0.72	0.72	0.18	0.17	0.17	0.17	0.17
v/c Ratio	0.61	0.33	0.03	0.02	0.69	0.05	0.62	0.03	0.02	0.14	0.38
Control Delay	39.2	5.2	1.7	5.3	9.1	1.5	44.5	28.6	0.0	30.7	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	5.2	1.7	5.3	9.1	1.5	44.5	28.6	0.0	30.7	25.9
LOS	D	A	A	A	A	A	D	C	A	C	C
Approach Delay		7.5			8.8			42.2			27.0
Approach LOS		A			A			D			C

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 84.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 11.0

Intersection LOS: B

Intersection Capacity Utilization 74.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage & Woodmen



HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd






Short-Term Background Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↰			↰			↱	
Traffic Vol, veh/h	0	0	0	145	0	0	0	0	119	0	1	0
Future Vol, veh/h	0	0	0	145	0	0	0	0	119	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	92	95	92	59	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	145	0	0	0	0	202	0	1	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	203	1	102	102	-	1	0	0	202	0	0
Stage 1	-	1	-	101	101	-	-	-	-	-	-	-
Stage 2	-	202	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	693	1084	879	788	0	1622	-	-	1370	-	-
Stage 1	0	895	-	905	811	0	-	-	-	-	-	-
Stage 2	0	734	-	1022	895	0	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	693	1084	879	788	-	1622	-	-	1370	-	-
Mov Cap-2 Maneuver	-	693	-	879	788	-	-	-	-	-	-	-
Stage 1	-	895	-	905	811	-	-	-	-	-	-	-
Stage 2	-	734	-	1022	895	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9.9	0	0
HCM LOS	A	A		













Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	- 879	1370	-	-
HCM Lane V/C Ratio	-	-	-	- 0.165	-	-	-
HCM Control Delay (s)	0	-	-	0 9.9	0	-	-
HCM Lane LOS	A	-	-	A A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	- 0.6	0	-	-

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	102	76	10	15	65
Future Vol, veh/h	31	102	76	10	15	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	100	100	35	35
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	124	76	10	43	186
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	86	0	-	0	281	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	200	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1510	-	-	-	709	979
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	834	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1510	-	-	-	691	979
Mov Cap-2 Maneuver	-	-	-	-	691	-
Stage 1	-	-	-	-	918	-
Stage 2	-	-	-	-	834	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.7	0		9.7		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1510	-	-	-	691	979
HCM Lane V/C Ratio	0.025	-	-	-	0.062	0.19
HCM Control Delay (s)	7.4	-	-	-	10.6	9.5
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.7

# Timings 3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Background Traffic

PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	198	223	230	1217	820	197
Future Volume (vph)	198	223	230	1217	820	197
Turn Type	pm+pt	Perm	pm+pt	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	7	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	65.0	50.0	50.0
Total Split (%)	27.8%	27.8%	16.7%	72.2%	55.6%	55.6%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	15.7	15.7	60.1	60.1	46.2	46.2
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.54	0.54
v/c Ratio	0.71	0.52	0.51	0.51	0.43	0.21
Control Delay	45.5	8.0	9.0	7.3	13.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	8.0	9.0	7.3	13.5	2.5
LOS	D	A	A	A	B	A
Approach Delay	25.7			7.6	11.4	
Approach LOS	C			A	B	

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 85.8

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 11.8

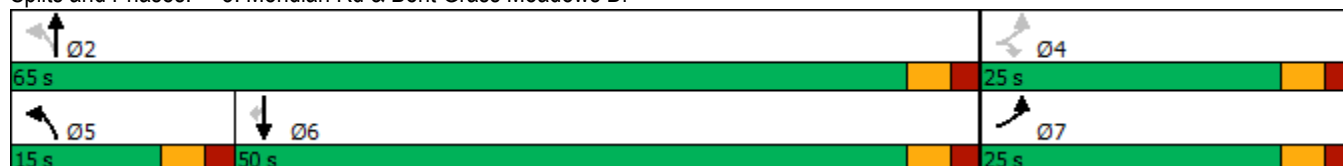
Intersection LOS: B

Intersection Capacity Utilization 58.9%

ICU Level of Service B

Analysis Period (min) 15























Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr





# Timings 25: Golden Sage & Woodmen

Short-Term Background Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	77	1370	85	16	946	33	106	17	17	48	7
Future Volume (vph)	77	1370	85	16	946	33	106	17	17	48	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	66.7%	66.7%	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	53.3	56.3	56.3	54.3	56.3	56.3	18.2	17.2	17.2	17.2	17.2
Actuated g/C Ratio	0.64	0.68	0.68	0.65	0.68	0.68	0.22	0.21	0.21	0.21	0.21
v/c Ratio	0.26	0.62	0.08	0.11	0.39	0.03	0.64	0.07	0.07	0.24	0.36
Control Delay	10.7	9.8	1.7	9.3	7.2	2.4	41.2	25.6	3.5	28.6	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	9.8	1.7	9.3	7.2	2.4	41.2	25.6	3.5	28.6	8.2
LOS	B	A	A	A	A	A	D	C	A	C	A
Approach Delay		9.4			7.0			34.8			14.2
Approach LOS		A			A			C			B

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 83

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 10.7

Intersection LOS: B

Intersection Capacity Utilization 66.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage & Woodmen



HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd






Short-Term Background Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↰			↰			↱	
Traffic Vol, veh/h	0	0	0	163	0	0	0	0	127	0	0	0
Future Vol, veh/h	0	0	0	163	0	0	0	0	127	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	92	95	92	59	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	163	0	0	0	0	215	0	0	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	216	1	109	109	-	1	0	0	215	0	0
Stage 1	-	1	-	108	108	-	-	-	-	-	-	-
Stage 2	-	215	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	682	1084	870	781	0	1622	-	-	1355	-	-
Stage 1	0	895	-	897	806	0	-	-	-	-	-	-
Stage 2	0	725	-	1022	895	0	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	682	1084	870	781	-	1622	-	-	1355	-	-
Mov Cap-2 Maneuver	-	682	-	870	781	-	-	-	-	-	-	-
Stage 1	-	895	-	897	806	-	-	-	-	-	-	-
Stage 2	-	725	-	1022	895	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.1	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	- 870	1355	-	-
HCM Lane V/C Ratio	-	-	-	- 0.187	-	-	-
HCM Control Delay (s)	0	-	-	0 10.1	0	-	-
HCM Lane LOS	A	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	- 0.7	0	-	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	67	105	16	9	50
Future Vol, veh/h	38	67	105	16	9	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	36	36	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	67	292	44	9	50













Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	336	0	0 457 314
Stage 1	-	-	- 314 -
Stage 2	-	-	- 143 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1223	-	- 562 726
Stage 1	-	-	- 741 -
Stage 2	-	-	- 884 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1223	-	- 545 726
Mov Cap-2 Maneuver	-	-	- 545 -
Stage 1	-	-	- 718 -
Stage 2	-	-	- 884 -

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1223	-	-	-	545	726
HCM Lane V/C Ratio	0.031	-	-	-	0.017	0.069
HCM Control Delay (s)	8	-	-	-	11.7	10.3
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2

# Timings 3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	145	279	165	583	1441	262
Future Volume (vph)	145	279	165	583	1441	262
Turn Type	pm+pt	Perm	pm+pt	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	7	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	65.0	50.0	50.0
Total Split (%)	27.8%	27.8%	16.7%	72.2%	55.6%	55.6%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	12.5	12.5	60.1	60.1	46.3	46.3
Actuated g/C Ratio	0.15	0.15	0.73	0.73	0.56	0.56
v/c Ratio	0.56	0.70	0.69	0.26	0.83	0.29
Control Delay	40.7	20.0	28.4	4.5	20.9	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	20.0	28.4	4.5	20.9	2.3
LOS	D	B	C	A	C	A
Approach Delay	27.0			9.8	18.0	
Approach LOS	C			A	B	

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 82.7

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 17.0

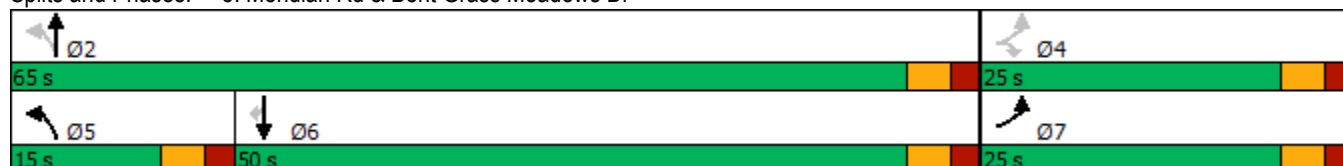
Intersection LOS: B

Intersection Capacity Utilization 69.5%

ICU Level of Service C























Analysis Period (min) 15

Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr



# Timings 25: Golden Sage & Woodmen

Short-Term Total Traffic  
AM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	77	804	38	7	1561	47	132	8	5	33	7
Future Volume (vph)	77	804	38	7	1561	47	132	8	5	33	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	58.1	61.1	61.1	59.1	61.1	61.1	15.8	14.8	14.8	14.8	14.8
Actuated g/C Ratio	0.68	0.71	0.71	0.69	0.71	0.71	0.18	0.17	0.17	0.17	0.17
v/c Ratio	0.68	0.33	0.03	0.02	0.69	0.05	0.67	0.03	0.02	0.14	0.50
Control Delay	48.0	5.4	1.7	5.4	9.4	1.6	48.3	28.4	0.0	30.4	30.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	5.4	1.7	5.4	9.4	1.6	48.3	28.4	0.0	30.4	30.4
LOS	D	A	A	A	A	A	D	C	A	C	C
Approach Delay		8.5			9.2			45.6			30.4
Approach LOS		A			A			D			C

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 85.5

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 12.1

Intersection LOS: B

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage & Woodmen



HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd

Short-Term Total Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↱			↱			↱	
Traffic Vol, veh/h	0	0	0	185	0	0	0	0	132	0	0	0
Future Vol, veh/h	0	0	0	185	0	0	0	0	132	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	92	95	92	59	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	185	0	0	0	0	224	0	0	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	225	1	113	113	-	1	0	0	224	0	0
Stage 1	-	1	-	112	112	-	-	-	-	-	-	-
Stage 2	-	224	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	674	1084	864	777	0	1622	-	-	1345	-	-
Stage 1	0	895	-	893	803	0	-	-	-	-	-	-
Stage 2	0	718	-	1022	895	0	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	674	1084	864	777	-	1622	-	-	1345	-	-
Mov Cap-2 Maneuver	-	674	-	864	777	-	-	-	-	-	-	-
Stage 1	-	895	-	893	803	-	-	-	-	-	-	-
Stage 2	-	718	-	1022	895	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.3	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	- 864	1345	-	-
HCM Lane V/C Ratio	-	-	-	- 0.214	-	-	-
HCM Control Delay (s)	0	-	-	0 10.3	0	-	-
HCM Lane LOS	A	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	- 0.8	0	-	-






HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 6.5

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations						
Traffic Vol, veh/h	44	102	76	10	15	105
Future Vol, veh/h	44	102	76	10	15	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	100	100	35	35
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	124	76	10	43	300

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	86	0	-	0	313	81
Stage 1	-	-	-	-	81	-
Stage 2	-	-	-	-	232	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1510	-	-	-	680	979
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1510	-	-	-	656	979
Mov Cap-2 Maneuver	-	-	-	-	656	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	807	-

Approach EB WB SB






HCM Control Delay, s	2.3	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1 SBLn2

Capacity (veh/h)	1510	-	-	-	656	979
HCM Lane V/C Ratio	0.036	-	-	-	0.065	0.306
HCM Control Delay (s)	7.5	-	-	-	10.9	10.3
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	1.3

Intersection

Int Delay, s/veh 1.9







Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	7	3	74	20	10
Future Vol, veh/h	45	7	3	74	20	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	8	3	80	22	11

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	57
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1547
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1547
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	877	-	-	1547	-
HCM Lane V/C Ratio	0.037	-	-	0.002	-
HCM Control Delay (s)	9.3	-	-	7.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-



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	4	49	2	10	58	7	7	0	30	19	0	13
Future Vol, veh/h	4	49	2	10	58	7	7	0	30	19	0	13
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	53	2	11	63	8	8	0	33	21	0	14













Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	55	0	0	158	155	54	168	152	67
Stage 1	-	-	-	-	-	-	62	62	-	89	89	-
Stage 2	-	-	-	-	-	-	96	93	-	79	63	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1529	-	-	1550	-	-	808	737	1013	796	740	997
Stage 1	-	-	-	-	-	-	949	843	-	918	821	-
Stage 2	-	-	-	-	-	-	911	818	-	930	842	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1529	-	-	1550	-	-	791	730	1013	765	733	997
Mov Cap-2 Maneuver	-	-	-	-	-	-	791	730	-	765	733	-
Stage 1	-	-	-	-	-	-	946	840	-	915	815	-
Stage 2	-	-	-	-	-	-	892	812	-	898	839	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	1	8.9	9.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	962	1529	-	-	1550	-	-	845
HCM Lane V/C Ratio	0.042	0.003	-	-	0.007	-	-	0.041
HCM Control Delay (s)	8.9	7.4	-	-	7.3	-	-	9.4
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

# Timings 3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	206	254	283	1217	820	211
Future Volume (vph)	206	254	283	1217	820	211
Turn Type	pm+pt	Perm	pm+pt	NA	NA	Perm
Protected Phases	7		5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	7	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	65.0	50.0	50.0
Total Split (%)	27.8%	27.8%	16.7%	72.2%	55.6%	55.6%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	16.1	16.1	60.1	60.1	45.8	45.8
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.53	0.53
v/c Ratio	0.73	0.55	0.62	0.51	0.44	0.22
Control Delay	46.4	8.1	11.5	7.5	13.9	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	8.1	11.5	7.5	13.9	2.5
LOS	D	A	B	A	B	A
Approach Delay	25.2			8.2	11.6	
Approach LOS	C			A	B	

## Intersection Summary

Cycle Length: 90  
Actuated Cycle Length: 86.2  
Natural Cycle: 60  
Control Type: Semi Act-Uncoord  
Maximum v/c Ratio: 0.73  
Intersection Signal Delay: 12.2  
Intersection Capacity Utilization 62.3%  
Analysis Period (min) 15























Intersection LOS: B  
ICU Level of Service B

## Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr



Timings  
25: Golden Sage & Woodmen

Short-Term Total Traffic  
PM Peak Hour

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	120	1370	85	16	946	33	106	18	17	48	7
Future Volume (vph)	120	1370	85	16	946	33	106	18	17	48	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA
Protected Phases		2			6			8			4
Permitted Phases	2		2	6		6	8		8	4	
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	21.5	21.5	21.5	21.5	21.5
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	66.7%	66.7%	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-3.0	-3.0	-1.0	-3.0	-3.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	4.0	4.0	6.0	4.0	4.0	4.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effect Green (s)	53.3	56.3	56.3	54.3	56.3	56.3	18.2	17.2	17.2	17.2	17.2
Actuated g/C Ratio	0.64	0.68	0.68	0.65	0.68	0.68	0.22	0.21	0.21	0.21	0.21
v/c Ratio	0.41	0.62	0.08	0.11	0.39	0.03	0.73	0.07	0.07	0.24	0.44
Control Delay	13.7	9.8	1.7	9.3	7.2	2.4	49.1	25.7	3.5	28.6	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	9.8	1.7	9.3	7.2	2.4	49.1	25.7	3.5	28.6	11.4
LOS	B	A	A	A	A	A	D	C	A	C	B
Approach Delay		9.6			7.0			40.6			15.8
Approach LOS		A			A			D			B

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 83	
Natural Cycle: 60	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 25: Golden Sage & Woodmen



HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd

Short-Term Total Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↱			↱			↱	
Traffic Vol, veh/h	0	0	0	189	0	0	0	0	171	0	0	0
Future Vol, veh/h	0	0	0	189	0	0	0	0	171	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	92	95	92	59	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	189	0	0	0	0	290	0	0	0

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	291	1	146	146	-	1	0	0	290	0	0
Stage 1	-	1	-	145	145	-	-	-	-	-	-	-
Stage 2	-	290	-	1	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	619	1084	823	745	0	1622	-	-	1272	-	-
Stage 1	0	895	-	858	777	0	-	-	-	-	-	-
Stage 2	0	672	-	1022	895	0	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	619	1084	823	745	-	1622	-	-	1272	-	-
Mov Cap-2 Maneuver	-	619	-	823	745	-	-	-	-	-	-	-
Stage 1	-	895	-	858	777	-	-	-	-	-	-	-
Stage 2	-	672	-	1022	895	-	-	-	-	-	-	-

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






Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	-	- 823	1272	-	-
HCM Lane V/C Ratio	-	-	-	- 0.23	-	-	-
HCM Control Delay (s)	0	-	-	0 10.7	0	-	-
HCM Lane LOS	A	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	- 0.9	0	-	-

HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
PM Peak Hour

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	82	67	105	16	9	76
Future Vol, veh/h	82	67	105	16	9	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	36	36	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	67	292	44	9	76






Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	336	0	0 545 314
Stage 1	-	-	- - 314 -
Stage 2	-	-	- - 231 -
Critical Hdwy	4.12	-	- - 6.42 6.22
Critical Hdwy Stg 1	-	-	- - 5.42 -
Critical Hdwy Stg 2	-	-	- - 5.42 -
Follow-up Hdwy	2.218	-	- - 3.518 3.318
Pot Cap-1 Maneuver	1223	-	- - 499 726
Stage 1	-	-	- - 741 -
Stage 2	-	-	- - 807 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	1223	-	- - 466 726
Mov Cap-2 Maneuver	-	-	- - 466 -
Stage 1	-	-	- - 691 -
Stage 2	-	-	- - 807 -







Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1223	-	-	-	466	726
HCM Lane V/C Ratio	0.067	-	-	-	0.019	0.105
HCM Control Delay (s)	8.2	-	-	-	12.9	10.5
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.3

HCM 6th TWSC  
203: Lynch Rd & Bent Grass Meadows Dr













Short-Term Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	71	23	11	51	13	7
Future Vol, veh/h	71	23	11	51	13	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	77	25	12	55	14	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	102	0	169	90
Stage 1	-	-	-	-	90	-
Stage 2	-	-	-	-	79	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1490	-	821	968
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	944	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1490	-	814	968
Mov Cap-2 Maneuver	-	-	-	-	796	-
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	944	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.3		9.4	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	849	-	-	1490	-	
HCM Lane V/C Ratio	0.026	-	-	0.008	-	
HCM Control Delay (s)	9.4	-	-	7.4	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	55	8	34	50	22	4	0	20	13	0	8
Future Vol, veh/h	14	55	8	34	50	22	4	0	20	13	0	8
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	60	9	37	54	24	4	0	22	14	0	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	78	0	0	69	0	0	240	247	65	246	239	66
Stage 1	-	-	-	-	-	-	95	95	-	140	140	-
Stage 2	-	-	-	-	-	-	145	152	-	106	99	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1520	-	-	1532	-	-	714	655	999	708	662	998
Stage 1	-	-	-	-	-	-	912	816	-	863	781	-
Stage 2	-	-	-	-	-	-	858	772	-	900	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1520	-	-	1532	-	-	690	633	999	675	639	998
Mov Cap-2 Maneuver	-	-	-	-	-	-	690	633	-	675	639	-
Stage 1	-	-	-	-	-	-	903	808	-	854	762	-
Stage 2	-	-	-	-	-	-	830	753	-	872	805	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			2.4			9			9.8		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	930	1520	-	-	1532	-	-	770				
HCM Lane V/C Ratio	0.028	0.01	-	-	0.024	-	-	0.03				
HCM Control Delay (s)	9	7.4	-	-	7.4	-	-	9.8				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1				

# Timings 3: Bent Grass Meadows Dr

2040 Background Traffic  
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	216	305	315	630	1678	282
Future Volume (vph)	216	305	315	630	1678	282
Turn Type	Prot	Free	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free	2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	10.0		10.0	10.0	10.0	10.0
Total Split (s)	25.0		31.0	95.0	64.0	64.0
Total Split (%)	20.8%		25.8%	79.2%	53.3%	53.3%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	Max	Max	Max
Act Effct Green (s)	13.0	113.0	90.0	90.0	63.8	63.8
Actuated g/C Ratio	0.12	1.00	0.80	0.80	0.56	0.56
v/c Ratio	0.60	0.21	0.86	0.24	0.91	0.30
Control Delay	54.0	0.3	52.1	3.3	32.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.3	52.1	3.3	32.1	3.7
LOS	D	A	D	A	C	A
Approach Delay	22.6			19.6	28.0	
Approach LOS	C			B	C	

## Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 113  
Natural Cycle: 75  
Control Type: Semi Act-Uncoord  
Maximum v/c Ratio: 0.91  
Intersection Signal Delay: 24.8  
Intersection Capacity Utilization 82.5%  
Analysis Period (min) 15

Intersection LOS: C  
ICU Level of Service E





























Splits and Phases: 3: Bent Grass Meadows Dr





Timings  
25: Golden Sage Rd & Woodmen Rd

2040 Background Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 						 	
Traffic Volume (vph)	354	732	74	77	1772	90	150	7	48	238	10	308
Future Volume (vph)	354	732	74	77	1772	90	150	7	48	238	10	308
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		Free
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	12.0	12.0	10.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	18.0	71.0	71.0	10.0	63.0	63.0	24.0	15.0	15.0	24.0	15.0	
Total Split (%)	15.0%	59.2%	59.2%	8.3%	52.5%	52.5%	20.0%	12.5%	12.5%	20.0%	12.5%	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	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	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Act Effect Green (s)	14.1	67.6	67.6	65.3	57.3	57.3	26.7	7.2	7.2	20.3	7.3	112.8
Actuated g/C Ratio	0.12	0.60	0.60	0.58	0.51	0.51	0.24	0.06	0.06	0.18	0.06	1.00
v/c Ratio	0.87	0.35	0.08	0.18	1.01	0.11	0.39	0.06	0.19	0.79	0.09	0.20
Control Delay	70.9	13.5	1.1	8.6	52.0	0.5	37.8	52.3	1.6	61.2	52.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0
Total Delay	70.9	13.5	1.1	8.6	52.0	0.5	37.8	52.3	1.6	75.2	52.9	0.3
LOS	E	B	A	A	D	A	D	D	A	E	D	A
Approach Delay		30.6			47.7			29.7			33.4	
Approach LOS		C			D			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 112.8

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 39.5

Intersection LOS: D

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage Rd & Woodmen Rd



Timings  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Background Traffic  
AM Peak Hour

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↰	↱
Traffic Volume (vph)	31	280	5	101	351
Future Volume (vph)	31	280	5	101	351
Turn Type	NA	pm+pt	NA	Prot	Over
Protected Phases	4	3	8	2	3
Permitted Phases		8			
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	30.0	40.0	80.0	30.0
Total Split (%)	8.3%	25.0%	33.3%	66.7%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	None	None	None	Min	None
Act Effect Green (s)	11.6		23.6	10.6	7.8
Actuated g/C Ratio	0.27		0.55	0.25	0.18
v/c Ratio	0.50		0.56	0.49	0.50
Control Delay	6.2		9.6	13.2	8.0
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	6.2		9.6	13.2	8.0
LOS	A		A	B	A
Approach Delay	6.2		9.6	10.6	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 42.6  
 Natural Cycle: 45  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.56  
 Intersection Signal Delay: 9.0  
 Intersection LOS: A  
 Intersection Capacity Utilization 57.3%  
 ICU Level of Service B  
 Analysis Period (min) 15






Splits and Phases: 26: Golden Sage Rd & Woodmen Frontage Rd

↰ Ø2	↱ Ø3	→ Ø4
80 s	30 s	10 s
	↰ Ø8	
	40 s	

Intersection

Int Delay, s/veh 3.5

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations						
Traffic Vol, veh/h	140	235	144	24	10	106
Future Vol, veh/h	140	235	144	24	10	106
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	155	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	255	157	26	11	115

Major/Minor Major1 Major2 Minor2







Conflicting Flow All	183	0	-	0	729	170
Stage 1	-	-	-	-	170	-
Stage 2	-	-	-	-	559	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1392	-	-	-	390	874
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1392	-	-	-	347	874
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	572	-

Approach EB WB SB

HCM Control Delay, s	3	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1 SBLn2

Capacity (veh/h)	1392	-	-	-	347	874
HCM Lane V/C Ratio	0.109	-	-	-	0.031	0.132
HCM Control Delay (s)	7.9	-	-	-	15.7	9.7
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.4	-	-	-	0.1	0.5

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	143	2	0	154	6	6	0	0	17	0	0
Future Vol, veh/h	0	143	2	0	154	6	6	0	0	17	0	0
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	155	2	0	167	7	7	0	0	18	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	174	0	0	157	0	0	327	330	156	327	328	171
Stage 1	-	-	-	-	-	-	156	156	-	171	171	-
Stage 2	-	-	-	-	-	-	171	174	-	156	157	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1403	-	-	1423	-	-	626	589	890	626	591	873
Stage 1	-	-	-	-	-	-	846	769	-	831	757	-
Stage 2	-	-	-	-	-	-	831	755	-	846	768	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1403	-	-	1423	-	-	626	589	890	626	591	873
Mov Cap-2 Maneuver	-	-	-	-	-	-	626	589	-	626	591	-
Stage 1	-	-	-	-	-	-	846	769	-	831	757	-
Stage 2	-	-	-	-	-	-	831	755	-	846	768	-
















Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			10.8			10.9		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	626	1403	-	-	1423	-	-	626
HCM Lane V/C Ratio	0.01	-	-	-	-	-	-	0.03
HCM Control Delay (s)	10.8	0	-	-	0	-	-	10.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Timings  
3: Bent Grass Meadows Dr

2040 Background Traffic  
PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 			 	 	
Traffic Volume (vph)	485	344	373	1424	1113	185
Future Volume (vph)	485	344	373	1424	1113	185
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	31.0	31.0	37.0	89.0	52.0	52.0
Total Split (%)	25.8%	25.8%	30.8%	74.2%	43.3%	43.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	22.8	22.8	84.1	84.1	53.3	53.3
Actuated g/C Ratio	0.20	0.20	0.72	0.72	0.46	0.46
v/c Ratio	0.79	0.61	0.85	0.61	0.75	0.24
Control Delay	53.9	8.8	44.4	9.8	31.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	8.8	44.4	9.8	31.9	4.0
LOS	D	A	D	A	C	A
Approach Delay	35.2			17.0	27.9	
Approach LOS	D			B	C	

Intersection Summary

























Cycle Length: 120  
 Actuated Cycle Length: 116.9  
 Natural Cycle: 65  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 24.4  
 Intersection LOS: C  
 Intersection Capacity Utilization 77.8%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 3: Bent Grass Meadows Dr



Timings  
25: Golden Sage Rd & Woodmen Rd

2040 Background Traffic  
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	1627	121	99	1083	284	152	14	114	177	10	389
Future Volume (vph)	371	1627	121	99	1083	284	152	14	114	177	10	389
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		Free
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	12.0	12.0	10.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	23.0	64.0	64.0	10.0	51.0	51.0	31.0	15.0	15.0	31.0	15.0	
Total Split (%)	19.2%	53.3%	53.3%	8.3%	42.5%	42.5%	25.8%	12.5%	12.5%	25.8%	12.5%	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	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	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Act Effect Green (s)	17.0	56.2	56.2	53.3	45.3	45.3	27.2	7.4	7.4	19.0	7.8	104.7
Actuated g/C Ratio	0.16	0.54	0.54	0.51	0.43	0.43	0.26	0.07	0.07	0.18	0.07	1.00
v/c Ratio	0.70	0.87	0.14	0.59	0.72	0.35	0.36	0.11	0.44	0.58	0.08	0.26
Control Delay	49.6	28.2	2.8	31.2	28.9	3.7	33.3	49.9	7.2	45.6	48.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	49.6	28.2	2.8	31.2	28.9	3.7	33.3	49.9	7.2	46.0	48.1	0.4
LOS	D	C	A	C	C	A	C	D	A	D	D	A
Approach Delay		30.6			24.1			23.5			15.2	
Approach LOS		C			C			C			B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 104.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 26.0

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage Rd & Woodmen Rd



Timings  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Background Traffic  
PM Peak Hour






	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↰	↱
Traffic Volume (vph)	27	392	15	330	339
Future Volume (vph)	27	392	15	330	339
Turn Type	NA	pm+pt	NA	Prot	Over
Protected Phases	4	3	8	2	3
Permitted Phases		8			
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	30.0	40.0	80.0	30.0
Total Split (%)	8.3%	25.0%	33.3%	66.7%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	None	None	None	Min	None
Act Effect Green (s)	23.9		36.2	19.5	8.2
Actuated g/C Ratio	0.38		0.57	0.31	0.13
v/c Ratio	0.30		0.70	0.71	0.68
Control Delay	5.7		16.2	26.7	11.5
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	5.7		16.2	26.7	11.5
LOS	A		B	C	B
Approach Delay	5.7		16.2	19.8	
Approach LOS	A		B	B	

Intersection Summary







Cycle Length: 120  
 Actuated Cycle Length: 63.7  
 Natural Cycle: 55  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 16.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 70.4%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 26: Golden Sage Rd & Woodmen Frontage Rd

↰ Ø2	↱ Ø3	→ Ø4
80 s	30 s	10 s
	↰ Ø8	
	40 s	

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	118	210	221	9	12	167
Future Vol, veh/h	118	210	221	9	12	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	155	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	228	240	10	13	182
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	250	0	-	0	729	245
Stage 1	-	-	-	-	245	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1316	-	-	-	390	794
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1316	-	-	-	352	794
Mov Cap-2 Maneuver	-	-	-	-	352	-
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	620	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.9	0		11.2		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1316	-	-	-	352	794
HCM Lane V/C Ratio	0.097	-	-	-	0.037	0.229
HCM Control Delay (s)	8	-	-	-	15.6	10.9
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	0.9



Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	185	8	0	119	17	5	0	0	10	0	0
Future Vol, veh/h	0	185	8	0	119	17	5	0	0	10	0	0
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	201	9	0	129	18	5	0	0	11	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	147	0	0	210	0	0	344	353	206	344	348	138
Stage 1	-	-	-	-	-	-	206	206	-	138	138	-
Stage 2	-	-	-	-	-	-	138	147	-	206	210	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1435	-	-	1361	-	-	610	572	835	610	576	910
Stage 1	-	-	-	-	-	-	796	731	-	865	782	-
Stage 2	-	-	-	-	-	-	865	775	-	796	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1435	-	-	1361	-	-	610	572	835	610	576	910
Mov Cap-2 Maneuver	-	-	-	-	-	-	610	572	-	610	576	-
Stage 1	-	-	-	-	-	-	796	731	-	865	782	-
Stage 2	-	-	-	-	-	-	865	775	-	796	728	-
















Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			11			11		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	610	1435	-	-	1361	-	-	610
HCM Lane V/C Ratio	0.009	-	-	-	-	-	-	0.018
HCM Control Delay (s)	11	0	-	-	0	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Timings  
3: Bent Grass Meadows Dr

2040 Total Traffic  
AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 			 	 	
Traffic Volume (vph)	224	338	324	630	1678	284
Future Volume (vph)	224	338	324	630	1678	284
Turn Type	Prot	Free	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		Free	2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	10.0		10.0	10.0	10.0	10.0
Total Split (s)	25.0		31.0	95.0	64.0	64.0
Total Split (%)	20.8%		25.8%	79.2%	53.3%	53.3%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None		None	Max	Max	Max
Act Effect Green (s)	13.0	113.1	90.1	90.1	63.8	63.8
Actuated g/C Ratio	0.11	1.00	0.80	0.80	0.56	0.56
v/c Ratio	0.60	0.22	0.86	0.24	0.88	0.30
Control Delay	54.0	0.3	52.2	3.3	29.6	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	0.3	52.2	3.3	29.6	3.4
LOS	D	A	D	A	C	A
Approach Delay	21.7			19.9	25.8	
Approach LOS	C			B	C	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 113.1  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.88  
 Intersection Signal Delay: 23.5  
 Intersection Capacity Utilization 83.2%  
 Analysis Period (min) 15

























Intersection LOS: C  
 ICU Level of Service E

Splits and Phases: 3: Bent Grass Meadows Dr



Timings  
25: Golden Sage Rd & Woodmen Rd

2040 Total Traffic  
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	362	732	74	77	1772	90	150	7	48	238	11	335
Future Volume (vph)	362	732	74	77	1772	90	150	7	48	238	11	335
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		Free
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	12.0	12.0	10.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	18.0	71.0	71.0	10.0	63.0	63.0	24.0	15.0	15.0	24.0	15.0	
Total Split (%)	15.0%	59.2%	59.2%	8.3%	52.5%	52.5%	20.0%	12.5%	12.5%	20.0%	12.5%	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	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	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Act Effect Green (s)	14.1	67.5	67.5	65.3	57.2	57.2	26.7	7.2	7.2	20.3	7.4	112.8
Actuated g/C Ratio	0.12	0.60	0.60	0.58	0.51	0.51	0.24	0.06	0.06	0.18	0.07	1.00
v/c Ratio	0.89	0.35	0.08	0.18	1.01	0.11	0.39	0.06	0.19	0.79	0.10	0.22
Control Delay	73.4	13.6	1.1	8.6	52.1	0.6	37.8	52.3	1.6	61.1	53.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0
Total Delay	73.4	13.6	1.1	8.6	52.1	0.6	37.8	52.3	1.6	75.1	53.0	0.3
LOS	E	B	A	A	D	A	D	D	A	E	D	A
Approach Delay		31.7			47.8			29.7			31.8	
Approach LOS		C			D			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 112.8

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 39.5

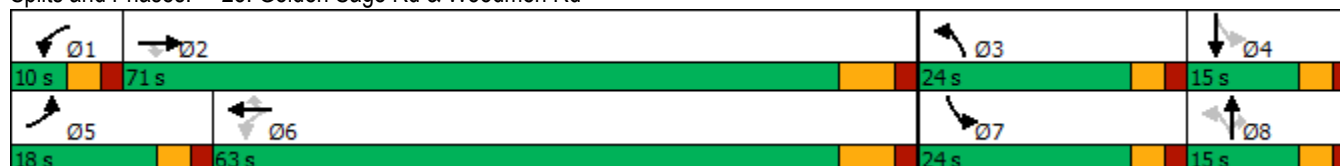
Intersection LOS: D

Intersection Capacity Utilization 90.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 25: Golden Sage Rd & Woodmen Rd



Timings  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
AM Peak Hour

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↰	↱
Traffic Volume (vph)	31	308	5	101	358
Future Volume (vph)	31	308	5	101	358
Turn Type	NA	pm+pt	NA	Prot	Over
Protected Phases	4	3	8	2	3
Permitted Phases		8			
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	30.0	40.0	80.0	30.0
Total Split (%)	8.3%	25.0%	33.3%	66.7%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	None	None	None	Min	None
Act Effect Green (s)	13.7		25.8	10.8	7.8
Actuated g/C Ratio	0.30		0.57	0.24	0.17
v/c Ratio	0.47		0.60	0.51	0.52
Control Delay	5.6		10.0	14.1	8.4
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	5.6		10.0	14.1	8.4
LOS	A		B	B	A
Approach Delay	5.6		10.0	11.3	
Approach LOS	A		B	B	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 45  
 Natural Cycle: 50  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.60  
 Intersection Signal Delay: 9.3  
 Intersection Capacity Utilization 59.0%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service B

Splits and Phases: 26: Golden Sage Rd & Woodmen Frontage Rd






↰ Ø2	↱ Ø3	→ Ø4
80 s	30 s	10 s
	↰ Ø8	
	40 s	

HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

2040 Total Traffic  
AM Peak Hour

Intersection

Int Delay, s/veh 3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	148	235	144	24	10	134
Future Vol, veh/h	148	235	144	24	10	134
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	155	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	255	157	26	11	146






Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	183	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1392	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1392	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	3.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1392	-	-	-	337	874
HCM Lane V/C Ratio	0.116	-	-	-	0.032	0.167
HCM Control Delay (s)	7.9	-	-	-	16	9.9
HCM Lane LOS	A	-	-	-	C	A
HCM 95th %tile Q(veh)	0.4	-	-	-	0.1	0.6







HCM 6th TWSC  
203: Lynch Rd & Bent Grass Meadows Dr

2040 Total Traffic  
AM Peak Hour

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	148	4	6	173	14	15
Future Vol, veh/h	148	4	6	173	14	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	161	4	7	188	15	16
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	165	0	365	163
Stage 1	-	-	-	-	163	-
Stage 2	-	-	-	-	202	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1413	-	635	882
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	632	882
Mov Cap-2 Maneuver	-	-	-	-	673	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	832	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.3		9.9		
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	767	-	-	1413	-	
HCM Lane V/C Ratio	0.041	-	-	0.005	-	
HCM Control Delay (s)	9.9	-	-	7.6	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

HCM 6th TWSC  
204: Berwyn Dr & Bent Grass Meadows Dr

2040 Total Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	158	3	11	159	15	10	0	33	40	0	9
Future Vol, veh/h	2	158	3	11	159	15	10	0	33	40	0	9
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	172	3	12	173	16	11	0	36	43	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	189	0	0	175	0	0	388	391	174	401	384	181
Stage 1	-	-	-	-	-	-	178	178	-	205	205	-
Stage 2	-	-	-	-	-	-	210	213	-	196	179	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1385	-	-	1401	-	-	571	545	869	560	550	862
Stage 1	-	-	-	-	-	-	824	752	-	797	732	-
Stage 2	-	-	-	-	-	-	792	726	-	806	751	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1385	-	-	1401	-	-	560	540	869	533	545	862
Mov Cap-2 Maneuver	-	-	-	-	-	-	560	540	-	533	545	-
Stage 1	-	-	-	-	-	-	823	751	-	796	725	-
Stage 2	-	-	-	-	-	-	776	719	-	772	750	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.5			10			11.9		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	770	1385	-	-	1401	-	-	573
HCM Lane V/C Ratio	0.061	0.002	-	-	0.009	-	-	0.093
HCM Control Delay (s)	10	7.6	-	-	7.6	-	-	11.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3



HCM 6th Roundabout  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
AM Peak Hour

Intersection				
Intersection Delay, s/veh	5.7			
Intersection LOS	A			
Approach	EB	WB	NB	
Entry Lanes	1	1	2	
Conflicting Circle Lanes	1	1	1	
Adj Approach Flow, veh/h	325	329	483	
Demand Flow Rate, veh/h	332	335	493	
Vehicles Circulating, veh/h	330	108	34	
Vehicles Exiting, veh/h	113	419	628	
Ped Vol Crossing Leg, #/h	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	
Approach Delay, s/veh	7.3	5.4	4.7	
Approach LOS	A	A	A	
Lane	Left	Left	Left	Right
Designated Moves	TR	LT	L	TR
Assumed Moves	TR	LT	L	TR
RT Channelized				
Lane Util	1.000	1.000	0.219	0.781
Follow-Up Headway, s	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544
Entry Flow, veh/h	332	335	108	385
Cap Entry Lane, veh/h	986	1236	1377	1377
Entry HV Adj Factor	0.980	0.982	0.981	0.979
Flow Entry, veh/h	325	329	106	377
Cap Entry, veh/h	966	1213	1351	1348
V/C Ratio	0.337	0.271	0.078	0.280
Control Delay, s/veh	7.3	5.4	3.3	5.1
LOS	A	A	A	A
95th %tile Queue, veh	1	1	0	1
















HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
AM Peak Hour

Intersection												
Int Delay, s/veh	26.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱			↱			↱	↱		↱	
Traffic Vol, veh/h	0	31	277	308	5	0	101	0	358	0	1	0
Future Vol, veh/h	0	31	277	308	5	0	101	0	358	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	95	95	95	95	92	95	92	95	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	33	292	324	5	0	106	0	377	0	1	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	213	1	376	213	-	1	0	-	0	0	0
Stage 1	-	1	-	212	212	-	-	-	-	-	-	-
Stage 2	-	212	-	164	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	684	1084	581	684	0	1622	-	0	-	-	-
Stage 1	0	895	-	790	727	0	-	-	0	-	-	-
Stage 2	0	727	-	838	895	0	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	640	1084	388	640	-	1622	-	-	-	-	-
Mov Cap-2 Maneuver	-	640	-	388	640	-	-	-	-	-	-	-
Stage 1	-	895	-	739	680	-	-	-	-	-	-	-
Stage 2	-	680	-	590	895	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.2		48.1		7.4		0					
HCM LOS	B		E									
Minor Lane/Major Mvmt	NBL		NBT EBLn1WBLn1		SBL		SBT		SBR			
Capacity (veh/h)	1622		- 1013 390		-		-		-			
HCM Lane V/C Ratio	0.066		- 0.32 0.845		-		-		-			
HCM Control Delay (s)	7.4		0 10.2 48.1		0		-		-			
HCM Lane LOS	A		A B E		A		-		-			
HCM 95th %tile Q(veh)	0.2		- 1.4 8		-		-		-			

Timings  
3: Bent Grass Meadows Dr

2040 Total Traffic  
PM Peak Hour

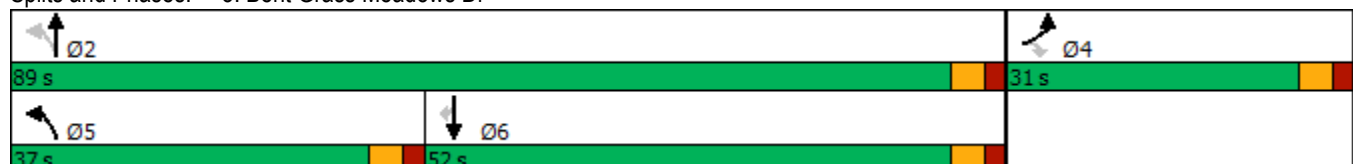
						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 			 	 	
Traffic Volume (vph)	492	371	421	1424	1113	197
Future Volume (vph)	492	371	421	1424	1113	197
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	31.0	31.0	37.0	89.0	52.0	52.0
Total Split (%)	25.8%	25.8%	30.8%	74.2%	43.3%	43.3%
Yellow Time (s)	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
Lost Time Adjust (s)	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
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effect Green (s)	22.6	22.6	84.1	84.1	51.4	51.4
Actuated g/C Ratio	0.19	0.19	0.72	0.72	0.44	0.44
v/c Ratio	0.78	0.63	0.88	0.59	0.75	0.25
Control Delay	53.5	8.9	47.3	9.4	32.7	4.0
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	8.9	47.3	9.4	32.7	4.0
LOS	D	A	D	A	C	A
Approach Delay	34.5			18.1	28.4	
Approach LOS	C			B	C	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 116.7  
 Natural Cycle: 70  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.88  
 Intersection Signal Delay: 25.0  
 Intersection Capacity Utilization 80.6%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service D

Splits and Phases: 3: Bent Grass Meadows Dr



























# Timings

## 25: Golden Sage Rd & Woodmen Rd

2040 Total Traffic

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	411	1627	121	99	1083	284	152	15	114	177	11	411
Future Volume (vph)	411	1627	121	99	1083	284	152	15	114	177	11	411
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		Free
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	12.0	12.0	10.0	12.0	12.0	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	23.0	64.0	64.0	10.0	51.0	51.0	31.0	15.0	15.0	31.0	15.0	
Total Split (%)	19.2%	53.3%	53.3%	8.3%	42.5%	42.5%	25.8%	12.5%	12.5%	25.8%	12.5%	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	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	2.0	2.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Act Effect Green (s)	17.8	56.2	56.2	52.5	44.4	44.4	27.2	7.5	7.5	19.0	7.8	104.7
Actuated g/C Ratio	0.17	0.54	0.54	0.50	0.42	0.42	0.26	0.07	0.07	0.18	0.07	1.00
v/c Ratio	0.74	0.87	0.14	0.59	0.74	0.35	0.36	0.12	0.44	0.58	0.09	0.27
Control Delay	50.7	28.3	2.9	30.7	29.7	3.8	33.3	49.9	7.2	45.6	48.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	50.7	28.3	2.9	30.7	29.7	3.8	33.3	49.9	7.2	45.9	48.2	0.4
LOS	D	C	A	C	C	A	C	D	A	D	D	A
Approach Delay		31.2			24.6			23.6			14.8	
Approach LOS		C			C			C			B	

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 104.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 26.4

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

### Splits and Phases: 25: Golden Sage Rd & Woodmen Rd



Timings  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
PM Peak Hour

	→	↖	←	↗	↘
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↰		↱	↘	↗
Traffic Volume (vph)	27	416	15	330	380
Future Volume (vph)	27	416	15	330	380
Turn Type	NA	pm+pt	NA	Prot	Over
Protected Phases	4	3	8	2	3
Permitted Phases		8			
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	30.0	40.0	80.0	30.0
Total Split (%)	8.3%	25.0%	33.3%	66.7%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0
Total Lost Time (s)	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	None	None	None	Min	None
Act Effect Green (s)	23.8		36.1	19.8	8.4
Actuated g/C Ratio	0.37		0.56	0.31	0.13
v/c Ratio	0.30		0.75	0.71	0.70
Control Delay	5.8		18.6	26.7	11.8
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	5.8		18.6	26.7	11.8
LOS	A		B	C	B
Approach Delay	5.8		18.6	19.6	
Approach LOS	A		B	B	

Intersection Summary






Cycle Length: 120  
 Actuated Cycle Length: 64  
 Natural Cycle: 55  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 17.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 72.6%  
 ICU Level of Service C  
 Analysis Period (min) 15

Splits and Phases: 26: Golden Sage Rd & Woodmen Frontage Rd

↖ Ø2	↖ Ø3	→ Ø4
80 s	30 s	10 s
	↖ Ø8	
	40 s	






HCM 6th TWSC  
40: frontage rd & Bent Grass Meadows Dr

2040 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	158	210	221	9	12	190
Future Vol, veh/h	158	210	221	9	12	190
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	155	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	228	240	10	13	207
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	250	0	-	0	817	245
Stage 1	-	-	-	-	245	-
Stage 2	-	-	-	-	572	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1316	-	-	-	346	794
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	565	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1316	-	-	-	301	794
Mov Cap-2 Maneuver	-	-	-	-	301	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	565	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.5	0		11.5		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1316	-	-	-	301	794
HCM Lane V/C Ratio	0.131	-	-	-	0.043	0.26
HCM Control Delay (s)	8.1	-	-	-	17.5	11.1
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.1	1

HCM 6th TWSC  
203: Lynch Rd & Bent Grass Meadows Dr







2040 Total Traffic  
PM Peak Hour

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	213	20	13	135	12	8
Future Vol, veh/h	213	20	13	135	12	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	155	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	232	22	14	147	13	9
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	254	0	418	243
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	175	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1311	-	591	796
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1311	-	584	796
Mov Cap-2 Maneuver	-	-	-	-	637	-
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	855	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.7		10.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	692	-	-	1311	-	
HCM Lane V/C Ratio	0.031	-	-	0.011	-	
HCM Control Delay (s)	10.4	-	-	7.8	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	



HCM 6th TWSC  
204: Berwyn Dr & Bent Grass Meadows Dr

2040 Total Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	193	15	35	132	39	9	0	21	23	0	8
Future Vol, veh/h	13	193	15	35	132	39	9	0	21	23	0	8
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	155	-	-	155	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	210	16	38	143	42	10	0	23	25	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	185	0	0	226	0	0	491	507	218	498	494	164
Stage 1	-	-	-	-	-	-	246	246	-	240	240	-
Stage 2	-	-	-	-	-	-	245	261	-	258	254	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1390	-	-	1342	-	-	488	468	822	483	476	881
Stage 1	-	-	-	-	-	-	758	703	-	763	707	-
Stage 2	-	-	-	-	-	-	759	692	-	747	697	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1390	-	-	1342	-	-	469	450	822	456	458	881
Mov Cap-2 Maneuver	-	-	-	-	-	-	469	450	-	456	458	-
Stage 1	-	-	-	-	-	-	750	696	-	755	687	-
Stage 2	-	-	-	-	-	-	730	673	-	719	690	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			1.3			10.6			12.4		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	671	1390	-	-	1342	-	-	521
HCM Lane V/C Ratio	0.049	0.01	-	-	0.028	-	-	0.065
HCM Control Delay (s)	10.6	7.6	-	-	7.8	-	-	12.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.2

HCM 6th Roundabout  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
PM Peak Hour

Intersection				
Intersection Delay, s/veh	6.8			
Intersection LOS	A			
Approach	EB	WB	NB	
Entry Lanes	1	1	2	
Conflicting Circle Lanes	1	1	1	
Adj Approach Flow, veh/h	221	454	747	
Demand Flow Rate, veh/h	226	463	762	
Vehicles Circulating, veh/h	447	354	29	
Vehicles Exiting, veh/h	370	437	644	
Ped Vol Crossing Leg, #/h	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	
Approach Delay, s/veh	6.9	9.7	5.1	
Approach LOS	A	A	A	
Lane	Left	Left	Left	Right
Designated Moves	TR	LT	L	TR
Assumed Moves	TR	LT	L	TR
RT Channelized				
Lane Util	1.000	1.000	0.465	0.535
Follow-Up Headway, s	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.544	4.544
Entry Flow, veh/h	226	463	354	408
Cap Entry Lane, veh/h	875	962	1383	1383
Entry HV Adj Factor	0.980	0.980	0.980	0.980
Flow Entry, veh/h	221	454	347	400
Cap Entry, veh/h	857	942	1356	1356
V/C Ratio	0.258	0.481	0.256	0.295
Control Delay, s/veh	6.9	9.7	4.8	5.2
LOS	A	A	A	A
95th %tile Queue, veh	1	3	1	1

HCM 6th TWSC  
26: Golden Sage Rd & Woodmen Frontage Rd

2040 Total Traffic  
PM Peak Hour

Intersection												
Int Delay, s/veh	298.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↱	↱		↰	
Traffic Vol, veh/h	0	27	183	416	15	0	330	0	380	0	0	0
Future Vol, veh/h	0	27	183	416	15	0	330	0	380	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	Free	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	95	95	95	95	92	95	92	95	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	193	438	16	0	347	0	400	0	0	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	695	1	806	695	-	1	0	-	0	0	0
Stage 1	-	1	-	694	694	-	-	-	-	-	-	-
Stage 2	-	694	-	112	1	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	366	1084	~ 300	366	0	1622	-	0	-	-	-
Stage 1	0	895	-	~ 433	444	0	-	-	0	-	-	-
Stage 2	0	444	-	893	895	0	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	-	288	1084	~ 191	288	-	1622	-	-	-	-	-
Mov Cap-2 Maneuver	-	288	-	~ 191	288	-	-	-	-	-	-	-
Stage 1	-	895	-	~ 340	349	-	-	-	-	-	-	-
Stage 2	-	349	-	711	895	-	-	-	-	-	-	-






Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	\$ 662.4	7.8	0
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1622	-	800 193	-	-	-
HCM Lane V/C Ratio	0.214	-	0.276 2.351	-	-	-
HCM Control Delay (s)	7.8	0	11.2\$ 662.4	0	-	-
HCM Lane LOS	A	A	B F	A	-	-
HCM 95th %tile Q(veh)	0.8	-	1.1 37.2	-	-	-

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

HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic (With Channelized "T")  
AM Peak Hour

Intersection						
Int Delay, s/veh	81.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	145	279	165	0	1441	262
Future Vol, veh/h	145	279	165	0	1441	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	330
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	86	86	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	151	291	192	0	1638	298

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2022	819	1936	0	-	0
Stage 1	1638	-	-	-	-	-
Stage 2	384	-	-	-	-	-
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	~ 57	319	301	-	-	-
Stage 1	~ 145	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 21	319	301	-	-	-
Mov Cap-2 Maneuver	~ 46	-	-	-	-	-
Stage 1	~ 52	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	459.1	35.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	301	-	46	319	-	-
HCM Lane V/C Ratio	0.637	-	3.284	0.911	-	-
HCM Control Delay (s)	35.8	\$	1213.2	67.2	-	-
HCM Lane LOS	E	A	F	F	-	-
HCM 95th %tile Q(veh)	4.1	-	16.6	8.8	-	-

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

HCM 6th Roundabout  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
AM Peak Hour













Intersection						
Intersection Delay, s/veh	16.6					
Intersection LOS	C					
Approach	EB		NB		SB	
Entry Lanes	2		2		2	
Conflicting Circle Lanes	2		2		2	
Adj Approach Flow, veh/h	442		870		1936	
Demand Flow Rate, veh/h	451		888		1975	
Vehicles Circulating, veh/h	1671		154		196	
Vehicles Exiting, veh/h	500		1968		846	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	30.3		6.2		18.1	
Approach LOS	D		A		C	
Lane	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	LT	TR	LT	TR
Assumed Moves	L	TR	LT	TR	LT	TR
RT Channelized						
Lane Util	0.341	0.659	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.500	2.500	2.500	2.500	2.500	2.500
Critical Headway, s	4.050	4.050	4.050	4.050	4.050	4.050
Entry Flow, veh/h	154	297	417	471	928	1047
Cap Entry Lane, veh/h	393	393	1277	1277	1236	1236
Entry HV Adj Factor	0.981	0.980	0.981	0.979	0.981	0.980
Flow Entry, veh/h	151	291	409	461	910	1026
Cap Entry, veh/h	385	385	1253	1251	1212	1212
V/C Ratio	0.392	0.757	0.326	0.369	0.751	0.847
Control Delay, s/veh	17.2	37.0	5.9	6.4	15.0	20.9
LOS	C	E	A	A	C	C
95th %tile Queue, veh	2	6	1	2	8	11

# Timings

2020 Total Traffic (With Signalized Channelized T)

## 3: Meridian Rd & Bent Grass Meadows Dr

AM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	145	279	165	583	1441	262	
Future Volume (vph)	145	279	165	583	1441	262	
Turn Type	Prot	Perm	custom	NA	NA	Perm	
Protected Phases	4!		5	Free!	6		2
Permitted Phases		4	2			6	
Detector Phase	4	4	5		6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0		23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0		50.0	50.0	65.0
Total Split (%)	27.8%	27.8%	16.7%		55.6%	55.6%	72%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None		Max	Max	Max
Act Effect Green (s)	12.6	12.6	60.1	82.7	46.3	46.3	
Actuated g/C Ratio	0.15	0.15	0.73	1.00	0.56	0.56	
v/c Ratio	0.56	0.70	0.69	0.19	0.83	0.29	
Control Delay	40.6	19.9	28.5	0.1	20.9	2.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.6	19.9	28.5	0.1	20.9	2.3	
LOS	D	B	C	A	C	A	
Approach Delay	26.9			6.4	18.0		
Approach LOS	C			A	B		

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 82.7

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 69.5%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr















# Timings

## 3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic (With SB RT Accel)

AM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	145	279	165	583	1441	262	
Future Volume (vph)	145	279	165	583	1441	262	
Turn Type	pm+pt	Free	pm+pt	NA	NA	Perm	
Protected Phases	7		5	2	6		4
Permitted Phases	4	Free	2			6	
Detector Phase	7		5	2	6	6	
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		10.0	23.0	23.0	23.0	23.0
Total Split (s)	25.0		15.0	65.0	50.0	50.0	25.0
Total Split (%)	27.8%		16.7%	72.2%	55.6%	55.6%	28%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None		None	Max	Max	Max	None
Act Effct Green (s)	12.3	82.8	60.5	60.5	46.7	46.7	
Actuated g/C Ratio	0.15	1.00	0.73	0.73	0.56	0.56	
v/c Ratio	0.58	0.18	0.69	0.26	0.82	0.29	
Control Delay	41.6	0.3	28.5	4.4	20.4	2.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.6	0.3	28.5	4.4	20.4	2.2	
LOS	D	A	C	A	C	A	
Approach Delay	14.4			9.7	17.6		
Approach LOS	B			A	B		

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 82.8

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 15.0

Intersection LOS: B

Intersection Capacity Utilization 69.5%

ICU Level of Service C

Analysis Period (min) 15






Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr





HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic (With Channelized "T")  
PM Peak Hour

Intersection						
Int Delay, s/veh	54.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	206	254	283	0	820	211
Future Vol, veh/h	206	254	283	0	820	211
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	330
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	96	96	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	240	295	295	0	820	211
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1410	410	1031	0	-	0
Stage 1	820	-	-	-	-	-
Stage 2	590	-	-	-	-	-
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	~ 140	592	672	-	-	-
Stage 1	394	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 79	592	672	-	-	-
Mov Cap-2 Maneuver	~ 144	-	-	-	-	-
Stage 1	~ 221	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	180.3	14.5		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	672	-	144	592	-	-
HCM Lane V/C Ratio	0.439	-	1.663	0.499	-	-
HCM Control Delay (s)	14.5	0\$	381.7	17	-	-
HCM Lane LOS	B	A	F	C	-	-
HCM 95th %tile Q(veh)	2.2	-	17.2	2.8	-	-
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						

HCM 6th Roundabout  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
PM Peak Hour













Intersection						
Intersection Delay, s/veh	10.7					
Intersection LOS	B					
Approach	EB		NB		SB	
Entry Lanes	2		2		2	
Conflicting Circle Lanes	2		2		2	
Adj Approach Flow, veh/h	535		1563		1031	
Demand Flow Rate, veh/h	546		1594		1051	
Vehicles Circulating, veh/h	836		245		301	
Vehicles Exiting, veh/h	516		1137		1538	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	9.6		12.6		8.3	
Approach LOS	A		B		A	
Lane	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	LT	TR	LT	TR
Assumed Moves	L	TR	LT	TR	LT	TR
RT Channelized						
Lane Util	0.449	0.551	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.500	2.500	2.500	2.500	2.500	2.500
Critical Headway, s	4.050	4.050	4.050	4.050	4.050	4.050
Entry Flow, veh/h	245	301	749	845	494	557
Cap Entry Lane, veh/h	752	752	1190	1190	1139	1139
Entry HV Adj Factor	0.980	0.980	0.981	0.980	0.981	0.981
Flow Entry, veh/h	240	295	734	828	484	546
Cap Entry, veh/h	736	737	1167	1167	1117	1117
V/C Ratio	0.326	0.400	0.629	0.710	0.434	0.489
Control Delay, s/veh	8.9	10.1	11.3	13.8	7.8	8.7
LOS	A	B	B	B	A	A
95th %tile Queue, veh	1	2	5	6	2	3

# Timings

2020 Total Traffic (With Signalized Channelized T)

3: Meridian Rd & Bent Grass Meadows Dr

PM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	206	254	283	1217	820	211	
Future Volume (vph)	206	254	283	1217	820	211	
Turn Type	Prot	Perm	custom	NA	NA	Perm	
Protected Phases	4!		5	Free!	6		2
Permitted Phases		4	2			6	
Detector Phase	4	4	5		6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	23.0	23.0	10.0		23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0		50.0	50.0	65.0
Total Split (%)	27.8%	27.8%	16.7%		55.6%	55.6%	72%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None		Max	Max	Max
Act Effect Green (s)	16.1	16.1	60.1	86.2	45.1	45.1	
Actuated g/C Ratio	0.19	0.19	0.70	1.00	0.52	0.52	
v/c Ratio	0.73	0.55	0.61	0.36	0.44	0.23	
Control Delay	46.4	8.1	11.1	0.3	14.2	2.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.4	8.1	11.1	0.3	14.2	2.5	
LOS	D	A	B	A	B	A	
Approach Delay	25.2			2.3	11.8		
Approach LOS	C			A	B		

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 86.2

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 9.4

Intersection LOS: A

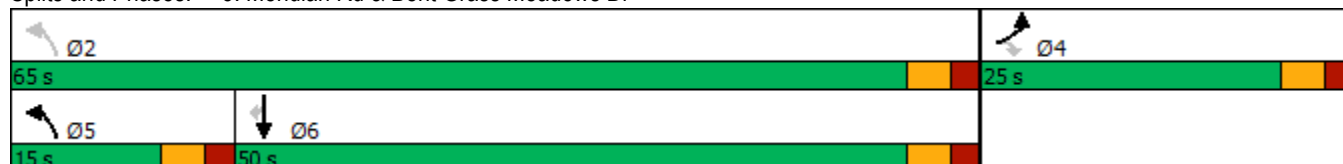
Intersection Capacity Utilization 62.3%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr















# Timings

# Short-Term Total Traffic (With SB RT Accel)

## 3: Meridian Rd & Bent Grass Meadows Dr

PM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø4
Lane Configurations							
Traffic Volume (vph)	206	254	283	1217	820	211	
Future Volume (vph)	206	254	283	1217	820	211	
Turn Type	pm+pt	Free	pm+pt	NA	NA	Perm	
Protected Phases	7		5	2	6		4
Permitted Phases	4	Free	2			6	
Detector Phase	7		5	2	6	6	
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		10.0	23.0	23.0	23.0	23.0
Total Split (s)	25.0		15.0	65.0	50.0	50.0	25.0
Total Split (%)	27.8%		16.7%	72.2%	55.6%	55.6%	28%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0		5.0	5.0	5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None		None	Max	Max	Max	None
Act Effect Green (s)	16.1	86.2	60.1	60.1	45.8	45.8	
Actuated g/C Ratio	0.19	1.00	0.70	0.70	0.53	0.53	
v/c Ratio	0.73	0.19	0.62	0.51	0.44	0.22	
Control Delay	46.4	0.3	11.5	7.5	13.9	2.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.4	0.3	11.5	7.5	13.9	2.5	
LOS	D	A	B	A	B	A	
Approach Delay	20.9			8.2	11.6		
Approach LOS	C			A	B		

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 86.2

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 62.3%

ICU Level of Service B

Analysis Period (min) 15






Splits and Phases: 3: Meridian Rd & Bent Grass Meadows Dr





HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

2040 Total Traffic (With Channelized "T")  
PM Peak Hour

Intersection						
Int Delay, s/veh	21.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	224	338	324	0	1678	284
Future Vol, veh/h	224	338	324	0	1678	284
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	330
Veh in Median Storage, #	1	-	-	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	236	356	341	0	1766	299
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2448	883	2065	0	-	0
Stage 1	1766	-	-	-	-	-
Stage 2	682	-	-	-	-	-
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	~ 30	~ 290	~ 268	-	-	-
Stage 1	~ 123	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	~ 290	~ 268	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s		186.8		0		
HCM LOS	-					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	~ 268	-	-	290	-	-
HCM Lane V/C Ratio	1.273	-	-	1.227	-	-
HCM Control Delay (s)	186.8	0	-	165.7	-	-
HCM Lane LOS	F	A	-	F	-	-
HCM 95th %tile Q(veh)	16.8	-	-	16.4	-	-
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						

HCM 6th Roundabout  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
AM Peak Hour

Intersection						
Intersection Delay, s/veh	35.8					
Intersection LOS	E					
Approach	EB		NB		SB	
Entry Lanes	2		2		2	
Conflicting Circle Lanes	2		2		2	
Adj Approach Flow, veh/h	592		1004		2065	
Demand Flow Rate, veh/h	604		1024		2106	
Vehicles Circulating, veh/h	1801		241		348	
Vehicles Exiting, veh/h	653		2164		917	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	67.2		7.5		40.6	
Approach LOS	F		A		E	
Lane	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	LT	TR	LT	TR
Assumed Moves	L	TR	LT	TR	LT	TR
RT Channelized						
Lane Util	0.399	0.601	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.500	2.500	2.500	2.500	2.500	2.500
Critical Headway, s	4.050	4.050	4.050	4.050	4.050	4.050
Entry Flow, veh/h	241	363	481	543	990	1116
Cap Entry Lane, veh/h	355	355	1194	1194	1099	1099
Entry HV Adj Factor	0.979	0.981	0.981	0.980	0.980	0.981
Flow Entry, veh/h	236	356	472	532	970	1094
Cap Entry, veh/h	347	348	1171	1170	1077	1077
V/C Ratio	0.679	1.023	0.403	0.455	0.901	1.016
Control Delay, s/veh	33.1	89.7	7.1	7.9	28.6	51.2
LOS	D	F	A	A	D	F
95th %tile Queue, veh	5	12	2	2	14	21















# Timings

## 3: Bent Grass Meadows Dr

2040 Total Traffic (With Signalized Channelized T)

AM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	224	338	324	630	1678	284	
Future Volume (vph)	224	338	324	630	1678	284	
Turn Type	Prot	Free	custom	NA	NA	Perm	
Protected Phases	4!		5	Free!	6		2
Permitted Phases		Free	2			6	
Detector Phase	4		5		6	6	
Switch Phase							
Minimum Initial (s)	5.0		5.0		5.0	5.0	5.0
Minimum Split (s)	10.0		10.0		10.0	10.0	10.0
Total Split (s)	25.0		31.0		64.0	64.0	95.0
Total Split (%)	20.8%		25.8%		53.3%	53.3%	79%
Yellow Time (s)	3.0		3.0		3.0	3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None		None		Max	Max	Max
Act Effect Green (s)	13.0	113.1	90.1	113.1	63.8	63.8	
Actuated g/C Ratio	0.11	1.00	0.80	1.00	0.56	0.56	
v/c Ratio	0.60	0.22	0.86	0.19	0.88	0.30	
Control Delay	54.0	0.3	52.2	0.1	29.6	3.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.0	0.3	52.2	0.1	29.6	3.4	
LOS	D	A	D	A	C	A	
Approach Delay	21.7			17.8	25.8		
Approach LOS	C			B	C		

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 113.1

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 23.0

Intersection LOS: C

Intersection Capacity Utilization 82.4%

ICU Level of Service E

Analysis Period (min) 15






! Phase conflict between lane groups.

Splits and Phases: 3: Bent Grass Meadows Dr



HCM 6th TWSC  
3: Meridian Rd & Bent Grass Meadows Dr

2040 Total Traffic (With Channelized "T")  
PM Peak Hour

Intersection						
Int Delay, s/veh	1070.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	492	371	421	0	1113	197
Future Vol, veh/h	492	371	421	0	1113	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	330
Veh in Median Storage, #	1	-	-	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	518	391	443	0	1172	207
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	2058	586	1379	0	-	0
Stage 1	1172	-	-	-	-	-
Stage 2	886	-	-	-	-	-
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	~ 54	454	495	-	-	-
Stage 1	~ 258	-	-	-	-	-
Stage 2	~ 402	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 6	454	495	-	-	-
Mov Cap-2 Maneuver	~ 40	-	-	-	-	-
Stage 1	~ 27	-	-	-	-	-
Stage 2	~ 402	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	3193.3	47.7		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	495	-	40	454	-	-
HCM Lane V/C Ratio	0.895	-	12.947	0.86	-	-
HCM Control Delay (s)	47.7	\$	5567.1	45.2	-	-
HCM Lane LOS	E	A	F	E	-	-
HCM 95th %tile Q(veh)	10.1	-	62.8	8.8	-	-
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						













HCM 6th Roundabout  
3: Meridian Rd & Bent Grass Meadows Dr

Short-Term Total Traffic  
PM Peak Hour

Intersection						
Intersection Delay, s/veh	42.3					
Intersection LOS	E					
Approach	EB		NB		SB	
Entry Lanes	2		2		2	
Conflicting Circle Lanes	2		2		2	
Adj Approach Flow, veh/h	909		1942		1379	
Demand Flow Rate, veh/h	927		1981		1406	
Vehicles Circulating, veh/h	1195		528		452	
Vehicles Exiting, veh/h	663		1594		2057	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	38.4		63.5		15.1	
Approach LOS	E		F		C	
Lane	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	LT	TR	LT	TR
Assumed Moves	L	TR	LT	TR	LT	TR
RT Channelized						
Lane Util	0.570	0.430	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.500	2.500	2.500	2.500	2.500	2.500
Critical Headway, s	4.050	4.050	4.050	4.050	4.050	4.050
Entry Flow, veh/h	528	399	931	1050	661	745
Cap Entry Lane, veh/h	568	568	955	955	1013	1013
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.980	0.981
Flow Entry, veh/h	518	391	913	1029	648	731
Cap Entry, veh/h	558	557	936	936	993	994
V/C Ratio	0.929	0.702	0.975	1.099	0.652	0.735
Control Delay, s/veh	49.4	23.8	44.5	80.2	13.4	16.6
LOS	E	C	E	F	B	C
95th %tile Queue, veh	12	6	17	26	5	7

Timings  
3: Bent Grass Meadows Dr

2040 Total Traffic (With Signalized T)  
PM Peak Hour

							
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	492	371	421	1424	1113	197	
Future Volume (vph)	492	371	421	1424	1113	197	
Turn Type	Prot	Perm	custom	NA	NA	Perm	
Protected Phases	4!		5	Free!	6		2
Permitted Phases		4	2			6	
Detector Phase	4	4	5		6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0		10.0	10.0	10.0
Total Split (s)	31.0	31.0	37.0		52.0	52.0	89.0
Total Split (%)	25.8%	25.8%	30.8%		43.3%	43.3%	74%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	
Lead/Lag			Lead		Lag	Lag	
Lead-Lag Optimize?			Yes		Yes	Yes	
Recall Mode	None	None	None		Max	Max	Max
Act Effect Green (s)	22.6	22.6	84.1	116.7	51.4	51.4	
Actuated g/C Ratio	0.19	0.19	0.72	1.00	0.44	0.44	
v/c Ratio	0.78	0.63	0.88	0.42	0.75	0.25	
Control Delay	53.5	8.9	47.3	0.4	32.7	4.0	
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.8	8.9	47.3	0.4	32.7	4.0	
LOS	D	A	D	A	C	A	
Approach Delay	34.5			11.1	28.4		
Approach LOS	C			B	C		

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 116.7  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.88  
 Intersection Signal Delay: 21.8  
 Intersection Capacity Utilization 80.6%  
 Analysis Period (min) 15  
 ! Phase conflict between lane groups.

Splits and Phases: 3: Bent Grass Meadows Dr



## Queuing and Blocking Report

## Intersection: 3: Meridian Rd &amp; Bent Grass Meadows Dr

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	175	217	190	119	99	396	377	193
Average Queue (ft)	77	100	85	51	36	241	195	54
95th Queue (ft)	140	178	154	98	81	367	336	123
Link Distance (ft)	277	277		1650	1650	723	723	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			700					330
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							1	0

## Intersection: 25: Golden Sage &amp; Woodmen

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	185	127	132	35	17	217	224	27	149	89	21	77
Average Queue (ft)	75	72	54	5	4	116	101	4	81	8	3	23
95th Queue (ft)	156	118	108	23	14	195	196	16	136	47	14	57
Link Distance (ft)		1641	1641			1652	1652			392		151
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	460			400	465			375	130		185	
Storage Blk Time (%)									2			
Queuing Penalty (veh)									0			

## Intersection: 25: Golden Sage &amp; Woodmen

Movement	SB
Directions Served	TR
Maximum Queue (ft)	142
Average Queue (ft)	70
95th Queue (ft)	128
Link Distance (ft)	151
Upstream Blk Time (%)	1
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

## Zone Summary

Zone wide Queuing Penalty: 2

## Queuing and Blocking Report

## Intersection: 3: Meridian Rd &amp; Bent Grass Meadows Dr

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	T	T	T	R
Maximum Queue (ft)	209	153	238	162	187	245	218	101
Average Queue (ft)	106	58	118	84	77	146	97	44
95th Queue (ft)	176	113	195	150	146	223	193	81
Link Distance (ft)	277	277		1650	1650	723	723	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			700					330
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 25: Golden Sage &amp; Woodmen

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	204	220	205	43	48	137	116	17	131	65	35	83
Average Queue (ft)	102	107	96	14	10	67	42	3	62	12	9	35
95th Queue (ft)	194	183	176	36	33	118	88	12	112	48	29	74
Link Distance (ft)		1641	1641			1652	1652			392		151
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	460			400	465			375	130		185	
Storage Blk Time (%)									1			
Queuing Penalty (veh)									0			

## Intersection: 25: Golden Sage &amp; Woodmen

Movement	SB
Directions Served	TR
Maximum Queue (ft)	101
Average Queue (ft)	43
95th Queue (ft)	80
Link Distance (ft)	151
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

## Zone Summary

Zone wide Queuing Penalty: 0

## Queuing and Blocking Report

## Intersection: 3: Bent Grass Meadows Dr

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	L	T	T	T	T	R
Maximum Queue (ft)	152	146	302	118	117	718	693	355
Average Queue (ft)	75	85	186	55	51	409	376	138
95th Queue (ft)	126	133	282	99	99	642	622	349
Link Distance (ft)	274	274		1658	1658	714	714	
Upstream Blk Time (%)						2	3	
Queuing Penalty (veh)						0	0	
Storage Bay Dist (ft)			700					330
Storage Blk Time (%)							8	0
Queuing Penalty (veh)							24	0

## Intersection: 25: Golden Sage Rd &amp; Woodmen Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	T	R
Maximum Queue (ft)	587	536	398	347	41	500	1411	1398	425	147	154	95
Average Queue (ft)	356	320	106	97	9	166	832	810	166	89	12	23
95th Queue (ft)	631	601	294	258	27	509	1579	1539	484	148	69	62
Link Distance (ft)			1627	1627			1652	1652			392	
Upstream Blk Time (%)							5	5				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	1000	1000			400	475			400	125		200
Storage Blk Time (%)						0	31	34	0	4		0
Queuing Penalty (veh)						0	24	31	0	2		0

## Intersection: 25: Golden Sage Rd &amp; Woodmen Rd

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	163	35	178
Average Queue (ft)	139	10	115
95th Queue (ft)	181	31	193
Link Distance (ft)	151	151	151
Upstream Blk Time (%)	18		6
Queuing Penalty (veh)	35		12
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

## Zone Summary

Zone wide Queuing Penalty: 129

## Queuing and Blocking Report

## Intersection: 3: Bent Grass Meadows Dr

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	L	T	T	T	T	R
Maximum Queue (ft)	255	261	100	436	377	366	539	510	321
Average Queue (ft)	159	172	2	225	173	170	318	275	88
95th Queue (ft)	240	253	42	401	287	283	487	446	237
Link Distance (ft)	277	277	277		1660	1660	712	712	
Upstream Blk Time (%)	0	0	0						
Queuing Penalty (veh)	0	0	0						
Storage Bay Dist (ft)				700					330
Storage Blk Time (%)					0			3	0
Queuing Penalty (veh)					0			5	0

## Intersection: 25: Golden Sage Rd &amp; Woodmen Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	T	T	R	L	T	R
Maximum Queue (ft)	819	813	923	828	269	160	422	422	265	148	166	158
Average Queue (ft)	477	431	340	328	27	63	245	232	91	89	16	64
95th Queue (ft)	834	819	753	704	154	121	369	361	215	146	70	128
Link Distance (ft)			1627	1627			1652	1652			392	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000	1000			400	475			400	125		200
Storage Blk Time (%)	0	1	0	1	0		0	1	0	4	0	0
Queuing Penalty (veh)	0	6	2	2	0		0	2	0	5	0	0

## Intersection: 25: Golden Sage Rd &amp; Woodmen Rd

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	160	52	179
Average Queue (ft)	110	10	106
95th Queue (ft)	172	35	186
Link Distance (ft)	151	151	151
Upstream Blk Time (%)	5		3
Queuing Penalty (veh)	9		6
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

## Zone Summary

Zone wide Queuing Penalty: 39