

# LSC Responses to TIS Redline Comments



This TIS supports the Sterling Ranch East - Phase 1 Preliminary Plan (SP224)

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## Sterling Ranch East - Phase 1 Rezoning & Preliminary Plan Traffic Impact Study (LSC #S224510)

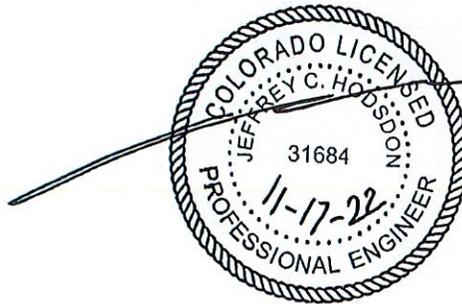
November 17, 2022

SP-22-004, P-22-012, P-22-013

Refer to comments on Master TIS where appropriate.

### 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, written over a horizontal line.

11/17/2022  
Date

See SKP-22-004 redlines also.

# LSC Responses to TIS Redline Comments

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Page: 1

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:28:38 AM

**This TIS supports the Sterling Ranch East - Phase 1 Preliminary Plan (SP224)**

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:00 PM  
LSC Response: Noted.

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☰ Number: 2 Author: Jeff Rice - PCD Engineering Subject: Text Box Date: 1/9/2023 10:50:43 AM

**SP-22-004, P-22-012, P-22-013**

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:04 PM  
LSC Response: Revised as requested.

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☰ Number: 3 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:44:19 AM

**Refer to comments on Master TIS where appropriate.**

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:18 PM  
LSC Response: Noted. An updated version of the Master TIS has been submitted and comments have been received since receipt of these comments on this Phase 1 report.

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☰ Number: 4 Author: dsdrice Subject: Text Box Date: 1/9/2023 10:48:24 AM

**See SKP-22-004 redlines also.**

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:30 PM  
LSC Response: Noted.

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↩ Author: jchodsdon Subject: Sticky Note Date: 2/10/2023 10:41:44 AM  
LSC Response: See LSC Responses to Master TIS redline comments on the SKP.

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- Findings and recommendations for study area roadways and intersections, including number of lanes, auxiliary turn lanes, intersection traffic control, etc.; and
- The recommended street classifications

## RECENT TRAFFIC REPORTS

LSC prepared a previous master traffic impact study (TIS) for the entire Sterling Ranch development dated June 5, 2008. **This master study was updated October 21, 2022.** Since 2008, LSC and SM Rocha, LLC have completed multiple studies for individual filings and phases within Sterling Ranch. A list of other traffic studies within Sterling Ranch and in the vicinity of area of study completed within the past five years (that LSC is aware of) is attached for reference. **We were not able to find this list.** <sup>1</sup>

El Paso County is currently studying the Briargate Stapleton Corridor as part of a Pikes Peak Rural Transportation Authority (PPRTA) study. A draft version of the Briargate-Stapleton Corridor Study by Wilson & Company was published December 9, 2021.

## STUDY AREA

Figure 1 shows the location of the Sterling Ranch East Phase 1 Preliminary Plan Area relative to the overall Sterling Ranch Sketch Plan Area. As shown in Figure 1, the site is located generally in the middle of the Sketch Plan Area adjacent to the future extension of Sterling Ranch.

## Land Use

Figure 2 shows the proposed Sterling Ranch East Phase 1 Preliminary Plan. The trip-generation table (Table 2) also lists the land uses and quantities of dwelling units, estimated non-residential building square footage, etc. The site is planned to be developed with 761 lots for single-family homes. Two future tracts are also included in the Preliminary Plan. Tract M, located southwest of the future intersection of Briargate/Sterling Ranch, is planned to be developed with a K-8 school and Tract T, located on the south end of the Preliminary Plan area, is planned to be developed with an elementary school. This land use is consistent with the land use assumed in the October 21, 2022 Master TIS.

## Pedestrian Plan

Figure 2 also shows the location of all planned trails and sidewalks in the vicinity of the site. Connections are also proposed to the planned future Sand Creek Regional Trail (west of Dines Boulevard), as shown in the attached map. **These connections do not appear on Figure 2. It only shows sidewalks.** <sup>2</sup>

A detached sidewalk will be provided along the west side of Sterling Ranch Road. The multi-use paved shoulder on Sterling Ranch Road will accommodate bicycles.

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:30:24 AM

We were not able to find this list.

↶ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:33 PM  
LSC Response: The list has been included with the updated TIS.

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☰ Number: 2 Author: Paul Brown Subject: Callout Date: 1/5/2023 10:30:40 AM

Road

↶ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:34:36 PM  
LSC Response: Revised as requested.

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☰ Number: 3 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:31:29 AM

These connections do not appear on Figure 2. It only shows sidewalks.

↶ Author: kdferrin Subject: Sticky Note Date: 1/16/2023 11:19:42 AM  
LSC Response: The trail locations have been included on Figure 2 in the updated TIS and the text has been revised to be consistent with the Letter of Intent.

The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate Parkway about 1,230 feet east of Sterling Ranch Road that is not shown on the access control plan.

The access control plan shows a right-in/right-out access to the south side of Briargate Parkway just west of Banning Lewis Parkway. The currently proposed Sketch Plan Amendment shows a right-in/right-out access to the north side of Briargate and a three-quarter movement access to the south side of Briargate at approximately the same location (1,085 feet west of Banning Lewis Parkway).

The access control plan shows the intersection of Briargate/Banning Lewis as a three-leg intersection. The currently proposed Sketch Plan includes a north leg at this future full-movement signal-controlled intersection.

### **Sight Distance Analysis**

Figures 4a through 4b show sight-distance analysis at the proposed intersections to Sterling Ranch Road. Based on a design speed of 40 miles per hour (mph) and the criteria contained in Table 2-21 of the *Engineering Criteria Manual (ECM)*, the required intersection sight distance at the future intersections is 445 feet.

Figure 4c shows sight-distance analysis at the proposed three-quarter movement intersections to Briargate Parkway. Based on a design speed of 50 miles per hour (mph) and the criteria contained in Table 2-21 of the *Engineering Criteria Manual (ECM)*, the required intersection sight distance at the future intersections is 555 feet.

As shown in these figures, that intersection sight distance can be met at all of the proposed site-access points.

### **REPORT SCENARIOS**

#### **Short-Term Scenario**

The short-term scenario includes the roadway segments to be added in the short term only as shown in Figure 3. This scenario includes the SRE Phase 1 Rezone and Preliminary Plan area ("the site") as well as traffic to be generated in the short term by buildout of Homestead at Sterling Ranch, Branding Iron at Sterling Ranch, Sterling Ranch Filings 2-4, Copper Chase at Sterling Ranch, Homestead North at Sterling Ranch Filings 1-3, the Retreat at TimberRidge Filings 1-3, the planned FourSquare at Sterling Ranch East development, and the planned Villages at Sterling Ranch East development. Trips projected from these other short-term developments outside of the SRE Phase 1 Preliminary Plan/Rezone boundary are included as short-term "background traffic" in this report.

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Number: 1 Author: Paul Brown Subject: Cloud+ Date: 1/5/2023 10:32:50 AM

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Duplicate text from page 3

Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:41:07 PM

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LSC Response: The duplicate text has been struck from the updated TIS.

## 2042 Total Traffic

Figure 15a shows the projected 2042 total daily traffic volumes on key street segments and Figure 15b shows the projected 2042 total peak-hour traffic volumes at the key study-area intersections. These volumes are the sum of the 2042 baseline traffic volumes (from Figures 7a and 7b), the long-term residential-related site-generated traffic volumes (from Figures 12a and 12b) and the long-term school-related site-generated traffic volumes (from Figures 13a and 13b).

Figure 14c shows the level of service analysis results for the key area intersections based on the projected 2042 total volumes. The figure also shows the general intersection lane geometry and intersection traffic control used in the analysis.

## LEVEL OF SERVICE ANALYSIS

The key area future signalized intersections have been analyzed to determine the projected intersection levels of service for short-term and 2042 baseline and total traffic scenarios for the morning and afternoon peak-hour periods using Synchro. The key area future stop-sign-controlled and modern-roundabout-controlled intersections have been analyzed based on the unsignalized-intersection analysis procedures from the *Highway Capacity Manual 6th Edition*. Figures 6c, 7c, 14c and 15c show the level of service analysis results. The level of service reports are attached.

### Intersection #1: Vollmer/Burgess

The stop-sign-controlled intersection of Burgess/Vollmer is currently operating at LOS E for the eastbound approach and LOS F for the westbound approach during the afternoon peak hour. The intersection currently has one-lane approaches in all directions. Based on existing traffic volumes shown in Figure 5 and the criteria contained in the *El Paso County Engineering Criteria Manual (ECM)*, multiple auxiliary turn lanes would be required to meet the *ECM* standard. LSC recommends this intersection be reconstructed as a modern one-lane roundabout. As a modern roundabout, it is projected to operate at LOS C or better for all approaches during the peak hours based on the projected short-term and 2042 total traffic volumes.

### Intersection #4: Vollmer/Briargate

The section of Briargate Parkway between Vollmer Road and Sterling Ranch Road is planned to be constructed to its final cross section in the short term. The intersection of Briargate/ Vollmer could operate at a satisfactory level of service (LOS C or better) in the short term as a stop-sign-controlled intersection.

Please use a more appropriate analysis tool for roundabout operations (Master TIS comment) 1

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:45:03 AM

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Please use a more appropriate analysis tool for roundabout operations (Master TIS comment)

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:42:16 PM

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LSC Response: LSC contends that the HCM methodology is appropriate for this planning level of analysis and provides a reasonable prediction of future LOS. This has been discussed with Staff. Once this intersection enters the design phase, detailed roundabout reports will be required that will utilize Rodel (most likely).

By 2042, it was assumed Briargate Parkway would be extended west to Black Forest Road and East to Towner Avenue and that the intersection of Vollmer/Briargate will be converted to traffic-signal control. The intersection of Vollmer/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection, based on the projected 2042 total traffic volumes shown in Figure 15b and the lane geometry shown in Figure 15c.

#### **Intersection #5: Sterling Ranch/Briargate**

The section of Briargate Parkway between Vollmer Road and Sterling Ranch Road is planned to be constructed to its final cross section in the short term. The intersection of Briargate/Sterling Ranch could operate at a satisfactory level of service (LOS C or better) in the short term as a stop-sign-controlled intersection.

By 2042, it was assumed Briargate Parkway would be extended west to Black Forest Road and East to Towner Avenue and that the intersection of Briargate/Sterling Ranch will be converted to traffic-signal control. The intersection of Sterling Ranch/Briargate is projected to operate at an overall LOS C during the peak hours as a signalized intersection, based on the projected 2042 total traffic volumes shown in Figure 15b and the lane geometry shown in Figure 15c.

#### **Intersection #8: Oak Park/Sterling Ranch**

The intersection of Oak Park Place/Sterling Ranch Road is projected to operate at LOS B or better for all movements as a stop-sign-controlled intersection, based on the projected short-term total traffic volumes shown in Figure 14b and the lane geometry shown in Figure 14c.

This access is not shown on Figure 2. <sup>1</sup>

By 2042, it was assumed the future K-8 School planned for the parcel southwest of Briargate/Sterling Ranch would be constructed and that an **exit-only** access would be constructed aligning with the Oak Park/Sterling Ranch intersection. Based on the 2042 total traffic volumes shown in Figure 15b and the lane geometry shown in Figure 15c, the eastbound and westbound left-turn movements are projected to operate at LOS E during the morning peak hour and LOS C during the afternoon peak hour. Alternate traffic control may be needed to achieve a satisfactory level of service at this intersection. Further analysis of this intersection should be conducted when number of students, site layout, and proposed access plan are determined.

#### **Intersection #12: Vollmer/Marksheffel**

Marksheffel Road is planned to be constructed between Vollmer Road and Sterling Ranch Road in the short-term future. The intersection of Marksheffel/Vollmer is initially planned to be stop-sign controlled. Based on the projected short-term total traffic volumes which assume buildout of the residential portion of SRE Phase 1 Preliminary Plan, the westbound left-turn

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Number: 1 Author: Paul Brown Subject: Callout Date: 1/5/2023 10:38:48 AM

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This access is not shown on Figure 2.

 Author: kdferrin Subject: Sticky Note Date: 2/9/2023 3:56:32 PM

LSC Response: Figure 2 has been revised to show the approximate location of the school site access. The exact location will be determined when the school site is developed.

movement is projected to operate at LOS E during the morning peak hour and LOS F during the afternoon peak hour. If this intersection is converted to traffic-signal control prior to buildout, it is projected to operate at an overall LOS A during the peak hours.

By 2042, it was assumed that Marksheffel Road would be constructed west to Briargate Parkway and that the intersection of Vollmer/Marksheffel will be converted to traffic-signal control. The intersection of Vollmer/Marksheffel is projected to operate at an overall LOS C or better during the peak hours as a signalized intersection, based on the projected 2042 total traffic volumes shown in Figure 15b and the lane geometry shown in Figure 15c.

### **Intersection #13: Sterling Ranch/Marksheffel**

Marksheffel Road is planned to be constructed between Vollmer Road and Sterling Ranch Road in the short-term future. The intersection of Marksheffel/Sterling Ranch is initially planned to be stop-sign controlled. Based on the projected short-term total traffic volumes which assume buildout of the residential portion of SRE Phase 1 Preliminary Plan, the southbound left-turn movement is projected to operate at LOS F during both the morning and afternoon peak hours. If this intersection is converted to traffic-signal control prior to buildout, it is projected to operate at an overall LOS A during the peak hours.

The intersection of Sterling Ranch/Marksheffel is projected to operate at an overall LOS C or better during the peak hours as a signalized intersection, based on the projected 2042 total traffic volumes shown in Figure 15b and the lane geometry shown in Figure 15c.

### **Sterling Ranch Road Site Access Points (Intersection #303-#308)**

The intersections of Lubbock Trail/Sterling Ranch Road (#303), Bellflower Drive/Sterling Ranch Road (#304), Lake Tahoe Drive/Sterling Ranch Road (#305), Newport Beach Place/Sterling Ranch Road (#306), Idaho Falls Drive/Sterling Ranch Road (#308) and Vancouver Street/Sterling Ranch Road (#309) are projected to operate at a satisfactory level of service (LOS C or better) during the peak hours as stop-sign-controlled intersections, based on the projected short-term and 2042 total traffic volumes

### **Briargate Parkway Site Access Points (Intersection #102-#103)**

The intersection of Boulder City Place/Briargate Parkway and the future K-8 school access to Briargate Parkway are projected to operate at LOS B or better for all movements as three-quarter movement (left-in/right-in/right-out only) stop-sign-controlled intersections, based on the projected short-term and 2042 total traffic volumes.

Intersection # 307 (Tract M entrance) is not discussed

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Number: 1 Author: Paul Brown Subject: Cloud+ Date: 1/5/2023 10:40:26 AM

Intersection # 307 (Tract M entrance) is not discussed

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Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:42:35 PM  
LSC Response: Discussion of intersection #307 has been added as requested.

- N12: Marksheffel Road from Woodman Road to Research Parkway as a 4-Lane Urban Principal Arterial; and
- M11: Vollmer Road Bicycle & Primary Regional Trail from Marksheffel Road to Shoup Road.

## CONCLUSIONS AND RECOMMENDATIONS

### Trip Generation

- The residential portion of the Sterling Ranch East Phase 1 Preliminary Plan is projected to generate about 7,176 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 19 vehicles would enter and 394 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 451 vehicles would enter and 265 vehicles would exit the site.
- The future school sites within Sterling Ranch East Phase 1 Preliminary Plan are projected to generate about 3,774 new external vehicle trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 660 vehicles would enter and 563 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 124 vehicles would enter and 143 vehicles would exit the site. As shown in the October 22, 2022 Master TIS, about 60 percent of these trips are projected to be internal to the Sterling Ranch Sketch Plan area.

### Level of Service

#### Need to include progression analysis (Master TIS comment) <sup>1</sup>

- The stop-sign-controlled intersection of Burgess/Vollmer is currently operating at LOS E for the eastbound approach and LOS F for the westbound approach during the afternoon peak hour. The intersection currently has one-lane approaches in all directions. Based on existing traffic volumes shown in Figure 5 and the criteria contained in the El Paso County *Engineering Criteria Manual (ECM)*, multiple auxiliary turn lanes would be required to meet the *ECM* standard. LSC recommends this intersection be reconstructed as a modern one-lane roundabout. As a modern roundabout, it is projected to operate at LOS C or better for all approaches during the peak hours based on the projected short-term and 2042 total traffic volumes.
- The intersections of Briargate/Vollmer and Briargate/Sterling Ranch are projected to operate at a satisfactory level of service as stop-sign-controlled intersections in the short-term future. By 2042, these intersections will likely need to be converted to traffic-signal control. As signalized intersections, all movements are projected to

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:43:23 AM

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**Need to include progression analysis (Master TIS comment)**

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 10:46:50 AM

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LSC Response: A paragraph has been added to the TIS report in response to this comment. The paragraph essentially indicates that no additional, potentially signalized intersections beyond those shown in the approved Master TIS from 2008 are proposed with this Preliminary Plan.

**Table 2  
Sterling Ranch East Phase 1 Preliminary Plan  
Trip Generation**

Sketch Plan TAZ	Filing	Location	ITE Code	ITE Land Use	Quantity	Unit	Trip Generation Rates <sup>(1)</sup>					Total Trip Generated					
							Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour		
								In	Out	In	Out		In	Out	In	Out	
<b>Residential Land Uses (Short-Term)</b>																	
18	1	North of Briargate Parkway	210	Single-Family Detached Housing	42	DU <sup>(2)</sup>	9.43	0.18	0.52	0.59	0.35	396	8	22	25	15	
22 & 26	1	South of Briargate Parkway	210	Single-Family Detached Housing	294	DU	9.43	0.18	0.52	0.59	0.35	2,772	54	152	174	102	
17, 23, 24 & 38	2	Southeast of Sterling Ranch Road	210	Single-Family Detached Housing	187	DU	9.43	0.18	0.52	0.59	0.35	1,763	34	97	111	65	
37	3	North of Briargate Parkway	210	Single-Family Detached Housing	238	DU	9.43	0.18	0.52	0.59	0.35	2,244	43	123	141	83	
<b>Residential Total</b>						<b>761</b>	<b>DU</b>	<b>Total Residential Land Uses</b>					<b>7,176</b>	<b>139</b>	<b>394</b>	<b>451</b>	<b>265</b>
<b>Non-Residential Land Uses (Future Phases)</b>																	
102	Future	Tract F	520	Elementary School	600	Students	2.27	0.40	0.34	0.07	0.09	1,362	240	204	44	52	
103		Tract M	520	Elementary School	600	Students	2.27	0.40	0.34	0.07	0.09	1,362	240	204	44	52	
			521	Middle School/Junior High	500	Students	2.10	0.36	0.31	0.07	0.08	1,050	181	154	36	39	
								<b>Total Non-Residential Land Uses</b>					<b>3,774</b>	<b>660</b>	<b>563</b>	<b>124</b>	<b>143</b>
<b>Grand Total</b>								<b>Grand Total</b>					<b>10,950</b>	<b>799</b>	<b>957</b>	<b>575</b>	<b>407</b>

Notes:

(1) Source: "Trip Generation, 11th Edition, 2021" by the Institute of Transportation Engineers (ITE)

(2) DU = Dwelling Unit

Source: LSC Transportation Consultants, Inc.

Nov-22

Should be LUC 522; rates and other data are correct for LUC 522.

1

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Number: 1 Author: Paul Brown Subject: Cloud+ Date: 1/5/2023 10:42:36 AM

Should be LUC 522; rates and other data are correct for LUC 522.

Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:42:55 PM  
LSC Response: Revised as requested.

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**Table 6**  
**Roadway Segment Improvements**  
**Sterling Ranch East Phase 1 Preliminary Plan**  
 (page 1 of 2)

Segment ID <sup>(1)</sup> (See Figure 16 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Responsibility
V1 northbound	Restriping the 38' of pavement for two 11' southbound lanes (remove the bike lane), a 12' northbound lane and a 4' outside paved shoulder along the east edge <sup>(2)</sup> (Pending City Traffic Engineering Approval)	With Sterling Ranch Filing No. 4	5,500 (Directional northbound)	13,080	Sterling Ranch
V1 southbound			10,000 (Directional southbound)		
V1	Improve Vollmer Road between Dry Needle Place and the Sterling Ranch south boundary to a standard 4-Lane Urban Minor Arterial Cross Section (Add a second northbound through lane and painted center median) <sup>(2)</sup>	Intermediate-Term Future	20,000		Sterling Ranch, if necessary prior to construction by Others <b>Trigger? (Master TIS comment)</b>
V2	Improve Vollmer Road between the Sterling Ranch south boundary to Lochwinnoch Lane/Sterling property boundary to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Short-Term Future (With Sterling Ranch Fil No. 2 Or Sterling Ranch Phase 2)	20,000 (Note: Existing Capacity 8,000 <sup>(3)</sup> )	14,385	Sterling Ranch
V3	<b>Short Term:</b> Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to provide 36' of pavement (existing pavement 1 approx. 23.38') and stripe for one through lane and plus a 6' paved, striped outside shoulder in each direction <sup>(2)</sup>	Short-Term Future (With Homestead North)	11,000 (Note: Existing Capacity 8,000)	15,040	Sterling Ranch
	<b>Long Term:</b> Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Long-Term Future	20,000		
V4	Improve Vollmer Road from Sterling Ranch boundary (northeast of Glider Loop) to Briargate Parkway to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Sections V4, V5, V6 to be constructed by <b>May 2024</b>	20,000	14,495	Sterling Ranch
V5	Improve Vollmer Road from Briargate Parkway to Jane Kirkham Drive to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	Sections V4, V5, v6 to be constructed by <b>May 2024</b>	20,000	11,690	Sterling Ranch
V6	Improve Vollmer Road from Jane Kirkham Drive to Sam Bass Drive to a standard 4-Lane Urban Minor Arterial Cross Section <sup>(2)</sup>	<b>Short-Term Future– May 2024</b> Sections V4, V5, v6 to be constructed by <b>May 2024</b>	20,000	11,425	Sterling Ranch
V7	Improve Vollmer Road between Sam Bass Drive and Poco Road to a 4-lane Urban Minor Arterial but with necessary lane transitions, redirect tapers, etc. south of Poco to adequately transition between the 4-Lane Urban Minor Arterial Cross Section and the 2-Lane Rural Arterial Cross Section north of Poco Road.	Sections V4, V5, v6 to be constructed by <b>May 2024</b>	20,000	9,920	Sterling Ranch
V8	Improve Vollmer Road from Poco Road to Shoup Road to a Rural 2-Lane Arterial Cross Section <sup>(2)</sup>	Long-Term Future	10,000	8,760	El Paso County Project ID U-12

Part 1/2 of this table (see Part 2 on next page)

**Notes:**

(1) See Figure 10

(2) Adequate transition/redirect tapers would be needed between the various cross sections on Vollmer Road. Based on the criteria contained in Table 2-29 of the *El Paso Engineering Criteria Manual* an appropriate taper ratio for a roadway with a design speed of 40 mile per hour is 20:1

(3) Source: Table 20 *Road Impact Fee Study Updated* November 16, 2016

Source: LSC Transportation Consultants, Inc. (October 25, 2022)

Removal of bike lane not appropriate when it will be restored later (Master TIS comment)

Others - pursuant to the recent development agreement between Sterling Ranch and EPC.

Sterling Ranch with potential County assistance with ROW acquisition

1

2

4

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:46:32 AM

Removal of bike lane not appropriate when it will be restored later (Master TIS comment)

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:43:20 PM

LSC Response: This table has been revised based on conversations with the City of Colorado Springs. It is consistent with the updated February 10, 2023 Sterling Ranch Master TIS.

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☰ Number: 2 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:47:05 AM

Trigger? (Master TIS comment)

↩ Author: kdferrin Subject: Sticky Note Date: 1/13/2023 10:29:48 AM

LSC Response: The triggers are listed in the preceding line item under design ADT (directional northbound and southbound).

↩ Author: jchodsdon Subject: Sticky Note Date: 2/10/2023 3:43:48 PM

LSC Response: This line item has been revised in both this report and the February 10, 2023 Master TIS per EPC Staff comment on the Master Study.

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📄 Number: 3 Author: Jeff Rice - PCD Engineering Date: 1/9/2023 11:02:32 AM

By other

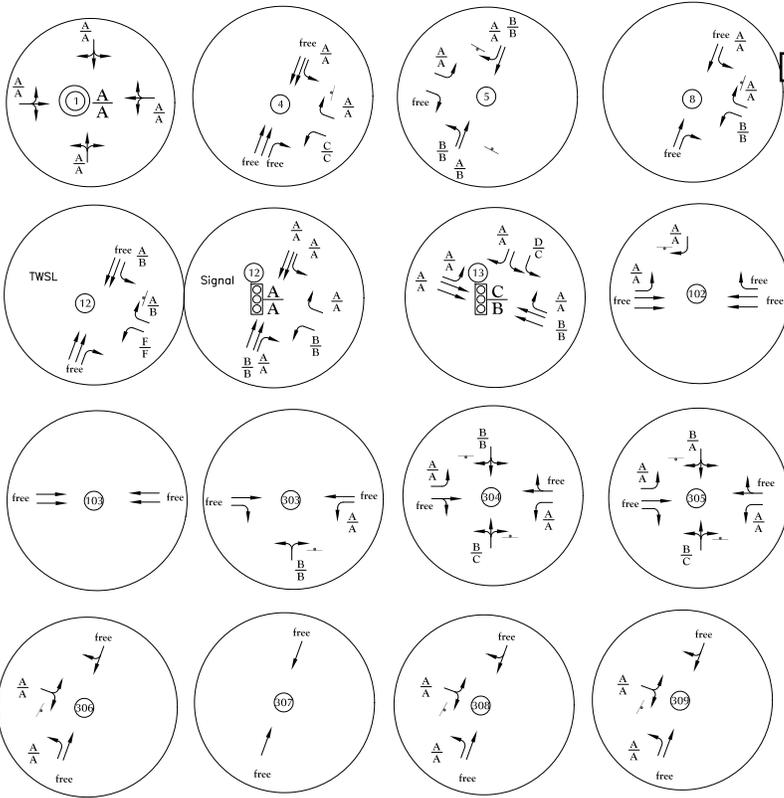
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☰ Number: 4 Author: Jeff Rice - PCD Engineering Subject: Callout Date: 1/9/2023 11:02:48 AM

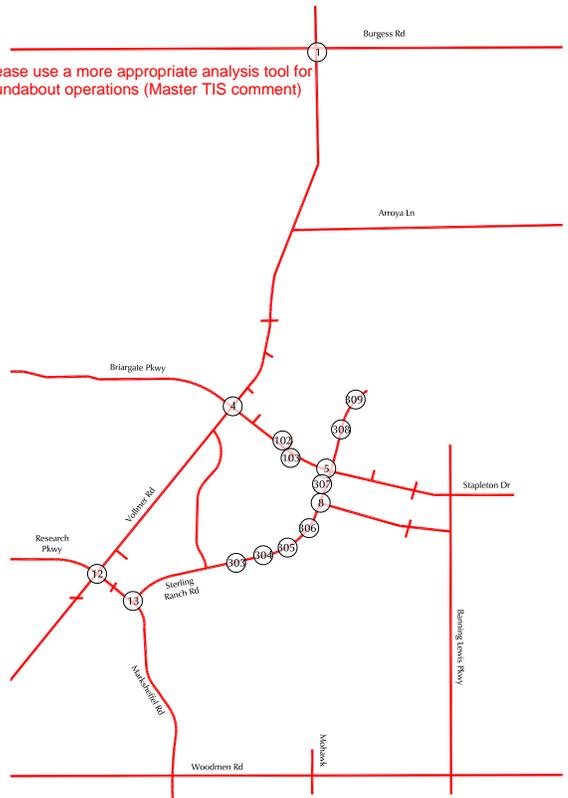
Sterling Ranch with potential County assistance with ROW acquisition

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:44:04 PM

LSC Response: Modified as requested.



1 Please use a more appropriate analysis tool for roundabout operations (Master TIS comment)



LEGEND:

- $\frac{A}{B}$  = AM Individual Movement Peak-Hour Level of Service
- $\frac{B}{B}$  = PM Individual Movement Peak-Hour Level of Service
- $\frac{C}{D}$  = AM Entire Intersection Peak-Hour Level of Service
- $\frac{D}{D}$  = PM Entire Intersection Peak-Hour Level of Service

- | = Stop Sign
- = Traffic Signal

- = Roundabout



Figure 14c  
Short-Term Total Lane Geometry,  
Traffic Control, and Level of Service

Sterling Ranch East Phase 1 Prelim Plan (LSC# S224510)

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:47:55 AM

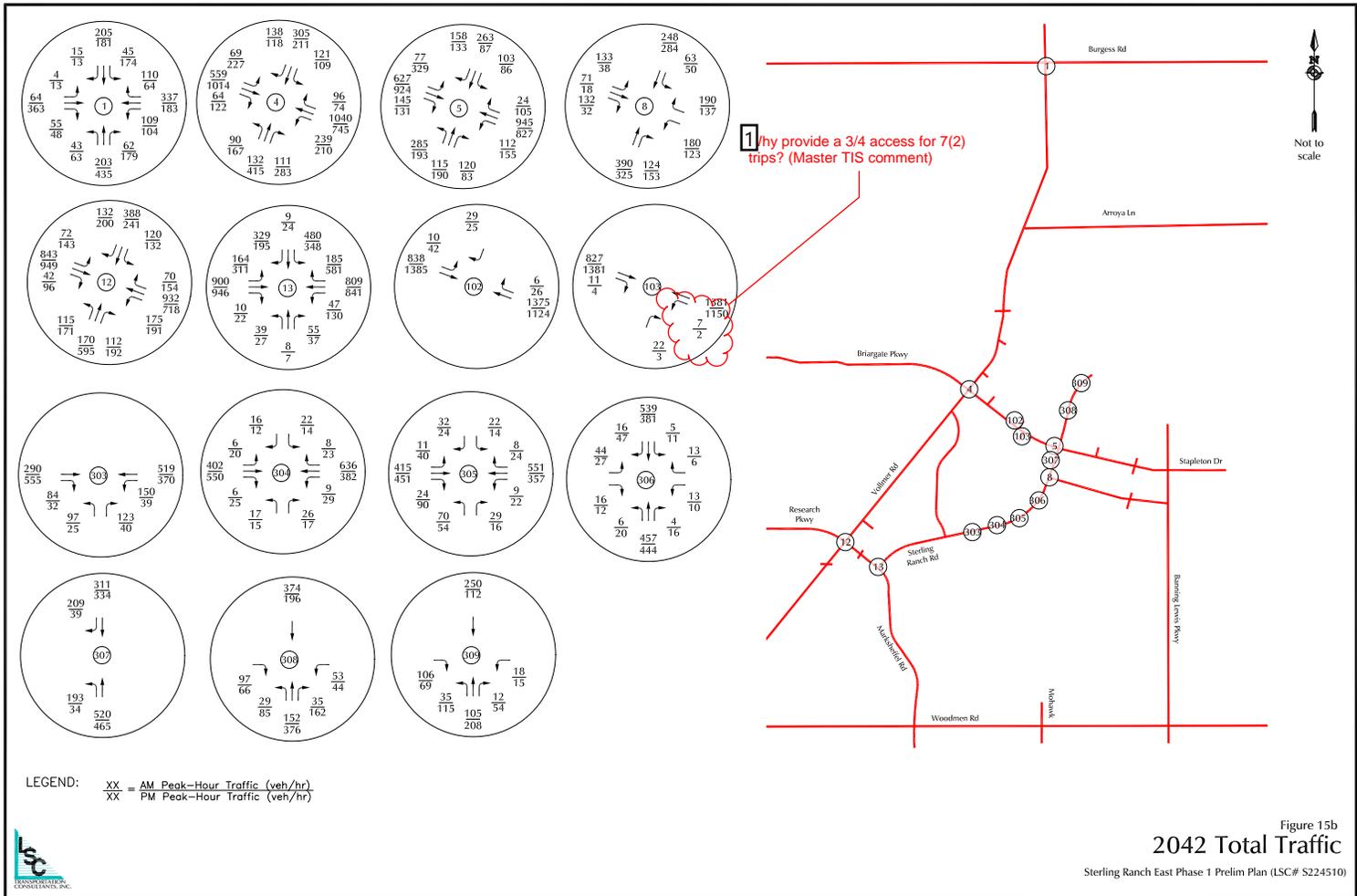
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Please use a more appropriate analysis tool for roundabout operations (Master TIS comment)

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:44:42 PM

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LSC Response: LSC contends that the HCM methodology is appropriate for this planning level of analysis and provides a reasonable prediction of future LOS. This has been discussed with Staff. Once this intersection enters the design phase, detailed roundabout reports will be required that will utilize Rodel (most likely).



Why provide a 3/4 access for 7(2) trips? (Master TIS comment)



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Number: 1 Author: Paul Brown Subject: Cloud+ Date: 1/5/2023 10:49:34 AM

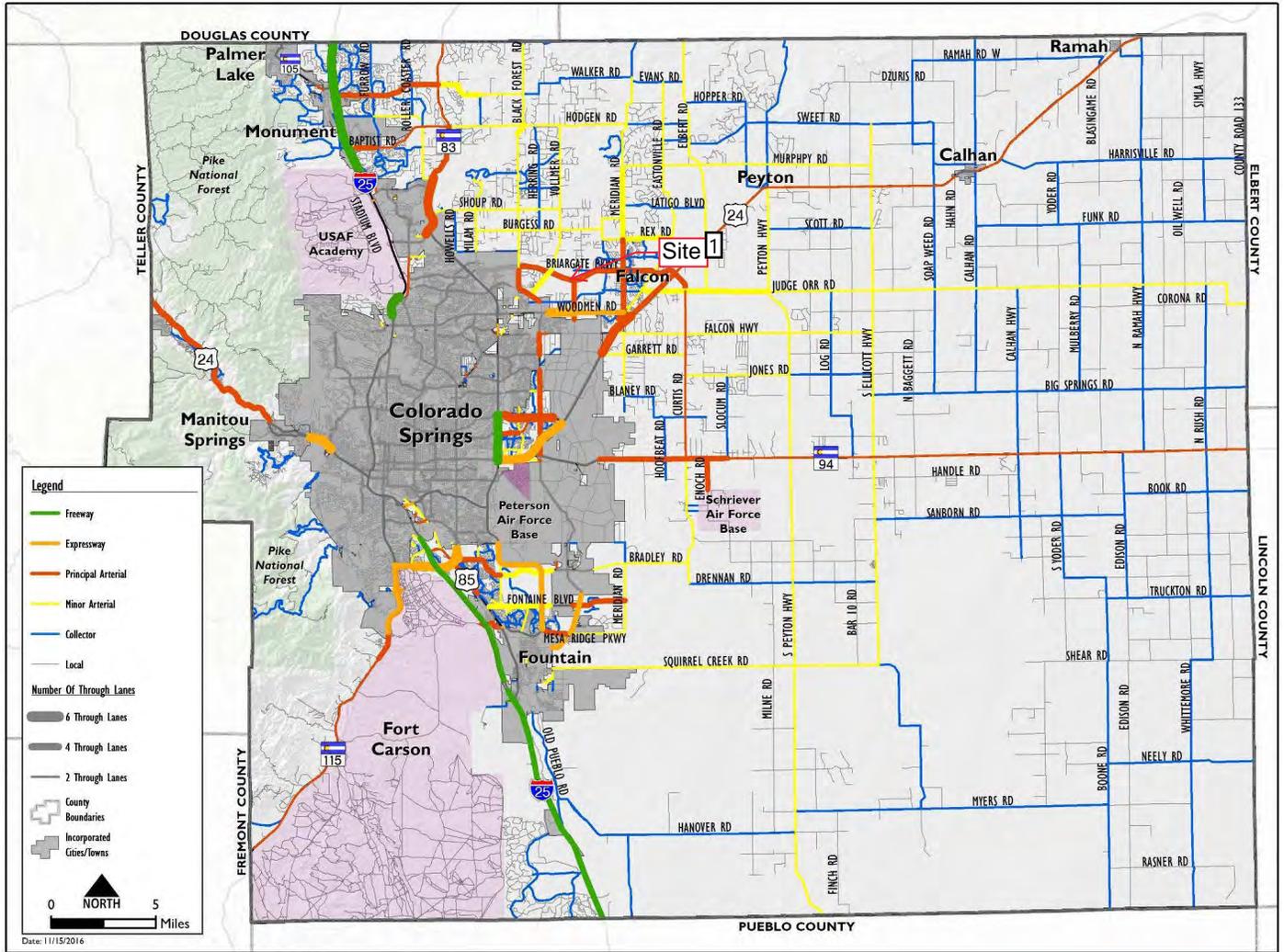
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Why provide a 3/4 access for 7(2) trips? (Master TIS comment)

Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:45:29 PM

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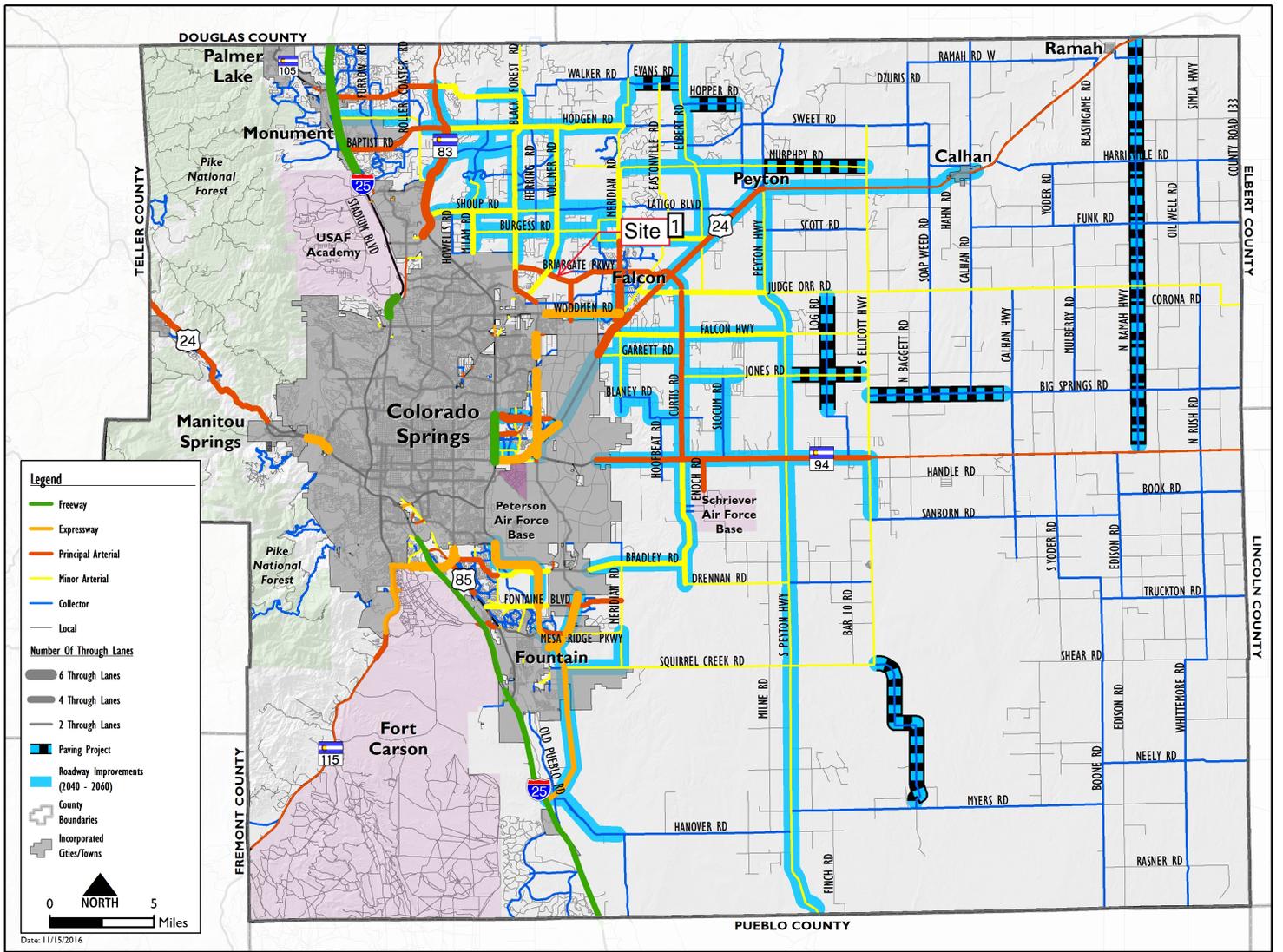
LSC Response: Intersection #103 is needed to serve the future K-8 school site. There are currently no plans available that show the school layout and access plan. This TIS assumed the access to Briargate Parkway would serve a bus loop only. However, this intersection is requested as a 3/4 movement access to provide flexibility as actual designs are prepared for the school.



Map 14: 2040 Roadway Plan (Classification and Lanes)



Map 17: 2060 Corridor Preservation





Intersection				
Intersection Delay, s/veh	6.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	148	423	274	159
Demand Flow Rate, veh/h	151	432	280	162
Vehicles Circulating, veh/h	205	254	95	486
Vehicles Exiting, veh/h	443	121	261	200
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	4.5	7.8	4.9	6.4
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	151	432	280	162
Cap Entry Lane, veh/h	1120	1065	1252	841
Entry HV Adj Factor	0.980	0.980	0.979	0.980
Flow Entry, veh/h	148	423	274	159
Cap Entry, veh/h	1097	1044	1225	824
V/C Ratio	0.135	0.406	0.224	0.193
Control Delay, s/veh	4.5	7.8	4.9	6.4
LOS	A	A	A	A
95th %tile Queue, veh	0	2	1	1

Please use a more appropriate analysis tool for roundabout operations (Master TIS comment) <sup>1</sup>

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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:49:58 AM

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Please use a more appropriate analysis tool for roundabout operations (Master TIS comment)

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:46:01 PM

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LSC Response: LSC contends that the HCM methodology is appropriate for this planning level of analysis and provides a reasonable prediction of future LOS. This has been discussed with Staff. Once this intersection enters the design phase, detailed roundabout reports will be required that will utilize Rodel (most likely).

Timings  
12: Vollmer Rd & Marksheffel Rd

Short-Term Total Traffic  
AM Peak Hour

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↖	↑↑	↗	↘	↑↑
Traffic Volume (vph)	184	86	268	97	88	497
Future Volume (vph)	184	86	268	97	88	497
Turn Type	Prot	Prot	NA	Perm	pm+pt	NA
Protected Phases	5	5	8		7	4
Permitted Phases				8	4	
Detector Phase	5	5	8	8	7	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	10.0	10.0	23.0	23.0	10.0	23.0
Total Split (s)	30.0	30.0	48.0	48.0	12.0	60.0
Total Split (%)	33.3%	33.3%	53.3%	53.3%	13.3%	66.7%
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			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	11.3	11.3	15.4	15.4	21.2	23.8
Actuated g/C Ratio	0.29	0.29	0.40	0.40	0.55	0.62
v/c Ratio	0.42	0.19	0.22	0.16	0.17	0.27
Control Delay	16.8	4.9	13.7	4.6	6.5	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	4.9	13.7	4.6	6.5	6.2
LOS	B	A	B	A	A	A
Approach Delay	13.0		11.3			6.3
Approach LOS	B		B			A

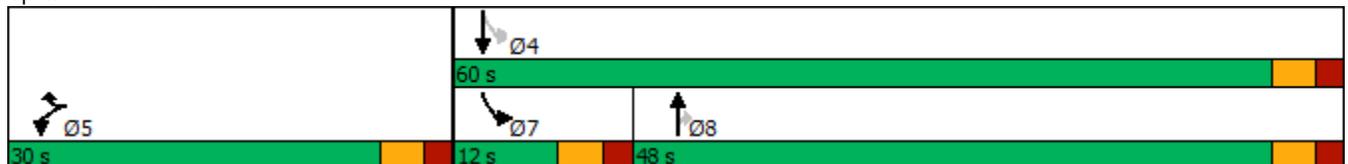
Calculate and include appropriate Y+AR times (typical all signalized intersections)

1

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 38.6	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 35.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Vollmer Rd & Marksheffel Rd



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☰ Number: 1 Author: Paul Brown Subject: Text Box Date: 1/5/2023 10:50:51 AM

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Calculate and include appropriate Y+AR times (typical all signalized intersections)

↩ Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:46:56 PM

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LSC Response: Typical Y+AR times adequate for this preliminary planning level analysis as many of the intersections have yet to be designed.

Timings  
4: Vollmer Rd & Briargate Pkwy

2042 Background Traffic  
PM Peak Hour

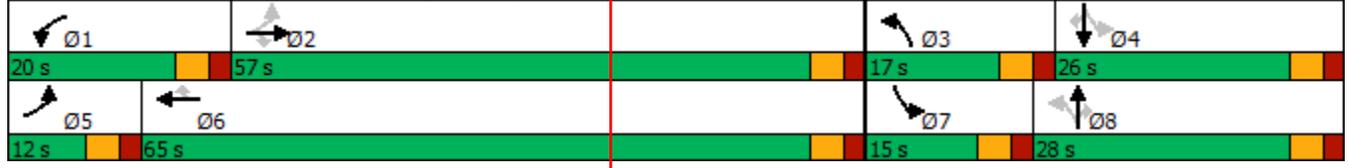
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖↗	↗↘	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	227	922	122	190	690	67	167	415	246	96	211	118
Future Volume (vph)	227	922	122	190	690	67	167	415	246	96	211	118
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	15.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	12.0	57.0	57.0	20.0	65.0	65.0	17.0	28.0	28.0	15.0	26.0	26.0
Total Split (%)	10.0%	47.5%	47.5%	16.7%	54.2%	54.2%	14.2%	23.3%	23.3%	12.5%	21.7%	21.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	-2.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	59.1	54.1	52.1	15.0	62.1	60.1	30.9	19.4	19.4	26.2	17.1	17.1
Actuated g/C Ratio	0.51	0.47	0.45	0.13	0.54	0.52	0.27	0.17	0.17	0.23	0.15	0.15
v/c Ratio	0.60	0.57	0.16	0.45	0.38	0.08	0.54	0.71	0.54	0.44	0.43	0.34
Control Delay	20.2	24.6	2.3	51.0	16.9	1.1	38.9	52.8	9.5	37.2	47.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	24.6	2.3	51.0	16.9	1.1	38.9	52.8	9.5	37.2	47.3	5.8
LOS	C	C	A	D	B	A	D	D	A	D	D	A
Approach Delay		21.6			22.6			36.9			33.5	
Approach LOS		C			C			D			C	

**Intersection Summary**

Cycle Length: 120  
 Actuated Cycle Length: 115.7  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 27.0  
 Intersection Capacity Utilization 70.6%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service C

Splits and Phases: 4: Vollmer Rd & Briargate Pkwy



Lost time adjustments are not customary. Provide reasoning for inclusion or remove these adjustments (typical all signalized intersections).

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Number: 1 Author: Paul Brown Subject: Cloud+ Date: 1/5/2023 10:52:06 AM

Lost time adjustments are not customary. Provide reasoning for inclusion or remove these adjustments (typical all signalized intersections).

Author: kdferrin Subject: Sticky Note Date: 2/10/2023 3:47:18 PM  
LSC Response: The analysis has been updated to remove these adjustments.

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