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4-Square at Sterling Ranch East Traffic Technical Memorandum

(LSC #S224590)

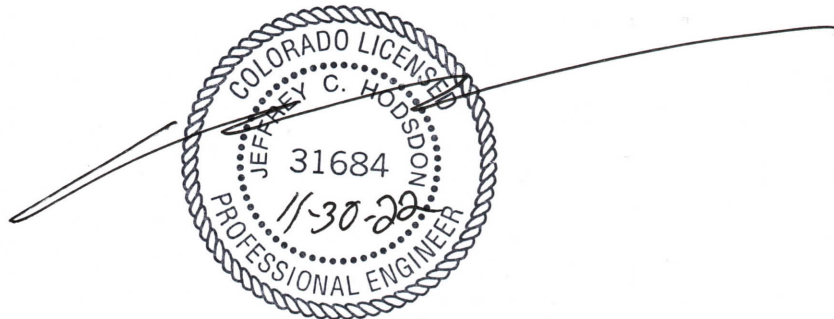
November 30, 2022

PUDSP-22-007/ SF-22-036

See comments on the PUDSP report. The same report can be submitted to this file once it is approved.

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.

J. M. Ull V.P.

11/30/22
Date

4-Square at Sterling Ranch East Traffic Technical Memorandum

Prepared for:

Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

NOVEMBER 30, 2022

LSC Transportation Consultants
Prepared by: Kirstin D. Ferrin, P.E.
Reviewed by: Jeffrey C. Hodsdon, P.E.

LSC #S224590



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 Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS*
 with notes by LSC



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November 30, 2022

Mr. Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

RE: 4-Square at Sterling Ranch East
El Paso County, CO
Traffic Technical Memorandum
LSC #S224590

Dear Mr. Moreland:

LSC Transportation Consultants, Inc. has prepared this traffic technical memorandum for the 4-Square at Sterling Ranch East residential development. As shown in Figure 1, the site is located north of the future extension of Briargate Parkway and west of the future extension of Sterling Ranch Road in El Paso County, Colorado. LSC recently prepared a traffic impact study (TIS) for the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan ([SP224](#)) that included trips by the currently-proposed filing. This memorandum is intended as a site-specific, final plat traffic report for 4-Square at Sterling Ranch East.

REPORT CONTENTS

This report presents:

- A summary of the proposed land use and access plan;
- The projected average weekday and peak-hour vehicle trips to be generated by the currently-proposed filing;
- The assignment of the site-generated traffic volumes to the area roadways;
- The recommended street classifications for the internal streets within the currently-proposed filing;
- Improvements needed with the currently-proposed filing; and
- The project's obligation to the County roadway improvement fee program.

RECENT TRAFFIC REPORTS

- LSC completed an updated master traffic study (TIS) for the entire Sterling Ranch development, dated October 21, 2022.
- LSC prepared a TIS for the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan, November 17, 2022. The currently proposed filing was accounted for within that recent report. Appendix A includes a link to the El Paso County Electronic Development Application Review Program (EDARP) page where a copy of the latest version of the Phase 1 TIS can be obtained.
- 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 (Appendix Table 1).
- 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.

LAND USE AND ACCESS

4-Square at Sterling Ranch East is planned to include 158 lots for single-family homes. Figure 2 shows the proposed site plan.

Figure 3 shows the roadway connections that are planned to be constructed in the short term. As shown in Figure 3, by 2023 Briargate Parkway is planned to be constructed to its final cross section between Vollmer Road and Wheatland Drive, Marksheffel Road is planned to be completed between Vollmer Road and Woodmen Road, and Sterling Ranch Road is planned to be constructed from Marksheffel Road to Dines Boulevard. With Sterling Ranch East Filing No. 1, which is planned to be constructed prior to the Villages at Sterling Ranch East, Briargate Parkway is planned to be constructed to its final cross section between Wheatland Drive and Sterling Ranch Road and Sterling Ranch Road is planned to be constructed from Dines Boulevard to Idaho Falls Drive. These connections will need to be constructed with 4-Square at Sterling Ranch East if they are not constructed as part of Sterling Ranch East Filing 1.

Full-movement access is proposed to Sterling Ranch Road via Idaho Falls Drive. The proposed access spacing is shown in Figure 2. As shown in the figure, all of the access points meet the intersection spacing requirements.

An additional three-quarter-movement access (Boulder City Place) is proposed to Briargate Parkway about 1,245 feet east of Wheatland Drive and 1,375 feet west of Sterling Ranch Road. This access will require a deviation to the criteria contained in the El Paso County *Engineering Criteria Manual (ECM)*. The *Briargate Parkway-Stapleton Road Corridor Study Appendix D: Access Control Plan* shows the access locations and intersection access restrictions along Briargate Parkway between Black Forest Road and Meridian Road. This deviation request is being made as part of the application for Sterling Ranch East Filing No. 1 but will be required by the

currently-proposed 4-Square at Sterling Ranch East if it develops first. The draft access control plan shows a right-in/right-out access point north and south of Briargate Parkway between Wheatland Drive and Sterling Ranch Road. The Master TIS showed two offset three-quarter movement (left-in/right-in/right-out only) access points in this general location. A future three-quarter movement access to be located 160 feet east of the currently-proposed Boulder City Place would serve the future planned K-8 school parcel located southwest of the intersection of Briargate/Sterling Ranch.

The currently-proposed filing was included in the Sterling Ranch Master TIS as Traffic Analysis Zone (TAZ) 19. Traffic projected to be generated by land uses within this zone was included as part of the short-term background traffic volumes in the Sterling Ranch East Phase 1 TIS. The land use and access currently proposed are consistent with what was assumed in the Master TIS and the Sterling Ranch East Phase 1 TIS.

Intersection Sight Distance

access points to Oak Park Dr are not shown on Figure 4a.

Figure 4a shows a sight-distance analysis at the proposed intersection of Idaho Falls/Sterling Ranch and the two access points to Oak Park Drive. 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. As shown in Figure 4a, the proposed intersections to Sterling Ranch Road and Idaho Falls Drive will meet the criteria.

Figure 4b shows a sight-distance analysis at the proposed three-quarter movement intersection of Boulder City/Briargate. 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 intersection is 55 feet. As shown in Figures 4b, the proposed intersection will meet the criteria.

555'

Pedestrian and Bicycle Analysis

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.

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.

There are no existing schools within two miles of the site, however, a K-8 school is planned southwest of the future intersection of Briargate/Sterling Ranch Road and two elementary schools are planned east of Sterling Ranch Road. A school crossing will likely be needed at the intersection of Sterling Ranch Road/Briargate Parkway. This intersection is planned to be signal controlled in the future.

Safety Analysis

Most of the roadways in the vicinity of the site have not yet been constructed. The Colorado State Patrol (CSP) provided LSC with crash history data for Vollmer Road between Tahiti Drive and Burgess Road from September 2019 through September 2022. During the reported time period, there were twelve reported crashes. Of the twelve reports, ten were single-vehicle non-intersection-related crashes on Vollmer Road. One crash involved a southbound vehicle that turned right onto Poco Road and crashed into several cars parked on Poco Road partially in the lane. The only intersection related crash occurred in June 2022. A vehicle heading northbound on Vollmer Road was slowing to turn left at Lochwinnoch Road and the vehicle behind them attempted to pass on the left side. The crash history data has been attached.

TRIP GENERATION

Crash history data is not in appendix - provide or revise the sentence.

4-Square at Sterling Ranch East site-generated vehicle trips have been estimated using the nationally-published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 1 shows the trip-generation estimate. The trip-generation estimate is consistent with the estimate assumed in the Sterling Ranch Master TIS and the Sterling Ranch East Phase 1 TIS for the same parcels.

Foursquare

The Villages at Sterling Ranch East is expected to generate 1,490 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 29 vehicles would enter and 82 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 94 vehicles would enter and 55 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

When the distribution percentages from Figure 8 of the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIA are applied to the new, external trip-generation estimates (from Table 1), the resulting site-generated traffic volumes can be determined. Figures 5a and 5b show the short-term residential site-generated traffic volumes. These volumes assume only the street network shown in Figure 3.

TOTAL TRAFFIC VOLUMES AND LEVELS OF SERVICE

Please refer to the short-term and 2042 peak-hour traffic-volume projections and level of service analysis shown in Figures 14c and 15c of the *Sterling Ranch East Phase 1 Rezoning & Preliminary Plan TIS*. The proposed land use and access is in compliance with the Sterling Ranch Master TIS and Sterling Ranch East Phase 1 Preliminary Plan TIS. As such, there are no changes to these projected volumes or level of service results.

SIGNAL WARRANT THRESHOLD ANALYSIS – AM AND PM PEAK HOURS

The intersections of Marksheffel/Vollmer and Marksheffel/Sterling Ranch were analyzed to determine if the thresholds for Four-Hour and/or Eight-Hour Vehicular-Volume Traffic-Signal Warrant thresholds would be reached or exceeded, based on the projected short-term traffic volumes.

The volumes shown are based on the following:

- The short-term background traffic volumes taken from Figure 6b of the Sterling Ranch East Phase 1 TIS,
- The Sterling Ranch East Filing No. 1 site-generated traffic volumes taken from the traffic memo for that subdivision filing.,
- The Villages at Sterling Ranch East site-generated traffic volumes from our current work for the traffic memo for that subdivision,
- The 4-Square at Sterling Ranch East site-generated traffic volumes shown in Figure 5b of this memorandum.

The off-peak-hour volumes are estimates by LSC based on the peak-hour traffic volumes, 72-hour machine counts conducted by LSC on Vollmer Road in November 2020, and vehicle time-of-day distribution data for single-family homes published by the Institute of Transportation Engineers.

Marksheffel/Vollmer

Table 2 shows the results of the analysis for the intersection of Marksheffel/Vollmer. As shown in Table 2, in the short-term only, five of the hours analyzed are projected to meet the thresholds for an Eight-Hour Vehicular-Volume Traffic-Signal Warrant and none of the hours analyzed are projected to meet the thresholds for a Four-Hour Vehicular Volume Traffic Signal Warrant. This analysis indicates that traffic-signal warrant(s) will likely **not** be met at the intersection of Marksheffel/Vollmer with buildout of Sterling Ranch East Filing 1, the Villages at Sterling Ranch East, and 4-Square at Sterling Ranch East.

Marksheffel/Sterling Ranch

Table 3 shows the results of the analysis for the intersection of Marksheffel/Sterling Ranch. As shown in Table 3, in the short-term, eight of the hours analyzed are projected to meet the thresholds for an Eight-Hour Vehicular-Volume Traffic-Signal Warrant. Twelve of the hours analyzed are projected to meet the thresholds for a Four-Hour Vehicular-Volume Traffic-Signal Warrant.

This analysis indicates that the Eight-Hour and Four-Hour Vehicular Volume traffic-signal warrant(s) may be met at the intersection of Marksheffel/Sterling Ranch with buildout of Sterling Ranch East Filing 1, the Villages at Sterling Ranch East, and 4-Square at Sterling Ranch East. LSC recommends at least eight hours of traffic count volume data be collected at the intersections

Marksheffel/Sterling Ranch following completion of Marksheffel Road between Vollmer Road and Woodmen Road, which is planned to be done in 2023. Once the traffic data is completed, traffic-signal warrant analysis can be reanalyzed based on the existing conditions at that time. The decision to require a signal to be installed rests with the County.

SUBDIVISION STREET CLASSIFICATIONS

All of the internal streets within 4-Square at Sterling Ranch East should be classified as Urban Local. Figure 6 shows the recommended street classifications for the internal streets and the streets in the vicinity of the site.

DEVIATION REQUESTS

No deviations are requested as part of this submittal. The Boulder City Place connection to Briargate Parkway, along with the Briargate Parkway extension to Sterling Ranch Road, are part of a separate Preliminary Plan and Final Plat.

ROADWAY IMPROVEMENTS

Tables 5 and 6 from the *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* contained a summary of needed improvements and recommendations for auxiliary turn-lane lengths. Copies of these tables have been attached with the improvements needed either prior to or with 4-Square at Sterling Ranch East highlighted.

ROADWAY IMPROVEMENT FEE PROGRAM

This project will be required to participate in the El Paso County Road Improvement Fee Program. 4-Square at Sterling Ranch East Filing will join the five-mil PID. The 2019 five-mil PID building permit fee portion associated with this option is \$2,527 per single-family dwelling unit. Based on 158 lots, the total building permit fee would be \$399,266. Note: program fees are subject to change.

* * * * *

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

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

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

JCH/KDF:jas

Enclosures: Tables 1-3
Figures 1-6
Appendix Table 1
Appendix A
Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS*
with notes by LSC

Tables



**Table 1
FourSquare at Sterling Ranch East
Trip Generation**

Sketch Plan TAZ	ITE Code	ITE Land Use	Quantity	Unit	Trip Generation Rates ⁽¹⁾				Total Trip Generated					
					Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour	
						In	Out	In	Out		In	Out		
19	210	Single-Family Detached Housing	158	DU ⁽²⁾	9.43	0.18	0.52	0.59	0.35	1,490	29	82	94	55

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

Table 2
Traffic Signal Warrant Analysis
Marksheffel Road/Vollmer Road

Warrant Analysis ⁽¹⁾																							
												Warrant 1: Eight Hour Vehicular Volume Evaluation						Warrant 2: Four Hour Vehicular Volume Evaluation					
												Warrant Threshold Met?						Short-Term Background		Short-Term Total			
Hour	Short-Term Background Traffic ⁽²⁾		SRE Filing 1 Generated Traffic		Villages at SRE Generated Traffic		FourSquare at SRE Generated Traffic		Short-Term Total Traffic		Warrant Thresholds				Short-Term Background		Short-Term Total		Warrant Threshold	Warrant Threshold	Warrant Threshold	Warrant Threshold	
	Major ⁽³⁾	Minor ⁽⁴⁾	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Condition A		Condition B		Condition n A	Condition n B	Condition n A	Condition n B	Minor	Met? WB	Minor	Met? WB	
	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Major	Minor	Major	Minor					Minimum		Minimum		
Short-Term Total Traffic⁽⁵⁾																							
12-1 AM	53	3	0	0	0	0	0	0	0	53	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
1-2 AM	26	3	0	0	0	0	0	0	0	26	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
2-3 AM	19	0	0	0	0	0	0	0	0	19	0	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
3-4 AM	28	3	0	0	0	0	0	0	0	28	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
4-5 AM	43	14	0	1	0	0	0	0	0	43	15	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
5-6 AM	117	34	0	2	0	0	1	0	0	117	37	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
6-7 AM	347	101	2	5	1	2	0	0	0	350	108	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
7-8 AM	833	174	3	8	1	3	0	0	0	837	185	600	150	900	75	Yes	No	Yes	No	192	No	191	No
8-9 AM	931	147	3	7	1	3	0	0	0	935	157	600	150	900	75	No	Yes	Yes	Yes	167	No	166	No
9-10 AM	805	92	3	4	1	2	0	0	0	809	98	600	150	900	75	No	No	No	No	199	No	198	No
10-11 AM	935	92	4	4	1	2	0	0	0	940	98	600	150	900	75	No	Yes	No	Yes	166	No	165	No
11-12 PM	1055	87	5	4	2	2	0	0	0	1062	93	600	150	900	75	No	Yes	No	Yes	134	No	131	No
12-1 PM	999	51	0	0	5	1	0	0	0	1004	52	600	150	900	75	No	No	No	No	150	No	149	No
1-2 PM	758	73	15	3	2	2	0	0	0	775	78	600	150	900	75	No	No	No	No	221	No	213	No
2-3 PM	871	77	5	4	2	2	0	0	0	878	83	600	150	900	75	No	No	No	No	182	No	181	No
3-4 PM	927	74	6	4	2	2	0	0	0	935	80	600	150	900	75	No	No	No	Yes	168	No	166	No
4-5 PM	962	93	7	4	3	2	0	0	0	972	99	600	150	900	75	No	Yes	No	Yes	160	No	157	No
5-6 PM	807	92	9	5	3	2	0	0	0	819	99	600	150	900	75	No	No	No	No	198	No	195	No
6-7 PM	553	73	9	5	2	2	0	0	0	564	80	600	150	900	75	No	No	No	No	314	No	308	No
7-8 PM	348	53	7	4	2	1	0	0	0	357	58	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
8-9 PM	282	38	5	3	2	1	0	0	0	289	42	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
9-10 PM	180	30	5	2	1	1	0	0	0	186	33	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
10-11 PM	101	14	4	2	1	0	0	0	0	106	16	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
11-12 AM	55	9	2	1	0	0	0	0	0	57	10	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
Numbers of Hours the Warrant Thresholds Are Met																1	4	2	5				
Warrant Met?																No		No					

Notes:
 (1) Thresholds are based on 2 or more lanes on the major approach and 1 lane on the minor approach (Warrant evaluation assuming the westbound left turn only for the minor street)
 (2) Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan Traffic Impact Study, November 14, 2022
 (3) The major street traffic includes all movements (left, through, and right)
 (4) The minor street traffic includes only the left turns from the minor street
 (5) Off peak hour traffic volumes are based on the projected peak hour traffic volumes, 72-hour machine counts conducted on Vollmer Road in November 2020 and vehicle time-of-day distribution data for single-family residential published by the Institute of Transportation Engineers

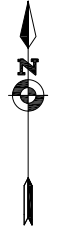
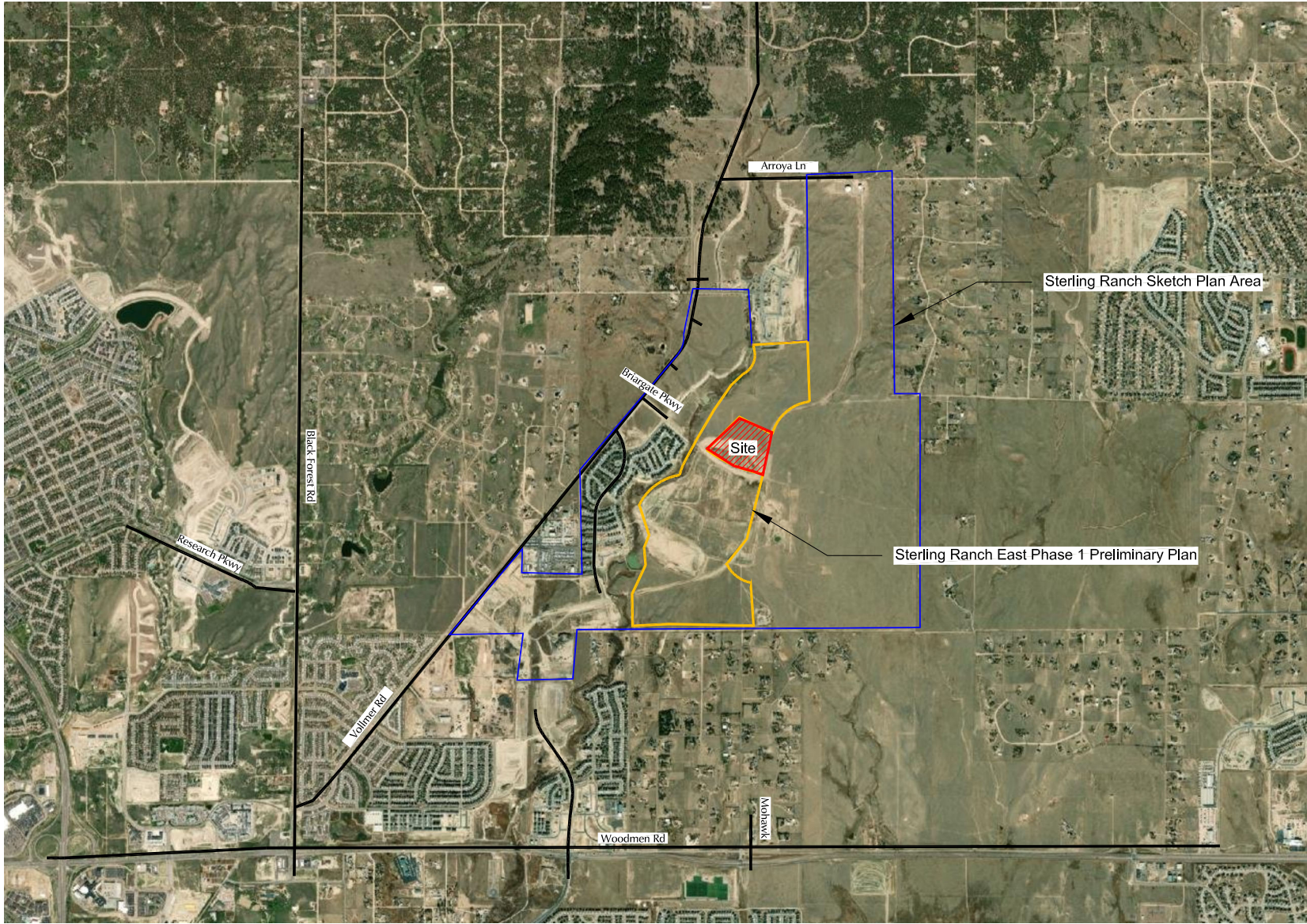
Table 3
Traffic Signal Warrant Analysis
Marksheffel Road/Sterling Ranch Road

Hour	Short-Term Total Traffic ⁽⁵⁾										Warrant Analysis ⁽¹⁾																
	Short-Term Background Traffic ⁽²⁾		SRE Filing 1 Generated Traffic		Villages at SRE Generated Traffic		FourSquare at SRE Generated Traffic		Short-Term Total Traffic		Warrant 1: Eight Hour Vehicular Volume Evaluation				Warrant 2: Four Hour Vehicular Volume Evaluation												
	Major ⁽³⁾ Marksheffel	Minor ⁽⁴⁾ Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Warrant Thresholds		Warrant Threshold Met?		Short-Term Background		Short-Term Total										
											Condition A		Condition B		Condition A	Condition B	Condition A	Condition B	Minimum	Warrant Threshold Met?	Minimum	Warrant Threshold Met?					
											Major	Minor	Major	Minor	n A	n B	n A	n B	Minimum	WB	Minimum	WB					
12-1 AM	47	7	1	22	1	11	1	4	50	44	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
1-2 AM	20	7	1	9	1	5	1	2	23	23	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
2-3 AM	19	0	0	9	0	5	0	2	19	16	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
3-4 AM	21	7	1	9	1	5	1	2	24	23	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
4-5 AM	31	26	4	13	2	7	3	2	40	48	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
5-6 AM	64	65	10	22	6	11	8	4	88	102	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
6-7 AM	193	192	28	69	17	36	24	12	262	309	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
7-8 AM	414	332	49	138	29	72	41	24	533	566	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
8-9 AM	469	280	41	160	24	83	35	28	569	551	600	150	900	75	No	No	No	No	356	No	306	Yes					
9-10 AM	406	176	26	138	15	72	22	24	469	410	600	150	900	75	No	No	No	No	387	No	356	Yes					
10-11 AM	503	176	26	181	15	95	22	32	566	484	600	150	900	75	No	No	No	No	339	No	307	Yes					
11-12 PM	616	166	25	233	15	122	21	41	677	562	600	150	900	75	Yes	No	Yes	No	284	No	259	Yes					
12-1 PM	928	114	87	158	42	88	42	88	1099	448	600	150	900	75	No	Yes	Yes	Yes	168	No	120	Yes					
1-2 PM	415	164	124	53	60	29	60	29	659	275	600	150	900	75	No	No	Yes	No	383	No	266	Yes					
2-3 PM	483	172	131	61	63	34	63	34	740	301	600	150	900	75	No	No	Yes	No	349	No	230	Yes					
3-4 PM	552	166	126	74	61	41	61	41	800	322	600	150	900	75	No	No	Yes	No	314	No	200	Yes					
4-5 PM	636	208	158	92	76	51	76	51	946	402	600	150	900	75	Yes	No	Yes	Yes	276	No	164	Yes					
5-6 PM	589	205	156	90	75	50	75	50	895	395	600	150	900	75	No	No	Yes	No	296	No	176	Yes					
6-7 PM	460	164	124	75	60	42	60	42	704	323	600	150	900	75	No	No	Yes	No	360	No	248	Yes					
7-8 PM	318	119	91	54	44	30	44	30	497	233	600	150	900	75	No	No	No	No	Low Volume	No	342	No					
8-9 PM	307	86	65	55	31	31	31	31	434	203	600	150	900	75	No	No	No	No	Low Volume	No	373	No					
9-10 PM	214	67	51	39	24	22	24	22	313	150	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
10-11 PM	107	31	23	19	11	11	11	11	152	72	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
11-12 AM	63	19	15	11	7	6	7	6	92	42	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No					
Numbers of Hours the Warrant Thresholds Are Met															2		1		8		2						
Warrant Met?															No		Yes						No			Yes	

Notes:
 (1) Thresholds are based on 2 or more lanes on the major approach and 1 lane on the minor approach (Warrant evaluation assuming the southbound left turn only for the minor street)
 (2) Source: *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan Traffic Impact Study*, November 14, 2022
 (3) The major street traffic includes all movements (left, through, and right)
 (4) The minor street traffic includes only the left turns from the minor street
 (5) Off peak hour traffic volumes are based on the projected peak hour traffic volumes, 72-hour machine counts conducted on Vollmer Road in November 2020 and vehicle time-of-day distribution data for single-family residential published by the Institute of Transportation Engineers
 Source: LSC Transportation Consultants, Inc.

Figures



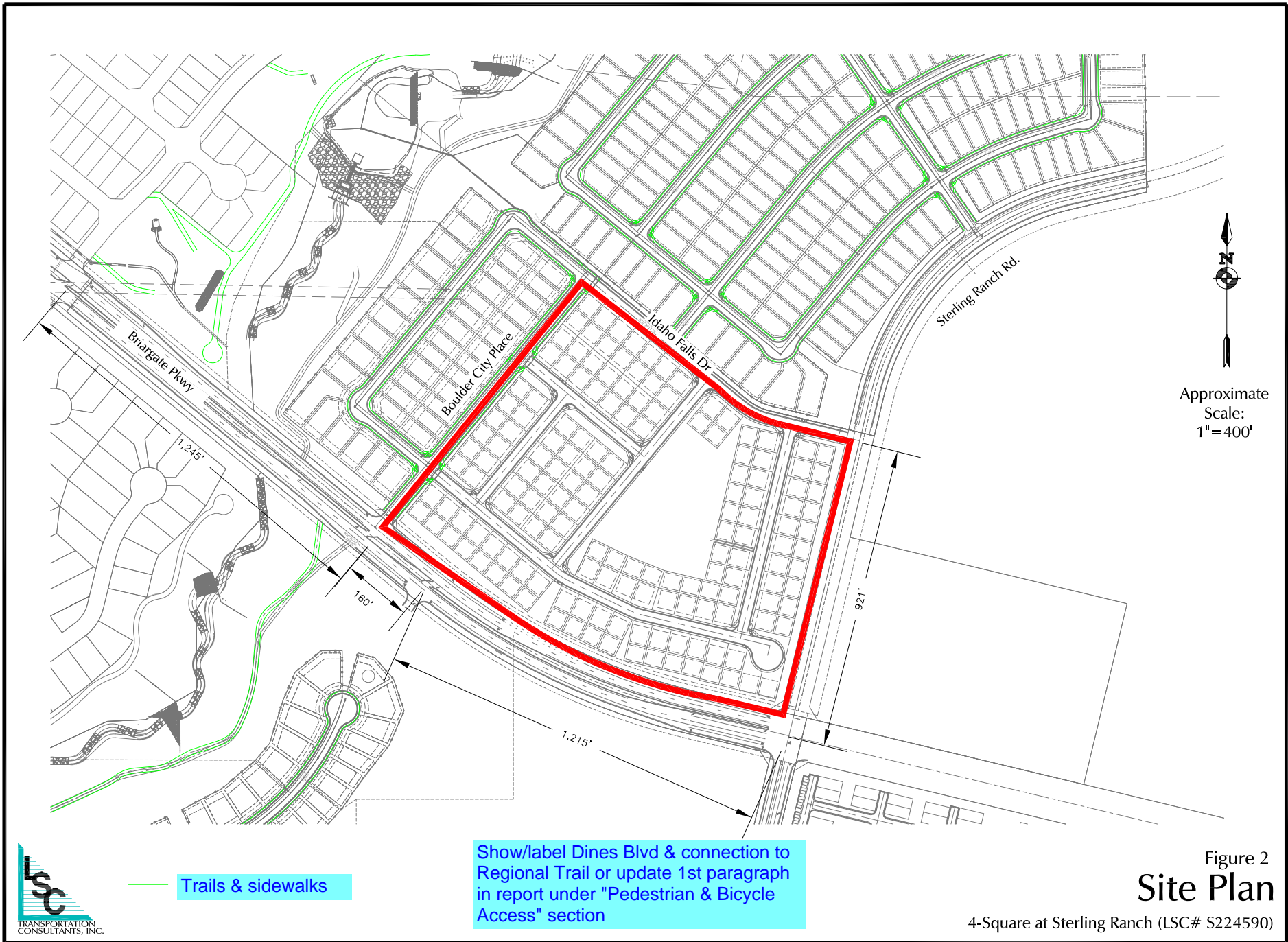


Not to scale

Figure 1

Vicinity Map

4-Square at Sterling Ranch (LSC# S224590)



Trails & sidewalks

Show/label Dines Blvd & connection to Regional Trail or update 1st paragraph in report under "Pedestrian & Bicycle Access" section

Figure 2
Site Plan

4-Square at Sterling Ranch (LSC# S224590)

First Briargate segment should be red or green?

Label Dines Blvd

Can the viewport be shifted to the east enough to show Sterling Ranch Road connecting to Marksheffel?



Not to scale

LEGEND:




-  Roadway Connection Planned with Four Square at Sterling Ranch or Earlier Filings
-  Roadway Planned to be Completed by 2023
-  Existing Roadway

Figure 3

Short-Term Roadway Connections

4-Square at Sterling Ranch (LSC# S224590)



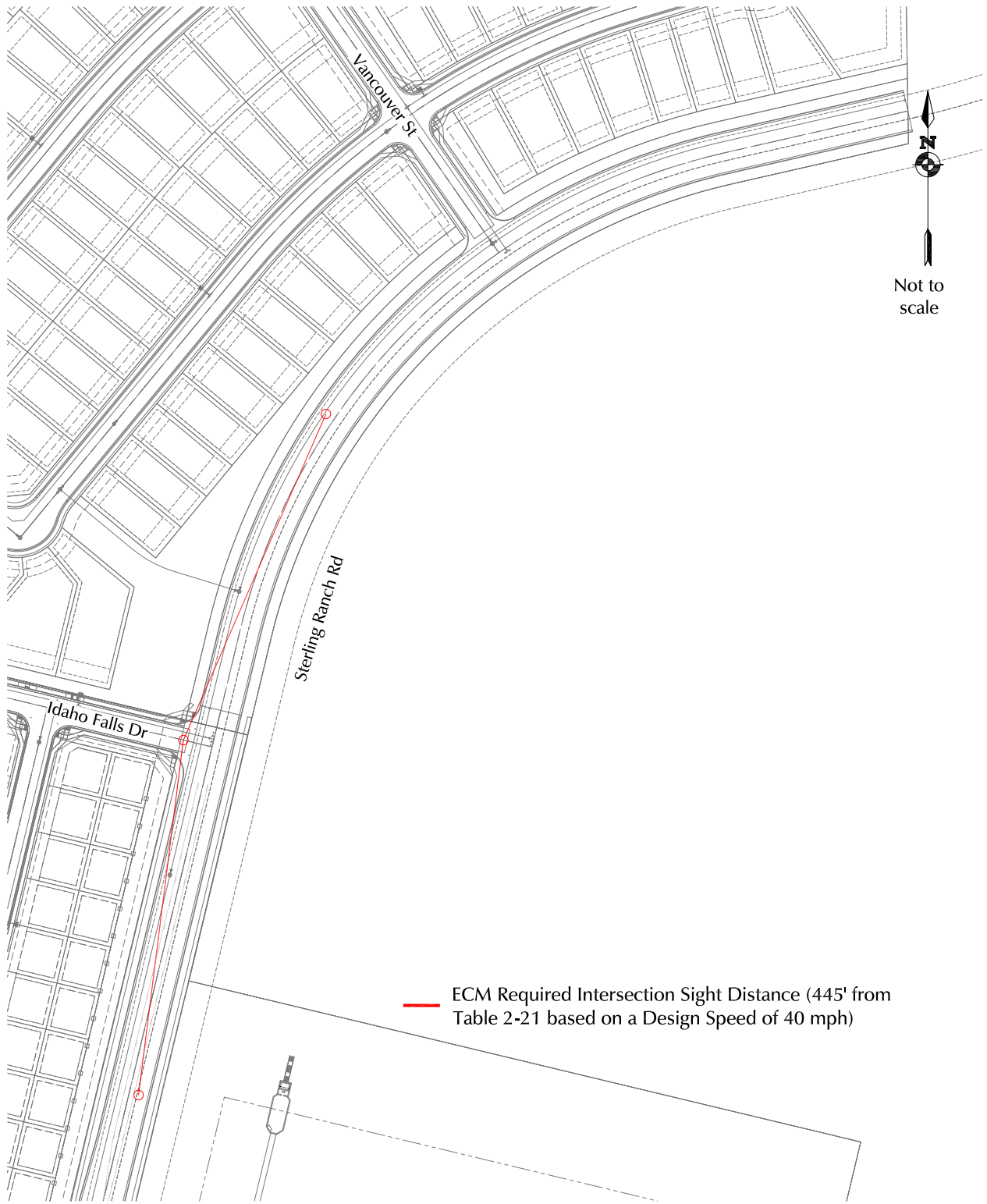
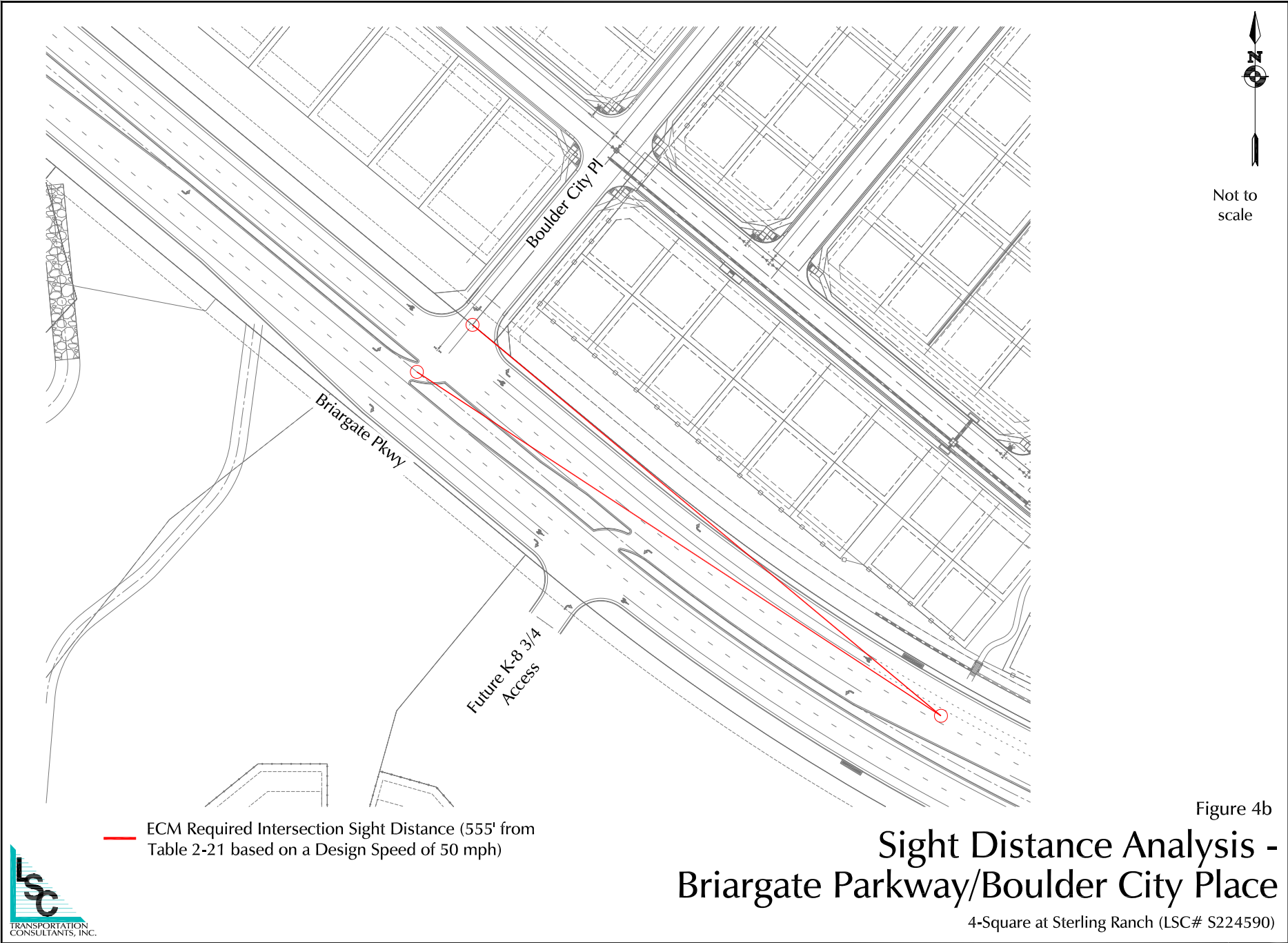


Figure 4a

Sight Distance Analysis - Sterling Ranch Road/Idaho Falls Drive

4-Square at Sterling Ranch (LSC# S224590)





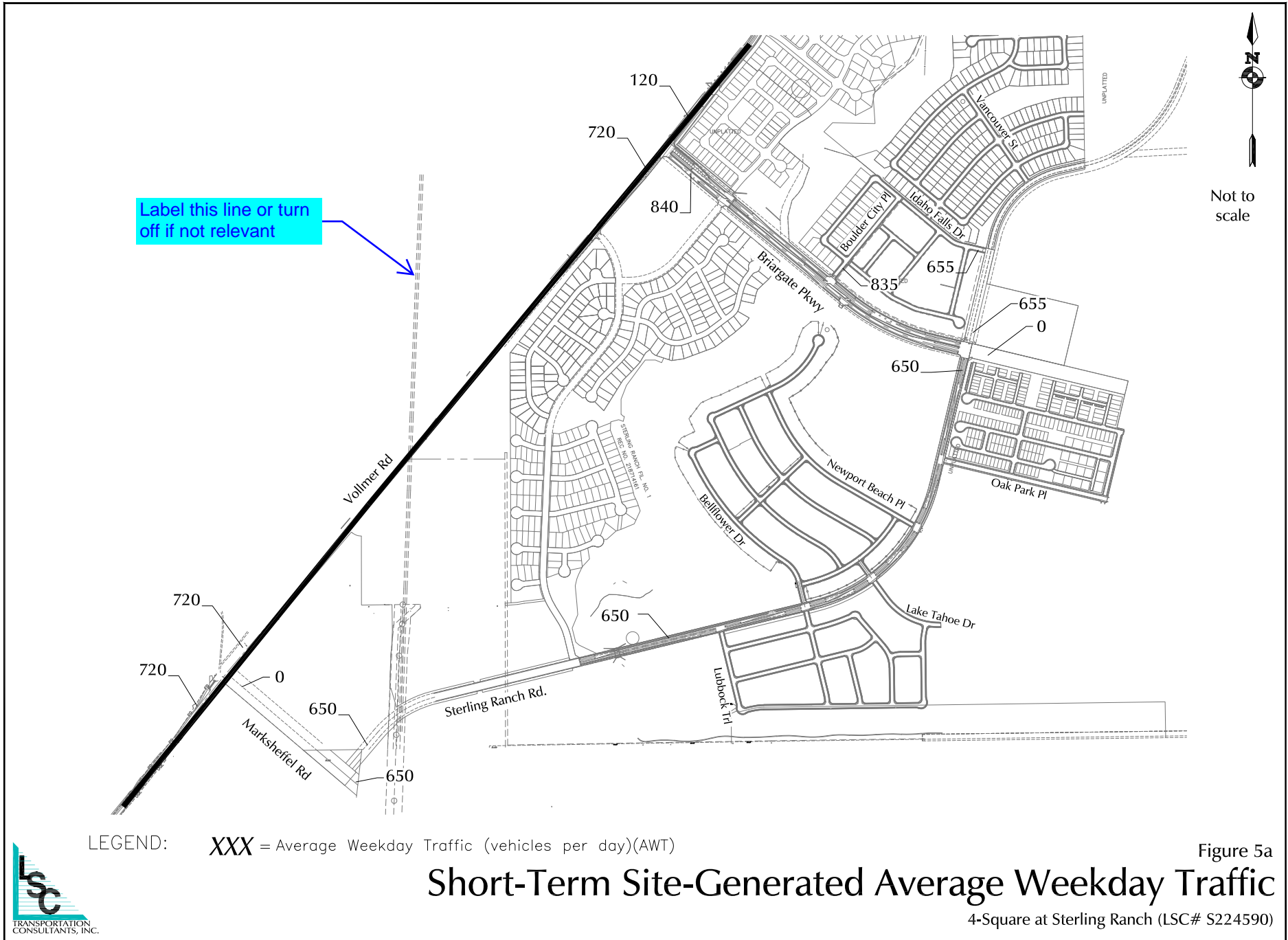
Not to scale

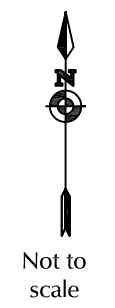
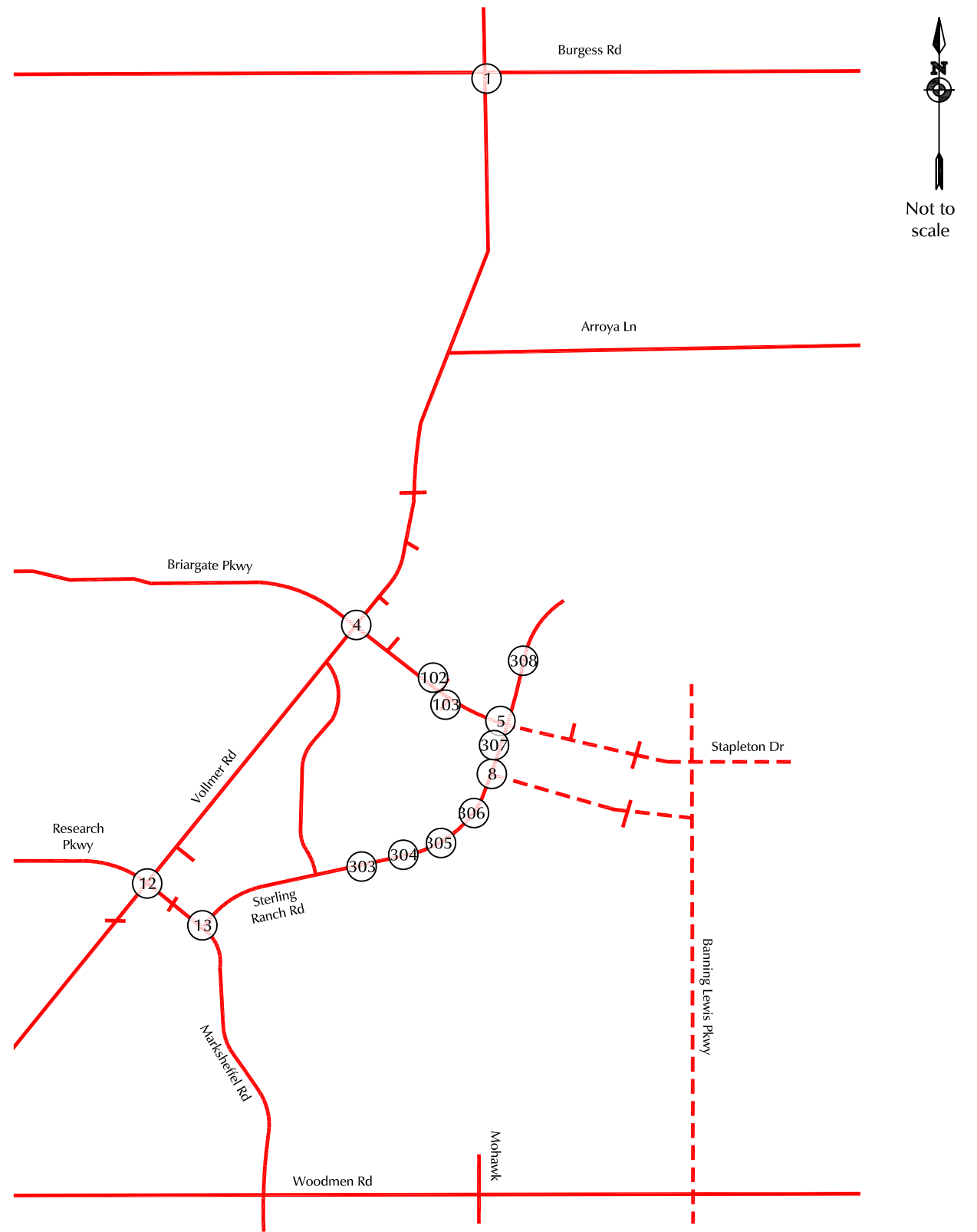
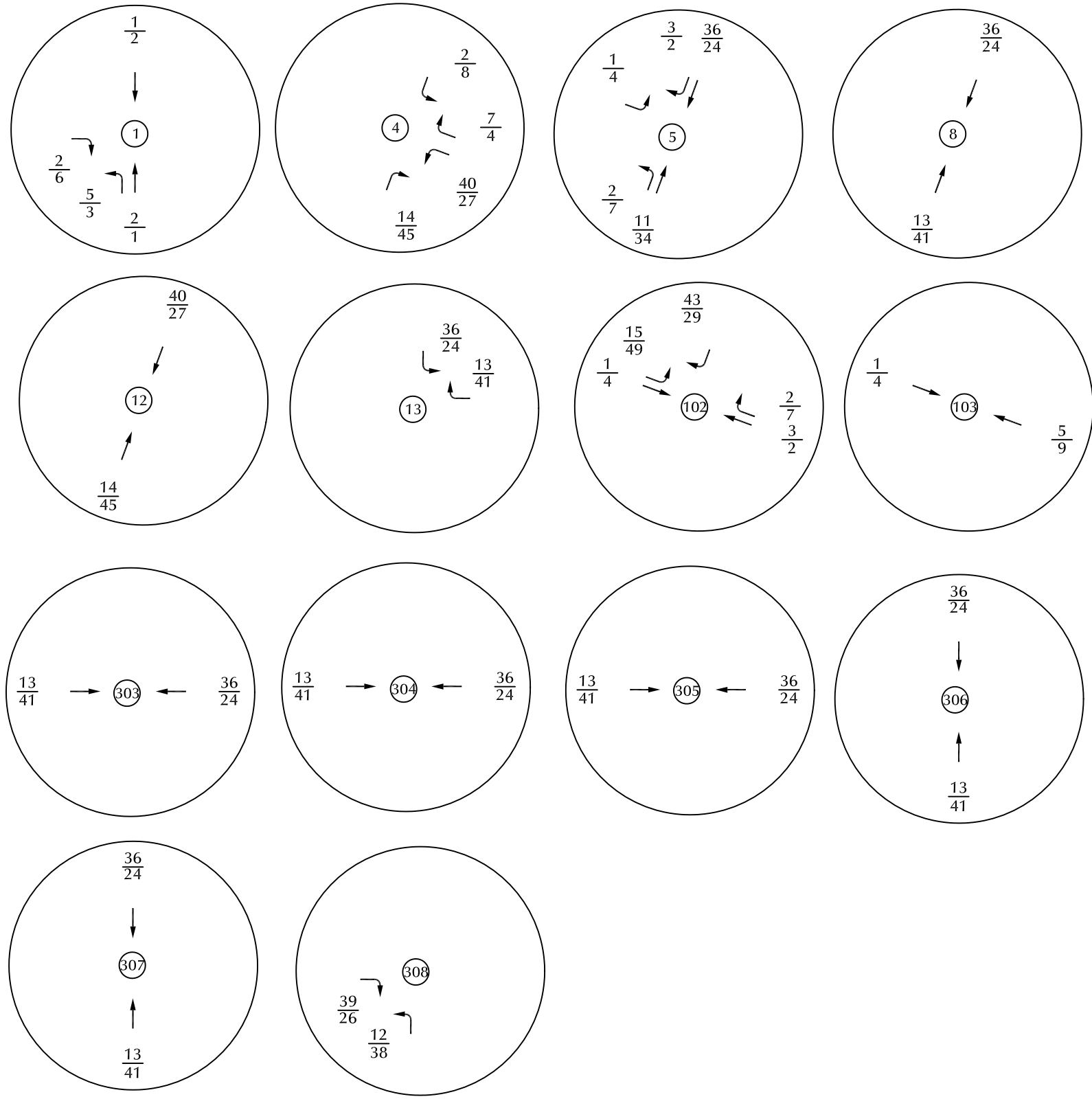
— ECM Required Intersection Sight Distance (555' from Table 2-21 based on a Design Speed of 50 mph)



Figure 4b Sight Distance Analysis - Briargate Parkway/Boulder City Place

4-Square at Sterling Ranch (LSC# S224590)



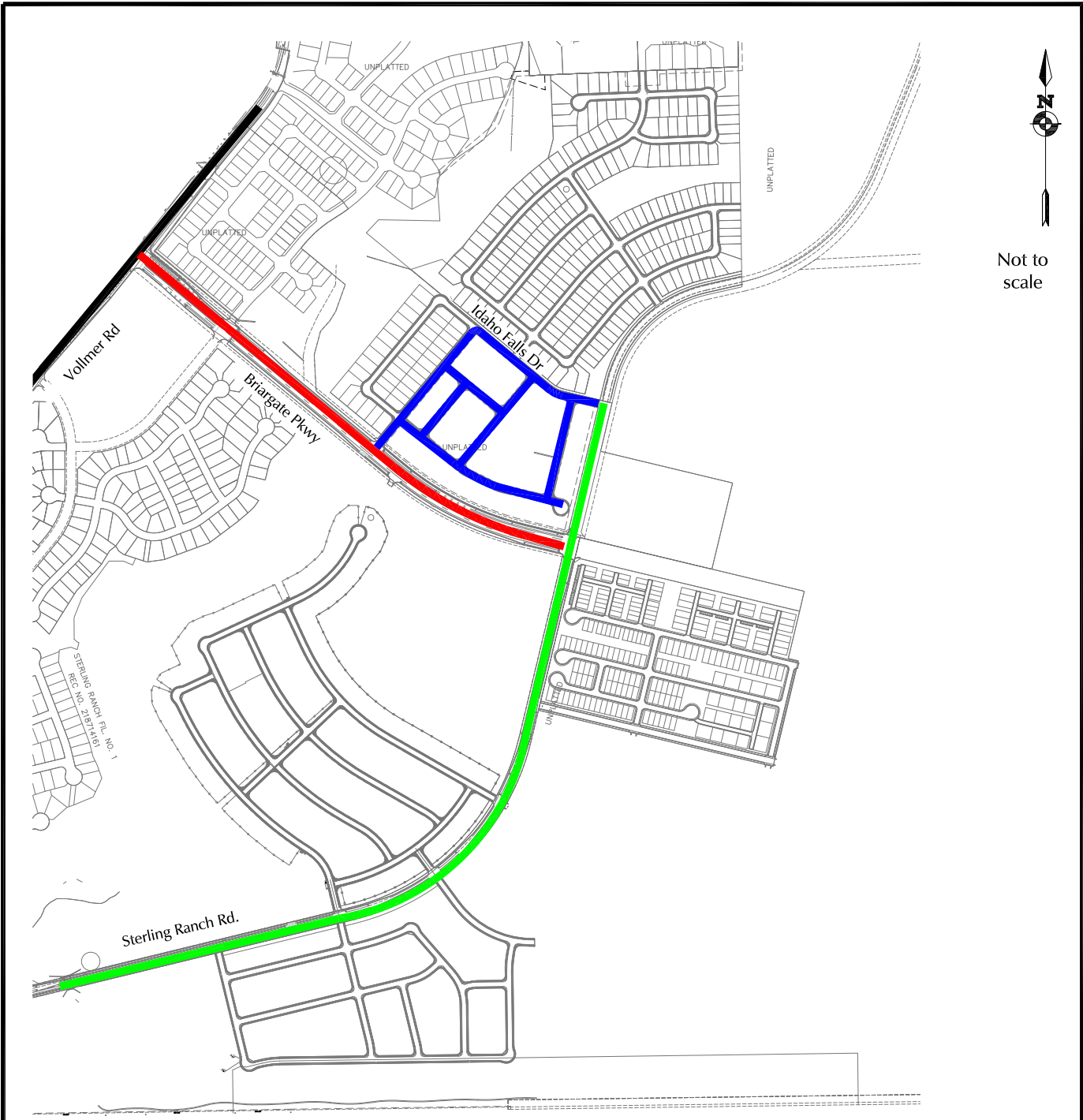


LEGEND: $\frac{XX}{XX} = \frac{\text{AM Peak-Hour Traffic (veh/hr)}}{\text{PM Peak-Hour Traffic (veh/hr)}}$



Figure 5b
Short-Term Site-Generated Traffic

4-Square at Sterling Ranch (LSC# S224590)



Not to scale

LEGEND:

- 4-Lane Urban Principal Arterial
- Urban Local
- Urban Non-Residential Collector



Figure 6
Roadway Classifications

4-Square at Sterling Ranch (LSC# S224590)

Appendix Table 1



**Appendix Table 1
Area Traffic Impact Studies
4-Square at Sterling Ranch East**

Study	PCD File No⁽¹⁾	Consultant	Date
Sterling Ranch Reports			
Sterling Ranch Updated Traffic Impact Analysis	SKP07007	LSC Transportation Consultants, Inc	June 5, 2008
Sterling Ranch Phase 1 Traffic Impact Study	P151	LSC Transportation Consultants, Inc	March 16, 2015
Sterling Ranch Phases 1-3 Transportation Memorandum	SP1415	LSC Transportation Consultants, Inc	October 2, 2017
Branding Iron at Sterling Ranch Filing No. 1 and Homestead at Sterling Ranch Filing No. 1 Transportation	SF1724 SF1725	LSC Transportation Consultants, Inc	December 19, 2017
Sterling Ranch Filing No. 2 Transportation Memorandum	SF1820	LSC Transportation Consultants, Inc	April 3, 2018
Sterling Ranch Phase 2 Preliminary Plan Traffic Impact Study	SP203	LSC Transportation Consultants, Inc	December 20, 2018
Homestead at Sterling Ranch Filing No. 2 Transportation Memorandum	SF194	LSC Transportation Consultants, Inc	March 3, 2020
Branding Iron at Sterling Ranch Filing No. 2 Transportation Memorandum	SF1918	LSC Transportation Consultants, Inc	May 6, 2020
Sterling Ranch Filing No. 2 and Phase 2 Traffic Impact Study	SF2015 SP191	LSC Transportation Consultants, Inc	June 23, 2021
Sterling Ranch Filing No. 3 Transportation Memorandum	SF2132	LSC Transportation Consultants, Inc	April 19, 2022
Copper Chase at Sterling Ranch Transportation Memorandum	PUDSP222	LSC Transportation Consultants, Inc	December 14, 2021
Homestead North Phase 1 Updated Transportation Memorandum	SP208	LSC Transportation Consultants, Inc	January 11, 2022
Homestead North Filing No. 1 Traffic Technical Memorandum	SF2213	LSC Transportation Consultants, Inc	February 2, 2022
Homestead North Filing No. 2 Traffic Technical Memorandum	SF2218	LSC Transportation Consultants, Inc	April 15, 2022
Homestead North Filing 3 Traffic Impact Study	SF2229	LSC Transportation Consultants, Inc	June 17, 2022
Foursquare at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP227	SM Rocha, LLC	April 27, 2022
The Villages at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP226	SM Rocha, LLC	July 1, 2022
Sterling Ranch Sketch Plan Amendment Master Traffic Impact Study	SKP224	LSC Transportation Consultants, Inc	October 26, 2022
Sterling Ranch East - Phase 1 Rezoning & Preliminary Plan Traffic Impact Study	SP224	LSC Transportation Consultants, Inc	November 17, 2022
Retreat at TimberRidge Reports			
The Retreat at TimberRidge Traffic Impact Analysis	PUD173	LSC Transportation Consultants, Inc	January 25, 2018
The Retreat at TimberRidge Preliminary Plan Traffic Technical Memorandum	SP182	LSC Transportation Consultants, Inc	June 29, 2018
The Retreat at TimberRidge Filing No. 1 Traffic Technical Memorandum	SF199	LSC Transportation Consultants, Inc	April 3, 2020
The Retreat at TimberRidge Filing No. 2 Updated Traffic Technical Memorandum	SF2121	LSC Transportation Consultants, Inc	October 4, 2021
The Retreat at TimberRidge Filing No. 3 Traffic Technical Memorandum		LSC Transportation Consultants, Inc	July 1, 2022
Other Area Reports			
Wolf Ranch School Site Traffic Impact Study	OAR1720	Matrix Design Group, Inc.	5-May-17
The Ranch Sketch Plan Traffic Impact Analysis	SKP186	LSC Transportation Consultants, Inc	July 9, 2019
Lodge III Traffic Impact Study	OAR	LSC Transportation Consultants, Inc	December 13, 2019
Continental 613 Traffic Impact Study	OAR2177	LSC Transportation Consultants, Inc	July 16, 2021
Solace at Black Forest Traffic Impact and Access Analysis	OAR2134	LSC Transportation Consultants, Inc	August 13, 2021
Traffic Impact Study Addendum for Percheron	OAR2173	SM Rocha, LLC	October, 2021
Woodmen East Commercial Center Traffic Impact Analysis	OAR2191	LSC Transportation Consultants, Inc	December 8, 2021
Traffic Impact Study for Jaynes Property	SKP225	SM Rocha, LLC	May, 2022
Traffic Impact Study for Rhetoric Site	P2216	SM Rocha, LLC	June, 2022
Briargate-Stapleton Corridor Study (DRAFT)	briargate-stapleton.com	Wilson & Company	December 9, 2021
Notes:			
(1) Follow the links listed below to obtain the most recent version of each listed study. To obtain a copy of the version of each study used in preparing this report please contact LSC Transportation Consultants, Inc.			
Source: LSC Transportation Consultants, Inc.			

Appendix A



This memorandum was based on the *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* dated November 17, 2022. The latest version of this report can be found at <https://epcdevplanreview.com/Public/ProjectDetails/184079>. If you need a copy of the November 17, 2022 version of the report, please contact LSC Transportation Consultants, Inc.

Additional Attachments

Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* with notes by LSC



Update to SRE Filing "2" instead of SRE Filing "1A" (all references)

Sterling Ranch East Phase 1 Preliminary Plan Intersection Improvements				
Item #	Improvement	Trigger	Timing	Responsibility
1) Burgess Road/Vollmer Road				
1	Reconstruct as a modern one-lane roundabout	When the LOS degrades below LOS F	Existing deficiency	This intersection may be eligible intersection under the fee impact program
12) Marksheffel Road/Vollmer Road				
2	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	This intersection may be eligible intersection under the fee impact program
14) Marksheffel Road/Sterling Ranch Road				
3	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	SRMD#3
102) Briargate Parkway/Boulder City Place				
4	Construct an eastbound left-turn lane on Briargate Parkway approaching Boulder City Place. The lane should be 285' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
5	Construct a westbound right-turn deceleration lane on Briargate Parkway approaching Boulder City Place. The lane should be 235' long plus a 200' taper.	westbound right-turn volume > 25 vph	Long Term	Sterling Ranch
103) Briargate Parkway/Future School 3/4 Movement Access				
6	Construct a westbound left-turn lane on Briargate Parkway approaching the school access. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
7	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching the school access. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
5) Briargate Parkway/Sterling Ranch Road				
8	Construct an eastbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 435' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
9	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
10	Construct a northbound to eastbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	northbound right-turn volume > 50 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
11	Construct a westbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term	Sterling Ranch
12	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term	Sterling Ranch
13	Construct a southbound to westbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	southbound right-turn volume > 50 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
303) Sterling Ranch Road/Lubbock Trail				
14	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 155' long plus a 160' taper	northeastbound right-turn volume > 50 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
15	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 305' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
304) Sterling Ranch Road/Bellflower Drive				
16	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 160' taper	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
17	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
305) Sterling Ranch Road/Lake Tahoe Drive				
18	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 225' long plus a 160' taper	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
19	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Not Required (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
20	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 155' long plus a 160' taper	northeastbound right-turn volume > 50 vph	Long Term	Sterling Ranch
306) Sterling Ranch Road/Newport Beach Place				
21	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Newport Beach Place. The lane should be 205' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
308) Sterling Ranch Road/Idaho Falls Drive				
22	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Idaho Falls Drive. The lane should be 240' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
309) Sterling Ranch Road/Vancouver Street				
23	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Vancouver Street. The lane should be 265' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch

Future SRE Filings

SRE Fil 1

SRE Fil 1A or FourSquare at SRE

SRE Fil 1A

Future SRE Filings

SRE Fil 1

SRE Fil 1

SRE Fil 1

SRE Fil 1A

Future SRE Filings

Notes:
 Source: LSC Transportation Consultants, Inc. (November 2022)

Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS, November 17, 2022. Improvements needed prior to 4-Square at Sterling Ranch East have been highlighted in green. Improvements needed with 4-Square at Sterling Ranch East have been highlighted in yellow. Improvements needed with 4-Square Sterling Ranch East as noted in text boxes with pointer.

Table 6

Roadway Segment Improvements

Sterling Ranch East Phase 1 Preliminary Plan

(Page 1 of 2)

Segment ID ⁽¹⁾ (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 ⁽²⁾ (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) ⁽²⁾	Intermediate-Term Future	20,000		Sterling Ranch, if necessary prior to construction by Others
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 ⁽²⁾	Short-Term Future (With Sterling Ranch Fil No. 2 Or Sterling Ranch Phase 2)	20,000 (Note: Existing Capacity 8,000 ⁽³⁾)	14,385	Sterling Ranch
V3	Short Term: 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 ⁽²⁾	Short-Term Future (With Homestead North)	11,000 (Note: Existing Capacity 8,000)	15,040	Sterling Ranch
	Long Term: Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	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 ⁽²⁾	Sections V4, V5, V6 to be constructed by May 2024	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 ⁽²⁾	Sections V4, V5, v6 to be constructed by May 2024	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 ⁽²⁾	Short-Term Future— May 2024 Sections V4, V5, v6 to be constructed by May 2024	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 May 2024	20,000	9,920	Sterling Ranch
V8	Improve Vollmer Road from Poco Road to Shoup Road to a Rural 2-Lane Arterial Cross Section ⁽²⁾	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. (November 22, 2022)

Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS, November 17, 2022. Improvements needed prior to FourSquare at Sterling Ranch East have been highlighted in green. Improvements needed with Sterling Ranch Filing 1 or 1A have been highlighted in yellow. Improvements needed with FourSquare Sterling Ranch East as noted in text boxes with pointer.

Table 6

Roadway Segment Improvements

Sterling Ranch East Phase 1 Preliminary Plan

With 4-Square at SRE

(Page 2 of 2)

Segment ID ⁽¹⁾ (See Figure 16 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Responsibility
SR1	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Marksheffel Road to Dines Boulevard	Short Term - with Sterling Ranch Fil No. 2	20,000	14,840	Sterling Ranch
SR2	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Dines Boulevard to Briargate Parkway	Short-Term - with this Preliminary Plan	20,000	10,275	Sterling Ranch
SR3	Construct Sterling Ranch Road as an Urban Collector from Briargate Parkway to Vancouver Street.	Short-Term - with this Preliminary Plan	10,000	9,300	Sterling Ranch
SR4	Construct Sterling Ranch Road from Vancouver Street north to Arroya (or ultimate north terminus)	Long-Term Future	10,000	4,260	Sterling Ranch
M1	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Vollmer Road and Sterling Ranch Road	To be completed by the end of 2022	40,000	23,935	Sterling Ranch
M2	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Sterling Ranch Road and the south boundary of the Sterling Ranch Master Plan Area. 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	To be completed in 2023	40,000	29,600	Sterling Ranch
M3	Construct Marksheffel Road between the south boundary of the Sterling Ranch Master Plan Area and Woodmen Road (Note this segment is located within the City of Colorado Springs) 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	Completed (by Others)	40,000	28,480	Others (Completed)
M4	Construct Marksheffel Road between Black Forest Road and Vollmer Road	Long-Term Future	40,000	27,910	Others
B1	Construct the full section of Briargate Pkwy (4-Lane Principal Arterial) between Vollmer Road and Wheatland Drive	Full section to be completed in 2023 with Homestead at Sterling Ranch Filing No. 1	40,000	24,745	Sterling Ranch
B2	Construct Briargate Pkwy (full section) as a 4-Lane Principal Arterial between Wheatland Dr and Sterling Ranch Road	Full section to be completed in 2023 or Spring 2024	40,000	26,375	Sterling Ranch
B3	Construct Briargate Pkwy as a 4-Lane Principal Arterial between Sterling Ranch Road and Banning Lewis Parkway	Intermediate Term	40,000	20,935	Sterling Ranch
B4	Construct Stapleton Road as a 4-Lane Principal Arterial between Banning Lewis Parkway and Meridian Road (including upgrade of existing rural two-lane segment between Towner and Meridian)	Long-Term Future	40,000	17,945	Others
B5	Construct Briargate Pkwy as a 4-Lane Principal Arterial between its current terminus and Black Forest Road and between Black Forest Road and Vollmer Road	Long-Term Future	40,000	23,320	Others
BL1	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between the south Sterling Ranch boundary and Briargate Pkwy	Long-Term Future	40,000	20,320	Future- TBD with the future preliminary plan for that area-potentially, financial assurances for half-section, west-side half-section or full-section w/ cost recover may be required
BL2	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between Woodmen Road and the south Sterling Ranch boundary (Note this segment will be located within the City of Colorado Springs)	Long-Term Future	40,000	28,480	Others
W1	Widen Woodmen Road from 4-lane to 6-lane section from Powers Boulevard to US 24	Long-Term Future	72,000	66,690	Others

Part 2/2 of this table

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. (November 22, 2022)

From Briargate Parkway to Idaho Falls Dr with 4-Square at SRE. From Idaho Falls Dr to Vancouver St with future SRE filings.

4-Square at Sterling Ranch East Traffic Technical Memorandum

Prepared for:

Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

NOVEMBER 30, 2022

LSC Transportation Consultants
Prepared by: Kirstin D. Ferrin, P.E.
Reviewed by: Jeffrey C. Hodsdon, P.E.

LSC #S224590



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 Appendix Table 1

 Appendix A

 Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS*
 with notes by LSC



LSC TRANSPORTATION CONSULTANTS, INC.
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E-mail: lsc@lsctrans.com
Website: <http://www.lsctrans.com>

November 30, 2022

Mr. Loren J. Moreland
Vice President/ Project Manager
Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

RE: 4-Square at Sterling Ranch East
El Paso County, CO
Traffic Technical Memorandum
LSC #S224590

Dear Mr. Moreland:

LSC Transportation Consultants, Inc. has prepared this traffic technical memorandum for the 4-Square at Sterling Ranch East residential development. As shown in Figure 1, the site is located north of the future extension of Briargate Parkway and west of the future extension of Sterling Ranch Road in El Paso County, Colorado. LSC recently prepared a traffic impact study (TIS) for the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan ([SP224](#)) that included trips by the currently-proposed filing. This memorandum is intended as a site-specific, final plat traffic report for 4-Square at Sterling Ranch East.

REPORT CONTENTS

This report presents:

- A summary of the proposed land use and access plan;
- The projected average weekday and peak-hour vehicle trips to be generated by the currently-proposed filing;
- The assignment of the site-generated traffic volumes to the area roadways;
- The recommended street classifications for the internal streets within the currently-proposed filing;
- Improvements needed with the currently-proposed filing; and
- The project's obligation to the County roadway improvement fee program.

RECENT TRAFFIC REPORTS

- LSC completed an updated master traffic study (TIS) for the entire Sterling Ranch development, dated October 21, 2022.
- LSC prepared a TIS for the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan, November 17, 2022. The currently proposed filing was accounted for within that recent report. Appendix A includes a link to the El Paso County Electronic Development Application Review Program (EDARP) page where a copy of the latest version of the Phase 1 TIS can be obtained.
- 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 (Appendix Table 1).
- 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.

LAND USE AND ACCESS

4-Square at Sterling Ranch East is planned to include 158 lots for single-family homes. Figure 2 shows the proposed site plan.

Figure 3 shows the roadway connections that are planned to be constructed in the short term. As shown in Figure 3, by 2023 Briargate Parkway is planned to be constructed to its final cross section between Vollmer Road and Wheatland Drive, Marksheffel Road is planned to be completed between Vollmer Road and Woodmen Road, and Sterling Ranch Road is planned to be constructed from Marksheffel Road to Dines Boulevard. With Sterling Ranch East Filing No. 1, which is planned to be constructed prior to the Villages at Sterling Ranch East, Briargate Parkway is planned to be constructed to its final cross section between Wheatland Drive and Sterling Ranch Road and Sterling Ranch Road is planned to be constructed from Dines Boulevard to Idaho Falls Drive. These connections will need to be constructed with 4-Square at Sterling Ranch East if they are not constructed as part of Sterling Ranch East Filing 1.

Full-movement access is proposed to Sterling Ranch Road via Idaho Falls Drive. The proposed access spacing is shown in Figure 2. As shown in the figure, all of the access points meet the intersection spacing requirements.

An additional three-quarter-movement access (Boulder City Place) is proposed to Briargate Parkway about 1,245 feet east of Wheatland Drive and 1,375 feet west of Sterling Ranch Road. This access will require a deviation to the criteria contained in the El Paso County *Engineering Criteria Manual (ECM)*. The *Briargate Parkway-Stapleton Road Corridor Study Appendix D: Access Control Plan* shows the access locations and intersection access restrictions along Briargate Parkway between Black Forest Road and Meridian Road. This deviation request is being made as part of the application for Sterling Ranch East Filing No. 1 but will be required by the

currently-proposed 4-Square at Sterling Ranch East if it develops first. The draft access control plan shows a right-in/right-out access point north and south of Briargate Parkway between Wheatland Drive and Sterling Ranch Road. The Master TIS showed two offset three-quarter movement (left-in/right-in/right-out only) access points in this general location. A future three-quarter movement access to be located 160 feet east of the currently-proposed Boulder City Place would serve the future planned K-8 school parcel located southwest of the intersection of Briargate/Sterling Ranch.

The currently-proposed filing was included in the Sterling Ranch Master TIS as Traffic Analysis Zone (TAZ) 19. Traffic projected to be generated by land uses within this zone was included as part of the short-term background traffic volumes in the Sterling Ranch East Phase 1 TIS. The land use and access currently proposed are consistent with what was assumed in the Master TIS and the Sterling Ranch East Phase 1 TIS.

Intersection Sight Distance

Figure 4a shows a sight-distance analysis at the proposed intersection of Idaho Falls/Sterling Ranch and the two access points to Oak Park Drive. 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. As shown in Figure 4a, the proposed intersections to Sterling Ranch Road and Idaho Falls Drive will meet the criteria.

Figure 4b shows a sight-distance analysis at the proposed three-quarter movement intersection of Boulder City/Briargate. 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 intersection is 55 feet. As shown in Figures 4b, the proposed intersection will meet the criteria.

Pedestrian and Bicycle Analysis

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.

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.

There are no existing schools within two miles of the site, however, a K-8 school is planned southwest of the future intersection of Briargate/Sterling Ranch Road and two elementary schools are planned east of Sterling Ranch Road. A school crossing will likely be needed at the intersection of Sterling Ranch Road/Briargate Parkway. This intersection is planned to be signal controlled in the future.

Safety Analysis

Most of the roadways in the vicinity of the site have not yet been constructed. The Colorado State Patrol (CSP) provided LSC with crash history data for Vollmer Road between Tahiti Drive and Burgess Road from September 2019 through September 2022. During the reported time period, there were twelve reported crashes. Of the twelve reports, ten were single-vehicle non-intersection-related crashes on Vollmer Road. One crash involved a southbound vehicle that turned right onto Poco Road and crashed into several cars parked on Poco Road partially in the lane. The only intersection related crash occurred in June 2022. A vehicle heading northbound on Vollmer Road was slowing to turn left at Lochwinnoch Road and the vehicle behind them attempted to pass on the left side. The crash history data has been attached.

TRIP GENERATION

4-Square at Sterling Ranch East site-generated vehicle trips have been estimated using the nationally-published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 1 shows the trip-generation estimate. The trip-generation estimate is consistent with the estimate assumed in the Sterling Ranch Master TIS and the Sterling Ranch East Phase 1 TIS for the same parcels.

The Villages at Sterling Ranch East is expected to generate 1,490 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 29 vehicles would enter and 82 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 94 vehicles would enter and 55 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

When the distribution percentages from Figure 8 of the Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIA are applied to the new, external trip-generation estimates (from Table 1), the resulting site-generated traffic volumes can be determined. Figures 5a and 5b show the short-term residential site-generated traffic volumes. These volumes assume only the street network shown in Figure 3.

TOTAL TRAFFIC VOLUMES AND LEVELS OF SERVICE

Please refer to the short-term and 2042 peak-hour traffic-volume projections and level of service analysis shown in Figures 14c and 15c of the *Sterling Ranch East Phase 1 Rezoning & Preliminary Plan TIS*. The proposed land use and access is in compliance with the Sterling Ranch Master TIS and Sterling Ranch East Phase 1 Preliminary Plan TIS. As such, there are no changes to these projected volumes or level of service results.

SIGNAL WARRANT THRESHOLD ANALYSIS – AM AND PM PEAK HOURS

The intersections of Marksheffel/Vollmer and Marksheffel/Sterling Ranch were analyzed to determine if the thresholds for Four-Hour and/or Eight-Hour Vehicular-Volume Traffic-Signal Warrant thresholds would be reached or exceeded, based on the projected short-term traffic volumes.

The volumes shown are based on the following:

- The short-term background traffic volumes taken from Figure 6b of the Sterling Ranch East Phase 1 TIS,
- The Sterling Ranch East Filing No. 1 site-generated traffic volumes taken from the traffic memo for that subdivision filing.,
- The Villages at Sterling Ranch East site-generated traffic volumes from our current work for the traffic memo for that subdivision,
- The 4-Square at Sterling Ranch East site-generated traffic volumes shown in Figure 5b of this memorandum.

The off-peak-hour volumes are estimates by LSC based on the peak-hour traffic volumes, 72-hour machine counts conducted by LSC on Vollmer Road in November 2020, and vehicle time-of-day distribution data for single-family homes published by the Institute of Transportation Engineers.

Marksheffel/Vollmer

Table 2 shows the results of the analysis for the intersection of Marksheffel/Vollmer. As shown in Table 2, in the short-term only, five of the hours analyzed are projected to meet the thresholds for an Eight-Hour Vehicular-Volume Traffic-Signal Warrant and none of the hours analyzed are projected to meet the thresholds for a Four-Hour Vehicular Volume Traffic Signal Warrant. This analysis indicates that traffic-signal warrant(s) will likely **not** be met at the intersection of Marksheffel/Vollmer with buildout of Sterling Ranch East Filing 1, the Villages at Sterling Ranch East, and 4-Square at Sterling Ranch East.

Marksheffel/Sterling Ranch

Table 3 shows the results of the analysis for the intersection of Marksheffel/Sterling Ranch. As shown in Table 3, in the short-term, eight of the hours analyzed are projected to meet the thresholds for an Eight-Hour Vehicular-Volume Traffic-Signal Warrant. Twelve of the hours analyzed are projected to meet the thresholds for a Four-Hour Vehicular-Volume Traffic-Signal Warrant.

This analysis indicates that the Eight-Hour and Four-Hour Vehicular Volume traffic-signal warrant(s) may be met at the intersection of Marksheffel/Sterling Ranch with buildout of Sterling Ranch East Filing 1, the Villages at Sterling Ranch East, and 4-Square at Sterling Ranch East. LSC recommends at least eight hours of traffic count volume data be collected at the intersections

Marksheffel/Sterling Ranch following completion of Marksheffel Road between Vollmer Road and Woodmen Road, which is planned to be done in 2023. Once the traffic data is completed, traffic-signal warrant analysis can be reanalyzed based on the existing conditions at that time. The decision to require a signal to be installed rests with the County.

SUBDIVISION STREET CLASSIFICATIONS

All of the internal streets within 4-Square at Sterling Ranch East should be classified as Urban Local. Figure 6 shows the recommended street classifications for the internal streets and the streets in the vicinity of the site.

DEVIATION REQUESTS

No deviations are requested as part of this submittal. The Boulder City Place connection to Briargate Parkway, along with the Briargate Parkway extension to Sterling Ranch Road, are part of a separate Preliminary Plan and Final Plat.

ROADWAY IMPROVEMENTS

Tables 5 and 6 from the *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* contained a summary of needed improvements and recommendations for auxiliary turn-lane lengths. Copies of these tables have been attached with the improvements needed either prior to or with 4-Square at Sterling Ranch East highlighted.

ROADWAY IMPROVEMENT FEE PROGRAM

This project will be required to participate in the El Paso County Road Improvement Fee Program. 4-Square at Sterling Ranch East Filing will join the five-mil PID. The 2019 five-mil PID building permit fee portion associated with this option is \$2,527 per single-family dwelling unit. Based on 158 lots, the total building permit fee would be \$399,266. Note: program fees are subject to change.

* * * * *

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

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

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

JCH/KDF:jas

Enclosures: Tables 1-3
Figures 1-6
Appendix Table 1
Appendix A
Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS*
with notes by LSC

Tables



**Table 1
FourSquare at Sterling Ranch East
Trip Generation**

Sketch Plan TAZ	ITE Code	ITE Land Use	Quantity	Unit	Trip Generation Rates ⁽¹⁾				Total Trip Generated					
					Daily	AM Peak Hour		PM Peak Hour		Daily	AM Peak Hour		PM Peak Hour	
						In	Out	In	Out		In	Out		
19	210	Single-Family Detached Housing	158	DU ⁽²⁾	9.43	0.18	0.52	0.59	0.35	1,490	29	82	94	55

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

Table 2
Traffic Signal Warrant Analysis
Marksheffel Road/Vollmer Road

Warrant Analysis ⁽¹⁾																							
												Warrant 1: Eight Hour Vehicular Volume Evaluation						Warrant 2: Four Hour Vehicular Volume Evaluation					
												Warrant Threshold Met?						Short-Term Background		Short-Term Total			
Hour	Short-Term Background Traffic ⁽²⁾		SRE Filing 1 Generated Traffic		Villages at SRE Generated Traffic		FourSquare at SRE Generated Traffic		Short-Term Total Traffic		Warrant Thresholds				Short-Term Background		Short-Term Total		Warrant Threshold Minor	Warrant Threshold Met? WB	Warrant Threshold Minor	Warrant Threshold Met? WB	
	Major ⁽³⁾	Minor ⁽⁴⁾	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Condition A		Condition B		Condition n A	Condition n B	Condition n A	Condition n B	Minimum	WB	Minimum	WB	
	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Vollmer	Marksheffel	Major	Minor	Major	Minor	n A	n B	n A	n B					
Short-Term Total Traffic⁽⁵⁾																							
12-1 AM	53	3	0	0	0	0	0	0	0	53	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
1-2 AM	26	3	0	0	0	0	0	0	0	26	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
2-3 AM	19	0	0	0	0	0	0	0	0	19	0	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
3-4 AM	28	3	0	0	0	0	0	0	0	28	3	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
4-5 AM	43	14	0	1	0	0	0	0	0	43	15	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
5-6 AM	117	34	0	2	0	0	1	0	0	117	37	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
6-7 AM	347	101	2	5	1	2	0	0	0	350	108	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
7-8 AM	833	174	3	8	1	3	0	0	0	837	185	600	150	900	75	Yes	No	Yes	No	192	No	191	No
8-9 AM	931	147	3	7	1	3	0	0	0	935	157	600	150	900	75	No	Yes	Yes	Yes	167	No	166	No
9-10 AM	805	92	3	4	1	2	0	0	0	809	98	600	150	900	75	No	No	No	No	199	No	198	No
10-11 AM	935	92	4	4	1	2	0	0	0	940	98	600	150	900	75	No	Yes	No	Yes	166	No	165	No
11-12 PM	1055	87	5	4	2	2	0	0	0	1062	93	600	150	900	75	No	Yes	No	Yes	134	No	131	No
12-1 PM	999	51	0	0	5	1	0	0	0	1004	52	600	150	900	75	No	No	No	No	150	No	149	No
1-2 PM	758	73	15	3	2	2	0	0	0	775	78	600	150	900	75	No	No	No	No	221	No	213	No
2-3 PM	871	77	5	4	2	2	0	0	0	878	83	600	150	900	75	No	No	No	No	182	No	181	No
3-4 PM	927	74	6	4	2	2	0	0	0	935	80	600	150	900	75	No	No	No	Yes	168	No	166	No
4-5 PM	962	93	7	4	3	2	0	0	0	972	99	600	150	900	75	No	Yes	No	Yes	160	No	157	No
5-6 PM	807	92	9	5	3	2	0	0	0	819	99	600	150	900	75	No	No	No	No	198	No	195	No
6-7 PM	553	73	9	5	2	2	0	0	0	564	80	600	150	900	75	No	No	No	No	314	No	308	No
7-8 PM	348	53	7	4	2	1	0	0	0	357	58	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
8-9 PM	282	38	5	3	2	1	0	0	0	289	42	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
9-10 PM	180	30	5	2	1	1	0	0	0	186	33	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
10-11 PM	101	14	4	2	1	0	0	0	0	106	16	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
11-12 AM	55	9	2	1	0	0	0	0	0	57	10	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No
Numbers of Hours the Warrant Thresholds Are Met																1	4	2	5				
Warrant Met?																No		No					

Notes:
 (1) Thresholds are based on 2 or more lanes on the major approach and 1 lane on the minor approach (Warrant evaluation assuming the westbound left turn only for the minor street)
 (2) Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan Traffic Impact Study, November 14, 2022
 (3) The major street traffic includes all movements (left, through, and right)
 (4) The minor street traffic includes only the left turns from the minor street
 (5) Off peak hour traffic volumes are based on the projected peak hour traffic volumes, 72-hour machine counts conducted on Vollmer Road in November 2020 and vehicle time-of-day distribution data for single-family residential published by the Institute of Transportation Engineers

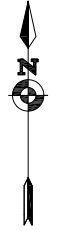
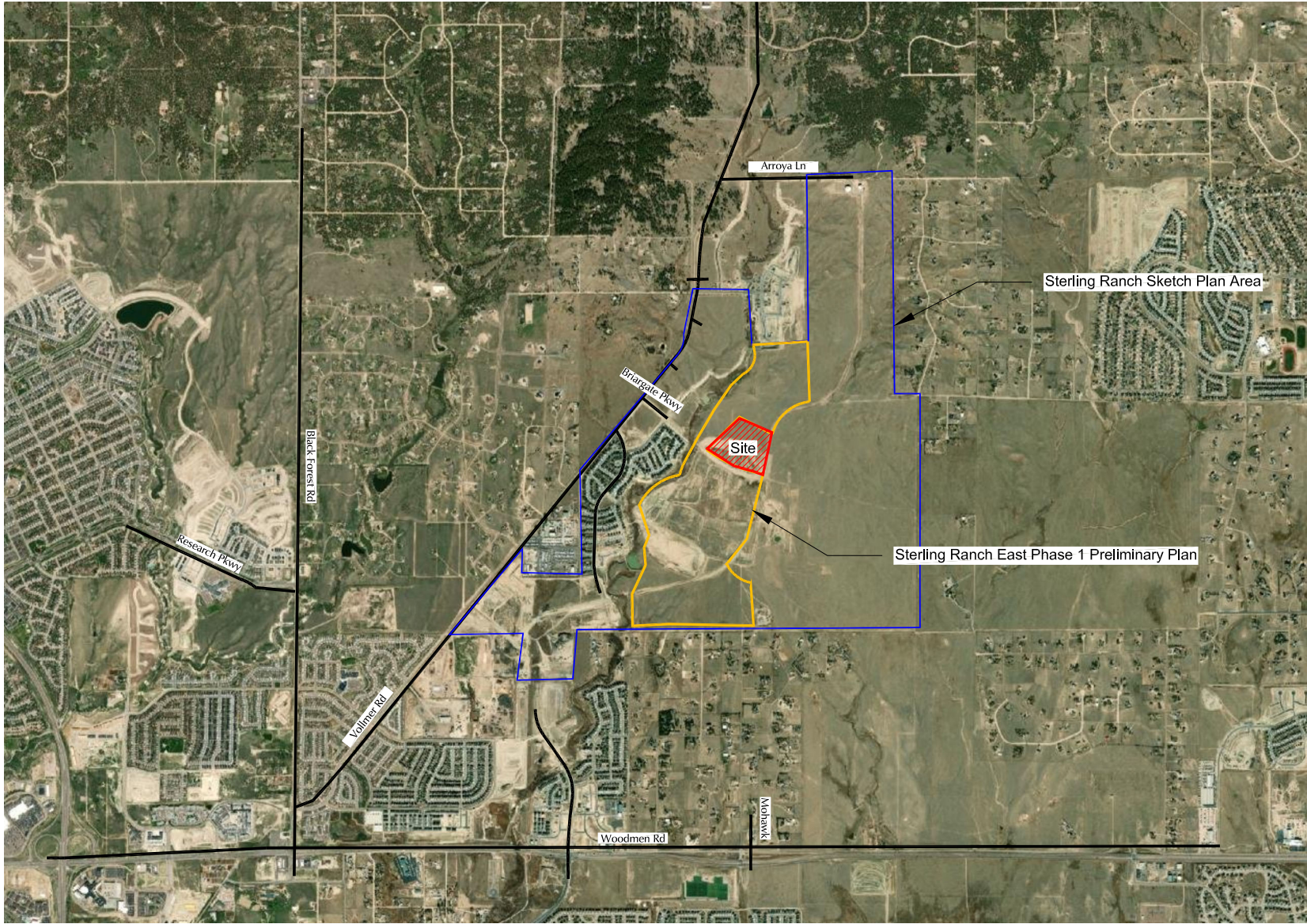
Table 3
Traffic Signal Warrant Analysis
Marksheffel Road/Sterling Ranch Road

Hour	Short-Term Total Traffic ⁽⁵⁾										Warrant Analysis ⁽¹⁾												
	Short-Term Background Traffic ⁽²⁾		SRE Filing 1 Generated Traffic		Villages at SRE Generated Traffic		FourSquare at SRE Generated Traffic		Short-Term Total Traffic		Warrant 1: Eight Hour Vehicular Volume Evaluation				Warrant 2: Four Hour Vehicular Volume Evaluation								
	Major ⁽³⁾ Marksheffel	Minor ⁽⁴⁾ Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Major Marksheffel	Minor Sterling Ranch	Warrant Thresholds		Warrant Threshold Met?		Short-Term Background		Short-Term Total						
											Condition A		Condition B		Condition A	Condition B	Condition A	Condition B	Minimum	Warrant Threshold Met? WB	Minimum	Warrant Threshold Met? WB	
	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor									Major
12-1 AM	47	7	1	22	1	11	1	4	50	44	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
1-2 AM	20	7	1	9	1	5	1	2	23	23	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
2-3 AM	19	0	0	9	0	5	0	2	19	16	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
3-4 AM	21	7	1	9	1	5	1	2	24	23	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
4-5 AM	31	26	4	13	2	7	3	2	40	48	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
5-6 AM	64	65	10	22	6	11	8	4	88	102	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
6-7 AM	193	192	28	69	17	36	24	12	262	309	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
7-8 AM	414	332	49	138	29	72	41	24	533	566	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
8-9 AM	469	280	41	160	24	83	35	28	569	551	600	150	900	75	No	No	No	No	356	No	306	Yes	
9-10 AM	406	176	26	138	15	72	22	24	469	410	600	150	900	75	No	No	No	No	387	No	356	Yes	
10-11 AM	503	176	26	181	15	95	22	32	566	484	600	150	900	75	No	No	No	No	339	No	307	Yes	
11-12 PM	616	166	25	233	15	122	21	41	677	562	600	150	900	75	Yes	No	Yes	No	284	No	259	Yes	
12-1 PM	928	114	87	158	42	88	42	88	1099	448	600	150	900	75	No	Yes	Yes	Yes	168	No	120	Yes	
1-2 PM	415	164	124	53	60	29	60	29	659	275	600	150	900	75	No	No	Yes	No	383	No	266	Yes	
2-3 PM	483	172	131	61	63	34	63	34	740	301	600	150	900	75	No	No	Yes	No	349	No	230	Yes	
3-4 PM	552	166	126	74	61	41	61	41	800	322	600	150	900	75	No	No	Yes	No	314	No	200	Yes	
4-5 PM	636	208	158	92	76	51	76	51	946	402	600	150	900	75	Yes	No	Yes	Yes	276	No	164	Yes	
5-6 PM	589	205	156	90	75	50	75	50	895	395	600	150	900	75	No	No	Yes	No	296	No	176	Yes	
6-7 PM	460	164	124	75	60	42	60	42	704	323	600	150	900	75	No	No	Yes	No	360	No	248	Yes	
7-8 PM	318	119	91	54	44	30	44	30	497	233	600	150	900	75	No	No	No	No	Low Volume	No	342	No	
8-9 PM	307	86	65	55	31	31	31	31	434	203	600	150	900	75	No	No	No	No	Low Volume	No	373	No	
9-10 PM	214	67	51	39	24	22	24	22	313	150	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
10-11 PM	107	31	23	19	11	11	11	11	152	72	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
11-12 AM	63	19	15	11	7	6	7	6	92	42	600	150	900	75	No	No	No	No	Low Volume	No	Low Volume	No	
Numbers of Hours the Warrant Thresholds Are Met															2	1	8	2		0		12	
Warrant Met?															No		Yes			No		Yes	

Notes:
 (1) Thresholds are based on 2 or more lanes on the major approach and 1 lane on the minor approach (Warrant evaluation assuming the southbound left turn only for the minor street)
 (2) Source: *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan Traffic Impact Study*, November 14, 2022
 (3) The major street traffic includes all movements (left, through, and right)
 (4) The minor street traffic includes only the left turns from the minor street
 (5) Off peak hour traffic volumes are based on the projected peak hour traffic volumes, 72-hour machine counts conducted on Vollmer Road in November 2020 and vehicle time-of-day distribution data for single-family residential published by the Institute of Transportation Engineers
 Source: LSC Transportation Consultants, Inc.

Figures





Not to scale

Figure 1

Vicinity Map

4-Square at Sterling Ranch (LSC# S224590)

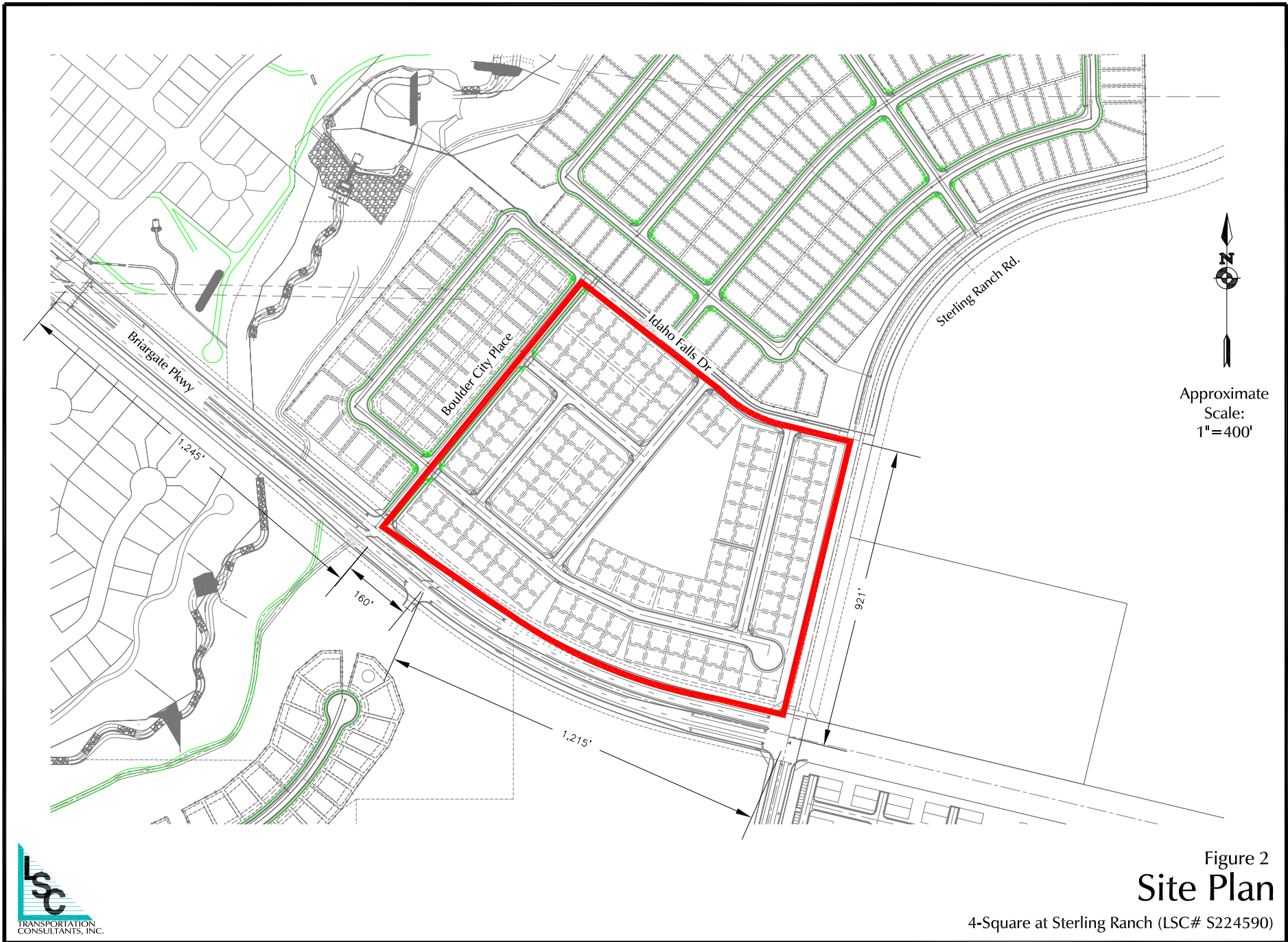
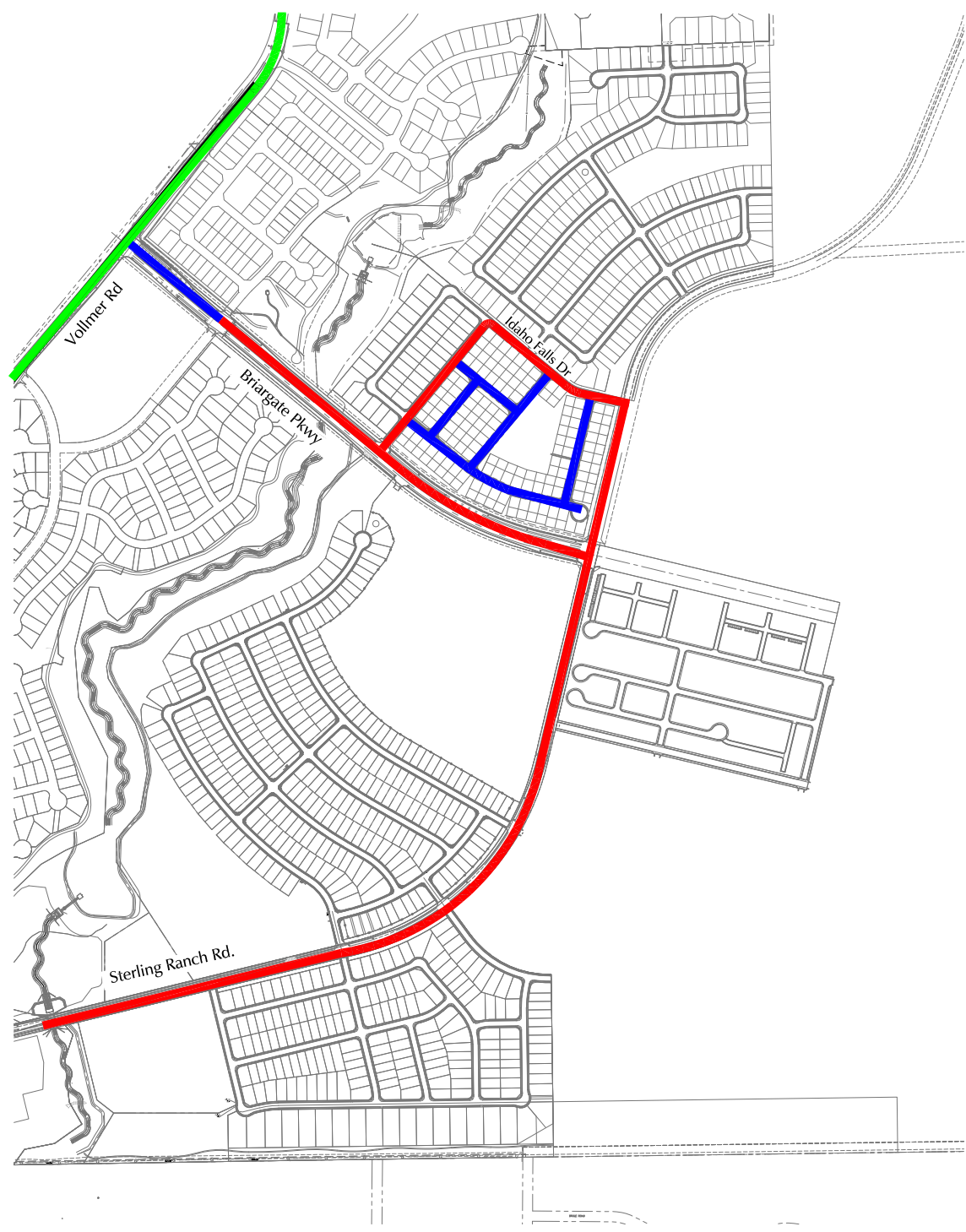


Figure 2
Site Plan

4-Square at Sterling Ranch (LSC# S224590)



Not to scale



LEGEND:

- Roadway Connection Planned with Four Square at Sterling Ranch or Earlier Filings
- Roadway Planned to be Completed by 2023
- Existing Roadway

Figure 3

Short-Term Roadway Connections

4-Square at Sterling Ranch (LSC# S224590)



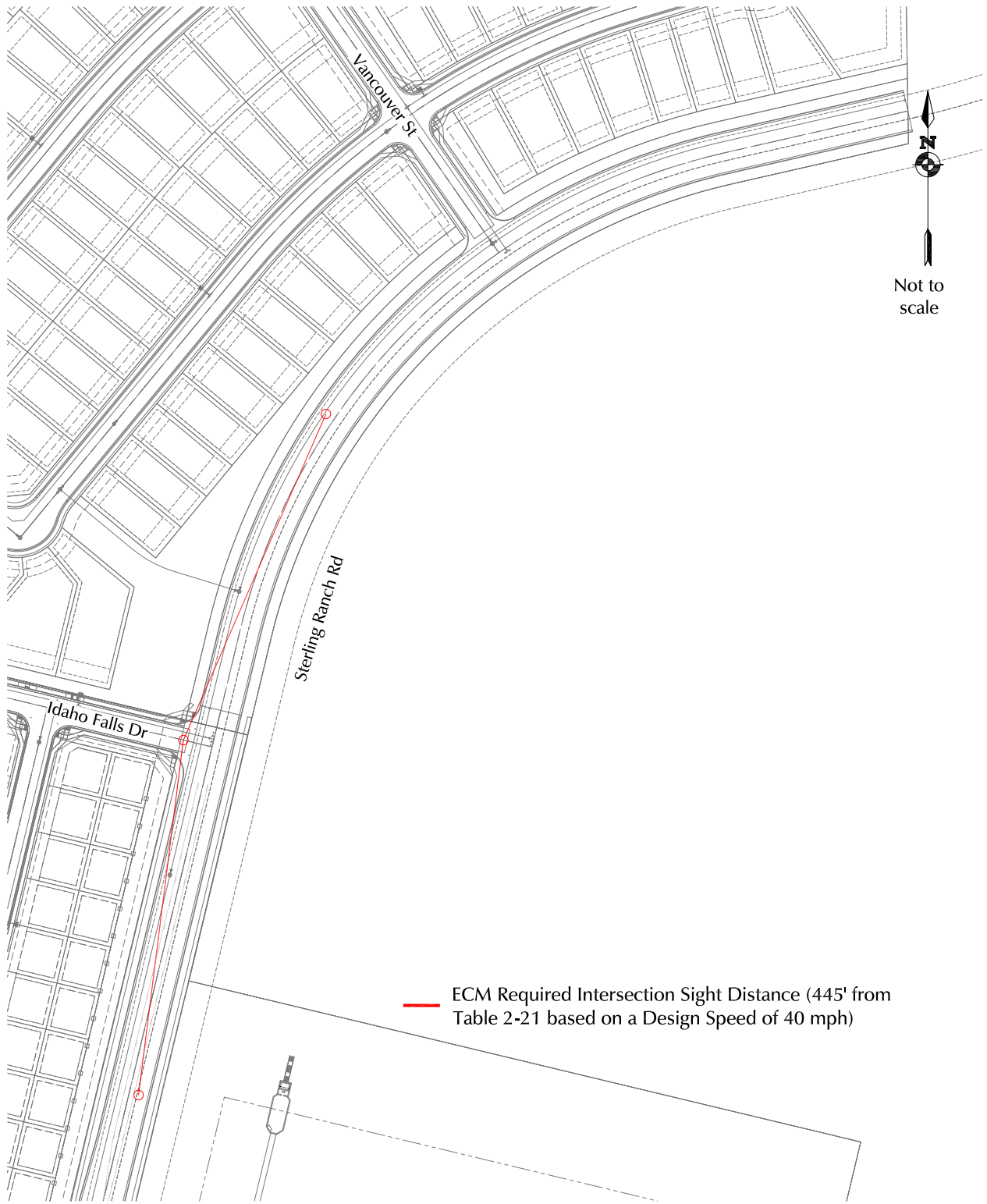
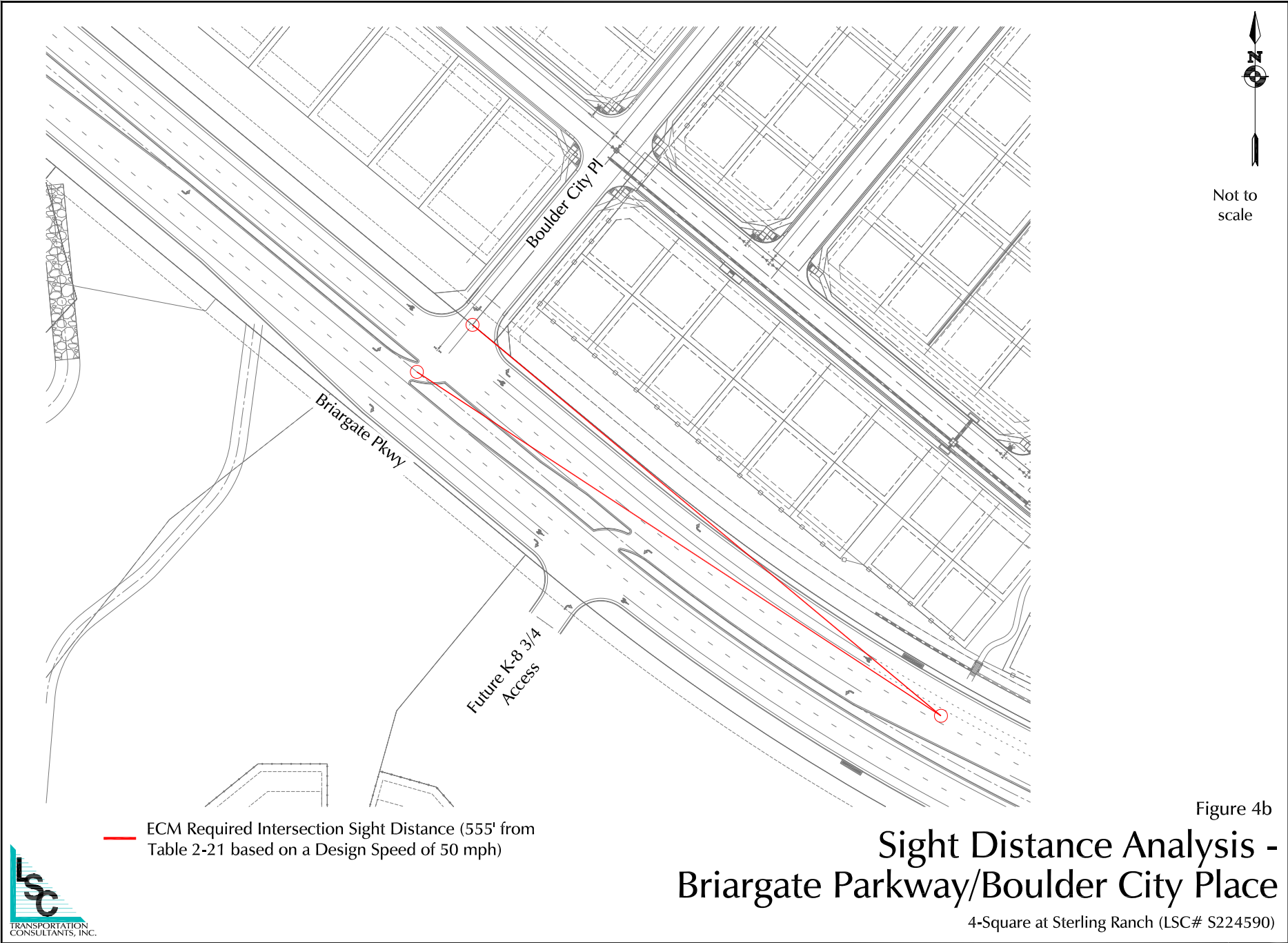


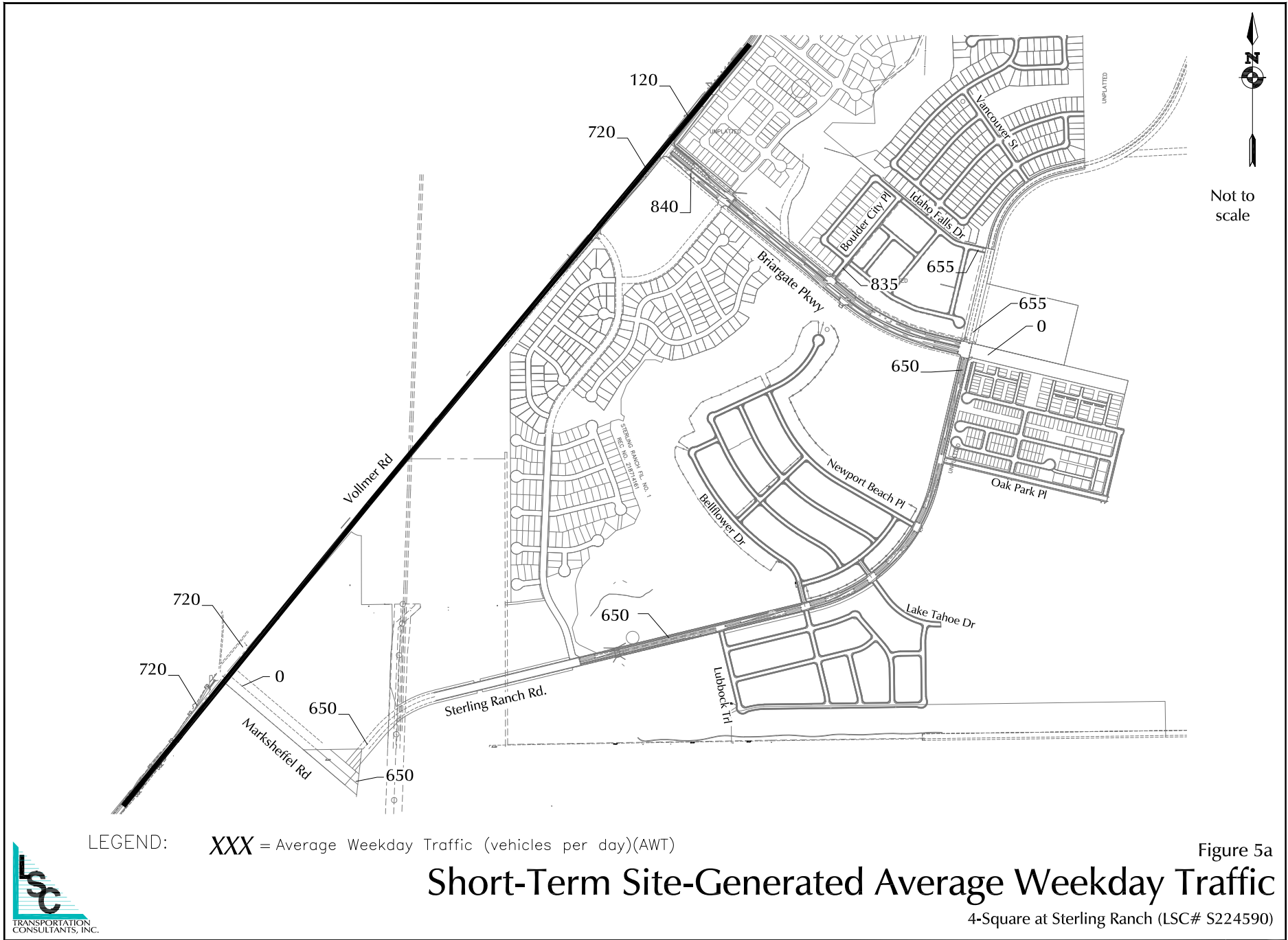
Figure 4a

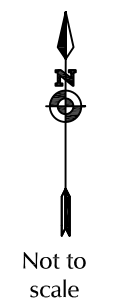
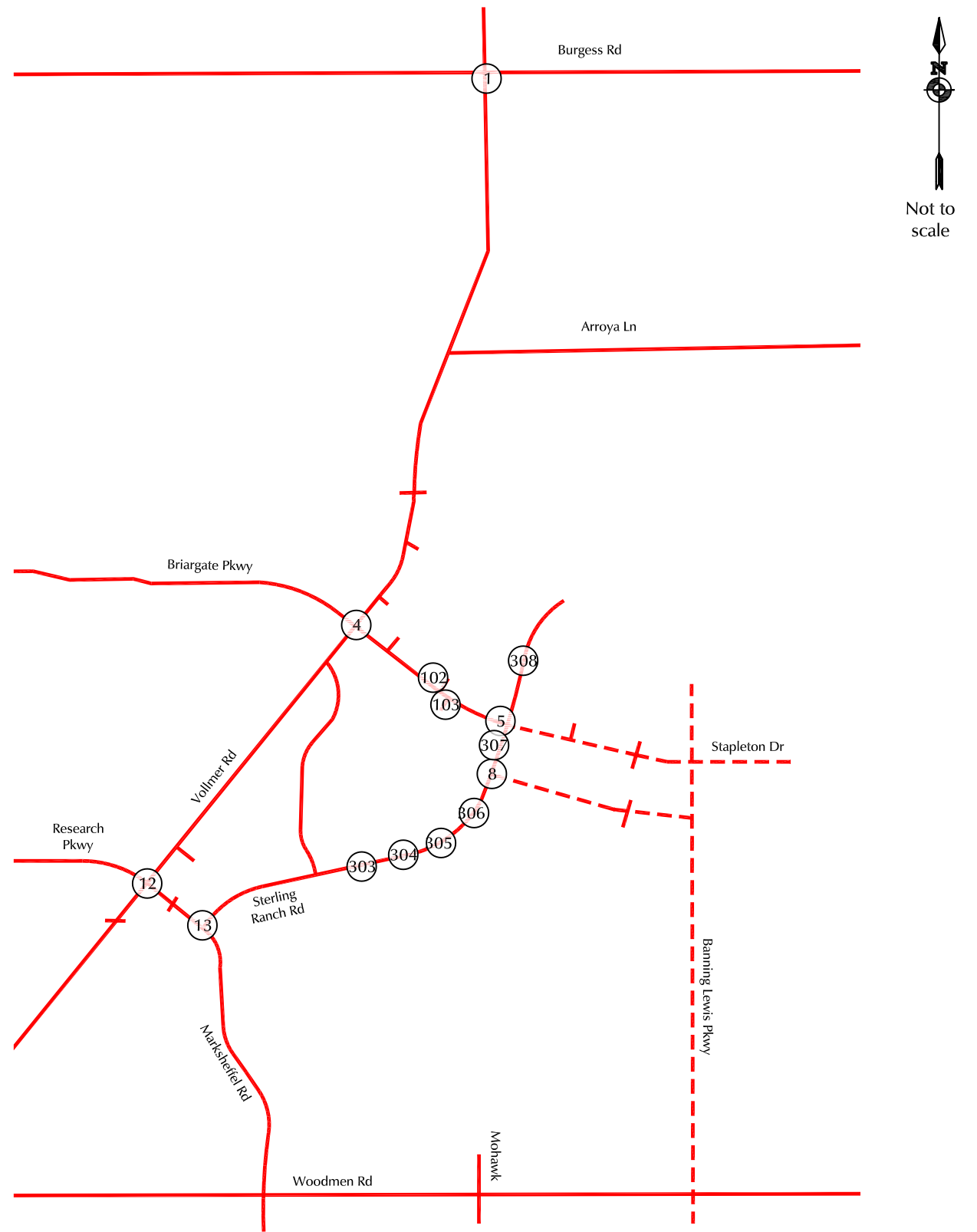
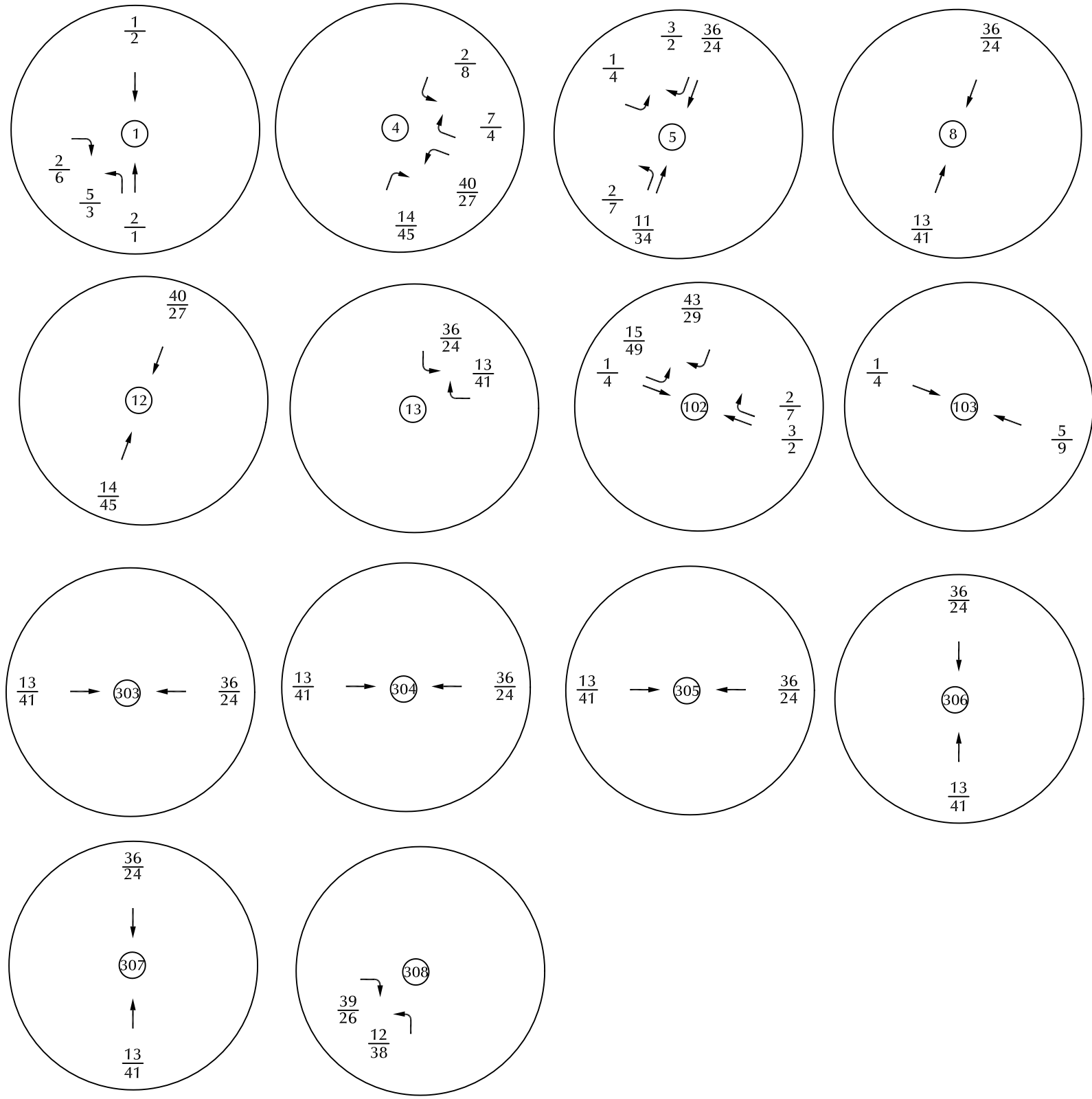
Sight Distance Analysis - Sterling Ranch Road/Idaho Falls Drive

4-Square at Sterling Ranch (LSC# S224590)







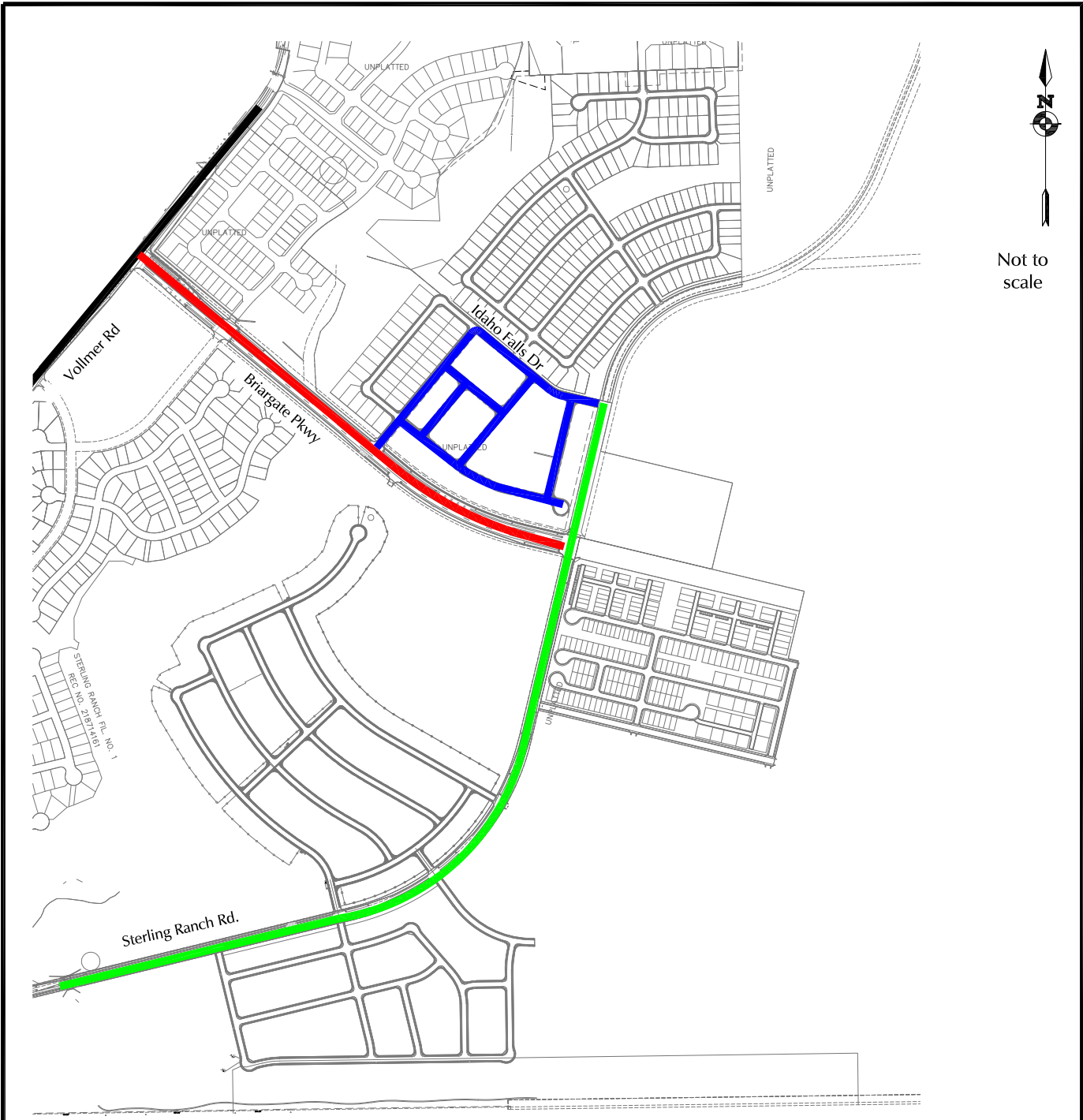


LEGEND: $\frac{XX}{XX} = \frac{\text{AM Peak-Hour Traffic (veh/hr)}}{\text{PM Peak-Hour Traffic (veh/hr)}}$



Figure 5b
Short-Term Site-Generated Traffic

4-Square at Sterling Ranch (LSC# S224590)



LEGEND:

- 4-Lane Urban Principal Arterial
- Urban Local
- Urban Non-Residential Collector



Figure 6
Roadway Classifications

4-Square at Sterling Ranch (LSC# S224590)

Appendix Table 1



**Appendix Table 1
Area Traffic Impact Studies
4-Square at Sterling Ranch East**

Study	PCD File No⁽¹⁾	Consultant	Date
Sterling Ranch Reports			
Sterling Ranch Updated Traffic Impact Analysis	SKP07007	LSC Transportation Consultants, Inc	June 5, 2008
Sterling Ranch Phase 1 Traffic Impact Study	P151	LSC Transportation Consultants, Inc	March 16, 2015
Sterling Ranch Phases 1-3 Transportation Memorandum	SP1415	LSC Transportation Consultants, Inc	October 2, 2017
Branding Iron at Sterling Ranch Filing No. 1 and Homestead at Sterling Ranch Filing No. 1 Transportation	SF1724 SF1725	LSC Transportation Consultants, Inc	December 19, 2017
Sterling Ranch Filing No. 2 Transportation Memorandum	SF1820	LSC Transportation Consultants, Inc	April 3, 2018
Sterling Ranch Phase 2 Preliminary Plan Traffic Impact Study	SP203	LSC Transportation Consultants, Inc	December 20, 2018
Homestead at Sterling Ranch Filing No. 2 Transportation Memorandum	SF194	LSC Transportation Consultants, Inc	March 3, 2020
Branding Iron at Sterling Ranch Filing No. 2 Transportation Memorandum	SF1918	LSC Transportation Consultants, Inc	May 6, 2020
Sterling Ranch Filing No. 2 and Phase 2 Traffic Impact Study	SF2015 SP191	LSC Transportation Consultants, Inc	June 23, 2021
Sterling Ranch Filing No. 3 Transportation Memorandum	SF2132	LSC Transportation Consultants, Inc	April 19, 2022
Copper Chase at Sterling Ranch Transportation Memorandum	PUDSP222	LSC Transportation Consultants, Inc	December 14, 2021
Homestead North Phase 1 Updated Transportation Memorandum	SP208	LSC Transportation Consultants, Inc	January 11, 2022
Homestead North Filing No. 1 Traffic Technical Memorandum	SF2213	LSC Transportation Consultants, Inc	February 2, 2022
Homestead North Filing No. 2 Traffic Technical Memorandum	SF2218	LSC Transportation Consultants, Inc	April 15, 2022
Homestead North Filing 3 Traffic Impact Study	SF2229	LSC Transportation Consultants, Inc	June 17, 2022
Foursquare at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP227	SM Rocha, LLC	April 27, 2022
The Villages at Sterling Ranch East Preliminary Plan/Traffic Generation Analysis	PUDSP226	SM Rocha, LLC	July 1, 2022
Sterling Ranch Sketch Plan Amendment Master Traffic Impact Study	SKP224	LSC Transportation Consultants, Inc	October 26, 2022
Sterling Ranch East - Phase 1 Rezoning & Preliminary Plan Traffic Impact Study	SP224	LSC Transportation Consultants, Inc	November 17, 2022
Retreat at TimberRidge Reports			
The Retreat at TimberRidge Traffic Impact Analysis	PUD173	LSC Transportation Consultants, Inc	January 25, 2018
The Retreat at TimberRidge Preliminary Plan Traffic Technical Memorandum	SP182	LSC Transportation Consultants, Inc	June 29, 2018
The Retreat at TimberRidge Filing No. 1 Traffic Technical Memorandum	SF199	LSC Transportation Consultants, Inc	April 3, 2020
The Retreat at TimberRidge Filing No. 2 Updated Traffic Technical Memorandum	SF2121	LSC Transportation Consultants, Inc	October 4, 2021
The Retreat at TimberRidge Filing No. 3 Traffic Technical Memorandum		LSC Transportation Consultants, Inc	July 1, 2022
Other Area Reports			
Wolf Ranch School Site Traffic Impact Study	OAR1720	Matrix Design Group, Inc.	5-May-17
The Ranch Sketch Plan Traffic Impact Analysis	SKP186	LSC Transportation Consultants, Inc	July 9, 2019
Lodge III Traffic Impact Study	OAR	LSC Transportation Consultants, Inc	December 13, 2019
Continental 613 Traffic Impact Study	OAR2177	LSC Transportation Consultants, Inc	July 16, 2021
Solace at Black Forest Traffic Impact and Access Analysis	OAR2134	LSC Transportation Consultants, Inc	August 13, 2021
Traffic Impact Study Addendum for Percheron	OAR2173	SM Rocha, LLC	October, 2021
Woodmen East Commercial Center Traffic Impact Analysis	OAR2191	LSC Transportation Consultants, Inc	December 8, 2021
Traffic Impact Study for Jaynes Property	SKP225	SM Rocha, LLC	May, 2022
Traffic Impact Study for Rhetoric Site	P2216	SM Rocha, LLC	June, 2022
Briargate-Stapleton Corridor Study (DRAFT)	briargate-stapleton.com	Wilson & Company	December 9, 2021
Notes:			
(1) Follow the links listed below to obtain the most recent version of each listed study. To obtain a copy of the version of each study used in preparing this report please contact LSC Transportation Consultants, Inc.			
Source: LSC Transportation Consultants, Inc.			

Appendix A



This memorandum was based on the *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* dated November 17, 2022. The latest version of this report can be found at <https://epcdevplanreview.com/Public/ProjectDetails/184079>. If you need a copy of the November 17, 2022 version of the report, please contact LSC Transportation Consultants, Inc.

Additional Attachments

Tables 5 and 6 from *Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS* with notes by LSC



Table 5 Sterling Ranch East Phase 1 Preliminary Plan Intersection Improvements				
Item #	Improvement	Trigger	Timing	Responsibility
1) Burgess Road/Vollmer Road				
1	Reconstruct as a modern one-lane roundabout	When the LOS degrades below LOS F	Existing deficiency	This intersection may be eligible intersection under the fee impact program
12) Marksheffel Road/Vollmer Road				
2	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	This intersection may be eligible intersection under the fee impact program
14) Marksheffel Road/Sterling Ranch Road				
3	Signalization of the intersection	Once warrants are met. The decision on timing of traffic signal installation rests with El Paso County Public Works.	Anticipated by buildout of Sterling Ranch East Phase 1 Preliminary Plan	SRMD#3
102) Briargate Parkway/Boulder City Place				
4	Construct an eastbound left-turn lane on Briargate Parkway approaching Boulder City Place. The lane should be 285' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
5	Construct a westbound right-turn deceleration lane on Briargate Parkway approaching Boulder City Place. The lane should be 235' long plus a 200' taper.	westbound right-turn volume > 25 vph	Long Term	Sterling Ranch
103) Briargate Parkway/Future School 3/4 Movement Access				
6	Construct a westbound left-turn lane on Briargate Parkway approaching the school access. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
7	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching the school access. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
5) Briargate Parkway/Sterling Ranch Road				
8	Construct an eastbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 435' long plus a 200' taper.	eastbound left-turn volume > 10 vph	With Sterling Ranch East Phase 1 Preliminary Plan or Foursquare at Sterling Ranch	Sterling Ranch
9	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
10	Construct a northbound to eastbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	northbound right-turn volume > 50 vph	Long Term With development of the K-8 School Parcel (Tract M)	Sterling Ranch
11	Construct a westbound left-turn lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 285' long plus a 200' taper.	westbound left-turn volume > 10 vph	Long Term	Sterling Ranch
12	Construct an eastbound right-turn deceleration lane on Briargate Parkway approaching Sterling Ranch Road. The lane should be 235' long plus a 200' taper.	eastbound right-turn volume > 25 vph	Long Term	Sterling Ranch
13	Construct a southbound to westbound right-turn acceleration lane on Briargate Parkway at Sterling Ranch Road. The lane should be 580' long plus a 180' taper.	southbound right-turn volume > 50 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
303) Sterling Ranch Road/Lubbock Trail				
14	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 155' long plus a 160' taper	northeastbound right-turn volume > 50 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
15	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lubbock Trail. The lane should be 305' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term With development of the Elementary School Parcel (Tract F)	Sterling Ranch
304) Sterling Ranch Road/Bellflower Drive				
16	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 160' taper	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
17	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Bellflower Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Long Term (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
305) Sterling Ranch Road/Lake Tahoe Drive				
18	Construct an northeastbound left-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 225' long plus a 160' taper	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
19	Construct a southwestbound left-turn lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 205' long plus a 200' taper.	southwestbound-turn volume > 25 vph	Not Required (Needed with construction of a northeastbound left-turn lane)	Sterling Ranch
20	Construct an northeastbound right-turn deceleration lane on Sterling Ranch Road approaching Lake Tahoe Drive. The lane should be 155' long plus a 160' taper	northeastbound right-turn volume > 50 vph	Long Term	Sterling Ranch
306) Sterling Ranch Road/Newport Beach Place				
21	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Newport Beach Place. The lane should be 205' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
308) Sterling Ranch Road/Idaho Falls Drive				
22	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Idaho Falls Drive. The lane should be 240' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch
309) Sterling Ranch Road/Vancouver Street				
23	Construct a northeastbound left-turn lane on Sterling Ranch Road approaching Vancouver Street. The lane should be 265' long plus a 200' taper.	northeastbound left-turn volume > 25 vph	With Sterling Ranch East Phase 1 Preliminary Plan	Sterling Ranch

Future SRE Filings

SRE Fil 1

SRE Fil 1A or FourSquare at SRE

SRE Fil 1A

Future SRE Filings

SRE Fil 1

SRE Fil 1

SRE Fil 1

SRE Fil 1A

Future SRE Filings

Notes:
 Source: LSC Transportation Consultants, Inc. (November 2022)

Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS, November 17, 2022. Improvements needed prior to 4-Square at Sterling Ranch East have been highlighted in green. Improvements needed with 4-Square at Sterling Ranch East have been highlighted in yellow. Improvements needed with 4-Square Sterling Ranch East as noted in text boxes with pointer.

Table 6

Roadway Segment Improvements

Sterling Ranch East Phase 1 Preliminary Plan

(Page 1 of 2)

Segment ID ⁽¹⁾ (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 ⁽²⁾ (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) ⁽²⁾	Intermediate-Term Future	20,000		Sterling Ranch, if necessary prior to construction by Others
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 ⁽²⁾	Short-Term Future (With Sterling Ranch Fil No. 2 Or Sterling Ranch Phase 2)	20,000 (Note: Existing Capacity 8,000 ⁽³⁾)	14,385	Sterling Ranch
V3	Short Term: 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 ⁽²⁾	Short-Term Future (With Homestead North)	11,000 (Note: Existing Capacity 8,000)	15,040	Sterling Ranch
	Long Term: Improve Vollmer Road from Lochwinnoch Lane to Sterling Ranch boundary (northeast of Glider Loop) to a standard 4-Lane Urban Minor Arterial Cross Section ⁽²⁾	Long-Term Future	20,000		By others - pursuant to the recent development agreement between Sterling Ranch and EPC.
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 ⁽²⁾	Sections V4, V5, V6 to be constructed by May 2024	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 ⁽²⁾	Sections V4, V5, v6 to be constructed by May 2024	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 ⁽²⁾	Short-Term Future— May 2024 Sections V4, V5, v6 to be constructed by May 2024	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 May 2024	20,000	9,920	Sterling Ranch
V8	Improve Vollmer Road from Poco Road to Shoup Road to a Rural 2-Lane Arterial Cross Section ⁽²⁾	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. (November 22, 2022)

Source: Sterling Ranch East Phase 1 Rezoning and Preliminary Plan TIS, November 17, 2022. Improvements needed prior to FourSquare at Sterling Ranch East have been highlighted in green. Improvements needed with Sterling Ranch Filing 1 or 1A have been highlighted in yellow. Improvements needed with FourSquare Sterling Ranch East as noted in text boxes with pointer.

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

With 4-Square
at SRE

Segment ID ⁽¹⁾ (See Figure 16 for map)	Improvement Description	Timing	Design ADT (vpd)	Projected 2042 ADT (vpd)	Responsibility
SR1	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Marksheffel Road to Dines Boulevard	Short Term - with Sterling Ranch Fil No. 2	20,000	14,840	Sterling Ranch
SR2	Construct Sterling Ranch Road as an Urban Non-Residential Collector from Dines Boulevard to Briargate Parkway	Short-Term - with this Preliminary Plan	20,000	10,275	Sterling Ranch
SR3	Construct Sterling Ranch Road as an Urban Collector from Briargate Parkway to Vancouver Street.	Short-Term - with this Preliminary Plan	10,000	9,300	Sterling Ranch
SR4	Construct Sterling Ranch Road from Vancouver Street north to Arroya (or ultimate north terminus)	Long-Term Future	10,000	4,260	Sterling Ranch
M1	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Vollmer Road and Sterling Ranch Road	To be completed by the end of 2022	40,000	23,935	Sterling Ranch
M2	Construct Marksheffel Road as an Urban Principal Arterial to City of Colorado Springs standards in 107' of right-of-way between Sterling Ranch Road and the south boundary of the Sterling Ranch Master Plan Area. 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	To be completed in 2023	40,000	29,600	Sterling Ranch
M3	Construct Marksheffel Road between the south boundary of the Sterling Ranch Master Plan Area and Woodmen Road (Note this segment is located within the City of Colorado Springs) 10/16/2022 NOTE: With the completion of M2 in 2023, the connection between Vollmer and Woodmen Road (via M3) will be completed.	Completed (by Others)	40,000	28,480	Others (Completed)
M4	Construct Marksheffel Road between Black Forest Road and Vollmer Road	Long-Term Future	40,000	27,910	Others
B1	Construct the full section of Briargate Pkwy (4-Lane Principal Arterial) between Vollmer Road and Wheatland Drive	Full section to be completed in 2023 with Homestead at Sterling Ranch Filing No. 1	40,000	24,745	Sterling Ranch
B2	Construct Briargate Pkwy (full section) as a 4-Lane Principal Arterial between Wheatland Dr and Sterling Ranch Road	Full section to be completed in 2023 or Spring 2024	40,000	26,375	Sterling Ranch
B3	Construct Briargate Pkwy as a 4-Lane Principal Arterial between Sterling Ranch Road and Banning Lewis Parkway	Intermediate Term	40,000	20,935	Sterling Ranch
B4	Construct Stapleton Road as a 4-Lane Principal Arterial between Banning Lewis Parkway and Meridian Road (including upgrade of existing rural two-lane segment between Towner and Meridian)	Long-Term Future	40,000	17,945	Others
B5	Construct Briargate Pkwy as a 4-Lane Principal Arterial between its current terminus and Black Forest Road and between Black Forest Road and Vollmer Road	Long-Term Future	40,000	23,320	Others
BL1	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between the south Sterling Ranch boundary and Briargate Pkwy	Long-Term Future	40,000	20,320	Future- TBD with the future preliminary plan for that area-potentially, financial assurances for half-section, west-side half-section or full-section w/ cost recover may be required
BL2	Construct Banning Lewis Parkway as a 4-Lane Principal Arterial between Woodmen Road and the south Sterling Ranch boundary (Note this segment will be located within the City of Colorado Springs)	Long-Term Future	40,000	28,480	Others
W1	Widen Woodmen Road from 4-lane to 6-lane section from Powers Boulevard to US 24	Long-Term Future	72,000	66,690	Others

Part 2/2 of this table

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. (November 22, 2022)

From Briargate Parkway to Idaho Falls Dr with 4-Square at SRE. From Idaho Falls Dr to Vancouver St with future SRE filings.