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Skyline at Lorson Ranch
Traffic Impact Analysis
(LSC #204250)
November 10, 2021

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.

_____ 11/12/21
Date

Skyline at Lorson Ranch

Traffic Impact Analysis

Prepared for:
The Landhuis Company
212 North Wahsatch Avenue, Suite 301
Colorado Springs, CO 80903

Contact: Mr. Jeff Mark, President

NOVEMBER 10, 2021

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

LSC #204250

CONTENTS

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November 10, 2021

Mr. Jeff Mark
President
The Landhuis Company
212 North Wahsatch Avenue, Suite 301
Colorado Springs, CO 80903

RE: Skyline at Lorson Ranch
El Paso County, CO
Traffic Impact Analysis
LSC #204250

Dear Mr. Mark,

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Skyline at Lorson Ranch residential development. As shown in Figure 1, the site is located within the Lorson Ranch development in El Paso County, Colorado.

REPORT CONTENTS

This report has been prepared to address the project's traffic impact at the proposed access points and adjacent intersections.

This report contains the following:

- The existing street and traffic conditions in the site's vicinity including the street widths, lane geometries, and traffic controls;
- The projected future background traffic volumes, which include estimates of traffic from other area development projects;
- The estimated average weekday and peak-hour trip generation;
- The estimated directional distribution of site-generated trips and the projected site-generated traffic volumes;
- Estimates of the resulting total traffic volumes on the adjacent streets and intersections; and
- The projected levels of service at the site-access points and key area intersections;

RECENT AREA TRAFFIC STUDIES

Appendix Table 1 includes a list of other recent traffic studies conducted by LSC within the Lorson Ranch development and in the vicinity.

This site was previously included in *The Hills at Lorson Ranch Full Traffic Impact and Access Analysis* (TIA) by LSC Transportation Consultants, Inc. dated October 27, 2020, as traffic analysis zone 45. That TIA assumed this zone would be developed with 76 single-family homes.

LAND USE AND ACCESS

Land Use

Skyline at Lorson Ranch is planned to include 85 lots for single-family homes. This is nine more single-family homes than was assumed in the Hills at Lorson Ranch TIA. Figure 2 shows the proposed site plan.

Street Connections

Fontaine Boulevard and Lorson Boulevard are planned to be extended east to a new north-south collector (Walleye Drive) as part of The Hills at Lorson Ranch. A new east-west collector (Grayling Drive) is planned to be constructed between Lamprey Drive and the future Walleye Drive as part of The Hills at Lorson Ranch. An additional section of Grayling Drive between Walleye Drive and the north boundary of Lorson Ranch is planned as part of the currently-proposed Skyline at Lorson Ranch. Two full-movement access points are proposed to Grayling Drive. Figure 2 shows the proposed access spacing.

Pedestrian and Bicycle Route Analysis

Grand Mountain K-8 School is located southwest of the site. The subdivision streets will include sidewalks and connecting streets within Lorson Ranch also have sidewalks. Trail corridors are planned along the powerline easement, the East Fork of Jimmy Camp Creek, and along Jimmy Camp Creek. Also, Marksheffel Road and Fontaine Boulevard have paved shoulders to accommodate cyclists. Lorson Boulevard has been constructed with wider travel lanes (and a striped left-turn median) to allow for shared lane use with experienced cyclists (the adjacent sidewalk will accommodate children and families, as well as cyclists less experienced at cycling in traffic). Figure 4 shows the school pedestrian paths and school crossing locations in the vicinity of the site.

Sight Distance Analysis

Figure 4 shows sight-distance analysis at the proposed public street intersections (note: this north street connection would become an “intersection” in the future if/when Grayling Drive is

extended north (with future development to the north). 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 access points is 445 feet. The required stopping sight distance from *ECM* Table 2-17 is 305 feet.

Figure 4 shows the areas between the sight distance lines and the curb line that will need to be kept free of other obstructions (such as rear privacy fencing, landscaping, and backyard/patio amenities) that would restrict the drivers' line of sight. Landscaping should be low — about 18 inches or lower in height — to the east of the passenger vehicle lines of sight shown. Please refer to *ECM* Sections 2.3.6.G.1 and 2.

The proposed initial, short-term, and long-term traffic control at Grayling/Lamprey is all-way, stop-sign control (AWSC). Provided the AWSC remains in-place in perpetuity, the required sight distance lines of sight for 445' of entering sight distance, which would otherwise apply for a TWSC intersection, would not be required for an AWSC intersection.

Regarding the Urban Local knuckle in the northeast corner of the site, please refer to the site development plan and plat for sight-distance easements across lot 67 (on the inside of the curve). Although the angle between the two street legs intersecting at this knuckle is less than 90 degrees, the centerline radius through this curve/knuckle is 52 feet - the same as the standard Urban Local knuckle. Also, please refer to Figure 4. Assuming a design speed of 15 mph around the curve of this knuckle, the required stopping sight distance is 80 feet along the centerline of the roadway.

STREET AND TRAFFIC CONDITIONS

Area Streets

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

- **Fontaine Boulevard** is designated as a four-lane Urban Principal Arterial east of Marksheffel Road and has been constructed as such from Marksheffel Road east to Old Glory Drive/Stingray Lane. Fontaine Boulevard has recently been constructed east of Old Glory Drive/Stingray Lane adjacent to the Lorson Ranch East development as an interim Urban Non-Residential Collector Street within 100 feet of right-of-way. As part of The Hills development, Fontaine Boulevard will be extended east from its current terminus adjacent to the site with the same interim cross section and right-of-way. The posted speed limit on Fontaine Boulevard is 35 mph just east of (and a short distance west of) Marksheffel Road. The speed limit increases to 45 mph just east of the bridge over Jimmy Camp Creek and then decreases back to 35 mph just east of Old Glory (east)/Stingray.

- **Lorson Boulevard** currently extends east from Marksheffel Road to Lamprey Drive. Lorson Boulevard is classified as an Urban Non-Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with an 80-foot-wide right-of-way between Marksheffel Road and Stingray Lane and as an Urban Residential Collector Street (modified for a 44-foot street width, rather than the standard 52-foot street width) with a 64- to 72-foot-wide right-of-way between Stingray Lane and Lamprey Drive. As part of The Hills development, Lorson Boulevard will be constructed east of Lamprey Drive adjacent to the site as a standard Urban Residential Collector with a 60-foot-wide right-of-way.

- **Lamprey Drive** is an Urban Residential Collector which currently extends north from Lorson Boulevard to Shavers Drive just north of Fontaine Boulevard. Lamprey Drive is planned to be constructed east to the future Walleye Drive as part of the Hills at Lorson Ranch. The intersection of Lamprey/Fontaine was constructed as an interim one-lane modern roundabout. This roundabout is expandable to two lanes should it be needed in the long-range (beyond 2040) future.

- **Grayling Drive** is a planned Urban Residential Collector which will extend north from Lorson Boulevard to the north boundary of the Lorson Ranch development.

TRIP GENERATION

The site-generated vehicle trips were estimated using the nationally-published trip-generation rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE). Table 1 shows the average weekday and peak-hour trip-generation estimates. Table 2 also shows a comparison of the trip-generation estimate for this same area, assumed in the *Lorson Ranch Sketch Plan Amendment 2 Traffic Impact Analysis* by LSC dated December 17, 2019 and *The Hills at Lorson Ranch Full Traffic Impact Analysis* by LSC dated October 27, 2020.

The site is projected to generate about 802 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 16 vehicles would enter and 47 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 53 vehicles would enter and 31 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated traffic volumes on the street and roadway system serving the site is one of the most important factors in determining the site's traffic impacts. Figure 5 shows the external trip-distribution estimates (external to Lorson Ranch). The directional-distribution estimates have been based on the location of the site with respect to the regional residential, employment, commercial, and activity centers; the land use proposed; the access/roadway connections assumed; the roadway network; and the most recent traffic counts

conducted at the intersection of Marksheffel/Fontaine. The short-term directional distribution assumes buildout of the Lorson Ranch street network but no connections to the north or the east. The long-term directional-distribution estimate assumes Grayling Drive has been extended north through the future Bull Run development. The number of external vehicle trips were based on the internal trip estimates shown in Appendix Table 2.

Figures 6 and 7 show the short-/intermediate-term and long-term site-generated traffic-volume estimates, respectively. These volumes were determined by first assigning the internal vehicle trips to the street network, based on the location of the existing Grand Mountain School located northeast of the intersection of Fontaine Boulevard and Lamprey Drive and the future retail sites located near the intersection of Fontaine Boulevard and Carriage Meadows Drive.

The external vehicle trips were then assigned to the street network by applying the trip-distribution percentages (from Figure 5) to the external trip-generation estimates. The internal and external site-generated traffic volumes were then summed to determine the total site-generated traffic volumes.

BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the roadways without the Hills at Lorson Ranch traffic.

Short Term

The short-term (Year 2025) background traffic volumes are shown in Figure 8. The short-term background traffic includes traffic projected to be generated by buildout of the approved Lorson Ranch subdivisions including Lorson Ranch East, Ponderosa at Lorson Ranch Filing 3, Creekside at Lorson Ranch, and The Hills at Lorson Ranch, but assumes zero traffic generated by Skyline at Lorson Ranch.

Intermediate Term (Lorson Ranch Buildout)

Figure 9 shows the projected intermediate-term background traffic volumes following buildout of Lorson Ranch. Appendix Tables 2 and 3 show the trip-generation estimates for all existing and future land uses assumed to be built out in the Lorson Ranch development. The intermediate-term background volumes also assume full buildout of the street network within Lorson Ranch, but assume Meridian Road has not been extended south to Fontaine Boulevard and Grayling Drive has not been extended north of the Lorson Ranch north boundary.

Long Term

The long-term background traffic volumes are shown in Figure 10. The long-term background traffic includes traffic projected to be generated by buildout of the parcels north of Lorson Ranch,

based on the land uses shown in early-assistance documents for the Bull Run development (EA File No. 21-164). The long-term background volumes assume Grayling Drive has been extended north into the Rolling Hills development but Meridian Road has not been fully constructed between Fontaine Boulevard and Bradley Road.

BUILDOUT TOTAL TRAFFIC

Figure 11 shows the short-term total traffic volumes. These volumes are the sum of the short-term background traffic volumes (from Figure 8) plus the short-term/intermediate-term site-generated traffic volumes (from Figure 6).

Figure 12 shows the intermediate-term total traffic volumes. These volumes are the sum of the intermediate-term background traffic volumes (from Figure 9) plus the short-term/intermediate-term -site-generated traffic volumes (from Figure 6).

Figure 13 shows the long-term total traffic volumes. These volumes are the sum of the long-term background traffic volumes (from Figure 10) plus the long-term site-generated traffic volumes (from Figure 7).

PROJECTED LEVELS OF SERVICE

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 2 shows the level of service delay ranges.

Table 2: Intersection Levels of Service Delay Ranges

	Signalized Intersections	Unsignalized Intersections
Level of Service	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle)[(1)]
A	10.0 sec or less	10.0 sec or less
B	10.1-20.0 sec	10.1-15.0 sec
C	20.1-35.0 sec	15.1-25.0 sec
D	35.1-55.0 sec	25.1-35.0 sec
E	55.1-80.0 sec	35.1-50.0 sec
F	80.1 sec or more	50.1 sec or more

(1) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F, regardless of the projected average control delay per vehicle.

The intersection of Lamprey/Fontaine and the access points to Grayling Drive have been analyzed to determine the projected levels of service for the short-term, intermediate-term, and long-term total traffic volumes, based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. The level of service reports are attached. The results of the analysis are shown in Figures 8 through 13.

Fontaine/Lamprey

The intersection of Fontaine/Lamprey was recently constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term, intermediate-term, and long-term total traffic volumes.

North Site Access Point

The north full-movement site access point to Grayling Drive is projected to operate at LOS B or better for all movements during the peak hours for all movements as a stop-sign-controlled "T" intersection based on the short-term, intermediate-term, and long-term total traffic volumes.

Lamprey/South Site Access/ Grayling

The south full-movement site access point/Lamprey Drive/Grayling Drive intersection is projected to operate at LOS B or better for all movements during the peak hours for all movements as an all-way, stop-sign-controlled intersection, based on the projected short-term, intermediate-term, and long-term total traffic volumes. If this intersection is two-way, stop-sign controlled the eastbound approach is projected to operate at LOS C during the peak hours, based on the long-term total traffic volumes.

ALL-WAY, STOP-SIGN-CONTROL WARRANT ANALYSIS

The intersection of Lamprey Drive/Grayling Drive was analyzed to determine if a multi-way stop-control warrant is projected to be met, based on the guidance contained in section 2B.07.04.C of the *2009 Manual on Uniform Traffic Control Devices* (*MUTCD*).

Minimum volumes:

1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*
2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*

3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

Table 3 shows the results of the analysis. As shown in Table 3, following buildout of Lorson Ranch, no hours have been identified that are projected to meet the minimum-volume thresholds given in section 2B.07.04.C. Four hours are projected to meet the minimum volumes, following buildout of the parcels north of Lorson Ranch, based on the land uses shown in early assistance documents Bull Run (EA File No. 21-164). An additional three hours are approaching the threshold (within 15 vehicles per hour).

Section 2B.07 also offers other criteria that may be considered. The two potentially applicable criteria are discussed below.

> *B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;*

This intersection has the potential to generate high pedestrian volumes due to the proximity to Grand Mountain School.

> *D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.*

This intersection could potentially meet this criterion as Lamprey Drive and Grayling Drive are both planned Residential Collectors and the projected level of service for the eastbound approach is LOS B if the intersection is all-way, stop-sign controlled and LOS C if the intersection is two-way, stop-sign controlled.

ROADWAY CLASSIFICATIONS

Figure 14 shows the recommended street classifications for the Lorson Ranch streets.

ROADWAY IMPROVEMENT FEE

This project will be required to participate in the El Paso County Road Improvement Fee Program. The Hills at Lorson Ranch will join the ten-mil PID. The current ten-mil PID building-permit fee portion associated with this option is $1,221 per single-family dwelling unit. Based on 86 lots, the total building-permit fee would be $103,785. Note: This is based on the current rate, which is subject to change. El Paso County updates this rate periodically.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

- The site is projected to generate about 802 new vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, about 16 vehicles would enter and 47 vehicles would exit the site. During the afternoon peak hour, about 53 vehicles would enter and 31 vehicles would exit the site.

Intersection Sight Distance

- Please refer to the Sight Distance section of this report for areas of that site that need to allow for the required intersection sight-distance lines of sight.

Projected Levels of Service & Intersection Traffic Control Recommendations

- The intersection of Fontaine/Lamprey was recently constructed as a modern one-lane roundabout. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

- The intersection of Lamprey/south site access/Grayling Drive is proposed for **all-way, stop-sign control (AWSC)** in the short, intermediate, and long term. The AWSC would mitigate the sight-distance lines of sight across the inside of the curve on Grayling from the site access/southwest-bound approach.

- The north full-movement site access point to Grayling Drive is projected to operate at a satisfactory level of service as a stop-sign-controlled “T” intersection.

Street Classifications

- All of the streets within Skyline at Lorson Ranch should be classified as Urban Local. See Figure 14 for the recommended classifications of the adjacent roadways.

Grayling Drive Striping

- Grayling Drive potentially should be striped with a single dual yellow centerline stripe instead of a center painted two-way left-turn “median” South of Lamprey drive as the through and left-turning volumes are projected to be relatively low. No striping is needed on Grayling Drive north of Lamprey Drive.

Fontaine Boulevard/Carriage Meadows Drive

- Signal escrow for the future signal at the Fontaine Boulevard/Carriage Meadows Drive intersection should not be required of this project. The escrow table for that intersection included developments adding traffic to the northbound and southbound (side-street) approaches, which this development would not. The escrow table was recently included in the Carriage Meadows Townhomes report and that table showed the contributing developments.

Fontaine/Old Glory Intersection

- The County has indicated that "*the developer shall participate in a fair and equitable manner in the design and construction of intersection improvements at the intersections of Fontaine Boulevard and Old Glory Drive. Address how the intersection improvements will be designed and provided for (set up escrow account?) and when they will be needed relative to The Hills at Lorson Ranch Filing No. 1 and Skyline at Lorson Ranch developments.*"
    - The plans for striping and signing improvements have been prepared and resubmitted with The Hills plat. The timing has been addressed in The Hills transportation memo.
    - A signal-escrow table for a future signal was prepared as part of the Ponderosa Filing No. 3 report. This project is not listed in the escrow table, as this project will not add side-street approach traffic at this intersection. That table showed the contributing developments.

* * * * *

We trust this traffic impact analysis will assist you in gaining approval of the proposed Skyline at Lorson Ranch residential development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By: Kirstin D. Ferrin, P.E.
Senior Transportation Engineer

JCH/KDF:jas

Enclosures: Tables 1 and 3
Figures 1-14
Appendix Tables 1-3
Level of Service Reports
MTCP Maps

Tables

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CONSULTANTS, INC.

Table 1
Trip Generation Estimate
Skyline at Lorson Ranch

Traffic Analysis Zone	Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates [1] Average Weekday Traffic	Trip Generation Rates [1] Morning Peak Hour In	Trip Generation Rates [1] Morning Peak Hour Out	Trip Generation Rates [1] Afternoon Peak Hour In	Trip Generation Rates [1] Afternoon Peak Hour Out	Total Trips Generated Average Weekday Traffic	Total Trips Generated Morning Peak Hour In	Total Trips Generated Morning Peak Hour Out	Total Trips Generated Afternoon Peak Hour In	Total Trips Generated Afternoon Peak Hour Out
Trip Generation Estimate Based on the Currently Proposed Plan													
45	210	Single-Family Detached Housing	85 DU[2]	9.44	0.19	0.56	0.62	0.37	802	16	47	53	31
Trip Generation Estimate for the Same Area From the *The Hills at Lorson Ranch Full Traffic Impact Analysis* by LSC October 26, 2020													
45	210	Single-Family Detached Housing	76 DU	9.44	0.19	0.56	0.62	0.37	717	14	42	47	28
				Change in Trip Generation Estimate					**85**	**2**	**5**	**6**	**3**
Trip Generation Estimate for the Same Area From the *Lorson Ranch Sketch Plan Amendment 2 Traffic Impact Analysis* by LSC December 17, 2018													
45	220	Multifamily Housing	123 DU	7.32	0.11	0.35	0.35	0.21	900	13	44	43	25
				Change in Trip Generation Estimate					**-98**	**3**	**4**	**10**	**6**

Notes:
(1) Source: "*Trip Generation, 10th Edition, 2017*" by the Institute of Transportation Engineers (ITE)
(2) DU = dwelling unit

Source: LSC Transportation Consultants, Inc.

Dec-20

Table 3
Traffic Control Warrant Analysis - Grayling Drive/Lamprey Drive
Skyline at Lorson Ranch

	Lorson Ranch Buildout					Lorson Ranch Buildout & Buildout of Parcels North of Lorson Ranch				
	Traffic Volumes (vehicles per hour)		All-Way, Stop-Sign Control Warrant Analysis[2]			Traffic Volumes (vehicles per hour)		All-Way, Stop-Sign Control Warrant Analysis[2]		
Hour	Major Approach Grayling Dr NB & SB Left/Thru/Right	Minor Approach Lamprey Dr EB & WB Left/Thru/Right	Volume Thresholds Major	Volume Thresholds Minor	Warrant Threshold Met?	Major Approach Grayling Dr NB & SB Left/Thru/Right	Minor Approach Lamprey Dr EB & WB Left/Thru/Right	Volume Thresholds Major	Volume Thresholds Minor	Warrant Threshold Met?
7-8 AM	36	50	300	200	No	460	211	300	200	**Yes**
8-9 AM	31	53	300	200	No	367	194	300	200	Approaching
9-10 AM	21	42	300	200	No	250	133	300	200	No
10-11 AM	20	47	300	200	No	261	161	300	200	No
11-12 PM	19	55	300	200	No	275	204	300	200	No
12-1 PM	21	60	300	200	No	301	214	300	200	**Yes**
1-2 PM	19	55	300	200	No	250	214	300	200	No
2-3 PM	20	62	300	200	No	290	283	300	200	Approaching
3-4 PM	20	73	300	200	No	286	321	300	200	Approaching
4-5 PM	24	88	300	200	No	332	370	300	200	**Yes**
5-6 PM	24	85	300	200	No	320	342	300	200	**Yes**
6-7 PM	19	71	300	200	No	251	278	300	200	No
7-8 PM	14	51	300	200	No	180	197	300	200	No
		Total Hours That Meet the Threshold			**0**		**Total Hours That Meet the Threshold**			**4**

Notes:

(2) The all-way, stop-stop control warrant analysis is based on the guidence found in the *Manual of Uniform Traffic Control Devices* (MUTCD) Section 2B.07.04.C

Per Section 2B.07.04.C.1 the major street approach volumes includes all northbound and southbound traffic movements (left, through, and right) on Grayling Drive

Per Section 2B.07.04.C.2 the minor street approach volumes includes all northbound and southbound traffic movements on Lamprey Dr

No pedestrian volumes were included in the warrant analysis

Source: LSC Transportation Consultants, Inc.

Nov-21

Figures

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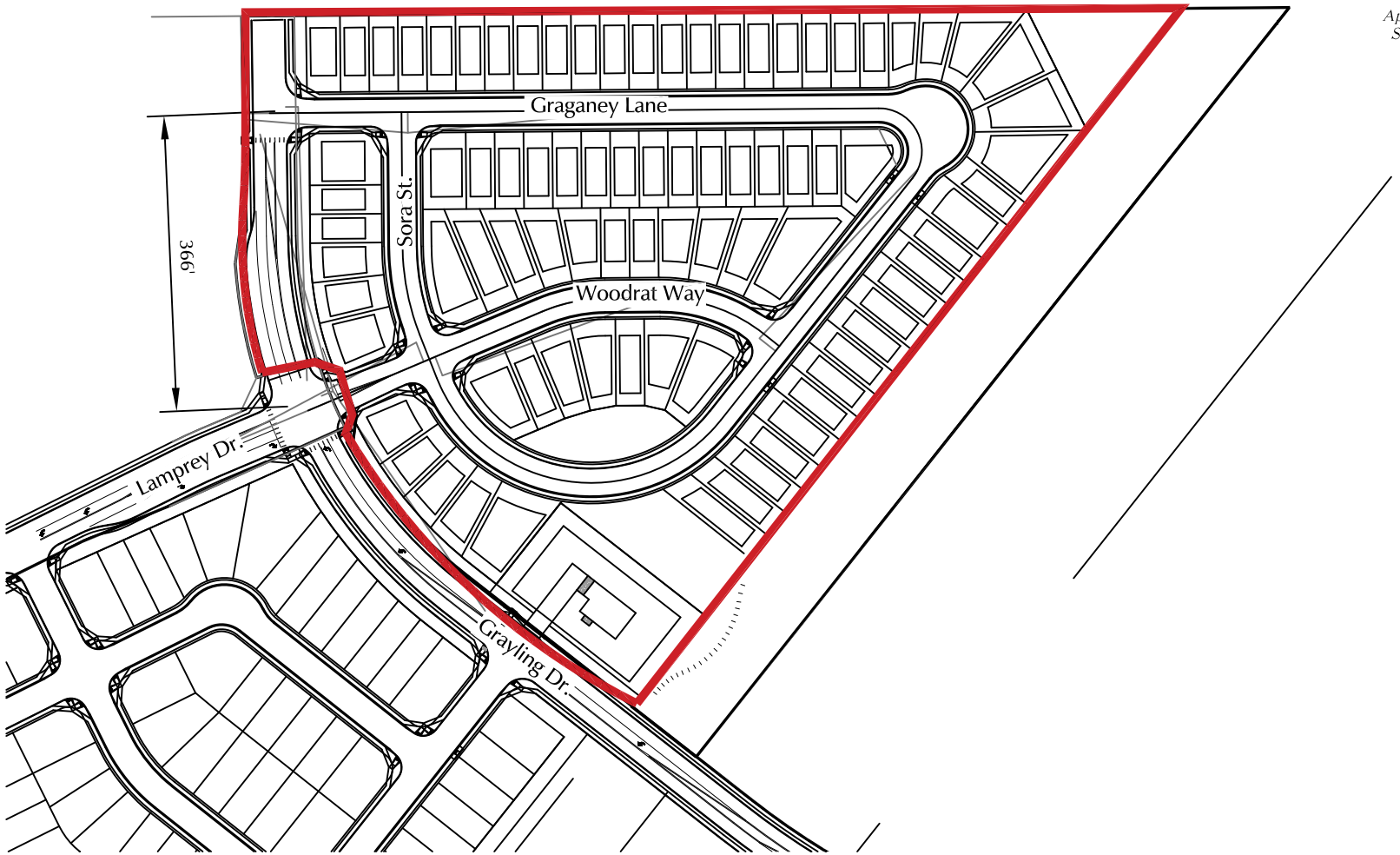
Figure 1

Vicinity Map

Skyline at Lorson Ranch (LSC #204250)



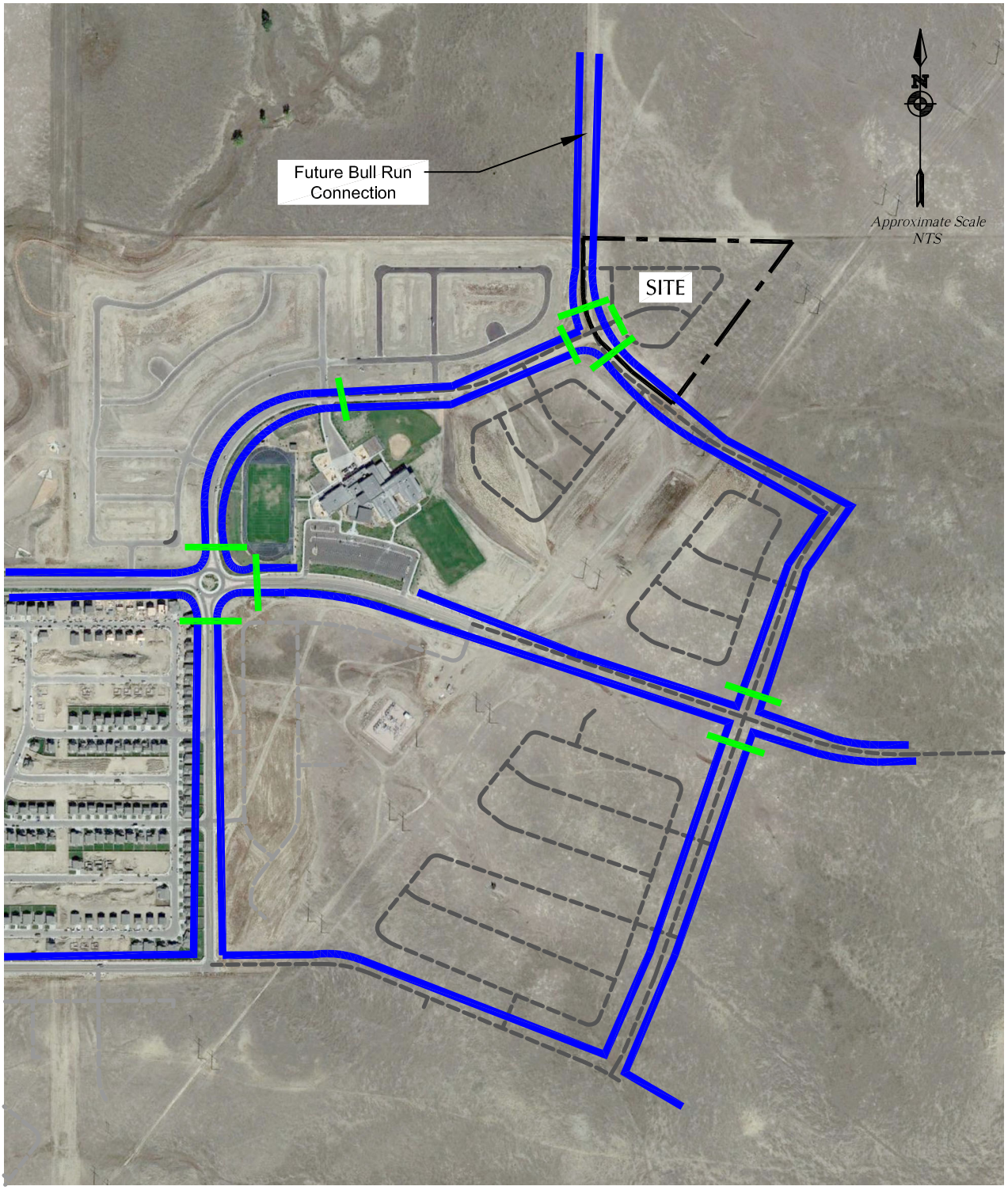
Approximate Scale
Scale: NTS

Figure 2

Site Plan

Skyline at Lorson Ranch (LSC #204250)

LSC TRANSPORTATION CONSULTANTS, INC.



= School Pedestrian Route

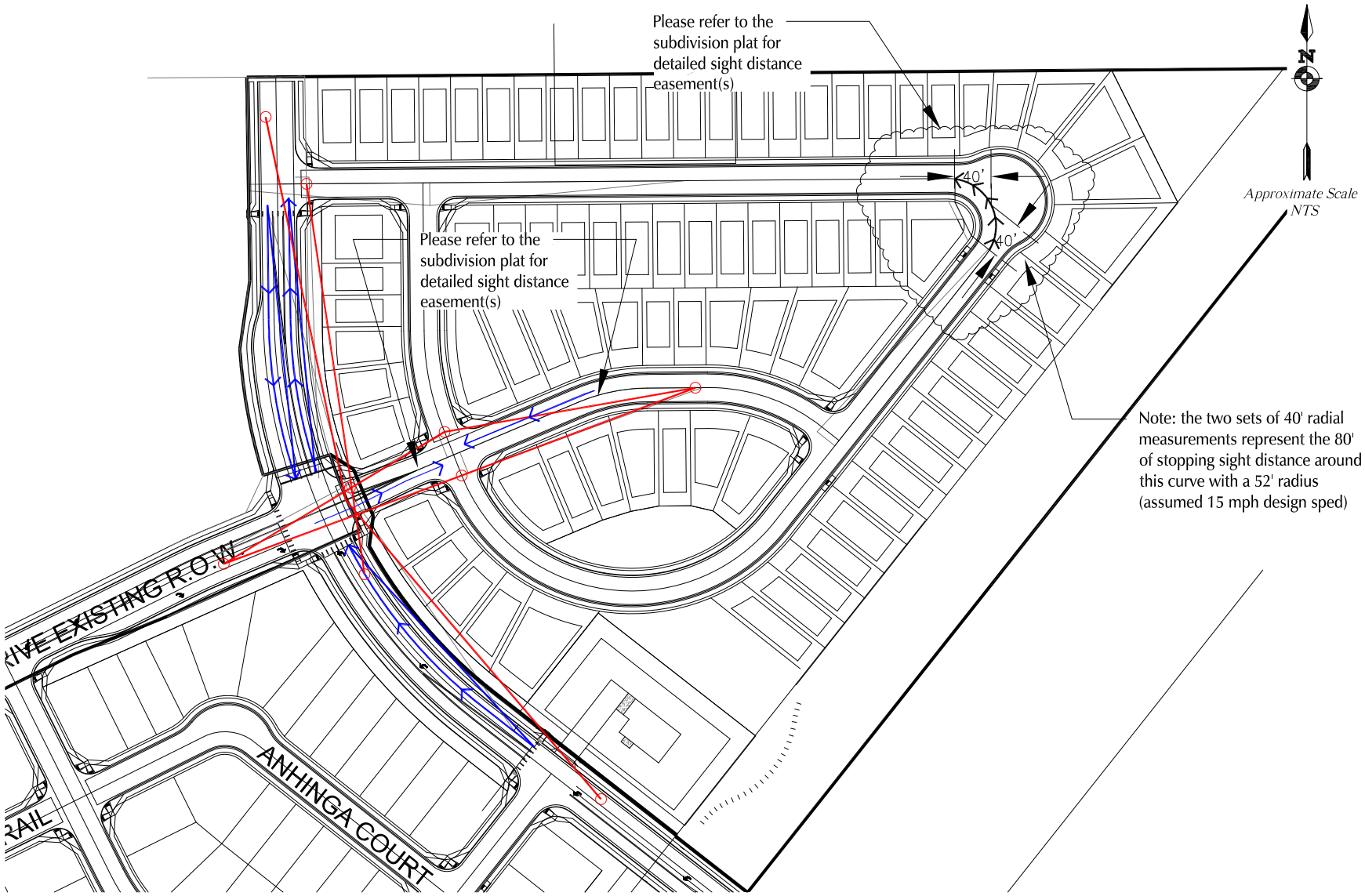
= School Crossing

Figure 3

School Pedestrian Plan

Skyline at Lorson Ranch (LSC #204250)

LSC TRANSPORTATION CONSULTANTS, INC.



LEGEND:

= ECM Required intersection sight distance - only assuming TWSC. (445' based on a 40mph design speed from Table 2-21)

= ECM Required stopping sight distance (305' based on a 40mph design speed from Table 2-17)

Note: The intersection is proposed for AWSC in the immediate, short, and long-term, therefore the entering sight distance lines of sight would not apply.

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Figure 4

Sight Distance Analysis

Skyline at Lorson Ranch (LSC #204250)

* Assumes no trip distribution east or north of the greater Lorson Ranch boundary within the 20-year horizon.

LEGEND:

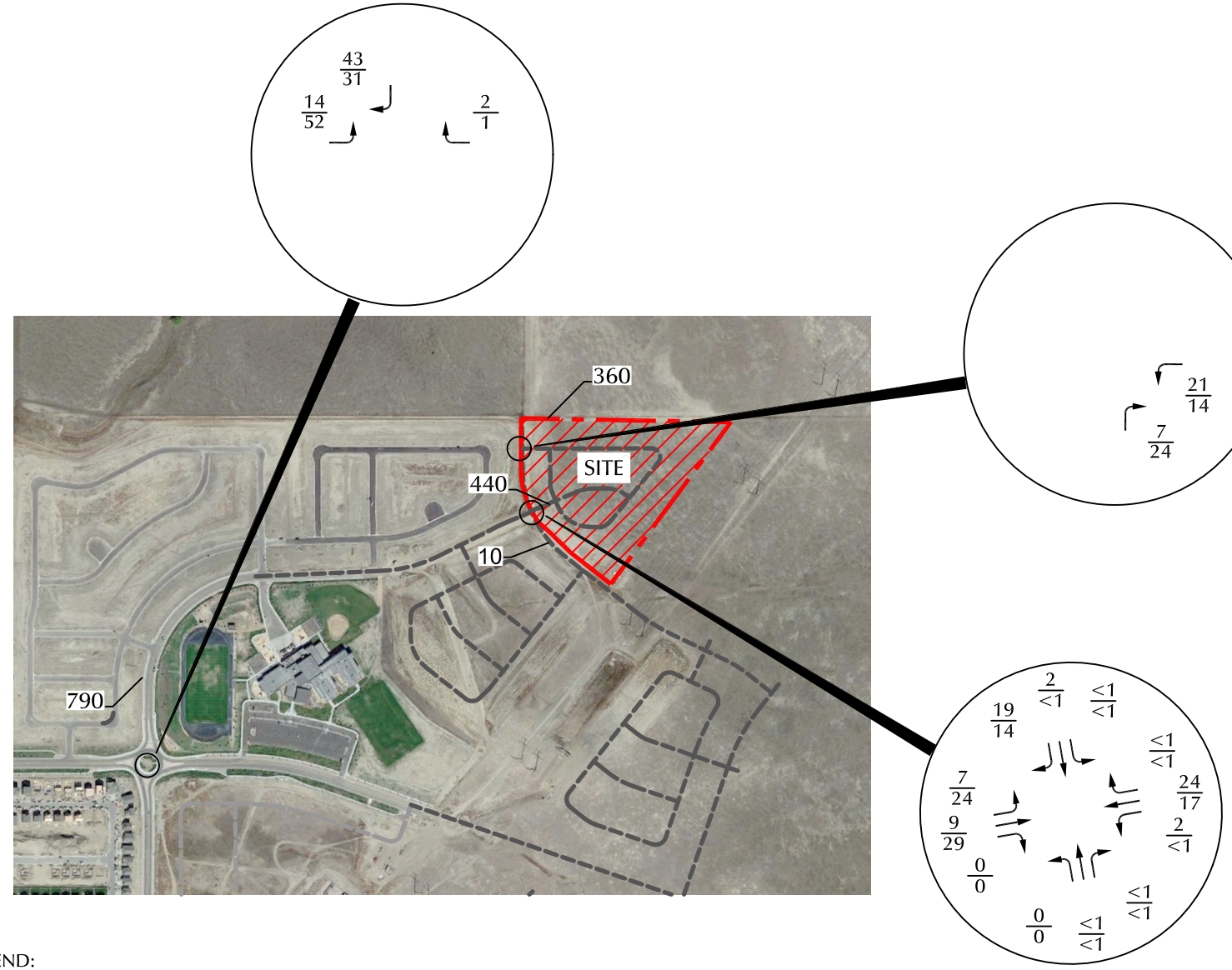
XX% / XX% = Percent Directional Distribution Short-Term / Percent Directional Distribution Long-Term

TRANSPORTATION CONSULTANTS, INC.

Figure 5

Directional Distribution of Site-Generated Traffic

Skyline at Lorson Ranch (LSC #204250)



N

Approximate Scale
Scale: NTS

LEGEND:

$\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$

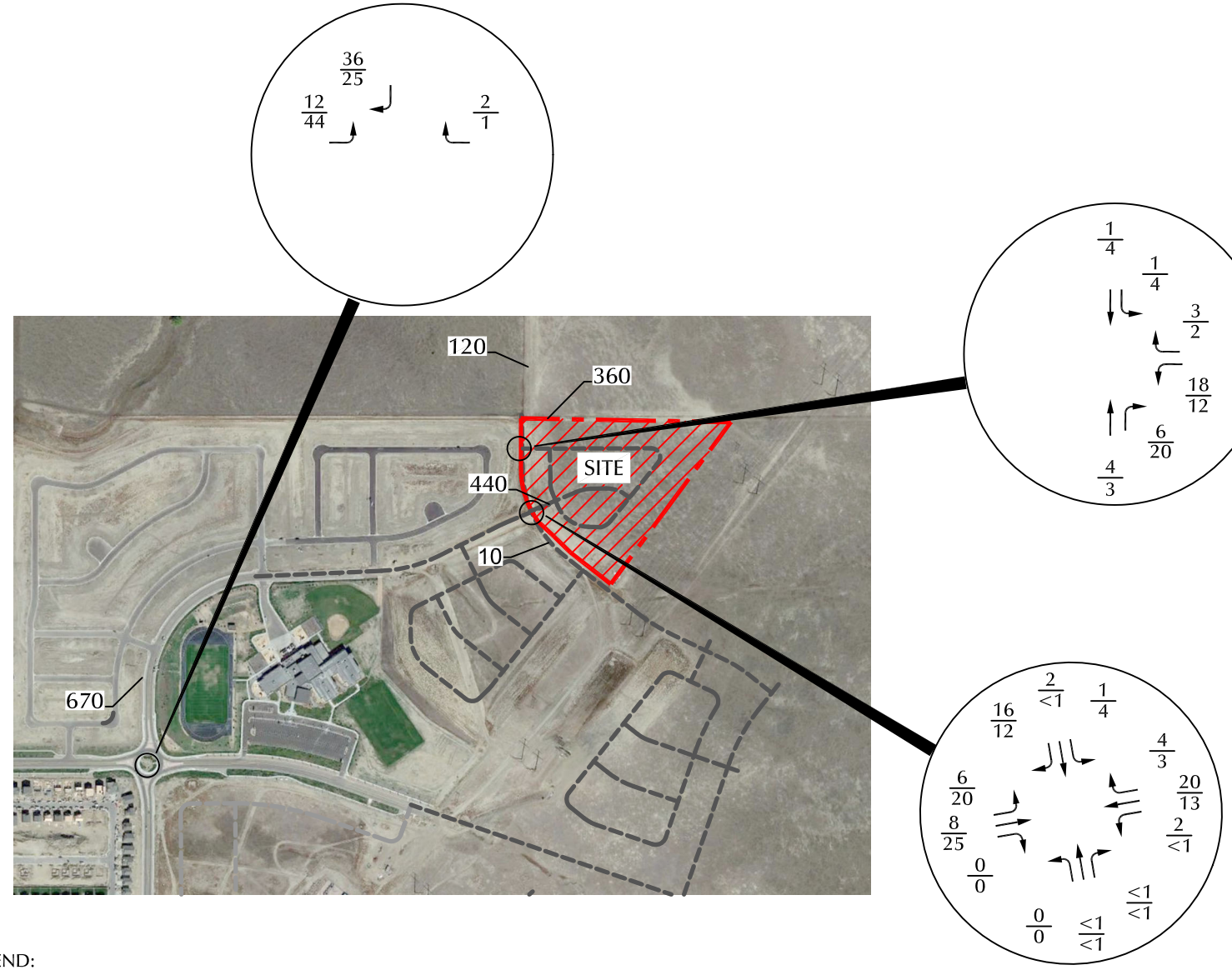
X,XXX= Annual Average Daily Traffic (vehicles per day)

TRANSPORTATION CONSULTANTS, INC.

Figure 6

Short/Intermediate-Term Site-Generated Traffic

Skyline at Lorson Ranch (LSC #204250)



LEGEND:

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

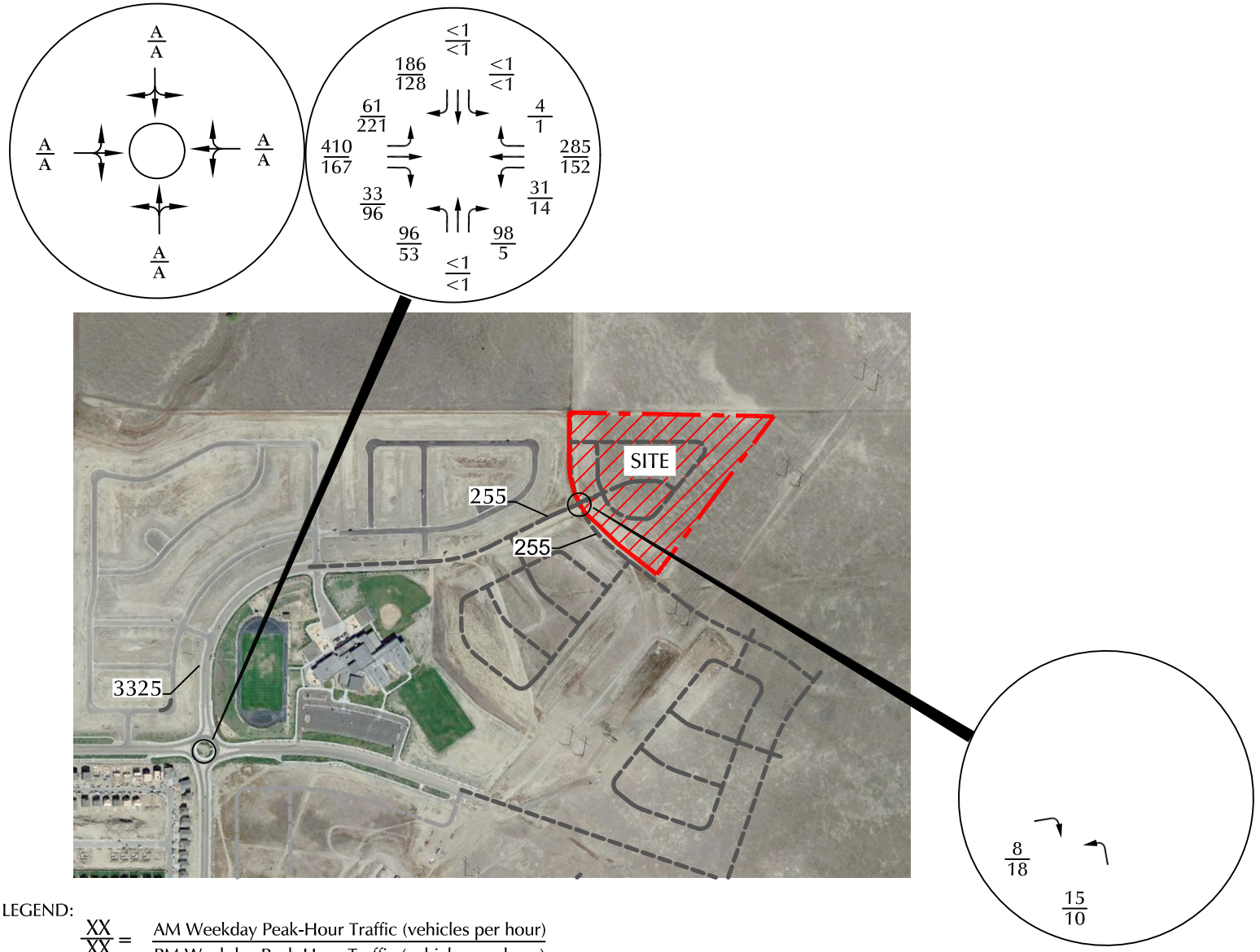
X,XXX= Annual Average Daily Traffic (vehicles per day)

TRANSPORTATION CONSULTANTS, INC.

Figure 7

Long-Term Site-Generated Traffic

Skyline at Lorson Ranch (LSC #204250)



Approximate Scale
Scale: NTS

LEGEND:

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

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

A/B = AM Individual Movement Peak-Hour Level of Service / PM Individual Movement Peak-Hour Level of Service

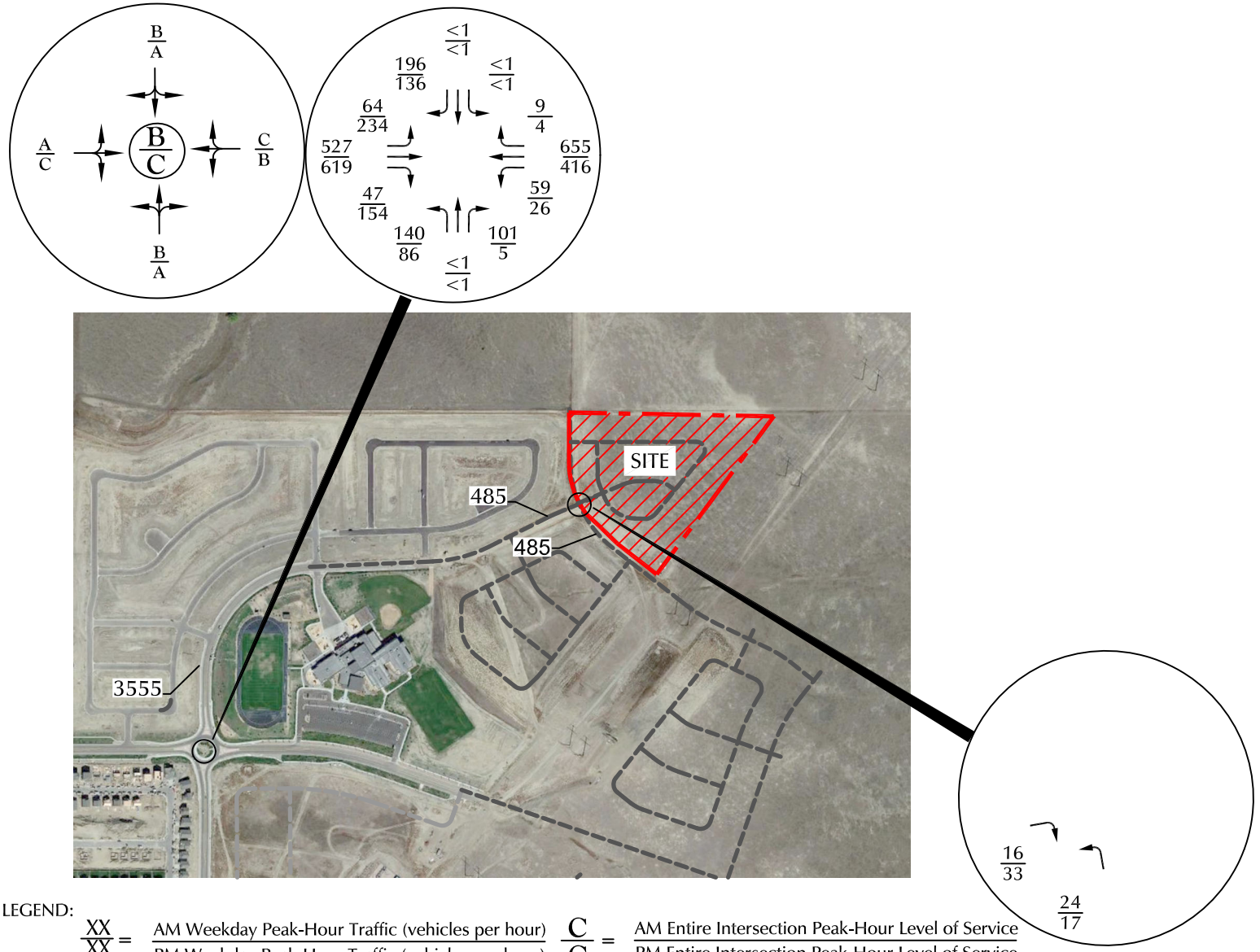
◯ = Modern Roundabout

TRANSPORTATION CONSULTANTS, INC.

Figure 8

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

Skyline at Lorson Ranch (LSC #204250)



Approximate Scale
Scale: NTS

LEGEND:

$\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$ $\frac{C}{C}$ = $\frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$

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

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

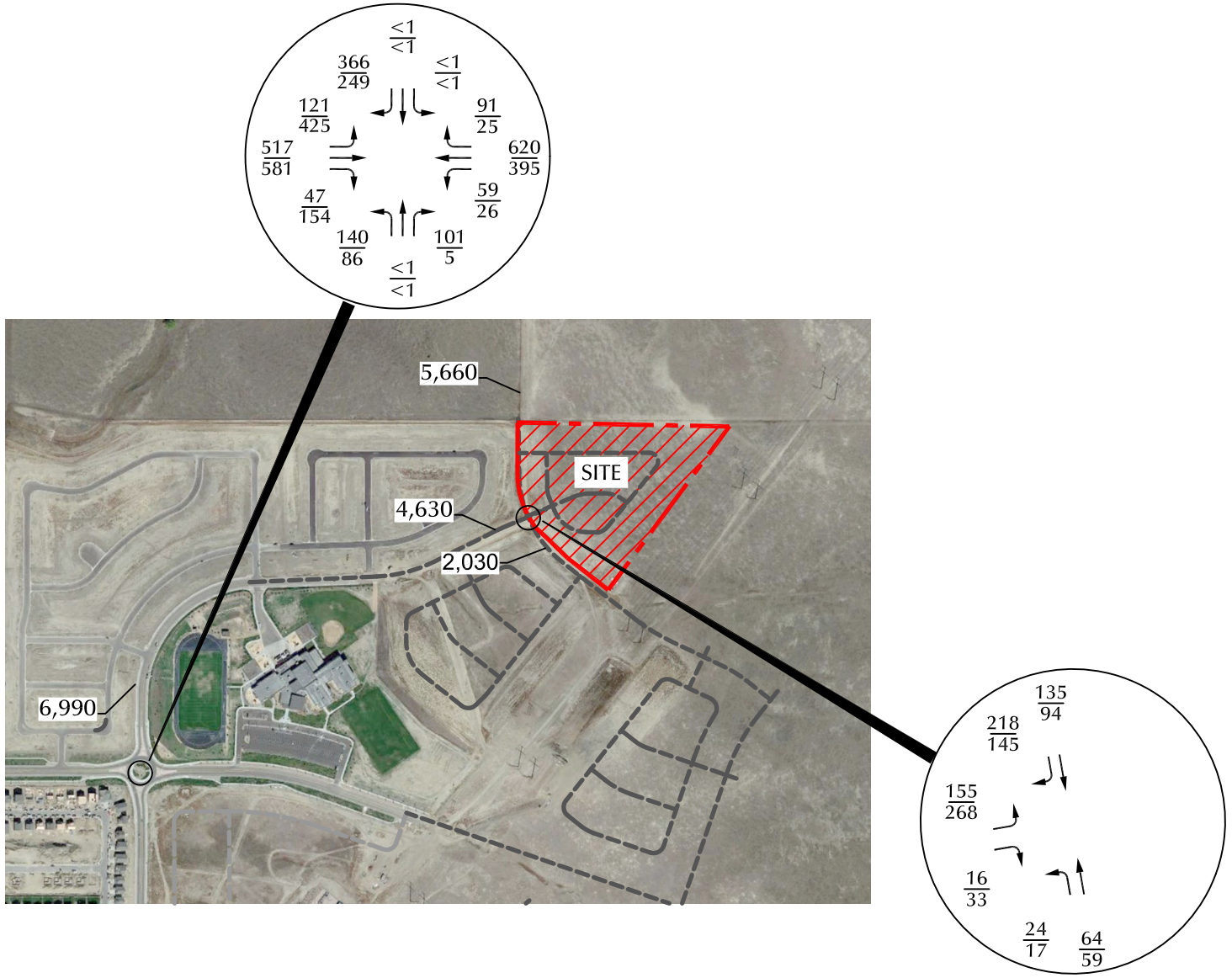
◯ = Modern Roundabout

TRANSPORTATION CONSULTANTS, INC.

Figure 9

Intermediate-Term Background Traffic, Lane Geometry, Level-of-Service, and Traffic Control

Skyline at Lorson Ranch (LSC #204250)



N

Approximate Scale
Scale: NTS

LEGEND:

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

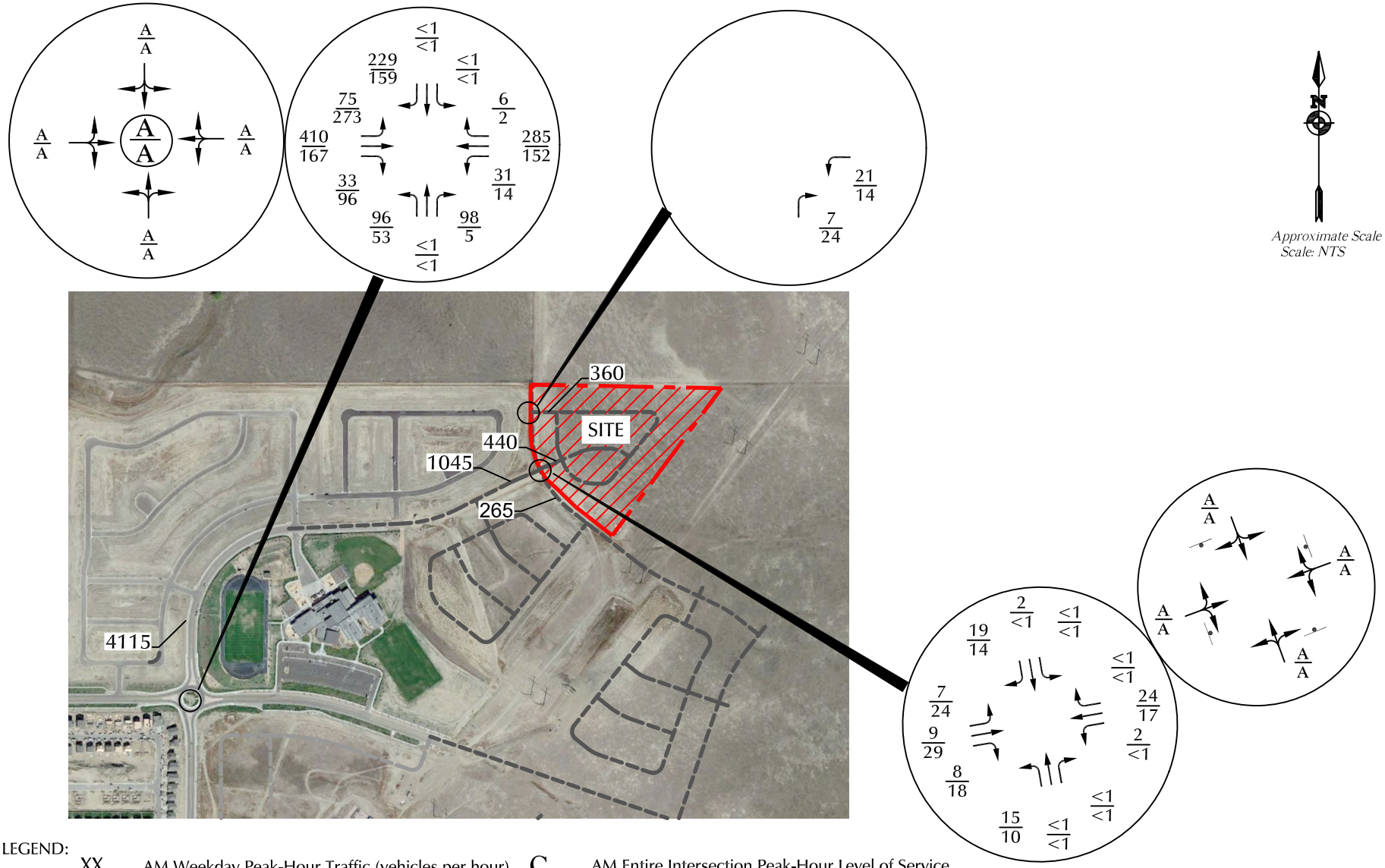
X,XXX= Annual Average Daily Traffic (vehicles per day)

TRANSPORTATION CONSULTANTS, INC.

Figure 10

Long-Term Background Traffic

Skyline at Lorson Ranch (LSC #204250)



LEGEND:

$\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$ $\frac{C}{C}$ = $\frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$

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

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

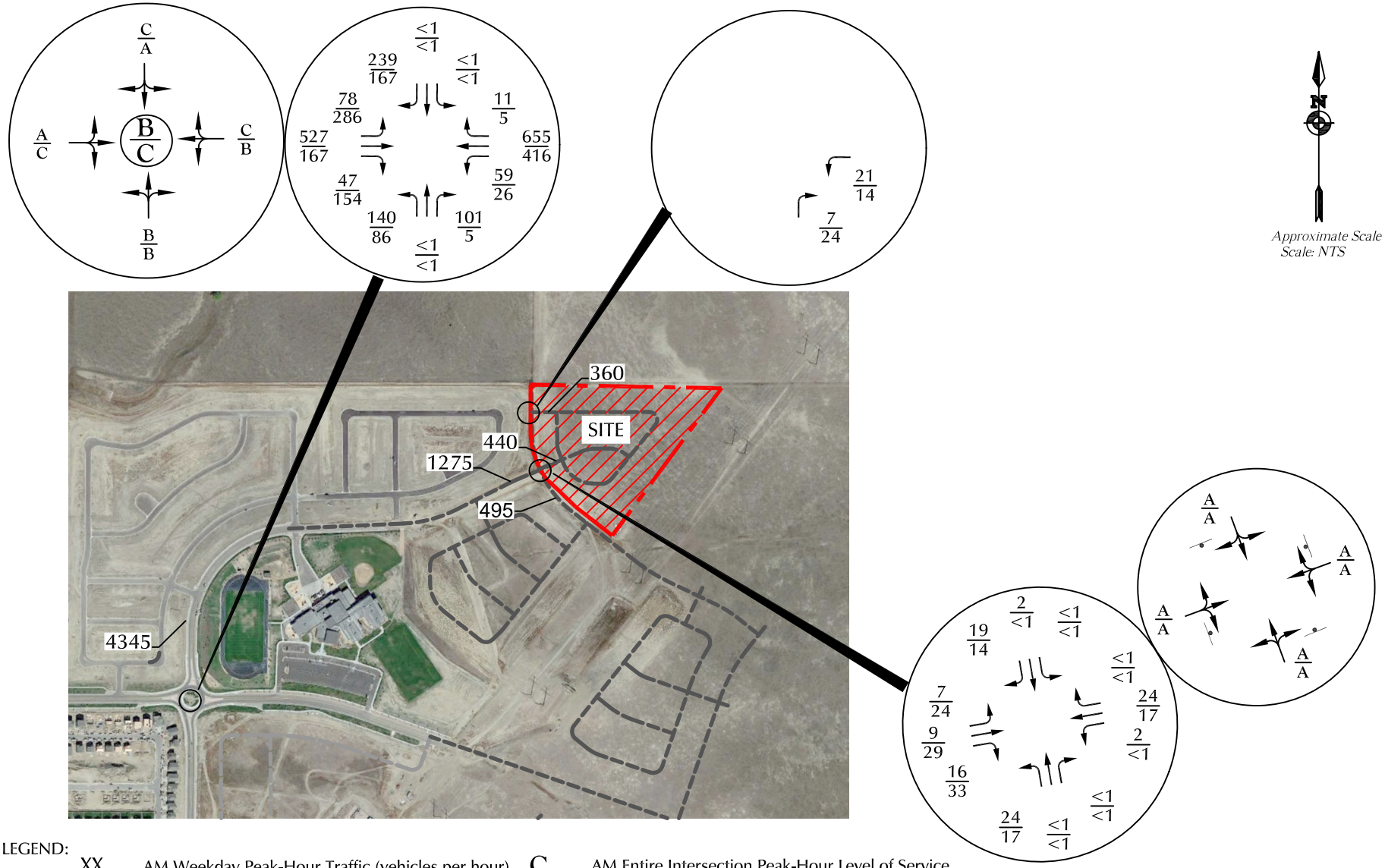
◯ = Modern Roundabout

TRANSPORTATION CONSULTANTS, INC.

Figure 11

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

Skyline at Lorson Ranch (LSC #204250)



LEGEND:

$\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$ $\frac{C}{C}$ = $\frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$

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

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

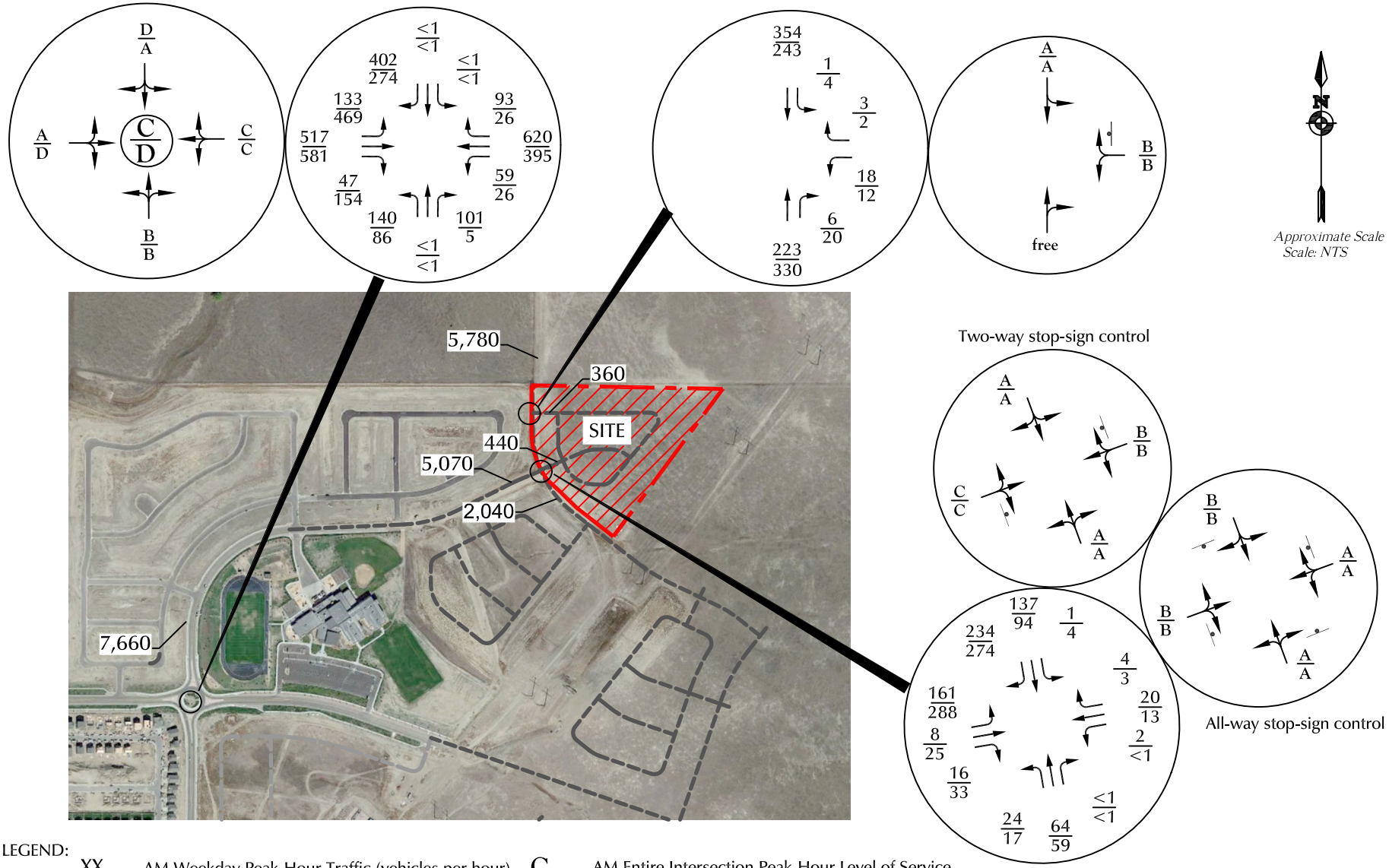
◯ = Modern Roundabout

TRANSPORTATION CONSULTANTS, INC.

Figure 12

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

Skyline at Lorson Ranch (LSC #204250)



LEGEND:

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

C/C = AM Entire Intersection Peak-Hour Level of Service / PM Entire Intersection Peak-Hour Level of Service

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

A/B = AM Individual Movement Peak-Hour Level of Service / PM Individual Movement Peak-Hour Level of Service

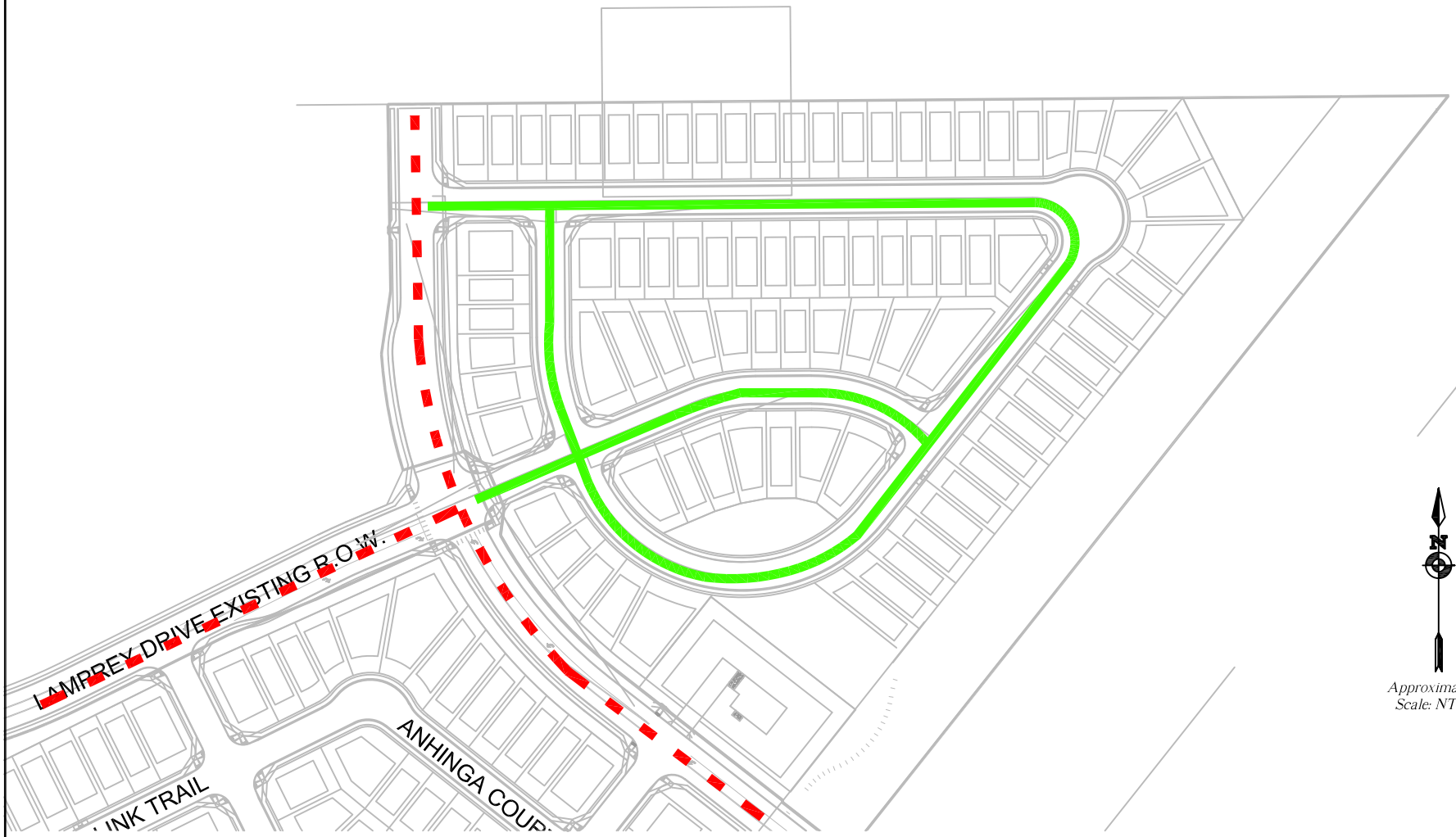
◯ = Modern Roundabout | = Stop Sign

TRANSPORTATION CONSULTANTS, INC.

Figure 13

2040 Total Traffic, Lane Geometry, Level-of-Service, and Traffic Control

Skyline at Lorson Ranch (LSC #204250)



Approximate Scale
Scale: NTS

LEGEND:

= Urban Local

= Urban Residential Collector (60' R.O.W.)

Figure 14

Street Classifications

Skyline at Lorson Ranch (LSC #204250)

Appendix Tables

TRANSPORTATION
CONSULTANTS, INC.

Appendix Table 1
Area Trafffic Impact Studies by LSC
Skyline at Lorson Ranch

Study	Date
Lorson Ranch Sketch Plan Amendment 2 Traffic Impact and Access Analysis	December 17, 2018
Carriage Meadows South at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	August 14, 2017
Carriage Meadows North at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	January 29, 2017
Lorson Ranch East Updated Traffic Impact and Access Analysis	November 9, 2017
Lorson Ranch East Filing No. 1 Transportation Memorandum	May 2, 2018
Lorson Ranch East Filing No. 2 Transportation Memorandum	September 24, 2018
Lorson Ranch East Filing No. 3 Transportation Memorandum	January 22, 2019
Lorson Ranch East Filing No. 4 Transportation Memorandum	March 12, 2019
Lorson Ranch PK-8 School Traffic Impact and Access Analysis	October 4, 2018
Creekside at Lorson Ranch Filing No. 1 Traffic Impact and Access Analysis	October 28, 2018
Creekside at Lorson Ranch Filing No. 1 Transportation Memorandum	April 26, 2019
Carriage Meadows Townhomes Traffic Impact Analysis	February 25, 2020
Fontaine/Old Glory Intersection Analysis	February 27, 2020
Ponderosa at Lorson Ranch Filing No. 3 Transportation Memoradum	September 2, 2020
The Glen at Widefield Filing No. 10 Transportation Memorandum	September 24, 2020
The Glen at Widefield Filing No. 11 Transportation Memorandum	September 24, 2020
Creekside South at Lorson Ranch Updated Transportation Memorandum	May 5, 2020
The Hills at Lorson Ranch Full Traffic Impact Analysis	October 26, 2020
The Hills at Lorson Ranch Final Plat Transportation Memorandum	April 19, 2021
Source: LSC Transportation Consultants, Inc. ***(June 2021)***	

Appendix Table 1
Area Trafffic Impact Studies by LSC
Skyline at Lorson Ranch

Study	Date
Lorson Ranch Sketch Plan Amendment 2 Traffic Impact and Access Analysis	December 17, 2018
Carriage Meadows South at Lorson Ranch Filing No. 1 Updated Traffic Impact Analysis	August 14, 2017
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Lorson Ranch PK-8 School Traffic Impact and Access Analysis	October 4, 2018
Creekside at Lorson Ranch Filing No. 1 Traffic Impact and Access Analysis	October 28, 2018
Creekside at Lorson Ranch Filing No. 1 Transportation Memorandum	April 26, 2019
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Creekside South at Lorson Ranch Updated Transportation Memorandum	May 5, 2020
The Hills at Lorson Ranch Full Traffic Impact Analysis	October 26, 2020
The Hills at Lorson Ranch Final Plat Transportation Memorandum	April 19, 2021
Source: LSC Transportation Consultants, Inc. ***(June 2021)***	

Appendix Table 2
Skyline at Lorson Ranch
Lorson Ranch Trip Generation Estimate

Land Use Data						Trip Generation Rates[1]					Raw ITE Trip Generation (Individual Driveway Trips)					School Internal Trips[2]					Retail Internal Trips[2]					Pass-by[3] (%)	Pass-by Trips					Total New External Trips				
Traffix Zone	Name	ITE Land Use	ITE Code	Quantity	Unit	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out		Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
RESIDENTIAL																																		
All Residential North of Lorson Boulevard "Between the Creeks"																																		
8	Ponderosa	Single-Family Detached Housing	210	102	DU[4]	9.44	0.19	0.56	0.62	0.37	963	19	57	64	37	26	2	5	1	1	99	0	2	5	2	0%	0	0	0	0	0	838	17	50	58	34
9	Ponderosa	Single-Family Detached Housing	210	102	DU	9.44	0.19	0.56	0.62	0.37	963	19	57	64	37	26	2	5	1	1	99	0	2	5	2	0%	0	0	0	0	0	838	17	50	58	34
10	Meadows Fil 1	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33
11	Meadows Fil 3	Single-Family Detached Housing	210	51	DU	9.44	0.19	0.56	0.62	0.37	481	9	28	32	19	13	1	2	1	0	50	0	1	2	1	0%	0	0	0	0	0	418	8	25	29	18
12	Meadows Fil 3	Single-Family Detached Housing	210	87	DU	9.44	0.19	0.56	0.62	0.37	821	16	48	54	32	22	2	4	1	0	85	0	1	4	2	0%	0	0	0	0	0	714	14	43	49	30
3	The Meadows Fil 2	Single-Family Detached Housing	210	109	DU	9.44	0.19	0.56	0.62	0.37	1,029	20	60	68	40	28	2	5	1	1	106	1	2	5	2	0%	0	0	0	0	0	895	17	53	62	37
13	Allegiant Fil 1	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33
5	Buffalo Crossing	Single-Family Detached Housing	210	204	DU	9.44	0.19	0.56	0.62	0.37	1,926	38	113	127	75	53	5	9	2	1	198	1	3	10	5	0%	0	0	0	0	0	1,675	32	101	115	69
	Townhomes at Lorson Ranch	Multifamily Housing	220	46	DU	7.32	0.11	0.35	0.35	0.21	337	5	16	16	10	9	1	2	0	0	35	0	1	2	1	0%	0	0	0	0	0	293	4	13	14	9
6	Pioneer Landing	Single-Family Detached Housing	210	59	DU	9.44	0.19	0.56	0.62	0.37	557	11	33	37	22	15	1	3	1	0	57	0	1	3	1	0%	0	0	0	0	0	485	10	29	33	21
7	Pioneer Landing	Single-Family Detached Housing	210	59	DU	9.44	0.19	0.56	0.62	0.37	557	11	33	37	22	15	1	3	1	0	57	0	1	3	1	0%	0	0	0	0	0	485	10	29	33	21
15	Meadows Future Fil 4 West	Single-Family Detached Housing	210	110	DU	9.44	0.19	0.56	0.62	0.37	1,038	20	61	69	40	28	2	5	1	1	107	1	2	5	2	0%	0	0	0	0	0	903	17	54	63	37
16	Meadows Future Fil 4 East	Single-Family Detached Housing	210	126	DU	9.44	0.19	0.56	0.62	0.37	1,189	23	70	79	46	32	3	6	1	1	123	1	2	6	3	0%	0	0	0	0	0	1,034	19	62	72	42
18	Ponderosa Fil 3	Multifamily Housing	220	90	DU	7.32	0.11	0.35	0.35	0.21	659	10	32	32	19	18	2	3	1	0	68	0	1	3	2	0%	0	0	0	0	0	573	8	28	28	17
39	Pioneer Landing Fil 2	Single-Family Detached Housing	210	170	DU	9.44	0.19	0.56	0.62	0.37	1,605	31	94	106	62	44	4	8	2	1	165	1	3	8	4	0%	0	0	0	0	0	1,396	26	83	96	57
	Total All Residential "Between the Creeks"			**1,509**	**DU**						**13,957**	**268**	**810**	**905**	**533**	**379**	**32**	**68**	**16**	**9**	**1,437**	**5**	**24**	**71**	**32**							**12,141**	**231**	**718**	**818**	**492**
Residential Adjacent to Marksheffel																																		
1	Carriage Meadows North	Single-Family Detached Housing	210	155	DU	9.44	0.19	0.56	0.62	0.37	1,463	29	86	97	57	40	3	7	2	1	151	1	2	7	3	0%	0	0	0	0	0	1,272	25	77	88	53
147	Carriage Meadows Town Homes	Multifamily Housing	220	49	DU	7.32	0.11	0.35	0.35	0.21	359	5	17	17	10	10	1	2	0	0	37	0	1	2	1	0%	0	0	0	0	0	312	4	14	15	9
47	Carriage Meadows South	Single-Family Detached Housing	210	86	DU	9.44	0.19	0.56	0.62	0.37	812	16	48	54	32	22	2	4	1	0	84	0	1	4	2	0%	0	0	0	0	0	706	14	43	49	30
247		Single-Family Detached Housing	210	51	DU	9.44	0.19	0.56	0.62	0.37	481	9	28	32	19	13	1	2	1	0	50	0	1	2	1	0%	0	0	0	0	0	418	8	25	29	18
347		Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33
	Total All Residential Adjacent to Marksheffel			**438**	**DU**						**4,031**	**77**	**233**	**260**	**154**	**110**	**9**	**19**	**5**	**2**	**416**	**1**	**6**	**20**	**9**							**3,505**	**67**	**208**	**235**	**143**
	Cumulative Total			**1,947**	**DU**						**17,988**	**345**	**1,043**	**1,165**	**687**	**489**	**41**	**87**	**21**	**11**	**1,853**	**6**	**30**	**91**	**41**							**15,646**	**298**	**926**	**1,053**	**635**
Lorson Ranch East																																		
42	North of Fontaine	Single-Family Detached Housing	210	277	DU	9.44	0.19	0.56	0.62	0.37	2,615	51	154	173	101	71	6	13	3	2	269	1	4	13	6	0%	0	0	0	0	0	2,275	44	137	157	93
37	East of Lamprey	Single-Family Detached Housing	210	122	DU	9.44	0.19	0.56	0.62	0.37	1,152	23	68	76	45	31	3	6	1	1	119	1	2	6	3	0%	0	0	0	0	0	1,002	19	60	69	41
27	West of Lamprey	Single-Family Detached Housing	210	303	DU	9.44	0.19	0.56	0.62	0.37	2,860	56	168	189	111	78	7	14	3	2	295	1	5	15	7	0%	0	0	0	0	0	2,487	48	149	171	102
127	South of Lorson - West	Single-Family Detached Housing	210	76	DU	9.44	0.19	0.56	0.62	0.37	717	14	42	47	28	20	2	3	1	0	74	0	1	4	2	0%	0	0	0	0	0	623	12	38	42	26
227	South of Lorson - East	Single-Family Detached Housing	210	48	DU	9.44	0.19	0.56	0.62	0.37	453	9	27	30	18	12	1	2	0	0	47	0	1	2	1	0%	0	0	0	0	0	394	8	24	28	17
	Lorson Ranch East			**826**	**DU**						**7,797**	**153**	**459**	**515**	**303**	**212**	**19**	**38**	**8**	**5**	**804**	**3**	**13**	**40**	**19**							**6,781**	**131**	**408**	**467**	**279**
	Cumulative Total			**2,773**	**DU**						**25,785**	**498**	**1,502**	**1,680**	**990**	**701**	**60**	**125**	**29**	**16**	**2,657**	**9**	**43**	**131**	**60**							**22,427**	**362**	**1,126**	**1,285**	**771**
Creekside at Lorson Ranch																																		
26	Creekside East (Filing 1)	Single-Family Detached Housing	210	97	DU	9.44	0.19	0.56	0.62	0.37	916	18	54	60	36	25	2	4	1	1	94	0	1	5	2	0%	0	0	0	0	0	797	16	49	54	33
126	Creekside West (Filing 1)	Single-Family Detached Housing	210	138	DU	9.44	0.19	0.56	0.62	0.37	1,303	26	77	86	51	36	3	6	1	1	134	1	2	7	3	0%	0	0	0	0	0	1,133	22	69	78	47
427	Creekside South Tract B	Multifamily Housing	220	97	DU	7.32	0.11	0.35	0.35	0.21	710	10	34	34	20	19	2	3	1	0	73	0	1	4	2	0%	0	0	0	0	0	618	8	30	29	18
327	Creekside South	Single-Family Detached Housing	210	200	DU	9.44	0.19	0.56	0.62	0.37	1,888	37	111	125	73	52	4	9	2	1	195	1	3	10	4	0%	0	0	0	0	0	1,641	32	99	113	68
	Creekside at Lorson Ranch			**532**	**DU**						**4,817**	**91**	**276**	**305**	**180**	**132**	**11**	**22**	**5**	**3**	**496**	**2**	**7**	**26**	**11**							**4,189**	**78**	**247**	**274**	**166**
	Cumulative Total			**3,305**	**DU**						**30,602**	**589**	**1,778**	**1,985**	**1,170**	**833**	**71**	**147**	**34**	**19**	**3,153**	**11**	**50**	**157**	**71**							**26,616**	**507**	**1,581**	**1,794**	**1,080**
The Hills PUD																																		
43	Area 'B'	Single-Family Detached Housing	210	116	DU	9.44	0.19	0.56	0.62	0.37	1,095	21	64	72	42	30	3	5	1	1	113	1	2	6	3	0%	0	0	0	0	0	952	17	57	65	38
44	Area 'C'	Single-Family Detached Housing	210	123	DU	9.44	0.19	0.56	0.62	0.37	1,161	23	68	77	45	32	3	6	1	1	120	1	2	6	3	0%	0	0	0	0	0	1,009	19	60	70	41
36	Areas 'E' & 'G'	Single-Family Detached Housing	210	275	DU	9.44	0.19	0.56	0.62	0.37	2,596	51	153	172	101	71	6	13	3	2	268	1	4	13	6	0%	0	0	0	0	0	2,257	44	136	156	93
	The Hills PUD			**514**	**DU**						**4,852**	**95**	**285**	**321**	**188**	**133**	**12**	**24**	**5**	**4**	**501**	**3**	**8**	**25**	**12**							**4,218**	**80**	**253**	**291**	**172**
	Cumulative Total			**3,819**	**DU**						**35,454**	**684**	**2,063**	**2,306**	**1,358**	**966**	**83**	**171**	**39**	**23**	**3,654**	**14**	**58**	**182**	**83**							**30,834**	**587**	**1,834**	**2,085**	**1,252**
Skyline at Lorson Ranch																																		
45	Area 'A' - East of Lamprey/Grayling	Single-Family Detached Housing	210	85	DU	9.44	0.19	0.56	0.62	0.37	802	16	47	53	31	22	2	4	1	0	83	0	1	4	2	0%	0	0	0	0	0	697	14	42	48	29
	Cumulative Total			**3,904**	**DU**						**36,256**	**700**	**2,110**	**2,359**	**1,389**	**988**	**85**	**175**	**40**	**23**	**3,737**	**14**	**59**	**186**	**85**							**31,531**	**601**	**1,876**	**2,133**	**1,281**
Future Residential Uses																																		
46	Area 'D' - NE of Fontaine/Walleye	Single-Family Detached Housing	210	461	DU	9.44	0.19	0.56	0.62	0.37	4,352	85	256	288	169	119	10	21	5	3	448	2	7	22	10	0%	0	0	0	0	0	3,785	73	228	261	156
35	Areas 'F' & 'H' - WE of Fontaine/Walleye	Single-Family Detached Housing	210	532	DU	9.44	0.19	0.56	0.62	0.37	5,022	98	295	332	195	137	12	24	5	3	518	3	8	26	12	0%	0	0	0	0	0	4,367	83	263	301	180
50	Area 'I' - South of Lorson/Walleye	Single-Family Detached Housing	210	441	DU	9.44	0.19	0.56	0.62	0.37	4,163	82	245	275	162	114	10	20	4	2	429	2	7	21	10	0%	0	0	0	0	0	3,620	70	218	250	150
	Future Residential Uses			**1,434**	**DU**						**13,537**	**265**	**796**	**895**	**526**	**370**	**32**	**65**	**14**	**8**	**1,395**	**7**	**22**	**69**	**32**							**11,772**	**226**	**709**	**812**	**486**
	Cumulative Total			**5,338**	**DU**						**49,793**	**965**	**2,906**	**3,254**	**1,915**	**1,358**	**117**	**240**	**54**	**31**	**5,132**	**21**	**81**	**255**	**117**							**43,303**	**827**	**2,585**	**2,945**	**1,767**
NON-RESIDENTIAL																																		
34	K-8 School	Elementary School	520	690	Students	1.89	0.36	0.31	0.07	0.08	1,304	250	213	51	53	913	175	85	20	37	0	0	0	0	0	0%	0	0	0	0	0	391	75	128	31	16
		Middle School/Junior High School	522	300	Students	2.13	0.31	0.27	0.07	0.08	639	94	80	22	23	447	66	32	9	16	0	0	0	0	0	0%	0	0	0	0	0	192	28	48	13	7
20	North of Fontaine	Shopping Center	820	101	KSF[5]	46.75	0.74	0.45	2.13	2.30	4,722	75	46	215	233	0	0	0	0	0	2,361	37	12	54	116	25%	590	9	9	35	35	1,771	29	25	126	82
22	South of Fontaine	Shopping Center	820	118	KSF	46.75	0.74	0.45	2.13	2.30	5,539	88	54	252	273	0	0	0	0	0	2,770	44	13	63	137	25%	692	11	11	41	41	2,077	33	30	148	95
											12,204	**507**	**393**	**540**	**582**	**1,360**	**241**	**117**	**29**	**53**	**5,131**	**81**	**25**	**117**	**253**		**1,282**	**20**	**20**	**76**	**76**	**4,431**	**165**	**231**	**318**	**200**
	Grand Total at Buildout of Lorson Ranch										**61,997**	**1,472**	**3,299**	**3,794**	**2,497**																**47,734**	**992**	**2,816**	**3,263**	**1,967**
Trip Generation Estimate From *Lorson Ranch Sketch Plan Amendment 2 Traffic Impact Analysis by LSC December 17, 2018*																																		
	Single-Family Detached Housing		210	4,408	DU	9.44	0.19	0.56	0.62	0.37	41,612	815	2,446	2,749	1,615	1,360	117	241	53	29	5,131	25	81	253	117	0%	0	0	0	0	0	0	41,665	768	2,441	2,758	1,654
	Multifamily Housing (Low-Rise)		220	894	DU	7.32	0.11	0.35	0.35	0.21	6,544	95	317	315	185											0%	0	0	0	0	0	0					
	Elementary School		520	690	Students	1.89	0.36	0.31	0.07	0.08	1,304	250	213	51	53	913	175	85	20	37	0	0	0	0	0	0%	0	0	0	0	0	0	391	75	128	31	16
	Middle School/Junior High School		522	300	Students	2.13	0.31	0.27	0.07	0.08	639	94	80	22	23	447	66	32	9	16	0	0	0	0	0	0%	0	0	0	0	0	0	192	28	48	13	7
	Shopping Center		820	219	KSF	46.75	0.74	0.45	2.13	2.30	0	0	0	0	0	0	0	0	0	0	5,131	81	25	117	253	25%	1,282	20	20	76	76	#	3,848	62	55	274	177
											60,360	**1,417**	**3,156**	**3,604**	**2,382**												**1,282**	**20**	**20**	**76**	**76**		**46,096**	**933**	**2,672**	**3,076**	**1,854**
	Change (Increase) From 2018										**1,637**	**55**	**143**	**190**	**115**																**1,638**	**59**	**144**	**187**	**113**

Notes:
(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)
(2) See Appendix Table 2 for Internal Trip Percentages
(3) Source: "Trip Generation Handbook - An ITE Proposed Recommended Practice 3rd Edition, 2017" by ITE
(3) DU = dwelling Unit
(4) KSF = thousand square feet of floor area

Appendix Table 3
Skyline at Lorson Ranch
Internal Trip Estimate

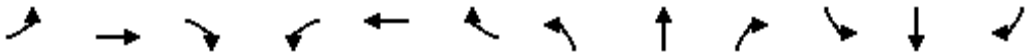
ITE Land Use	ITE Code	Quantity	Unit	Trip Generation Rates[1] Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Raw ITE Trip Generation (Individual Driveway Trips) Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
Single-Family Detached Housing	210	5,056	DU[2]	9.44	0.19	0.56	0.62	0.37	47,729	935	2,806	3,153	1,852
Residential Condominium/Townhouse	210	282	DU	7.32	0.11	0.35	0.35	0.21	2,064	30	100	99	58
									49,793	**965**	**2,906**	**3,252**	**1,910**
Elementary School	520	690	Students	1.89	0.36	0.31	0.07	0.08	1,304	250	213	51	53
Middle School/Junior High School	522	300	Students	2.13	0.31	0.27	0.07	0.08	639	94	80	22	23
								Total School	**1,943**	**344**	**293**	**73**	**76**
Shopping Center	820	219	KSF[3]	46.75	0.74	0.45	2.13	2.30	10,261	162	99	467	506
								Total School and Retail	**12,204**	**506**	**392**	**540**	**582**

	Percent Internal Trips Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Total Internal Trips Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out	Total External Trips Daily	AM Peak Hour In	AM Peak Hour Out	PM Peak Hour In	PM Peak Hour Out
School	3%	12%	8%	2%	2%	1,360	117	241	53	29					
Retail	10%	3%	3%	8%	6%	5,131	25	81	253	117					
Total	13%	15%	11%	9%	8%	**6,491**	**142**	**322**	**306**	**146**	**43,302**	**823**	**2,584**	**2,946**	**1,764**
	70%	70%	40%	40%	70%	913	175	85	20	37	391	75	128	31	16
	70%	70%	40%	40%	70%	447	66	32	9	16	192	28	48	13	7
						1,360	**241**	**117**	**29**	**53**	**583**	**103**	**176**	**44**	**23**
	50%	50%	25%	25%	50%	5,131	81	25	117	253	5,129	80	74	350	252
						6,491	**322**	**142**	**146**	**306**					
											49,014	**1,006**	**2,834**	**3,340**	**2,039**

Notes:
(1) Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)
(2) DU = dwelling Unit
(3) KSF = thousand square feet of floor area

Levels of Service

TRANSPORTATION
CONSULTANTS, INC.



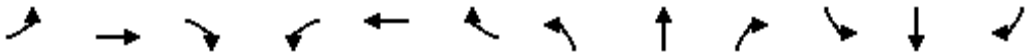
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	61	410	33	31	285	4	96	0	98	0	0	186
Future Volume (vph)	61	410	33	31	285	4	96	0	98	0	0	186
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	72	482	39	36	335	5	113	0	115	0	0	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	593	0	0	376	0	0	228	0	0	219	0

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	593	376	228	219
Demand Flow Rate, veh/h	605	384	232	223
Vehicles Circulating, veh/h	37	188	565	494
Vehicles Exiting, veh/h	680	609	77	78
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.3	6.5	8.2	7.3
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	605	384	232	223
Cap Entry Lane, veh/h	1329	1139	775	834
Entry HV Adj Factor	0.981	0.980	0.983	0.982
Flow Entry, veh/h	593	376	228	219
Cap Entry, veh/h	1303	1116	762	819
V/C Ratio	0.455	0.337	0.299	0.267
Control Delay, s/veh	7.3	6.5	8.2	7.3
LOS	A	A	A	A
95th %tile Queue, veh	2	2	1	1



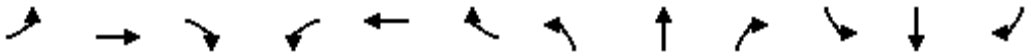
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	221	167	96	14	152	1	53	0	5	0	0	128
Future Volume (vph)	221	167	96	14	152	1	53	0	5	0	0	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	260	196	113	16	179	1	62	0	6	0	0	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	569	0	0	196	0	0	68	0	0	151	0

Intersection Summary

Intersection	
Intersection Delay, s/veh	6.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	569	196	68	151
Demand Flow Rate, veh/h	580	200	69	154
Vehicles Circulating, veh/h	16	328	465	262
Vehicles Exiting, veh/h	400	206	131	266
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.8	5.7	5.0	4.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	580	200	69	154
Cap Entry Lane, veh/h	1358	988	859	1056
Entry HV Adj Factor	0.981	0.982	0.986	0.981
Flow Entry, veh/h	569	196	68	151
Cap Entry, veh/h	1332	970	846	1036
V/C Ratio	0.427	0.203	0.080	0.146
Control Delay, s/veh	6.8	5.7	5.0	4.8
LOS	A	A	A	A
95th %tile Queue, veh	2	1	0	1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	75	410	33	31	285	6	96	0	98	0	0	229
Future Volume (vph)	75	410	33	31	285	6	96	0	98	0	0	229
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	88	482	39	36	335	7	113	0	115	0	0	269
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	609	0	0	378	0	0	228	0	0	269	0

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	609	378	228	269
Demand Flow Rate, veh/h	622	386	232	274
Vehicles Circulating, veh/h	37	205	582	494
Vehicles Exiting, veh/h	731	609	77	97
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	6.7	8.4	8.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	622	386	232	274
Cap Entry Lane, veh/h	1329	1120	762	834
Entry HV Adj Factor	0.980	0.980	0.983	0.982
Flow Entry, veh/h	609	378	228	269
Cap Entry, veh/h	1302	1097	749	819
V/C Ratio	0.468	0.345	0.304	0.329
Control Delay, s/veh	7.5	6.7	8.4	8.2
LOS	A	A	A	A
95th %tile Queue, veh	3	2	1	1

Intersection	
Intersection Delay, s/veh	7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	9	8	2	24	0	15	1	0	0	2	19
Future Vol, veh/h	7	9	8	2	24	0	15	1	0	0	2	19
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	11	9	2	28	0	18	1	0	0	2	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7	7.2	7.4	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	29%	8%	0%
Vol Thru, %	6%	38%	92%	10%
Vol Right, %	0%	33%	0%	90%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	24	26	21
LT Vol	15	7	2	0
Through Vol	1	9	24	2
RT Vol	0	8	0	19
Lane Flow Rate	19	28	31	25
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.031	0.034	0.024
Departure Headway (Hd)	4.242	3.891	4.047	3.507
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	843	921	886	1018
Service Time	2.269	1.911	2.066	1.536
HCM Lane V/C Ratio	0.023	0.03	0.035	0.025
HCM Control Delay	7.4	7	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1

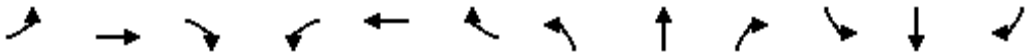
Intersection	
Int Delay, s/veh	6.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	0	0	7	0	0
Future Vol, veh/h	21	0	0	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	0	0	8	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	5	4	0	0	8	0
Stage 1	4	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1017	1080	-	-	1612	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1017	1080	-	-	1612	-
Mov Cap-2 Maneuver	930	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	930	1612	-
HCM Lane V/C Ratio	-	-	0.027	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	273	167	96	14	152	2	53	0	5	0	0	159
Future Volume (vph)	273	167	96	14	152	2	53	0	5	0	0	159
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	321	196	113	16	179	2	62	0	6	0	0	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	630	0	0	197	0	0	68	0	0	187	0

Intersection Summary

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	630	197	68	187
Demand Flow Rate, veh/h	642	201	69	191
Vehicles Circulating, veh/h	16	390	527	262
Vehicles Exiting, veh/h	437	206	131	329
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.5	6.1	5.4	5.2
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	642	201	69	191
Cap Entry Lane, veh/h	1358	927	806	1056
Entry HV Adj Factor	0.981	0.982	0.986	0.979
Flow Entry, veh/h	630	197	68	187
Cap Entry, veh/h	1332	910	794	1034
V/C Ratio	0.473	0.217	0.086	0.181
Control Delay, s/veh	7.5	6.1	5.4	5.2
LOS	A	A	A	A
95th %tile Queue, veh	3	1	0	1

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	29	18	0	17	0	10	1	0	0	0	14
Future Vol, veh/h	24	29	18	0	17	0	10	1	0	0	0	14
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	28	34	21	0	20	0	12	1	0	0	0	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.2	7.4	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	34%	0%	0%
Vol Thru, %	9%	41%	100%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	71	17	14
LT Vol	10	24	0	0
Through Vol	1	29	17	0
RT Vol	0	18	0	14
Lane Flow Rate	13	84	20	16
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.091	0.022	0.016
Departure Headway (Hd)	4.309	3.917	4.049	3.523
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	917	884	1010
Service Time	2.35	1.929	2.072	1.566
HCM Lane V/C Ratio	0.016	0.092	0.023	0.016
HCM Control Delay	7.4	7.3	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.3	0.1	0

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	0	0	24	0	0
Future Vol, veh/h	14	0	0	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	0	0	28	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	15	14	0	0	28	0
Stage 1	14	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1004	1066	-	-	1585	-
Stage 1	1009	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1004	1066	-	-	1585	-
Mov Cap-2 Maneuver	920	-	-	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	1022	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	920	1585	-
HCM Lane V/C Ratio	-	-	0.018	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	694	786	262	213
Demand Flow Rate, veh/h	707	801	267	217
Vehicles Circulating, veh/h	65	226	655	946
Vehicles Exiting, veh/h	1098	696	117	81
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.0	15.5	10.2	13.9
Approach LOS	A	C	B	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	707	801	267	217
Cap Entry Lane, veh/h	1291	1096	707	526
Entry HV Adj Factor	0.981	0.981	0.981	0.982
Flow Entry, veh/h	694	786	262	213
Cap Entry, veh/h	1267	1075	694	516
V/C Ratio	0.547	0.731	0.377	0.413
Control Delay, s/veh	9.0	15.5	10.2	13.9
LOS	A	C	B	B
95th %tile Queue, veh	3	7	2	2

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	16	0	0	0	24	0	0	0	0	0
Future Vol, veh/h	0	0	16	0	0	0	24	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	17	0	0	0	26	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	6.4	0	7.3	0
HCM LOS	A	-	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	0%
Vol Thru, %	0%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	16	0	0
LT Vol	24	0	0	0
Through Vol	0	0	0	0
RT Vol	0	16	0	0
Lane Flow Rate	26	17	0	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.03	0.016	0	0
Departure Headway (Hd)	4.164	3.379	3.992	3.983
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	865	1061	0	0
Service Time	2.166	1.393	2.007	1.991
HCM Lane V/C Ratio	0.03	0.016	0	0
HCM Control Delay	7.3	6.4	7	7
HCM Lane LOS	A	A	N	N
HCM 95th-tile Q	0.1	0	0	0

Intersection	
Intersection Delay, s/veh	15.0
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1094	484	98	148
Demand Flow Rate, veh/h	1115	494	100	151
Vehicles Circulating, veh/h	29	354	945	585
Vehicles Exiting, veh/h	707	691	199	263
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	18.7	10.4	9.6	7.0
Approach LOS	C	B	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	1115	494	100	151
Cap Entry Lane, veh/h	1340	962	526	760
Entry HV Adj Factor	0.981	0.980	0.980	0.980
Flow Entry, veh/h	1094	484	98	148
Cap Entry, veh/h	1314	942	516	745
V/C Ratio	0.832	0.514	0.190	0.199
Control Delay, s/veh	18.7	10.4	9.6	7.0
LOS	C	B	A	A
95th %tile Queue, veh	11	3	1	1

Intersection	
Intersection Delay, s/veh	6.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	33	0	0	0	17	0	0	0	0	0
Future Vol, veh/h	0	0	33	0	0	0	17	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	36	0	0	0	18	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	6.5	0	7.3	0
HCM LOS	A	-	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	0%
Vol Thru, %	0%	0%	100%	100%
Vol Right, %	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	17	33	0	0
LT Vol	17	0	0	0
Through Vol	0	0	0	0
RT Vol	0	33	0	0
Lane Flow Rate	18	36	0	0
Geometry Grp	1	1	1	1
Degree of Util (X)	0.022	0.034	0	0
Departure Headway (Hd)	4.197	3.365	3.992	4.011
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	857	1066	0	0
Service Time	2.201	1.377	2.006	2.02
HCM Lane V/C Ratio	0.021	0.034	0	0
HCM Control Delay	7.3	6.5	7	7
HCM Lane LOS	A	A	N	N
HCM 95th-tile Q	0.1	0.1	0	0

Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	709	788	262	260
Demand Flow Rate, veh/h	723	803	267	265
Vehicles Circulating, veh/h	65	242	671	946
Vehicles Exiting, veh/h	1146	696	117	99
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.2	16.3	10.4	16.4
Approach LOS	A	C	B	C

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	723	803	267	265
Cap Entry Lane, veh/h	1291	1078	696	526
Entry HV Adj Factor	0.980	0.981	0.981	0.981
Flow Entry, veh/h	709	788	262	260
Cap Entry, veh/h	1266	1058	683	516
V/C Ratio	0.560	0.745	0.384	0.504
Control Delay, s/veh	9.2	16.3	10.4	16.4
LOS	A	C	B	C
95th %tile Queue, veh	4	7	2	3

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	9	16	2	24	0	24	1	0	0	2	19
Future Vol, veh/h	7	9	16	2	24	0	24	1	0	0	2	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	10	17	2	26	0	26	1	0	0	2	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7	7.2	7.4	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	96%	22%	8%	0%
Vol Thru, %	4%	28%	92%	10%
Vol Right, %	0%	50%	0%	90%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	32	26	21
LT Vol	24	7	2	0
Through Vol	1	9	24	2
RT Vol	0	16	0	19
Lane Flow Rate	27	35	28	23
Geometry Grp	1	1	1	1
Degree of Util (X)	0.032	0.037	0.032	0.022
Departure Headway (Hd)	4.253	3.785	4.062	3.52
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	842	945	881	1014
Service Time	2.28	1.81	2.086	1.552
HCM Lane V/C Ratio	0.032	0.037	0.032	0.023
HCM Control Delay	7.4	7	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1

Intersection	
Int Delay, s/veh	6.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	0	0	7	0	0
Future Vol, veh/h	21	0	0	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	0	8	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	5	4	0	0	8	0
Stage 1	4	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1017	1080	-	-	1612	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1017	1080	-	-	1612	-
Mov Cap-2 Maneuver	930	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1022	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	930	1612	-
HCM Lane V/C Ratio	-	-	0.025	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	17.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1151	485	98	182
Demand Flow Rate, veh/h	1173	495	100	186
Vehicles Circulating, veh/h	29	412	1003	585
Vehicles Exiting, veh/h	742	691	199	322
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	22.3	11.5	10.3	7.6
Approach LOS	C	B	B	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	1173	495	100	186
Cap Entry Lane, veh/h	1340	906	496	760
Entry HV Adj Factor	0.981	0.980	0.980	0.978
Flow Entry, veh/h	1151	485	98	182
Cap Entry, veh/h	1314	888	486	743
V/C Ratio	0.876	0.546	0.202	0.245
Control Delay, s/veh	22.3	11.5	10.3	7.6
LOS	C	B	B	A
95th %tile Queue, veh	13	3	1	1

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	29	33	0	17	0	17	1	0	0	0	14
Future Vol, veh/h	24	29	33	0	17	0	17	1	0	0	0	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	32	36	0	18	0	18	1	0	0	0	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.3	7.2	7.5	6.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	94%	28%	0%	0%
Vol Thru, %	6%	34%	100%	0%
Vol Right, %	0%	38%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	18	86	17	14
LT Vol	17	24	0	0
Through Vol	1	29	17	0
RT Vol	0	33	0	14
Lane Flow Rate	20	93	18	15
Geometry Grp	1	1	1	1
Degree of Util (X)	0.024	0.1	0.021	0.015
Departure Headway (Hd)	4.329	3.834	4.065	3.541
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	824	936	879	1003
Service Time	2.372	1.853	2.095	1.59
HCM Lane V/C Ratio	0.024	0.099	0.02	0.015
HCM Control Delay	7.5	7.3	7.2	6.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	0	0	24	0	0
Future Vol, veh/h	14	0	0	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	0	0	26	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	14	13	0	0	26	0
Stage 1	13	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	1005	1067	-	-	1588	-
Stage 1	1010	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1005	1067	-	-	1588	-
Mov Cap-2 Maneuver	921	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1022	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	921	1588	-
HCM Lane V/C Ratio	-	-	0.017	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	19.7
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	758	839	262	437
Demand Flow Rate, veh/h	773	855	267	446
Vehicles Circulating, veh/h	65	303	721	907
Vehicles Exiting, veh/h	1288	685	117	251
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.0	23.8	11.3	34.0
Approach LOS	A	C	B	D

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	773	855	267	446
Cap Entry Lane, veh/h	1291	1013	661	547
Entry HV Adj Factor	0.980	0.981	0.981	0.980
Flow Entry, veh/h	758	839	262	437
Cap Entry, veh/h	1266	994	649	536
V/C Ratio	0.599	0.844	0.404	0.815
Control Delay, s/veh	10.0	23.8	11.3	34.0
LOS	A	C	B	D
95th %tile Queue, veh	4	11	2	8

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	161	8	16	2	20	4	24	64	0	1	137	234
Future Vol, veh/h	161	8	16	2	20	4	24	64	0	1	137	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	175	9	17	2	22	4	26	70	0	1	149	254
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	8.6	8.9	11.3
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	87%	8%	0%
Vol Thru, %	73%	4%	77%	37%
Vol Right, %	0%	9%	15%	63%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	185	26	372
LT Vol	24	161	2	1
Through Vol	64	8	20	137
RT Vol	0	16	4	234
Lane Flow Rate	96	201	28	404
Geometry Grp	1	1	1	1
Degree of Util (X)	0.134	0.29	0.041	0.481
Departure Headway (Hd)	5.041	5.195	5.265	4.285
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	686	673	837
Service Time	3.106	3.266	3.355	2.328
HCM Lane V/C Ratio	0.136	0.293	0.042	0.483
HCM Control Delay	8.9	10.4	8.6	11.3
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.5	1.2	0.1	2.7

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	161	8	16	2	20	4	24	64	0	1	137	234
Future Vol, veh/h	161	8	16	2	20	4	24	64	0	1	137	234
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	175	9	17	2	22	4	26	70	0	1	149	254

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	413	400	276	413	527	70	403	0	0	70	0	0
Stage 1	278	278	-	122	122	-	-	-	-	-	-	-
Stage 2	135	122	-	291	405	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	549	538	763	549	456	993	1156	-	-	1531	-	-
Stage 1	728	680	-	882	795	-	-	-	-	-	-	-
Stage 2	868	795	-	717	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	517	525	763	520	445	993	1156	-	-	1531	-	-
Mov Cap-2 Maneuver	517	525	-	520	445	-	-	-	-	-	-	-
Stage 1	711	679	-	862	777	-	-	-	-	-	-	-
Stage 2	821	777	-	691	597	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.8	12.8	2.2	0
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1156	-	-	532	492	1531	-	-
HCM Lane V/C Ratio	0.023	-	-	0.378	0.057	0.001	-	-
HCM Control Delay (s)	8.2	0	-	15.8	12.8	7.4	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	3	223	6	1	354
Future Vol, veh/h	18	3	223	6	1	354
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	3	242	7	1	385

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	633	246	0	0	249	0
Stage 1	246	-	-	-	-	-
Stage 2	387	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	444	793	-	-	1317	-
Stage 1	795	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	444	793	-	-	1317	-
Mov Cap-2 Maneuver	536	-	-	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	685	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	562	1317	-
HCM Lane V/C Ratio	-	-	0.041	0.001	-
HCM Control Delay (s)	-	-	11.7	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	26.3
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1268	470	96	288
Demand Flow Rate, veh/h	1293	480	98	294
Vehicles Circulating, veh/h	28	597	1128	545
Vehicles Exiting, veh/h	811	629	193	532
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	34.9	16.4	12.0	9.2
Approach LOS	D	C	B	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	1293	480	98	294
Cap Entry Lane, veh/h	1341	751	437	791
Entry HV Adj Factor	0.980	0.979	0.980	0.980
Flow Entry, veh/h	1268	470	96	288
Cap Entry, veh/h	1315	734	428	775
V/C Ratio	0.964	0.639	0.224	0.371
Control Delay, s/veh	34.9	16.4	12.0	9.2
LOS	D	C	B	A
95th %tile Queue, veh	19	5	1	2

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	288	25	33	0	13	3	17	59	0	4	94	157
Future Vol, veh/h	288	25	33	0	13	3	17	59	0	4	94	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	313	27	36	0	14	3	18	64	0	4	102	171
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.1	8.4	9.2	10.4
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	83%	0%	2%
Vol Thru, %	78%	7%	81%	37%
Vol Right, %	0%	10%	19%	62%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	76	346	16	255
LT Vol	17	288	0	4
Through Vol	59	25	13	94
RT Vol	0	33	3	157
Lane Flow Rate	83	376	17	277
Geometry Grp	1	1	1	1
Degree of Util (X)	0.122	0.513	0.026	0.36
Departure Headway (Hd)	5.328	4.915	5.291	4.679
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	666	726	681	762
Service Time	3.416	2.987	3.291	2.743
HCM Lane V/C Ratio	0.125	0.518	0.025	0.364
HCM Control Delay	9.2	13.1	8.4	10.4
HCM Lane LOS	A	B	A	B
HCM 95th-tile Q	0.4	3	0.1	1.6

Intersection	
Int Delay, s/veh	9.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	288	25	33	0	13	3	17	59	0	4	94	157
Future Vol, veh/h	288	25	33	0	13	3	17	59	0	4	94	157
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	313	27	36	0	14	3	18	64	0	4	102	171

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	305	296	188	327	381	64	273	0	0	64	0	0
Stage 1	196	196	-	100	100	-	-	-	-	-	-	-
Stage 2	109	100	-	227	281	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	647	616	854	626	552	1000	1290	-	-	1538	-	-
Stage 1	806	739	-	906	812	-	-	-	-	-	-	-
Stage 2	896	812	-	776	678	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	624	606	854	572	543	1000	1290	-	-	1538	-	-
Mov Cap-2 Maneuver	624	606	-	572	543	-	-	-	-	-	-	-
Stage 1	795	737	-	893	801	-	-	-	-	-	-	-
Stage 2	865	801	-	714	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.4	11.2	1.8	0.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1290	-	-	639	594	1538	-	-
HCM Lane V/C Ratio	0.014	-	-	0.589	0.029	0.003	-	-
HCM Control Delay (s)	7.8	0	-	18.4	11.2	7.3	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	3.8	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	2	330	20	4	243
Future Vol, veh/h	12	2	330	20	4	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	2	359	22	4	264

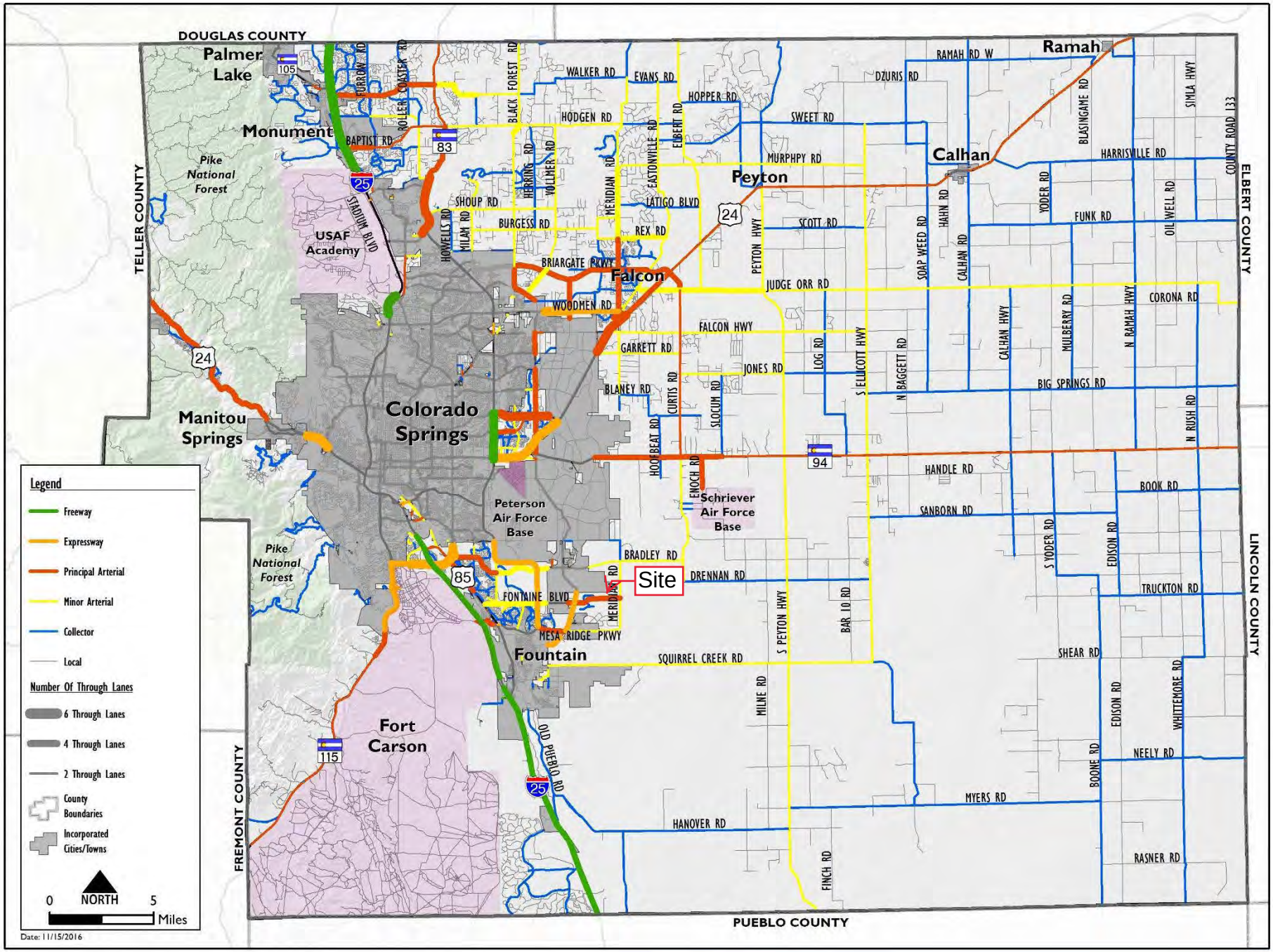
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	642	370	0	0	381	0
Stage 1	370	-	-	-	-	-
Stage 2	272	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	438	676	-	-	1177	-
Stage 1	699	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	436	676	-	-	1177	-
Mov Cap-2 Maneuver	532	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	771	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	549	1177	-
HCM Lane V/C Ratio	-	-	0.028	0.004	-
HCM Control Delay (s)	-	-	11.7	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

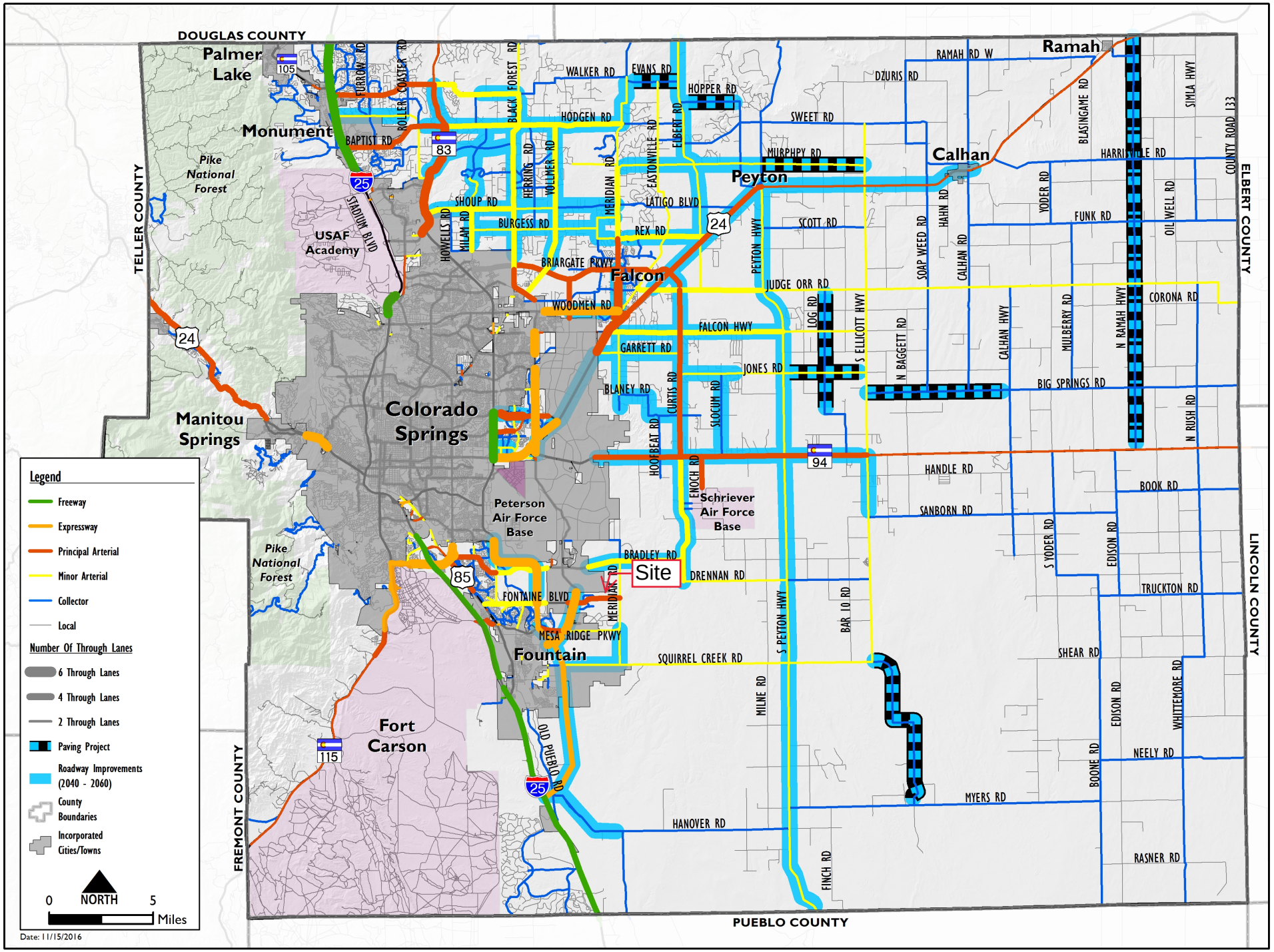
MTCP Maps

TRANSPORTATION
CONSULTANTS, INC.



Map 14: 2040 Roadway Plan (Classification and Lanes)

Map 17: 2060 Corridor Preservation



Bull Run Conceptual Layout

TRANSPORTATION
CONSULTANTS, INC.

N

GRAPHIC SCALE

500 0 250 500 1000

(IN FEET)
1 inch = 500 ft.

Drennan Road (planned as Collector in EPC 2040 MTCP)

Powerline Easement/ Open Space

Residential Collector (60' ROW)

41.2 AC.
10-12 DU/AC
450 DU

Water Tank

Park

Residential Collector

135.8 AC.
10-12 DU/AC
1,440 DU

Channel/ Floodplain

126.3 AC.
10-12 DU/AC
1390 DU

43.5 AC.
10-12 DU/AC
480 DU

Meridian Road (planned as Collector in EPC 2040 MTCP)

96.2 AC.
10-12 DU/AC
1060 DU

Powerline Easement/ Open Space

9.8 AC.
10-12 DU/AC
105 DU

81.8 AC.
10-12 DU/AC
900 DU

29.3 AC.
10-12 DU/AC
320 DU

29.8 AC.
20-24 DU/AC
650 DU

Non-Residential Collector (80' ROW)

30.0 AC.
High School

14.7 AC.
20-24 DU/AC
325 DU

Bradley Road (planned as Minor Arterial in EPC 2040 MTCP)

25.3 AC.
10-12 DU/AC
280 DU

5.1 AC.
Fire Station

62.6 AC.
10-12 DU/AC
690 DU

SDS

25.2 AC.
10-12 DU/AC
275 DU

74.1 AC.
10-12 DU/AC
815 DU

16.6 AC.
10-12 DU/AC
180 DU

47.8 AC.
10-12 DU/AC
525 DU

Banning Lewis Ranch

211.7 AC.
10-12 DU/AC
2,325 DU

143.0 AC.
10-12 DU/AC
1,575 DU

18.1 AC.
10-12 DU/AC
200 DU

Lorson Ranch

Park

DATA CHART:

Total Site = 1,564 Ac.

Total Residential = 1,227.9 Ac.
Total Units = 13,985
School Sites = 30.0 Ac.
Open Space/ Parks = 144.9 Ac.
Channel/ Floodplain = 126.1 Ac.
Other (Fire Station/ Water Tank/ Major R.O.W.) = 35.1 Ac.

Intersection of Lamprey Dr/ Grayling Dr

ROLLING HILLS

Matrix
Excellence by Design
2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Contact: Jason Alwine
Phone (719) 575-0100 | Fax (719) 575-0208

S:\20.1129.007 Rolling Hills\100 Dwg\105 Exhibits
Rolling Hills_Concept05

CONCEPTUAL LAYOUT 05

08/13/2021