Appendix K.1

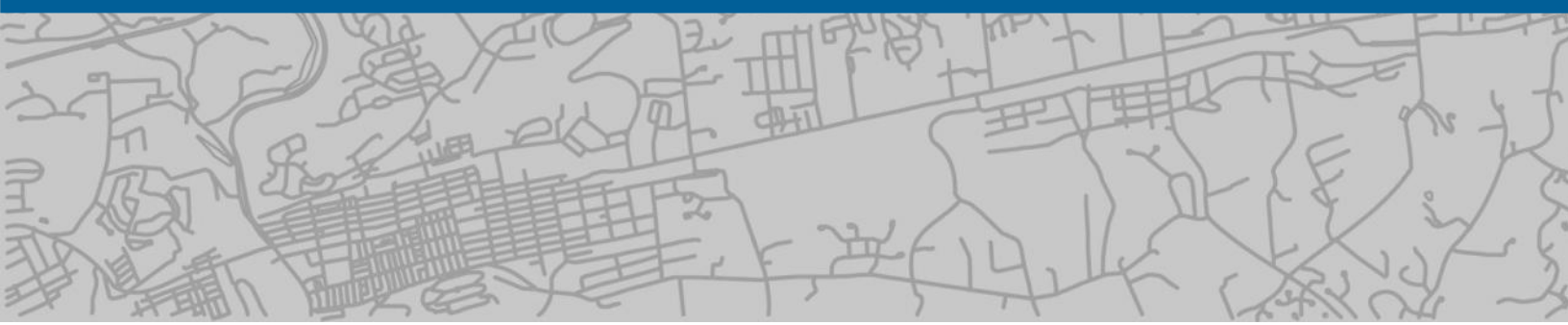
Transportation Impact Assessment

KITTELSON & ASSOCIATES

STARLIGHT SOLAR TRANSPORTATION IMPACT ASSESSMENT

COUNTY OF SAN DIEGO, CA

February 16, 2024



Starlight Solar Transportation Impact Assessment

County of San Diego, CA

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Project Number 29233

February 16, 2024

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INTRODUCTION

Starlight Solar, LLC (Applicant) is requesting a major use permit (MUP) from County of San Diego (County) to develop, finance, construct, and operate an unmanned renewable energy solar and battery storage project (project) in the southeastern region of the County.

Kittelson and Associates, Inc (Kittelson) prepared this transportation impact assessment to identify potential traffic effects associated with the construction and operations of the proposed Starlight Solar. The analysis documented in this report was performed to comply with methodologies identified in the *County of San Diego Transportation Study Guidelines* adopted September 2022.

The report covers the following transportation analyses:

- Project Description
  - Project location
  - Project trip generation and trip distribution
- CEQA VMT Assessment
- Local Mobility Analysis (LMA)
  - Methodology and Thresholds
  - Existing Conditions
  - Construction Phase I Conditions
  - Construction Phase II Conditions
  - Operational Conditions
  - Recommendations

PROJECT DESCRIPTION

The proposed project is a solar facility that would generate and store solar energy.

The proposed project is located south of Interstate 8 and Old Highway 80 and east of Tierra Del Sol Road in unincorporated San Diego County, south of the community of Boulevard and approximately 0.93 mile north of the United States/Mexico border as shown in Figure 1. The entire project site is currently undeveloped. The parcel is currently zoned as Rural Lands 80 (RL-80) and the County's Zoning Ordinance identifies the site as General Rural (S-92). The County's General Regulation Section 6954 states that solar energy systems for off-site use are considered Major Impact Service and Utility in all zones and thus require the approval of an MUP (County of San Diego 2022).[1] The proposed site plan is provided in Appendix A.

The project site would be divided into eight solar array areas totaling approximately 581 acres, an off-site generation tie-line (gen-tie) area of 7 acres, and an off-site vehicle turnaround area on Jewel Valley Road. The underground gen-tie line would be located on the east side of Tule Jim Lane and connect into the southeastern corner of the SDG&E Boulevard Substation. The project would be constructed in two separate phases. Phase I encompasses approximately 125 acres and includes the development of a PV system capable of generating up to 20 MW of solar energy and providing 17.4 MW of battery storage. Phase II encompasses approximately 456 acres and includes the development of a PV system capable of generating up to 80 MW of solar energy and providing 200 MW of battery storage.

Regional access to the project site would be provided by State Route 94 and Interstate 8. Access to the project site would be provided by Jewel Valley Road, which connects to Old Highway 80 in the town of

[1] County of San Diego, Planning and Development Services, Applicant's Guide for a Solar Energy System (Zoning Division), 2023. https://www.sandiegocounty.gov/pds/zoning/formfields/PDS-316.pdf

Boulevard. Additional emergency fire access would be provided via Tule Jim Lane which also connects to Old Highway 80 in the town of Boulevard.

SITE ACCESS

Access to the Project site would be provided via Jewel Valley Road, which can be accessed regionally from the interchange with Interstate 8 or the intersection with State Route 94 / Old Highway 80. There would be three site access locations, one during Phase I of the project and then all three for Phase II of the project, described and labeled from north to south as follows:

Access Point A/Jewel Valley Road (Gate 3) [Phase II]

- Construct a full access driveway for use during Phase II to access areas north/east of Jewel Valley Road, per County of San Diego standards, approximately 1.7 miles south of the Interstate 8 interchange;
- Provide a single westbound shared left/through/right-turn lane from the Project site;
- No changes planned for Jewel Valley Road

Access Point B/Jewel Valley Road (Gate 4) [Phase II]

- Construct a full access driveway for use during Phase II to access areas south of Jewel Valley Road, per County of San Diego standards, approximately 2.1 miles south of the Interstate 8 interchange;
- Provide a single northbound shared left/through/right-turn lane from the Project site;
- No changes planned for Jewel Valley Road

Access Point C/Jewel Valley Road (Gate 2) [Phase I and II]

- Construct a full access driveway for use during Phase I and II, per County of San Diego standards, approximately 2.3 miles southeast of the Interstate 8 interchange;
- Provide a single southbound shared left/through/right-turn lane from the Project site;
- No changes planned for Jewel Valley Road

The Project would use a just-in-time delivery system with supplies and components delivered on a schedule to minimize on-site storage needs.

A vehicle turnaround location would also be created along Jewel Valley Road in the center of the project site. The turnaround shall be designed in accordance with County of San Diego design standard DS-06 for a County emergency fire apparatus.

Internal Circulation

All internal access road surfaces would be Class II, composed of decomposed granite and would be permeable in order to reduce fugitive dust and erosion in accordance with County Code Section 87.428, Dust Control Measures, and with San Diego Air Pollution Control District Rule 55, which regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions. Traffic speeds on unpaved driveways would be limited to 15 mph.

PROJECT LOCATION

The existing conditions of nearby roadways and intersections were reviewed to gain an understanding of the project site area. The existing conditions review involved mapping, reviewing, and documenting existing land use, multi-modal transportation infrastructure, and roadway characteristics. The findings from the existing conditions review are summarized below. The project location can be visualized in Figure 1.

ROADWAY FACILITIES

The project site connects with Jewel Valley Road in San Diego. A detailed explanation of each roadway per County of San Diego Mobility Element[2] is provided below:

- **Interstate 8** is classified as a freeway and typically has four (two lanes in each direction) in the vicinity of the project site. The posted speed limit is 65 miles per hour. Interchanges near the project site are located at Ribbonwood Road/Jewel Valley Road, Carrizo Gorge Road, and Old Highway 80.
- **Ribbonwood Road/Jewel Valley Road** is classified as a local public road and has two travel lanes (one lane in each direction). Ribbonwood Road connects with I-8 at its northern end and turns into Jewel Valley Road at Old Highway 80 and continues until it terminates into dirt roads at the eastern end of the airstrip and project site. The posted speed limit is 30 miles per hour.
- **Avenue de Robles Verdes** is classified as a local public road and has two travel lanes (one lane in each direction). Avenue de Robles Verdes provides access to areas west of its intersection with State Route 94. The posted speed limit is 30 miles per hour.
- **Old Highway 80** is classified as a light collector and is an undivided highway with two lanes (one lane in each direction). O0ld Highway 80 connects Ribbonwood Road/Jewel Valley Road with Jacumba Hot Springs. The posted speed limit is 40 miles per hour.
- **State Route 94** is Jewel Valley Road between I-8 and Old Highway 80, and west of Old Highway 80 as it turns into Campo Road and connects with Jamul and the more urban areas of San Diego County.

No network changes are proposed as part of the project. There is no pedestrian, bicyclist, or transit access along any of these roadways.

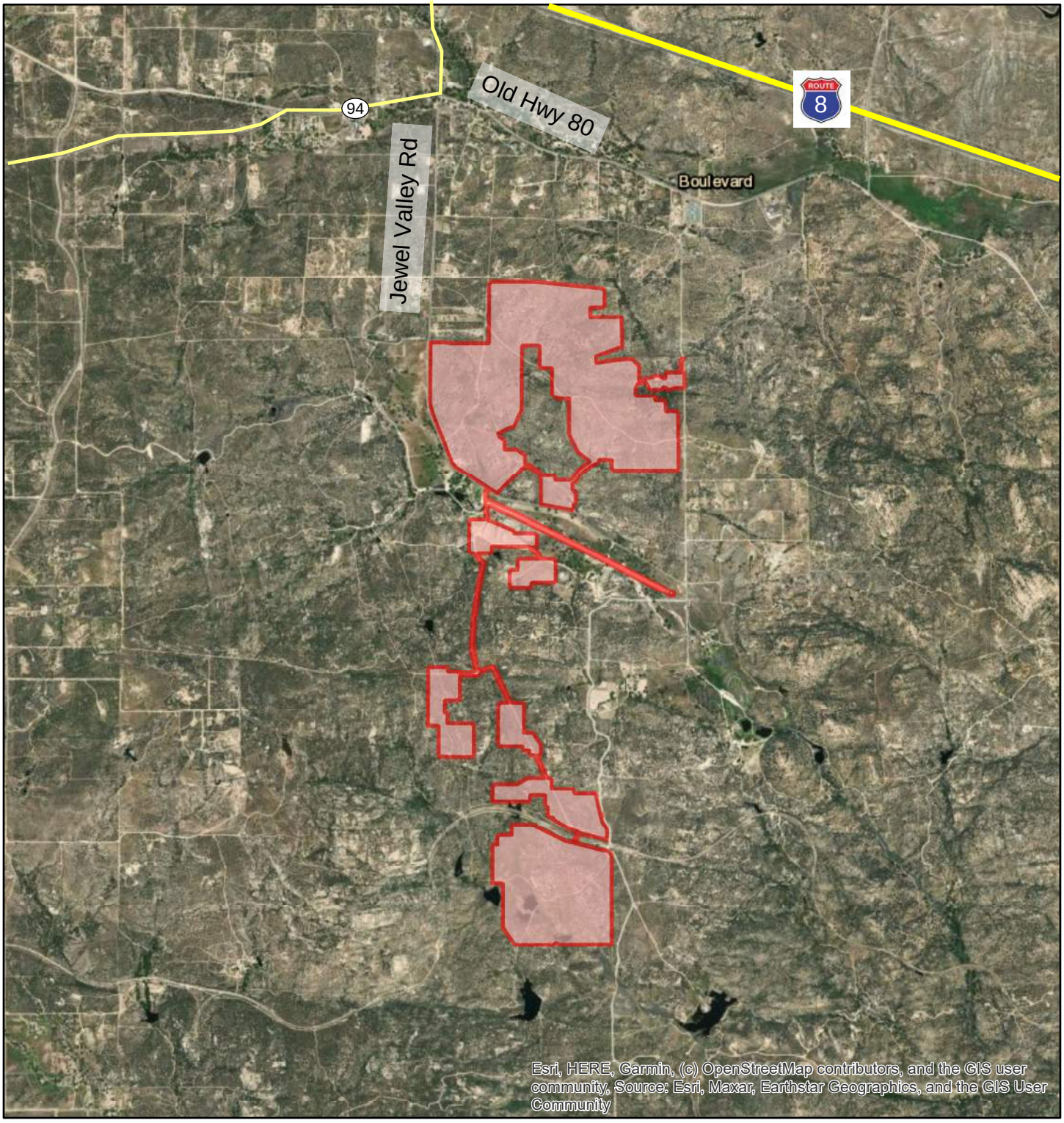
BICYCLE AND PEDESTRIAN TRAVEL

There are no existing pedestrian or bicyclist facilities along any of the roadways surrounding the Project site.

LAND USE CONTEXT

The project parcel is surrounded primarily by general rural, open space, and agricultural uses. North of the project, there are rural residential, residential mobile home, and commercial and office uses.

[2] County of San Diego General Plan, Mobility Element (June 2014). *Mobility Element Network.*



Project Site

Figure 1
Site Location
Starlight Solar TIA

KITTELSON & ASSOCIATES

Miles
0 ½

TRIP GENERATION

After the construction is finished and the Project site is in operation, trip generation for the site will be nominal. The solar facility is generally unmanned during operation and trips to the site are needed occasionally for security, maintenance, and repairs. Therefore, this transportation analysis focuses on potential impacts during project construction.

Trips generated by construction of the proposed project were developed using information provided by the Applicant based on anticipated construction work efforts and schedule. The highest number of trips would generally be from construction workers traveling to and from the site each day. Additional trips generated during construction would be comprised of heavy trucks delivering materials and construction equipment to the site and occasional water trucks. Construction of Phase I would occur over approximately 12 months (Fall 2024 through Fall 2025), and Phase II would occur over approximately 18 months (Spring 2026 through Winter 2027). Construction is assumed to occur Monday through Friday with primary hours between 6:00 a.m. to 4:00 p.m.

The workforce for onsite construction activities includes laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The onsite construction workforce is anticipated to have a peak workforce of up to 90 workers during Phase I and 225 workers during Phase II. The following assumptions were assumed to estimate trip generation associated with construction workers:

- Due to the remote location of the project site, it is assumed that 30% of workers would be able to carpool. This results in a 15% reduction of vehicles traveling to and from the site.
- 65% of workers would travel to the project site during a single peak hour between 7:00 – 9:00 a.m. The remaining 35% would travel either before or after the peak hour. All trips in the morning would be inbound towards the site.
- 65% of workers would travel from the project site during a single peak hour between 4:00 – 6:00 p.m. The remaining 35% would travel either before or after the peak hour. All trips in the afternoon would be outbound from the site.
- 15% of workers would make an additional trip during the day that would occur outside of the morning and afternoon peak hours. This accounts for workers leaving for lunch and additional miscellaneous trips that are to be expected. These trips are included in the daily trip estimates but would not be shown in peak hour operation analyses.

The heavy truck needs for construction activities includes material and equipment delivery. The average daily number of construction trucks is anticipated to be 164 trucks during Phase I and 466 trucks during Phase II. The following assumptions were assumed to estimate trip generation associated with heavy trucks:

- 10% of trucks would travel to and from the project site during the morning peak hour. Both an inbound and outbound trip for this 10% of trucks is assumed during the peak hour.
- 5% of trucks would travel to and from the project site during the afternoon peak hour. Both an inbound and outbound trip for this 5% of trucks is assumed during the peak hour.
- The remaining 80% of trucks would travel either before or after the peak hours. Each truck would make an inbound trip towards the site and an outbound trip from the site.
- To account for the effect of heavy trucks on intersection operations, a passenger car equivalent of 2.5 was applied to the truck volumes and the resulting number was used for trip assignment.

The number of water trucks was determined based off the estimated total construction water demand and the capacities of the water tanks. The estimated total construction water demand is 26,086 gallons per day for Phase I and 24,996 gallons per day for Phase II, with a water truck tank capacity of 10,000 gallons. Therefore, it is estimated that there will be 3 round-trip truck trips for both Phase I and for Phase II. It is assumed one trip would occur during the morning peak hour and the other two would occur at non-peak times of the day.

The construction trip generation is summarized in Table 1. Based on the available information and listed assumptions, it is estimated that the project would generate a total of 514 daily trips during Phase I with a passenger car equivalent of 1,015 trips to account for heavy trucks. This includes the passenger car equivalent of 138 trips (94 in, 44 out) during the AM peak hour and 92 trips (21 in, 71 out) during the PM peak hour. Phase II would a total of 1,388 daily trips with a passenger car equivalent of 2,795 trips to account for heavy trucks and include 364 trips (244 in, 120 out) during the AM peak hour and 142 trips (59 in, 183 out) during the PM peak hour.

Table 1: Project Construction Daily Trip Generation

Trip Type	Number of Workers/ Trucks	Passenger Car Equivalent	Vehicle Trips				
			Daily	AM Peak Hour		PM Peak Hour	
				In	Out	In	Out
Phase I							
Workers	90	1.0	180	50	0	0	50
Heavy Duty Trucks	164	2.5	820	41	41	21	21
Water Trucks	3	2.5	15	3	3	0	0
		Total	**1,015**	**94**	**44**	**21**	**71**
Phase II							
Workers	225	1.0	450	124	0	0	124
Heavy Duty Trucks	466	2.5	2,330	117	117	59	59
Water Trucks	3	2.5	15	3	3	0	0
		Total	**2,795**	**244**	**120**	**59**	**183**

SOURCE: KITTELSON & ASSOCIATES, INC (2023)

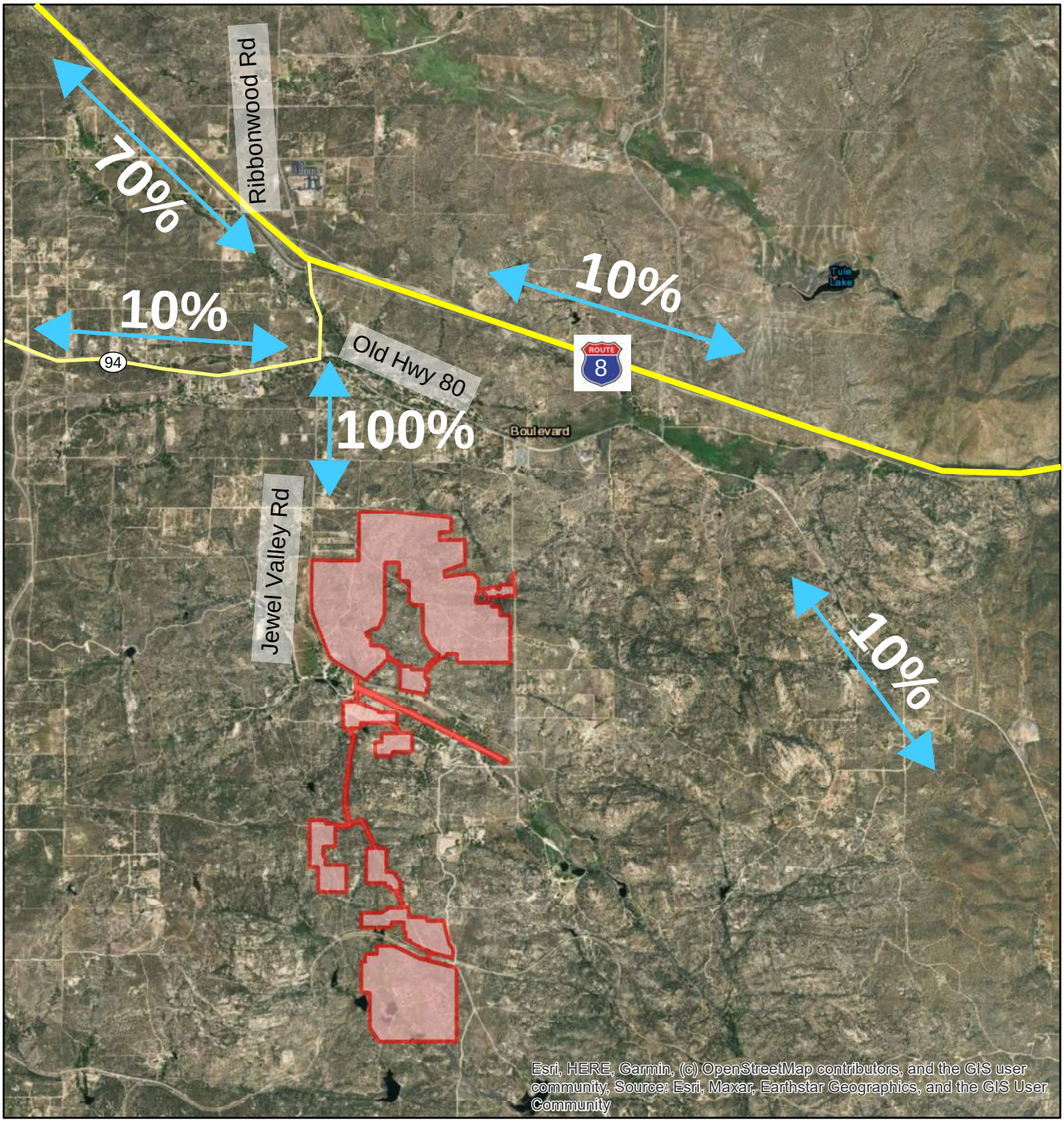
TRIP DISTRIBUTION

The proposed project's trip distribution was developed based on a review of the adjacent roadway network and surrounding land uses to determine anticipated origins and paths of travel. The following is the resulting general project traffic distribution assumed for this analysis (shown in Figure 2):

- 70% of trips to/from the west using I-8 and the Jewel Valley Road interchange
- 10% of trips to/from the east using I-8 and the Jewel Valley Road interchange
- 10% of trips to/from the east using I-8 and the Old Highway 80 interchange
- 10% of trips to/from the west using State Route 94 (Campo Road / Old Highway 80)
- 100% of trips use Jewel Valley Road south of the intersection with Old Highway 80

TRIP ASSIGNMENT

The trip generation volumes were applied to the trip distribution to calculate the number of vehicle trips the project would add to the surrounding roadway network during each phase of construction. The resulting trip assignment for Phase I and Phase II during the weekday AM and PM peak hours at the study area intersections are shown in Figure 3 and Figure 4, respectively.

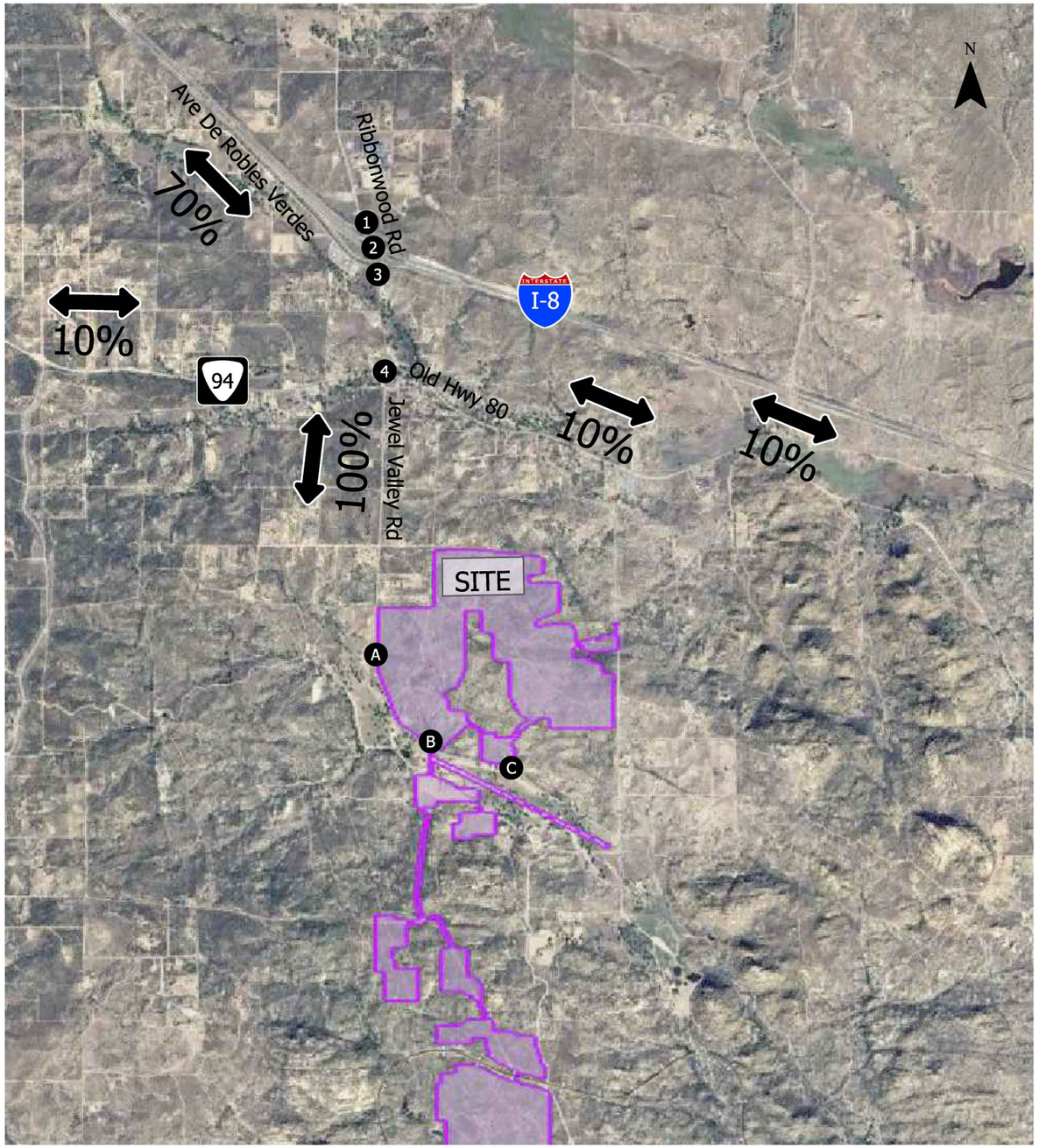


Project Site

Figure 2
Trip Distribution
Starlight Solar TIA

KITTELSON & ASSOCIATES

Miles
0 ½



1 Ribbonwood Rd & I-8 WB Ramps

0(0) 0(0) 0(0)		0(0) 0(0) 9(2)
0(0) 0(0) 0(0)		31(50) 0(0) 0(0)

4 Jewel Valley Rd & Old Hwy 80

0(0) 75(17) 0(0)		0(0) 0(0) 10(2)
0(0) 0(0) 9(2)		4(7) 35(57) 5(7)

C Phase 1 and 2 Access C & Jewel Valley Rd

44(71) 0(0) 0(0)		0(0) 0(0) 0(0)
94(21) 0(0) 0(0)		0(0) 0(0) 0(0)

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 9(2) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 66(15)		0(0) 31(50) 4(7)

A Jewel Valley Rd & Phase 2 Access A

0(0) 94(21) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 44(71) 0(0)

3 Ribbonwood Rd & Ave De Robles Verdes

0(0) 75(17) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 35(57) 0(0)

B Jewel Valley Rd & Phase 2 Access B

0(0) 94(21) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 44(71) 0(0)

*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

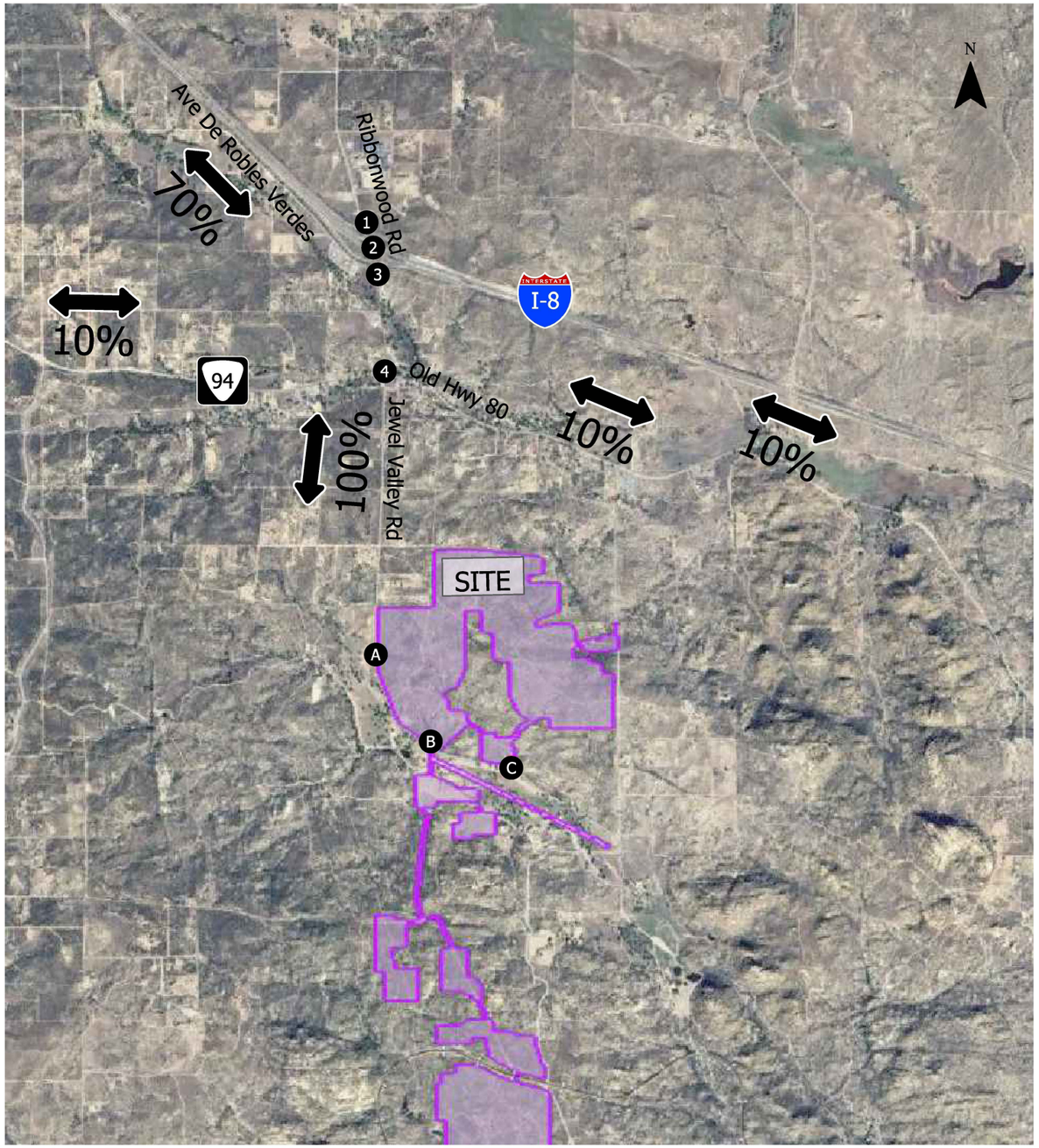
(##) - Study Intersections

- Stop Sign

XX% - Trip Distribution

Weekday AM (PM) Project Site Trips Distribution & Assignment - Phase 1
San Diego County, California

Figure 3



1 Ribbonwood Rd & I-8 WB Ramps

0(0) 0(0) 0(0)		0(0) 0(0) 24(6)
0(0) 0(0) 0(0)	84(128) 0(0) 0(0)	

4 Jewel Valley Rd & Old Hwy 80

0(0) 195(47) 0(0)		0(0) 0(0) 25(6)
0(0) 0(0) 24(6)	12(18) 96(146) 12(19)	

C Phase 1 and 2 Access C & Jewel Valley Rd

12(18) 0(0) 0(0)		0(0) 0(0) 0(0)
24(5) 0(0) 0(0)	0(0) 0(0) 0(0)	

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 24(6) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 171(41)	0(0) 84(128) 12(18)	

A Jewel Valley Rd & Phase 2 Access A

0(0) 146(35) 98(24)		48(73) 0(0) 0(0)
0(0) 0(0) 0(0)	0(0) 72(110) 0(0)	

3 Ribbonwood Rd & Ave De Robles Verdes

0(0) 195(47) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)	0(0) 96(146) 0(0)	

B Jewel Valley Rd & Phase 2 Access B

122(30) 24(5) 0(0)		0(0) 0(0) 0(0)
60(92) 0(0) 0(0)	0(0) 12(18) 0(0)	

*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

- Study Intersections
- Stop Sign
- Trip Distribution
XX%

Weekday AM (PM) Project Site Trips Distribution & Assignment - Phase 2
San Diego County, California

Figure 4

VMT ASSESSMENT

CEQA analysis requires an evaluation of project impacts related to vehicle miles travelled (VMT). However, a detailed CEQA assessment is not required for land use elements of a project that meet certain screening criteria, described below.

SCREENING CRITERIA

According to the County of San Diego Transportation Analysis Guidelines and supporting Scoping Agreement for Transportation Studies, a project can meet screening criteria for project type or project location.

Project type screening looks at the following five screening criteria that would assume the project to have a less than significant impact to VMT:

1. **Small Projects.** Projects that generate or attract fewer than 110 vehicle trips per day are classified as 'small projects'.
2. **Small Service/Retail Projects.** Projects that are a service or retail use with 50,000 square feet gross floor area or less.
3. **Mixed-Use Projects.** Projects screened out based on their location on the SANDAG screening map for VMT/service population.
4. **Local-Serving Retail/Public Facility/Recreational.** Projects that are locally serving and are either a retail or public service or recreational land use.
5. **Redevelopment Projects.** Projects that are replacing an existing VMT-generating land use and do not result in a net overall increase or projects that redevelop an affordable housing site with all proposed units as affordable housing units.

Additional screening criteria related to project location are also included if the project type is not screened out. These include considerations of VMT/resident, VMT/employee, VMT/service population, and designated infill areas based on the County screening maps and the project location and type. This level of screening was not needed for the proposed project.

SCREENING RESULTS

A review of the County TIA Guidelines has determined that the project meets one of the five VMT project type screening criteria – small projects. Therefore, the project is presumed to have a less than significant impact on VMT and is exempt from detailed VMT analysis. Table 2 provides a VMT screening summary for the project.

Table 2: VMT Screening Summary

VMT Screening Criteria	Criterion Met?	Reasoning
Small Projects	**Yes**	The proposed project would generate nominal daily primary vehicle trips once operational. Construction traffic is not considered for VMT analyses due to its temporary effect on the roadway network.
Small Service/Retail Project	No	The proposed project is not a service or retail land use.
Mixed-Use Project	No	The proposed project does not include a mix of land uses.
Locally Serving Retail / Public Facility / Recreational	No	The project is not a locally serving public facility, providing a more regional area.
Redevelopment Projects	No	The project is not a redevelopment project.

SOURCE: KITTELSON & ASSOCIATES, INC., 2023

LOCAL MOBILITY ANALYSIS

A level-of-service (LOS) analysis was conducted to determine if there are potential adverse effects to intersections or roadways near the project. Phase I of the project is planned to occur in 2024-2025 and Phase II of the project is planned to occur in 2026-2027. The latter of the two-year construction timeframes was used to show larger background growth. The baseline intersection data was collected in 2023.

INTERSECTION OPERATIONS ANALYSIS

SCENARIOS

The following scenarios were analyzed as part of the LMA:

- Existing (2023)
- Phase I Construction Year Baseline (1% annual growth from existing to estimate year 2025)
- Phase I Construction Year with Construction
- Phase II Construction Year Baseline (1% annual growth from existing to estimate year 2027)
- Phase II Construction Year with Construction

STUDY AREA

The study area was determined based on access to the project site and was identified through the scoping process with County staff. The scoping agreement is included in Appendix B.

A total of four (4) study intersections and three (3) access points (listed in Table 3) were selected for analysis in coordination with County staff. Figure 5 illustrates the lane geometry of each study intersection and traffic control devices at the intersections.

Table 3. Study Intersections

ID	Intersection	Control Type
1	Ribbonwood Road / I-8 WB Ramps	Stop-Controlled
2	Ribbonwood Road / I-8 EB Ramps	Stop-Controlled
3	Ribbonwood Road / Avenue de Robles Verdes	Stop-Controlled
4	Jewel Valley Road / Old Highway 80	Stop-Controlled
A	Jewel Valley Road / Access A	Stop-Controlled
B	Jewel Valley Road / Access B	Stop-Controlled
C	Jewel Valley Road / Access C	Stop-Controlled

INTERSECTION ANALYSIS METHODOLOGY

The following list contains assumptions for the peak hour factor (PHF) and heavy vehicle percent used in the intersection analyses:

- Peak-hour factor from the traffic counts measured in field were used for all scenarios.
- The heavy vehicle percents from the traffic counts was input into all scenarios.
- Project-related heavy vehicles were converted to passenger car equivalents using a factor of 2.5 in the trip generation calculations. The resulting trip assignment applied to the network includes the effect of heavy vehicles through this methodology.

LOS describes the operating conditions experienced by motorists. LOS is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions and delay, freedom to maneuver, driving comfort, and convenience. LOS A through LOS F covers the entire range of traffic operations that might occur. Motorists using a facility that operates at a LOS A experience very little delay, while those using a facility that operates at a LOS F will experience long delays. Intersection analyses for the four study intersections were conducted using the operational methodologies outlined in the 7th Edition of the Highway Capacity Manual (HCM) methodology (Transportation Research Board, Washington, D.C., 2016), calculated with Synchro software. The Synchro analysis reports are available for reference Appendix D.

For unsignalized intersections, the HCM methodology is used to calculate the weighted average control delay for each controlled intersection leg and for the intersection as a whole. In the case of two-way stop-controlled intersections, the LOS for the worst approach is used as the performance measure for the level of service. The level of service designation for a signalized intersection is determined by calculating a weighted average control delay in seconds per vehicle.

Table 4 presents the relationship of average delay to level of service for both signalized and unsignalized intersections. The study area does not include signalized intersections and those definitions are provided for informational purposes.

Table 4 Level of Service Definition for Intersections

Level of Service	Delay Per Vehicle (Seconds)	
	Signalized Intersection	Unsignalized Intersection
A	< 10.0	< 10.0
B	> 10.0 to 20.0	> 10.0 to 15.0
C	> 20.0 to 35.0	> 15.0 to 25.0
D	> 35.0 to 55.0	> 25.0 to 35.0
E	> 55.0 to 80.0	> 35.0 to 50.0
F	> 80.0	> 50.0

SOURCE: HIGHWAY CAPACITY MANUAL

REGULATORY STANDARDS

Regulatory standards were identified using the County of San Diego Transportation Study Guidelines adopted September 2022.

To determine potential adverse effects, LOS D was used as the allowable peak hour system performance for the study.

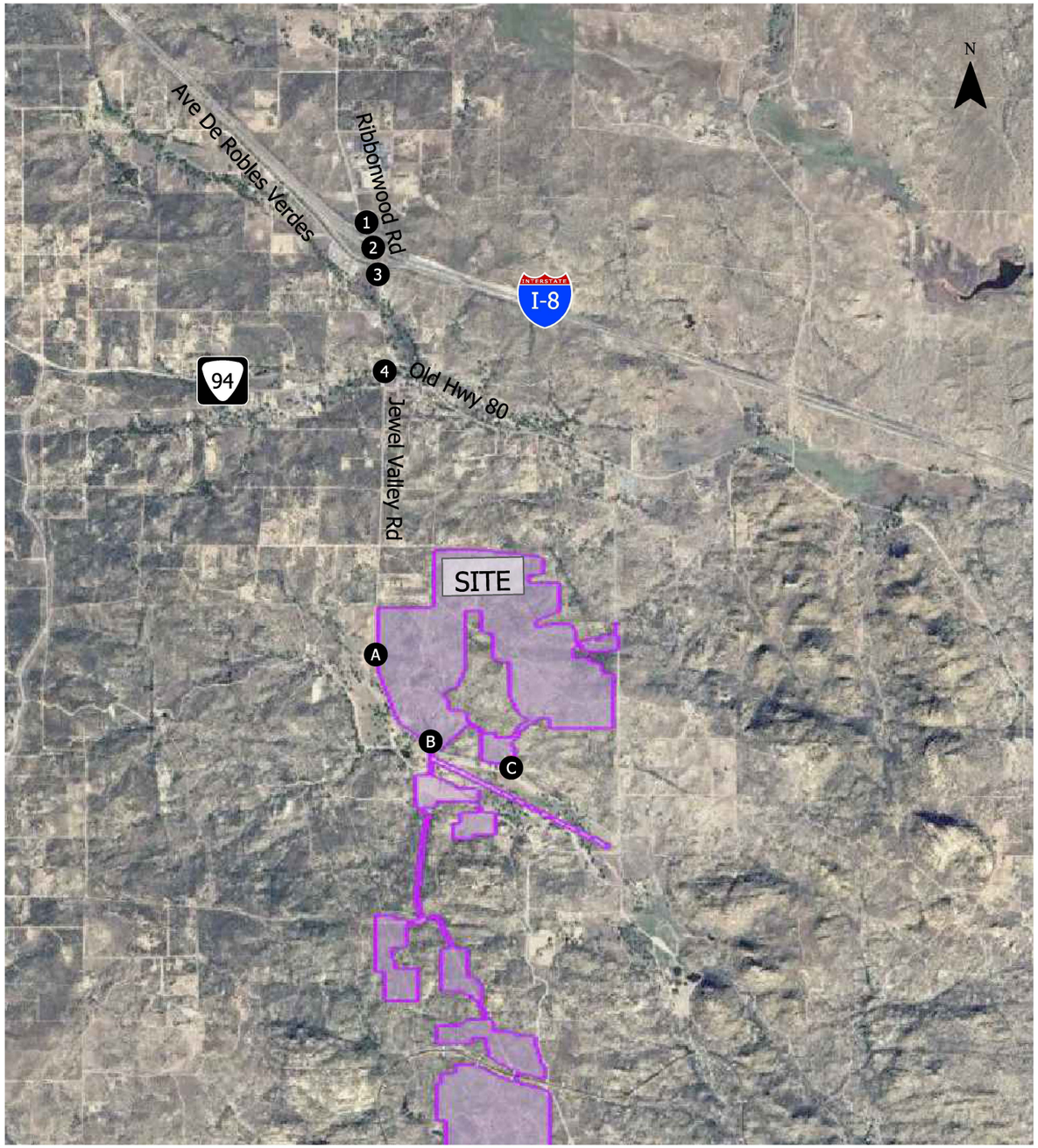
An improvement is required at side street stop unsignalized intersection if one of the following apply:

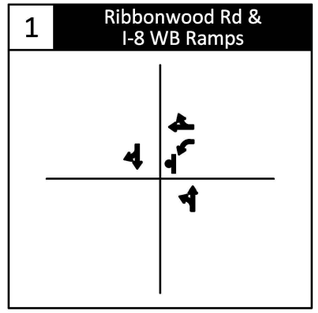
- The project causes the average intersection delay to be LOS E or F during the peak hour.
- If the worst-case movement is currently operating at LOS E or F, the project adds 5 or more seconds of overall intersection delay AND the project adds ten (10) or more trips to the worst-case movement OR 50 or more trips to the overall intersection.
- The intersection meets the peak hour traffic signal warrants after the addition of project traffic per the California Manual on Uniform Traffic Control Devices (CA MUTCD–latest edition).
  - An investigation of the need for a traffic control signal may also include an analysis of factors related to the existing operations and safety at a study intersection and the potential to improve these conditions. A warrant analysis is not required for right turn in/right turn out only intersections or driveways that are physically restricted by raised center median.

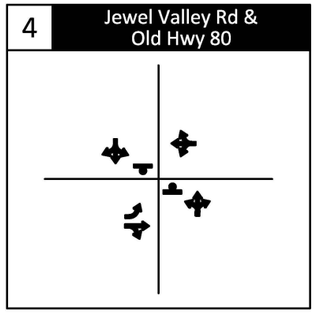
An improvement is required at all-way stop and roundabout unsignalized intersection if:

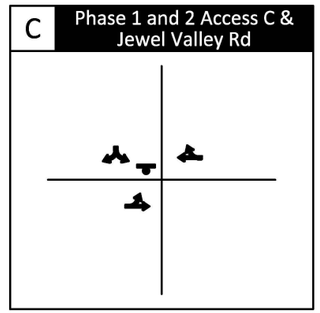
- The project causes the average intersection delay to be LOS E or F during the peak hour.

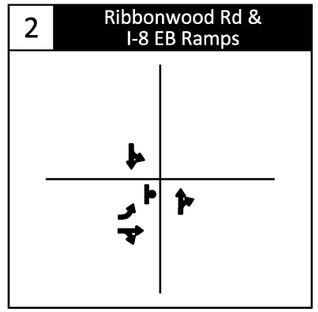
- The project adds 5 or more seconds of delay to an intersection that is currently operating at LOS E or F during the peak hour.
- The intersection meets the peak hour traffic signal warrants after the addition of project traffic per the California Manual on Uniform Traffic Control Devices (CA MUTCD–latest edition).
  - An investigation of the need for a traffic control signal may also include an analysis of factors related to the existing operations and safety at a study intersection and the potential to improve these conditions. A warrant analysis is not required for right turn in/right turn out only intersections or driveways that are physically restricted by raised center median.

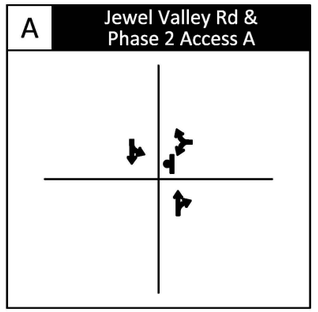


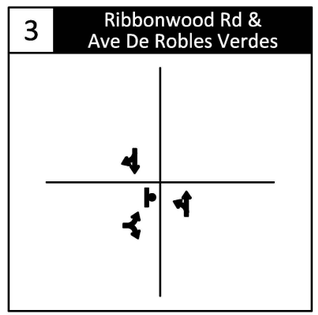


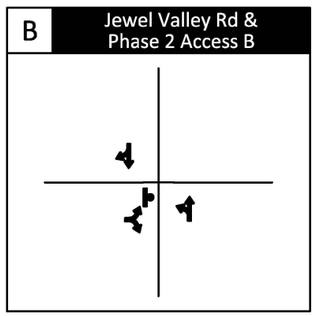












*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Existing Lane Configurations & Traffic Control Devices
San Diego County, California

Figure 5

EXISTING CONDITIONS

The existing conditions analysis summarizes the intersection operations with the current roadway configuration and volumes obtained in August 2023.

Traffic Volumes

Daily roadway volume counts were collected for a 24-hour period along the following roadway segments on Tuesday, August 29, 2023:

1. Jewel Valley Road south of Old Highway 80

Weekday intersection vehicle turning movement counts were collected at the following study intersections during the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods on Tuesday, August 29, 2023:

1. Ribbonwood Road and I-8 WB Ramps
2. Ribbonwood Road and I-8 EB Ramps
3. Ribbonwood Road and Avenue de Robles Verdes
4. Jewel Valley Road and Old Highway 80

Original traffic count information is provided in Appendix C.

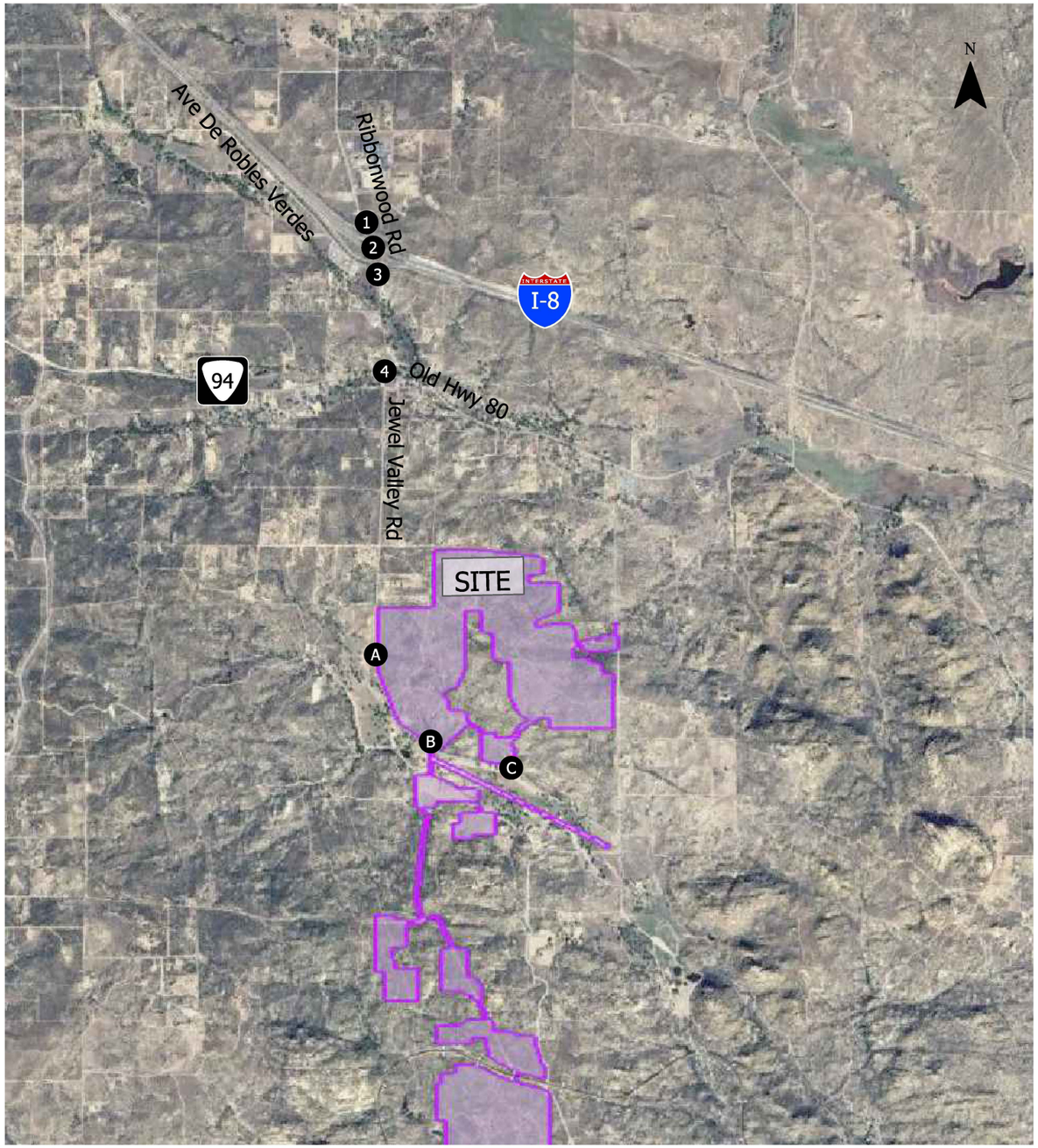
Intersection Operations

The intersection operations were analyzed during morning (7 - 9 AM) and afternoon (4 -6 PM) peak periods to determine potential project effects within the study area. Figure 6 illustrates the existing conditions AM and PM peak hour volumes and Table 5 summarizes the delay and LOS analysis results for each study intersection under existing conditions. As shown in the table, all intersections operate acceptably during AM and PM peak hours.

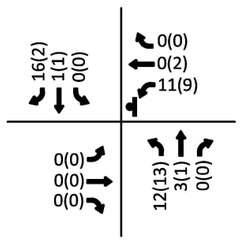
Table 5: Year 2023 Existing Conditions Level-of-Service Analyses Results

ID	Intersection	Control Type	Delay (s/veh)		LOS	
			AM	PM	AM	PM
1	Ribbonwood Road and I-8 WB Ramps	Stop-Controlled	9.0	9.0	A	A
2	Ribbonwood Road and I-8 EB Ramps	Stop-Controlled	8.9	8.8	A	A
3	Ribbonwood Road and Avenue de Robles Verdes	Stop-Controlled	8.6	8.8	A	A
4	Jewel Valley Road and Old Highway 80	Stop-Controlled	9.2	9.8	A	A
A	Jewel Valley Road and Access A	Stop-Controlled	Does not exist under this scenario			
B	Jewel Valley Road and Access B	Stop-Controlled	Does not exist under this scenario			
C	Jewel Valley Road and Access C	Stop-Controlled	Does not exist under this scenario			

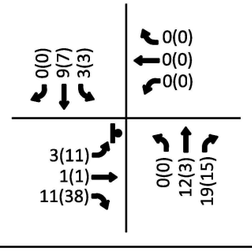
SOURCE: KITTELSON AND ASSOCIATES, INC (2023)



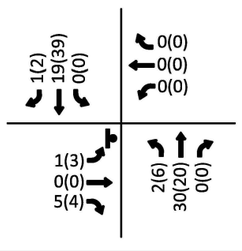
1 Ribbonwood Rd & I-8 WB Ramps



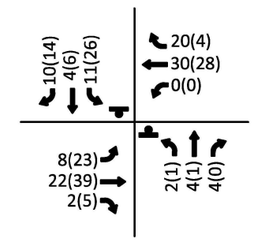
2 Ribbonwood Rd & I-8 EB Ramps



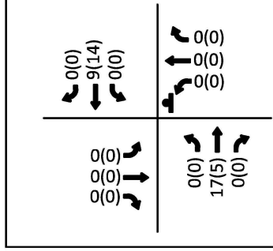
3 Ribbonwood Rd & Ave De Robles Verdes



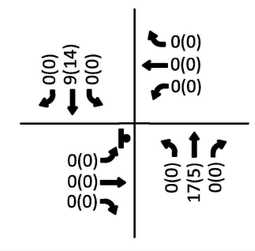
4 Jewel Valley Rd & Old Hwy 80



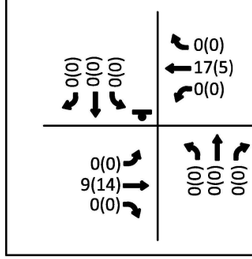
A Jewel Valley Rd & Phase 2 Access A



B Jewel Valley Rd & Phase 2 Access B



C Phase 1 and 2 Access C & Jewel Valley Rd



*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Weekday AM (PM) Existing Turning Movement Counts
San Diego County, California

Figure 6

PHASE I CONSTRUCTION (2025) CONDITIONS

This scenario evaluates the intersection operations during construction of Phase I of the project which is assumed to occur in years 2024-2025. The latter of the two-year construction timeframe was used to show larger background growth.

Traffic Volumes

An annual growth rate of 1% per year was used to grow existing traffic volumes for this scenario. There is no planned development in the area and this accounts for general growth in population and traffic across the County.

Intersection Operations

Figure 7 illustrates the Year 2025 baseline conditions AM and PM peak hour volumes and Table 6 summarizes the delay and LOS analysis results for each study intersection under baseline Phase I existing conditions. As shown in the table, all intersections continue to operate acceptably during AM and PM peak hours.

Table 6: Year 2025 Baseline Conditions Level-of-Service Analyses Results

ID	Intersection	Control Type	Delay (s/veh)		LOS	
			AM	PM	AM	PM
1	Ribbonwood Road and I-8 WB Ramps	Stop-Controlled	9.0	9.0	A	A
2	Ribbonwood Road and I-8 EB Ramps	Stop-Controlled	8.9	8.8	A	A
3	Ribbonwood Road and Avenue de Robles Verdes	Stop-Controlled	8.6	8.8	A	A
4	Jewel Valley Road and Old Highway 80	Stop-Controlled	9.2	9.8	A	A
A	Jewel Valley Road and Access A	Stop-Controlled	Does not exist under this scenario			
B	Jewel Valley Road and Access B	Stop-Controlled	Does not exist under this scenario			
C	Jewel Valley Road and Access C	Stop-Controlled	Does not exist under this scenario			

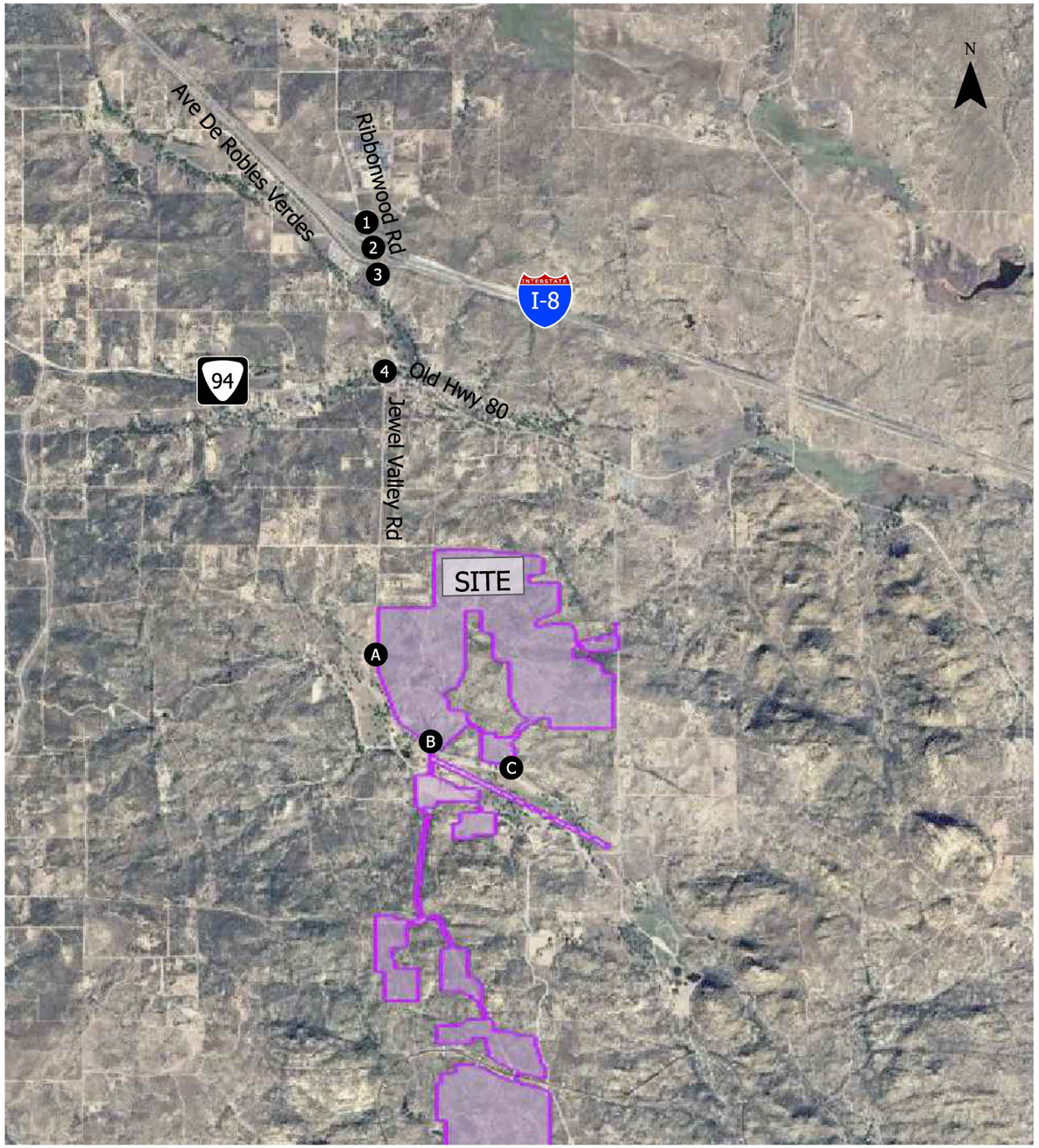
SOURCE: KITTELSON AND ASSOCIATES, INC (2023)

During Phase I, traffic would only use Access C to enter and exit the project site. Figure 8 illustrates the Year 2025 plus Construction Phase I AM and PM peak hour volumes and Table 7 summarizes the delay and LOS analysis results for each study intersection. As shown in the table, all intersections operate acceptably during AM and PM peak hours.

Table 7: Year 2025 Plus Construction Phase I Conditions Level-of-Service Analyses Results

ID	Intersection	Control Type	Delay (s/veh)		LOS	
			AM	PM	AM	PM
1	Ribbonwood Road and I-8 WB Ramps	Stop-Controlled	9.7	10.4	A	B
2	Ribbonwood Road and I-8 EB Ramps	Stop-Controlled	9.1	9.1	A	A
3	Ribbonwood Road and Avenue de Robles Verdes	Stop-Controlled	9.2	9.1	A	A
4	Jewel Valley Road and Old Highway 80	Stop-Controlled	10.6	10.9	B	B
A	Jewel Valley Road and Access A	Stop-Controlled	Does not exist under this scenario			
B	Jewel Valley Road and Access B	Stop-Controlled	Does not exist under this scenario			
C	Jewel Valley Road and Access C	Stop-Controlled	8.6	9.0	A	A

SOURCE: KITTELSON AND ASSOCIATES, INC (2023)



1 Ribbonwood Rd & I-8 WB Ramps

16(2) 1(1) 0(0)		0(0) 0(2) 11(9)
0(0) 0(0) 0(0)		12(13) 3(1) 0(0)

4 Jewel Valley Rd & Old Hwy 80

10(14) 4(6) 11(27)		20(4) 31(29) 0(0)
8(23) 22(40) 2(5)		2(1) 4(1) 4(0)

C Phase 1 and 2 Access C & Jewel Valley Rd

0(0) 0(0) 0(0)		0(0) 17(5) 0(0)
0(0) 9(14) 0(0)		0(0) 0(0) 0(0)

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 9(7) 3(3)		0(0) 0(0) 0(0)
3(11) 1(1) 11(39)		0(0) 12(3) 19(15)

A Jewel Valley Rd & Phase 2 Access A

0(0) 9(14) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 17(5) 0(0)

3 Ribbonwood Rd & Ave De Robles Verdes

1(2) 19(40) 0(0)		0(0) 0(0) 0(0)
1(3) 0(0) 5(4)		2(6) 31(20) 0(0)

B Jewel Valley Rd & Phase 2 Access B

0(0) 9(14) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 17(5) 0(0)

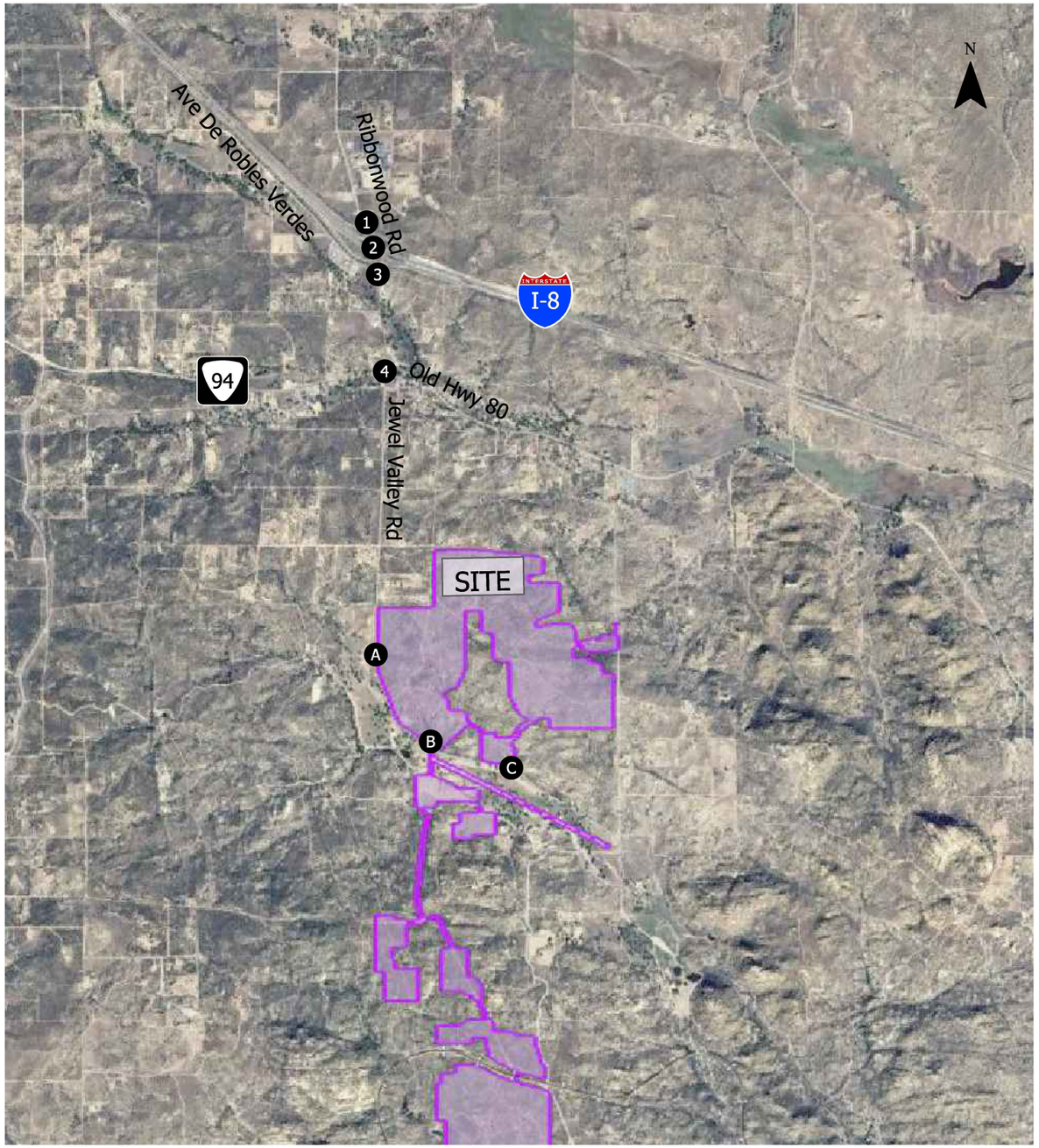
*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Weekday AM (PM) Year 2025 Turning Movement Counts
San Diego County, California

Figure 7



1 Ribbonwood Rd & I-8 WB Ramps

16(2) 1(1) 0(0)		0(0) 0(2) 20(11)
0(0) 0(0) 0(0)		43(63) 3(1) 0(0)

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 18(9) 3(3)		0(0) 0(0) 0(0)
3(11) 1(1) 77(54)		0(0) 43(53) 23(22)

3 Ribbonwood Rd & Ave De Robles Verdes

1(2) 94(57) 0(0)		0(0) 0(0) 0(0)
1(3) 0(0) 5(4)		2(6) 66(77) 0(0)

4 Jewel Valley Rd & Old Hwy 80

10(14) 79(23) 11(27)		20(4) 31(29) 10(2)
8(23) 22(40) 11(7)		6(8) 39(58) 9(7)

A Jewel Valley Rd & Phase 2 Access A

0(0) 103(35) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 61(76) 0(0)

B Jewel Valley Rd & Phase 2 Access B

0(0) 103(35) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 61(76) 0(0)

C Phase 1 and 2 Access C & Jewel Valley Rd

44(71) 0(0) 0(0)		0(0) 17(5) 0(0)
94(21) 9(14) 0(0)		0(0) 0(0) 0(0)

*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Weekday AM (PM) Year 2025 Plus Construction Phase I Turning Movement Counts
San Diego County, California

Figure 8

PHASE II CONSTRUCTION (2027) CONDITIONS

This scenario evaluates the intersection operations during construction of Phase II of the project which is assumed to occur in years 2026-2027. The latter of the two-year construction timeframe was used to show larger background growth.

Traffic Volumes

An annual growth rate of 1% per year was used to grow existing traffic volumes for this scenario. There is no planned development in the area and this accounts for general growth in population and traffic across the County.

Intersection Operations

Figure 9 illustrates the Year 2027 baseline conditions AM and PM peak hour volumes and Table 8 shows the delay and LOS analysis results for each study intersection. As shown in the table, all intersections operate acceptably during the AM and PM peak hours.

Table 8: Year 2027 Baseline Conditions Level-of-Service Analyses Results

ID	Intersection	Control Type	Delay (s/veh)		LOS	
			AM	PM	AM	PM
1	Ribbonwood Road and I-8 WB Ramps	Stop-Controlled	9.0	9.0	A	A
2	Ribbonwood Road and I-8 EB Ramps	Stop-Controlled	8.9	8.8	A	A
3	Ribbonwood Road and Avenue de Robles Verdes	Stop-Controlled	8.6	8.8	A	A
4	Jewel Valley Road and Old Highway 80	Stop-Controlled	9.2	9.9	A	A
A	Jewel Valley Road and Access A	Stop-Controlled	Does not exist under this scenario			
B	Jewel Valley Road and Access B	Stop-Controlled	Does not exist under this scenario			
C	Jewel Valley Road and Access C	Stop-Controlled	Does not exist under this scenario			

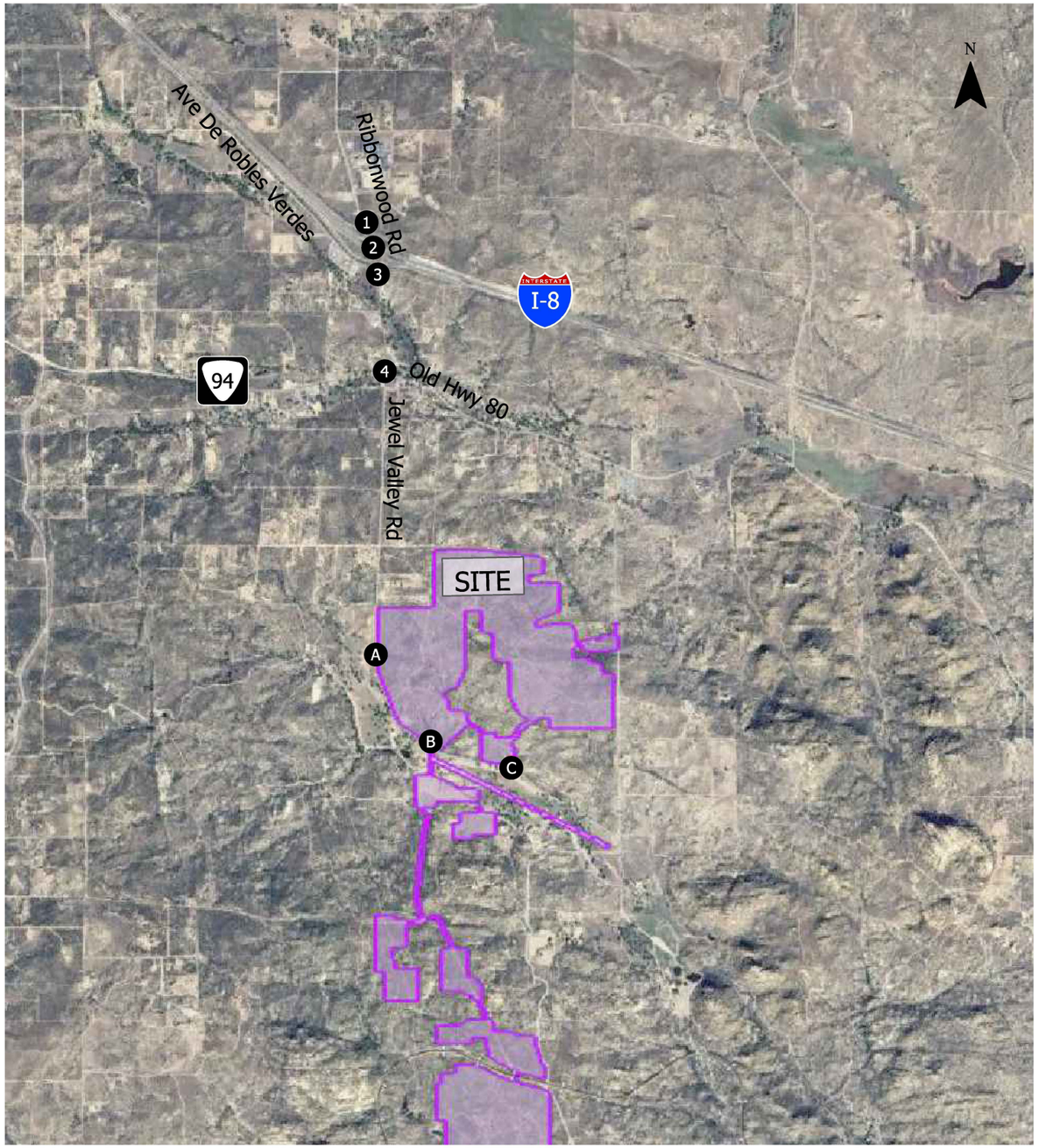
SOURCE: KITTELSON AND ASSOCIATES, INC (2023)

During Phase II, 50% of traffic is expected to use Access A, 40% of traffic is expected to use Access B and 10% of traffic is expected to use Access C to enter and exit the project site. Figure 10 illustrates the Year 2027 plus Phase II AM and PM peak hour volumes and Table 9 summarizes the delay and LOS analysis results for each study intersection. As shown in the table, all intersections operate acceptably during AM and PM peak hours.

Table 9: Year 2027 Plus Construction Phase II Conditions Level-of-Service Analyses Results

ID	Intersection	Control Type	Delay (s/veh)		LOS	
			AM	PM	AM	PM
1	Ribbonwood Road and I-8 WB Ramps	Stop-Controlled	11.5	13.7	B	B
2	Ribbonwood Road and I-8 EB Ramps	Stop-Controlled	9.7	9.7	A	A
3	Ribbonwood Road and Avenue de Robles Verdes	Stop-Controlled	10.2	9.8	B	A
4	Jewel Valley Road and Old Highway 80	Stop-Controlled	13.4	12.0	B	B
A	Jewel Valley Road and Access A	Stop-Controlled	9.0	9.3	A	A
B	Jewel Valley Road and Access B	Stop-Controlled	9.4	9.3	A	A
C	Jewel Valley Road and Access C	Stop-Controlled	8.5	8.5	A	A

SOURCE: KITTELSON AND ASSOCIATES, INC (2023)



1 Ribbonwood Rd & I-8 WB Ramps

17(2) 1(1) 0(0)		0(0) 0(2) 11(9)
0(0) 0(0) 0(0)		12(14) 3(1) 0(0)

4 Jewel Valley Rd & Old Hwy 80

10(15) 4(6) 11(27)		21(4) 31(29) 0(0)
8(24) 22(41) 2(5)		2(1) 4(1) 4(0)

C Phase 1 and 2 Access C & Jewel Valley Rd

0(0) 0(0) 0(0)		0(0) 18(5) 0(0)
0(0) 9(15) 0(0)		0(0) 0(0) 0(0)

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 9(7) 3(3)		0(0) 0(0) 0(0)
3(11) 1(1) 11(40)		0(0) 12(3) 20(16)

A Jewel Valley Rd & Phase 2 Access A

0(0) 9(15) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 18(5) 0(0)

3 Ribbonwood Rd & Ave De Robles Verdes

1(2) 20(41) 0(0)		0(0) 0(0) 0(0)
1(3) 0(0) 5(4)		2(6) 31(21) 0(0)

B Jewel Valley Rd & Phase 2 Access B

0(0) 9(15) 0(0)		0(0) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 18(5) 0(0)

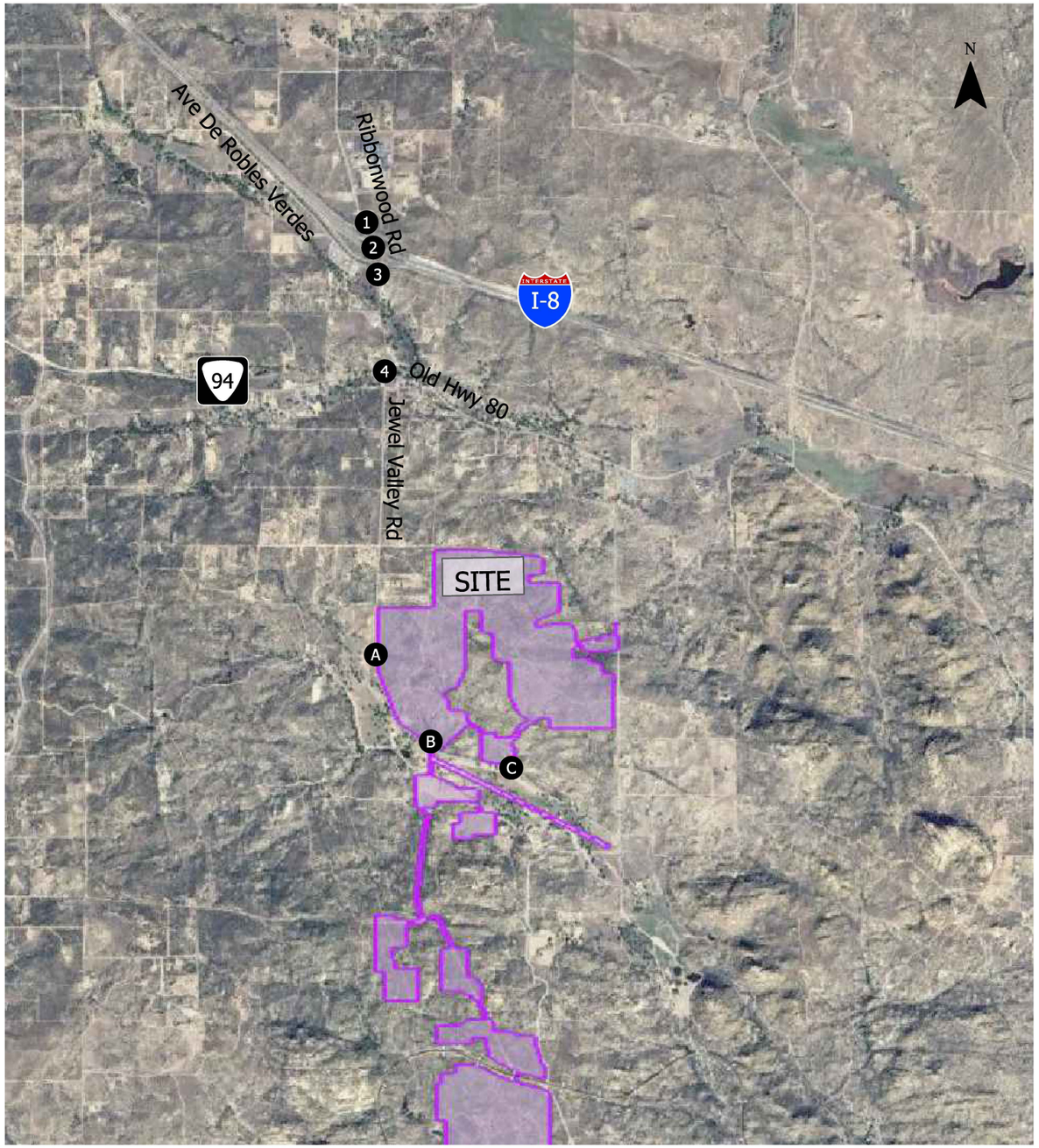
*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Weekday AM (PM) Year 2027 Turning Movement Counts
San Diego County, California

Figure 9



1 Ribbonwood Rd & I-8 WB Ramps

17(2) 1(1) 0(0)		0(0) 0(2) 35(15)
0(0) 0(0) 0(0)		96(142) 3(1) 0(0)

4 Jewel Valley Rd & Old Hwy 80

10(15) 199(53) 11(27)		21(4) 31(29) 25(6)
8(24) 23(41) 26(11)		14(19) 100(147) 16(19)

C Phase 1 and 2 Access C & Jewel Valley Rd

12(18) 0(0) 0(0)		0(0) 18(5) 0(0)
24(5) 9(15) 0(0)		0(0) 0(0) 0(0)

2 Ribbonwood Rd & I-8 EB Ramps

0(0) 33(13) 3(3)		0(0) 0(0) 0(0)
3(11) 1(1) 182(81)		0(0) 96(131) 32(34)

A Jewel Valley Rd & Phase 2 Access A

0(0) 155(50) 98(24)		48(73) 0(0) 0(0)
0(0) 0(0) 0(0)		0(0) 90(115) 0(0)

3 Ribbonwood Rd & Ave De Robles Verdes

1(2) 125(88) 0(0)		0(0) 0(0) 0(0)
1(3) 0(0) 5(4)		2(6) 127(167) 0(0)

B Jewel Valley Rd & Phase 2 Access B

22(12) 33(20) 0(0)		0(0) 0(0) 0(0)
24(92) 0(0) 0(0)		0(0) 30(23) 0(0)

*NOTE: Intersection naming convention: North-South roadway name / East-West roadway name

(##) - Study Intersections

- Stop Sign

Weekday AM (PM) Year 2027 Plus Construction Phase II Turning Movement Counts
San Diego County, California

Figure 10

ACTIVE TRANSPORTATION

There are no existing pedestrian or bicyclist facilities along any of the roadways surrounding the Project site. Jewel Valley Road is a dead end to the south and does not provide connectivity that would be attractive to bicyclists. Therefore, no adverse effects to bicycle or pedestrian travel are expected during construction or operation of the project.

SITE ACCESS AND CIRCULATION

The site access analysis reviews site access, project queues, and operational needs to determine if the project requires additional considerations to operate functionally. The three proposed new site accesses comply with the County of San Diego standards such that there is a minimum of 300 feet of unobstructed sight distance in both directions.

Sight distance for project site accesses were evaluated by Michael Baker International and no anticipated issues were identified. The sight distance certification letters are provided in Appendix E.

The operational analysis found that delays would be minimal at the site access locations and turn lanes along Jewel Valley Road are not needed. This is primarily due to the very low volumes that currently are on this section of Jewel Valley Road.

FINDINGS AND RECOMMENDATIONS

The development of the proposed project and resulting construction traffic are not expected to cause any adverse traffic effects to the study area. Based on the LOS analysis results, all intersections are expected to operate within the LOS standard during the weekday AM and PM peak hours during both phases of construction. Once constructed, operations of the proposed project would generate negligible and infrequent number of trips.

TRAFFIC MANAGEMENT PLAN

It is recommended that the contractor prepare a Construction Traffic Management Plan for County of San Diego approval to efficiently manage the flow of traffic during construction. Developing a traffic management plan would further support that satisfactory operation of the roadways is met during construction of the Project. Measures typically include worker carpooling, flaggers for large vehicles or platoons, escort vehicles for oversized equipment, and signage to minimize conflicts and hazards. Additional elements may include:

- An estimate of the anticipated daily or weekly number of vehicles during each major phase of construction;
- Methods to minimize work vehicles through carpooling opportunities;
- Estimates of the number, type, and dimensions of the construction vehicles that would serve the Project site;
- Assisting truck turning movements at intersections and access points. Potential strategies include informing drivers of geometric conditions, and employing flaggers at intersections;
- Work and delivery hour restrictions, if applicable;
- Motorist information strategies such as static or dynamic signage including information on construction activity and related timeline; and
- A contact for complaints and how they should be addressed.