

TRANSPORTATION IMPACT ANALYSIS
THE TERRACES AT MURRIETA
Murrieta, California
December 12, 2022

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THE TERRACES AT MURRIETA
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1.0 INTRODUCTION

The Terraces at Murrieta Project is a proposed residential development consisting of 899 multi-family residential units. The Project Site is located north of Murrieta Hot Springs Road between I-15 and Sparkman Court, in the City of Murrieta.

Various intersections and segments within the study area were analyzed to determine potential project related transportation impacts, as set forth in the following sections.

- Project Description
- Methodology and Impact Thresholds
- Existing Conditions Description
- Project Trip Generation / Distribution / Assignment
- Near-Term Opening Year Conditions including Ambient Growth and Cumulative Projects
- Analysis of Near-Term Scenarios
- Analysis of Horizon Year Scenarios
- Site Access and Circulation
- Improvements and Recommendations
- Vehicle Miles Traveled Analysis
- Active Transportation Review and Public Transit Analysis
- Conclusions

1.1 Purpose of Study

This study has been prepared to evaluate the effects of the Project on mobility, access, circulation, and related safety elements in the proximate area of the Project per the City of Murrieta's *Traffic Impact Analysis Preparation Guidelines*, March 2020. In addition to the vehicular analyses, the multi-modal network in the influence of the Project study area was also reviewed. This included Pedestrian, Bicycle, and Transit mobility. Collectively, vehicular mobility combined with multi-modal networks were reviewed to help promote local and regional mobility without auto-dependency. In addition, a CEQA Vehicle Miles Travelled (VMT) analysis is provided.

1.2 Project Description

The Project includes the construction of 899 multi-family units in two phases. Phase 1 includes the development of 652 dwelling units and Phase 2 includes the remaining 247 dwelling units.

Figure 1-1 depicts the Project Area, while **Figure 1-2** depicts the conceptual Site Plan.

1.2.1 *Project Location*

The Project is located north of Murrieta Hot Springs Road between I-15 and Sparkman Court in the City of Murrieta.

1.2.2 *Zoning*

The current Zoning for the site is Transit Oriented District (TOD) Overlay and the current General Plan Land Use is TOD Overlay, Office and Regional Commercial. The Proposed Zoning is Residential, consistent with TOD Overlay, and the Proposed Land Use is Multi-Family Residential.

1.2.3 *Project Phasing*

The Project will be built in two phases as follows:

- **Phase 1** construction will commence in the Year 2023. The first units in will be delivered in **2025** and Phase 1 construction will be completed in 2026.
- **Phase 2** construction will commence in the Year 2027. The first units will be delivered in **2028** and Phase 2 construction will be completed in 2029.

1.2.4 *Project Access*

Two access points will be provided for Phase 1 and a third will be added for Phase 2. In addition to these day-to-day access points, an emergency access will be provided via Murrieta Hot Springs Road:

Phase 1

- A full access driveway at Sparkman Court opposite Walsh Center Drive. Most of the Project traffic will use this driveway.
- A full access driveway on Vista Murrieta, along the northern boundary of the site. Vista Murrieta is currently an unpaved dirt road. The Project will pave Vista Murrieta along its Project frontage.
- An emergency access driveway at the eastern boundary of the site on Murrieta Hot Springs Road. This access will be gated and kept locked and will be opened by emergency personnel for access by emergency vehicles only.

Phase 2

- An additional driveway will be provided on Sparkman Court north of Walsh Center Drive in Phase 2.

1.3 Study Area

The following Project Study Area was determined based on the proximity of intersections and segments to the Project site and discussions with City Staff:

INTERSECTIONS

1. Sparkman Court / Walsh Center Drive / Project Driveway #1
3. Hancock Avenue / Walsh Center Drive
4. Hancock Avenue / Medical Center Drive
5. Sparkman Court / Medical Center Drive
6. Murrieta Hot Springs Rd / Madison Avenue
7. I-15 SB Ramps / Murrieta Hot Springs Road
8. I-15 NB Ramps / Murrieta Hot Springs Road
9. Murrieta Hot Springs Rd / Sparkman Court
10. Murrieta Hot Springs Rd / Hancock Avenue
11. I-215 SB Ramps / Murrieta Hot Springs Road
12. I-215 NB Ramps / Murrieta Hot Springs Road
13. Murrieta Hot Springs Rd / Alta Murrieta Drive
14. Project Driveway #2 / Vista Murrieta
15. Monroe Avenue / Project Driveway #3

SEGMENTS

1. **Vista Murrieta:** South of Los Alamos
2. **Medical Center Drive:** Sparkman Court to Hancock Avenue
3. **Murrieta Hot Springs Rd:** Madison Avenue to I-15 Ramps
4. **Murrieta Hot Springs Rd:** I-15 Ramps to Sparkman Court
5. **Murrieta Hot Springs Rd:** Sparkman Court to Hancock Avenue
6. **Murrieta Hot Springs Rd:** Hancock Avenue to I-215 Ramps
7. **Murrieta Hot Springs Rd:** I-215 Ramps to Alta Murrieta Drive
8. **Sparkman Court:** Vista Murrieta Road to Walsh Center Drive
9. **Sparkman Court:** Walsh Center Drive to Medical Center Drive
10. **Sparkman Court:** Medical Center Drive to Murrieta Hot Springs Road
11. **Hancock Avenue:** Los Alamos Road to Parkcrest Drive
12. **Hancock Avenue:** Parkcrest Drive to Walsh Center Drive
13. **Hancock Avenue:** Walsh Center Drive to Medical Center Drive
14. **Hancock Avenue:** Medical Center Drive to Murrieta Hot Springs Road

1.4 Analysis Scenarios

The following scenarios are included in this report:

- a). Existing Conditions
- b). Opening Year 2025 Conditions – Defined as Opening **Year 2025** Conditions with traffic from approved projects in the area plus an ambient growth of 2% for 4 years from existing traffic volumes
- c). Opening Year 2025 Plus **Project Phase 1** Conditions – Defined as Opening Year 2025 conditions **plus traffic from the proposed project Phase 1**
- d). Year 2028 Conditions – Defined as **Year 2028** Conditions with traffic from approved projects in the area plus an ambient growth of 2% for 7 years from existing traffic volumes
- e). Opening Year 2028 Plus **Entire Project** Conditions – Defined as Year 2028 conditions **plus traffic from the proposed Entire Project**
- f). Cumulative No Project Conditions (Horizon Year 2040) – Defined as ambient growth to the Cumulative Horizon (typically coinciding with the forecast horizon **Year 2040** of the RIVTAM/RIVCOM travel demand forecasting model) that includes traffic from approved and pending projects in the area but no Project traffic
- g). Cumulative Plus Project Conditions (Horizon Year 2040 + Project) – Defined as Cumulative No Project **Year 2040** conditions **plus traffic from the proposed Project**

The approved Scoping Agreement is included in *Appendix A*.

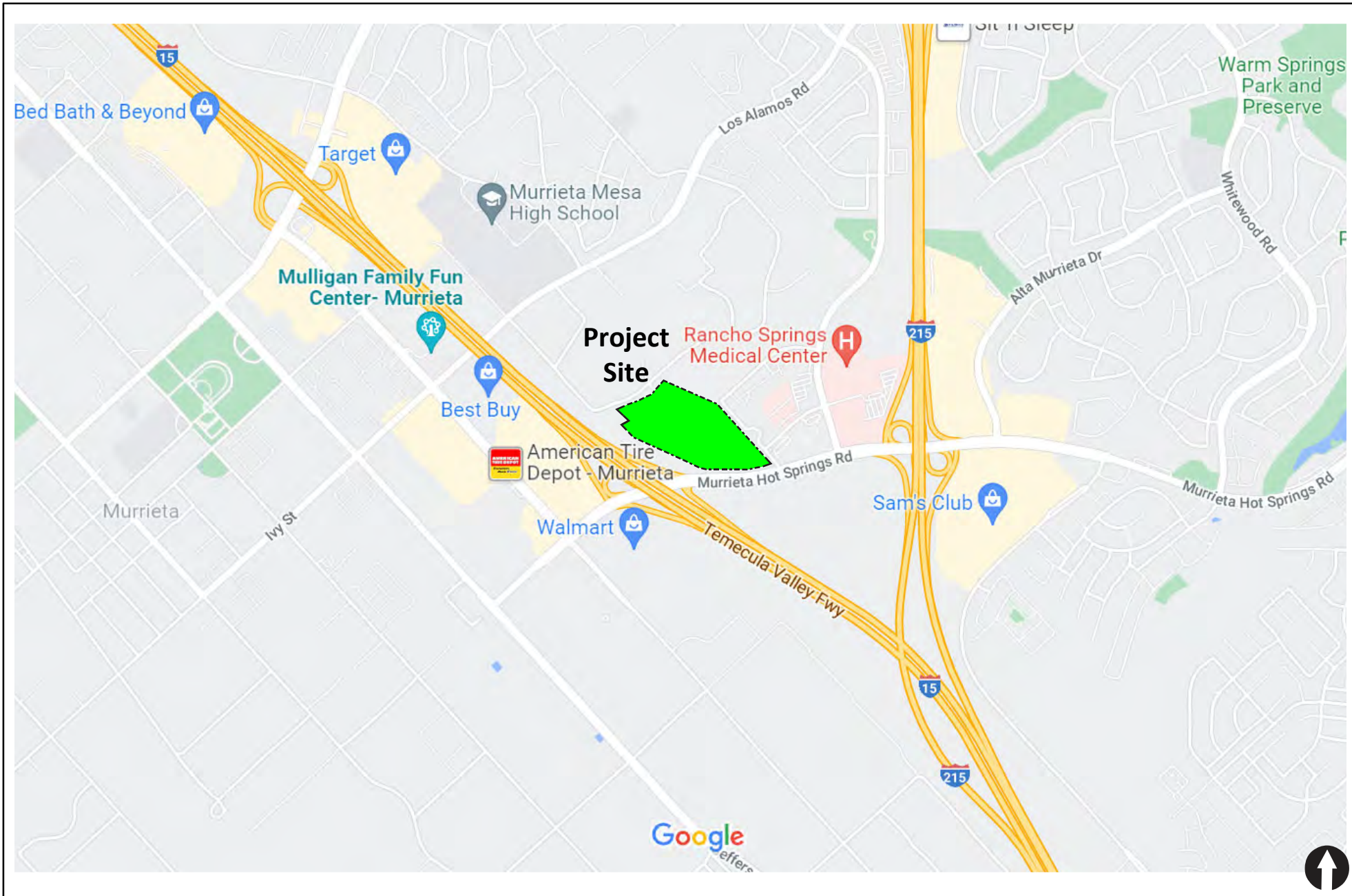
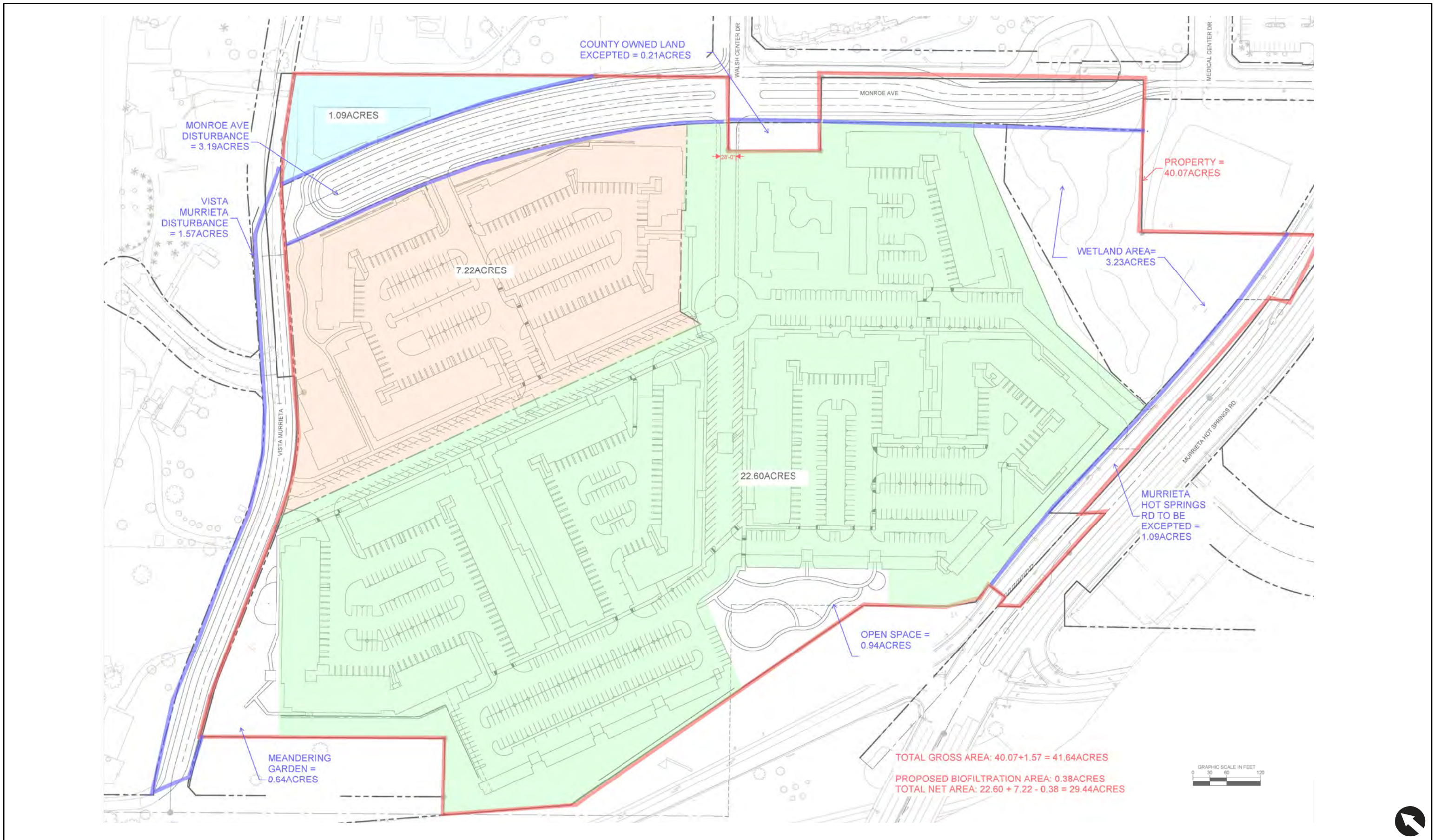


Figure 1-1
Project Area Map

The Terraces at Murrieta



2.0 METHODOLOGY AND IMPACT THRESHOLDS

2.1 Highway Capacity Manual (HCM) Method of Analysis (Signalized Intersections)

Based on the HCM operations method of analysis, level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometries, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents, and when there are no other vehicles on the road.

In Chapter 19 of the HCM, only the portion of total delay attributed to the control facility is quantified. This delay is called *control delay*. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In contrast, in previous versions of the HCM (1994 and earlier), delay included only stopped delay. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle. The six qualitative categories of Level of Service that have been defined along with the corresponding HCM control delay value range for signalized intersections are shown in **Table 2-1**.

2.2 HCM Method of Analysis (Unsignalized Intersections)

The HCM unsignalized methodology for stop-controlled intersections was utilized for the analysis of the unsignalized intersections. LOS criteria for unsignalized intersections differ from LOS criteria for signalized intersections as signalized intersections are designed for heavier traffic and therefore a greater delay.

2.2.1 *Two-Way Stop-Controlled Intersections*

Two-way stop-controlled intersections are comprised of a major street, which is uncontrolled, and a minor street, which is controlled by stop signs. Level of service for a two-way stop-controlled intersection is determined by the computed or measured control delay. The control delay by movement, by approach, and for the intersection as a whole is estimated by the computed capacity for each movement. LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns. The worst side street approach delay is reported. LOS is not defined for the intersection as a whole or for major-street approaches, as it is assumed that major-street through vehicles experience zero delay. The HCM control delay value range for two-way stop-controlled intersections is shown in **Table 2-2**.

2.2.2 All-Way Stop-Controlled Intersections

All-way stop-controlled intersections require every vehicle to stop at the intersection before proceeding. Because each driver must stop, the decision to proceed into the intersection is a function of traffic conditions on the other approaches. The time between subsequent vehicle departures depends on the degree of conflict that results between the vehicles and vehicles on the other approaches. This methodology determines the control delay for each lane on the approach, computes a weighted average for the whole approach, and computes a weighted average for the intersection as a whole. Level of service (LOS) at the approach and intersection levels is based solely on control delay. The HCM control delay value range for all-way stop-controlled intersections is shown in *Table 2-2*.

**TABLE 2-1
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS (HCM)**

Level of Service (LOS)	Control Delay Per Vehicle (seconds/vehicle)	Level of Service Description
A	≤ 10.0	This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10.0 and ≤ 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	> 20.0 and ≤ 35.0	Average traffic delays. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and ≤ 55.0	Long traffic delays At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55.0 and ≤ 80.0	Very long traffic delays This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.
F	≥ 80.0	Severe congestion This level, considered to be unacceptable to most drivers, often occurs with over saturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

TABLE 2-2
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM)

Level of Service (LOS)	Highway Capacity Manual (HCM) Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

2.3 Volume to Capacity (V/C) Ratio Method of Analysis (Roadway Segments)

In conformance with *City of Murrieta Traffic Impact Analysis Preparation Guidelines*, daily operating conditions for the key study roadway segments have been investigated according to the Volume to Capacity (V/C) ratio of each roadway segment. The V/C relationship is used to estimate the LOS of the roadway segment with the volume based on the 24-hour traffic volumes and the capacity based on the City’s classification of each roadway. The daily roadway link capacity of each street classification according to the *Murrieta General Plan 2035; Chapter 5 – Circulation Element; Table 5-2 - Daily Roadway Capacity Values* are presented in **Table 2-3**. The six qualitative categories of Level of Service have been defined along with the corresponding Volume to Capacity (V/C) value range and are shown in **Table 2-4**.

2.4 Analysis Thresholds

According to City of Murrieta guidelines, LOS D is the minimum acceptable condition that should be maintained during the morning and evening peak commute hours on all intersections and LOS C is the minimum acceptable condition that should be maintained on a daily basis on all roadway segments.

**TABLE 2-3
CITY OF MURRIETA DAILY ROADWAY CAPACITY VALUES**

Facility	Number of Lanes	Maximum Two-Way Volume (ADT)				
		LOS A	LOS B	LOS C	LOS D	LOS E
Freeway	4	45,900	53,550	61,200	68,900	76,500
Freeway	6	70,500	82,250	94,000	105,800	117,500
Freeway	8	96,300	112,350	128,400	144,500	160,500
Freeway	10	120,360	140,420	160,500	180,500	200,600
Expressway	4	24,540	28,630	32,700	36,800	40,900
Expressway	6	36,780	42,910	49,000	55,200	61,300
Multi-Modal Corridor	4	21,540	25,130	28,700	32,300	35,900
Multi-Modal Corridor	6	32,340	37,730	43,100	48,500	53,900
Augmented Urban Arterial	8	43,080	50,260	57,400	64,600	71,800
Augmented Urban Arterial	7	37,700	44,000	50,250	56,550	62,850
Urban Arterial	6	32,340	37,730	43,100	48,500	53,900
Arterial	4	21,540	25,130	28,700	32,300	35,900
Arterial	6	32,340	37,730	43,100	48,500	53,900
Major	4	20,460	23,870	27,300	30,700	34,100
Secondary	4	15,540	18,130	20,700	23,300	25,900
Collector	2	7,800	9,100	10,400	11,700	13,000

Notes:

1. All capacity figures are based on optimum conditions and are intended as guidelines for planning purposes only.
2. Maximum two-way ADT values are based on the 1999 Modified Highway Capacity Manual Level of Service tables, as defined in the Riverside County Congestion Management Program.
3. LOS A and LOS B capacities are estimated.
4. Capacities for 7-Lane Urban Arterial estimated by averaging the capacities of 8-Lane Augmented Urban Arterial and 6-Lane Urban Arterial.

TABLE 2-4
LEVEL OF SERVICE CRITERIA FOR ROADWAY SEGMENTS (V/C METHODOLOGY)

Level of Service (LOS)	Volume to Capacity Ratio (V/C)	Level of Service Description
A	≤ 0.600	EXCELLENT. Describes primarily free flow operations at average travel speeds, usually about 90% of the free flow speed for the arterial class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.
B	0.601 – 0.700	VERY GOOD. Represents reasonably unimpeded operations at average travel speeds, usually about 70% of the free flow speed for the arterial class. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tension.
C	0.701 – 0.800	GOOD. Represents stable conditions; however, ability to maneuver and change lanes in mid-block location may be more restricted than in LOS B, and longer queues and/or adverse signal coordination may contribute to lower average travel speeds of about 50% of the average free flow speed for the arterial class. Motorists will experience appreciable tension while driving.
D	0.801 – 0.900	FAIR. Borders on a range in which small increases in flow may cause substantial increases in approach delay and, hence, decreases in arterial speed. This may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40% of free flow speed.
E	0.901 – 1.000	POOR. Characterized by significant approach delays and average travel speeds of one-third the free flow speed or lower. Such operations are caused by some combination of adverse progression, high signal density, extensive queuing at critical intersections, and inappropriate signal timing.
F	> 1.000	FAILURE. Characterizes arterial flow at extremely low speeds below one-third to one-quarter of the free flow speed. Intersection congestion is likely at critical signalized locations, with resultant high approach delays. Adverse progression is frequently a contributor to this condition.

3.0 EXISTING CONDITIONS

Effective evaluation of the traffic impacts associated with the proposed Project requires an understanding of the existing transportation system within the project area.

3.1 Existing Roadway Network

The following is a description of the existing street network in the study area.

Murrieta Hot Springs Road

Murrieta Hot Springs Road is classified as a 6-Lane Urban Arterial between Madison Avenue and I-15 Freeway and an 8-Lane Augmented urban Arterial between the I-15 freeway and the I-215 freeway. It is classified as a 6-Lane Multi Modal Transportation Corridor, east of the I-215 freeway. in the City of Murrieta Circulation Element. It is along a truck route. Currently, it is built as follows:

- Magnolia Avenue to and the I-15 Freeway: Eight-Lane divided road with a raised median. The curb lane in both directions is a right-turn only lane.
- I-15 SB Ramps to I-15 NB Ramps: Six-Lane undivided road.
- I-15 Northbound Ramps to Sparkman Court: Eight-Lane divided road. The curb lane in both directions is a right-turn only lane.
- Sparkman Court to the I-215 freeway: Seven-Lane divided road with 3 lanes in the WB direction and 4 lanes in the EB direction. The curb lane in eastbound direction is a right-turn only lane.
- I-215 SB Ramps to I-215 NB Ramps: Six-Lane divided road.
- I-215 NB Ramps to Alta Murrieta Drive: Seven-Lane divided road with 4 lanes in the westbound direction and 3 lanes in the eastbound direction. The curb lane in westbound direction is a right-turn only lane.

Curb, gutter and sidewalks are provided along both curbs. The posted speed limit is 45 mph. Bike lanes are not provided.

Vista Murrieta Road

Vista Murrieta Road is classified as a Two-Lane Collector in the City of Murrieta Circulation Element. This road is partially paved south of Los Alamos for a distance of approximately 1,300 feet. Curb, gutter and sidewalks are provided along the paved portion of this road, just south of Los Alamos Road, where the posted speed limit is 30 mph. Bike lanes are not provided. Parking is generally permitted along both curbs. The remaining portion of Vista Murrieta including the section along the Project frontage is unpaved.

Walsh Center Drive

Walsh Center Drive is an unclassified Two-Lane Road in the City of Murrieta. Curb, gutter and sidewalks are provided along the south curb of this road. There is no posted speed limit and bike lanes are not provided. Parking is generally permitted along both curbs.

Sparkman Court

Sparkman Court is an unclassified Two-Lane Road in the City of Murrieta. Curb, gutter and sidewalks are provided along the east curb of this road. Nor curb, gutter or sidewalk are provided along the west curb. There is no posted speed limit and bike lanes are not provided. Curbside parking is not prohibited. Sparkman Court will be realigned, improved and renamed Monroe Avenue as described below.

The Precise Alignment Study Monroe Avenue Between Los Alamos Road & Murrieta Hot Springs Road, City of Murrieta was conducted in 2007 and updated in 2008. This road would replace Sparkman Court and connect Murrieta Hot Springs Road and Los Alamos Road along a new alignment. Three alternative alignments were studied and *Alternative 1* described below was approved for implementation. Monroe Avenue will be constructed to City of Murrieta 4-Lane Collector standards.

Monroe Avenue will be aligned to intersect at grade with existing Walsh Center Drive and Medical Center Drive. However, portions of existing Vista Murrieta Road, Jackson Avenue, and Sparkman drive would need to be vacated with possible realignment or cul-de-sac construction. The modifications to these local streets should be considered through further study during the design phase of the roadway and through review of future development proposals.

The Project will implement half-width improvements along the Project frontage of Monroe Avenue. The portion of Monroe Avenue built by the Project will terminate in a cul-de-sac just south of Vista Murrieta due to a significant grade difference.

Hancock Avenue

Hancock Avenue is classified as a 4-Lane Major Road in the City of Murrieta. It is currently built as a four-lane road with a center two-way-left-turn-lane (TWLTL). Curb, gutter and sidewalks are provided along both curbs, except along a portion of the west curb between Park Crest Drive and Walsh Center Drive. Bike lanes are provided north of Medical Center Drive. The posted speed limit is 45 mph.

Figure 3-1 depicts the existing conditions diagram, including existing intersection geometry and traffic control.

3.2 Existing Traffic Volumes

AM & PM peak hour and segment volume counts including bicycle and pedestrian counts were conducted at the study area intersections and segments respectively on November 9, 2021, when area schools were in session.

LLG previously conducted counts at most of these intersections and segments in December 2019, when area schools were in session, for another project. *Table 3-1* summarizes and compares the Year 2019 and 2021 segment counts. As seen in *Table 3-1*, Year 2021 segment counts were similar to or higher than the Pre-Covid Year 2019 counts. Therefore, after discussions with City staff, it was decided to use the 2021 counts without applying any “Covid factor”. A similar trend was also observed when intersections counts were compared.

Figure 3–2 depicts the Existing Traffic Volumes. *Appendix A* contains the Year 2021 manual count sheets. *Appendix A* also contains a comparison of the Year 2020 and 2021 peak hour intersection turning movement counts.

Signal timing plans were obtained from the City for all the signalized intersections in the study area. Copies of the signal timing plans are included in *Appendix A*.

**TABLE 3-1
EXISTING TRAFFIC VOLUMES**

Street Segment	Pre Covid (Dec 2019) ADT^a	Nov 2021 (During Covid) ADT
Vista Murrieta Road		
South of Los Alamos Rd	NC	850
Medical Center Drive		
Sparkman Ct to Hancock Ave	NC	2,470
Murrieta Hot Springs Road		
Madison Ave to I-15 Ramps	NC	41,310
I-15 Ramps to Sparkman Ct	48,700	52,610
Sparkman Ct to Hancock Ave	43,200	50,200
Hancock Ave to I-215 Ramps	45,800	57,830
I-215 Ramps to Alta Murrieta Dr	NC	61,570
Sparkman Court		
Walsh Center Dr to Medical Center Dr	NC	340
Medical Center Dr to Murrieta Hot Springs Rd	3,000	2,760
Hancock Avenue		
Los Alamos Rd to Parkcrest Dr	NC	11,690
Parkcrest Dr to Walsh Center Dr	12,900	12,910
Walsh Center Dr to Medical Center Dr	13,200	13,470
Medical Center Dr to Murrieta Hot Springs Rd	11,700	12,830 ^b

Footnotes:

- a. Average Daily Traffic Volumes.
- b. Estimated based on peak hour volumes at the Murrieta Hot Springs Road / Hancock Avenue being 10% of the daily segment volume.

General Note:

- NC – No Count
- DNE – Does Not Exist

3.3 Existing Intersection Conditions

In conformance with *City of Murrieta Traffic Impact Analysis Preparation Guidelines*, existing AM peak hour and PM peak hour operating conditions were evaluated using the methodology outlined in the *Highway Capacity Manual 6th Edition (HCM 6)* for signalized and unsignalized intersections. Daily operating conditions for the key study roadway segments were analyzed using the *Volume to Capacity (V/C) ratio*.

Table 3-2 summarizes the results of the Existing intersection analysis. As seen in *Table 3-2*, all intersections are calculated to operate at LOS D or better except the following:

- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E during the PM peak hour)

3.4 Existing Segment Conditions

In conformance with *City of Murrieta Traffic Impact Analysis Preparation Guidelines*, existing segment operations were evaluated using the *Volume to Capacity (V/C) ratio*.

Table 3-3 summarizes the results of the Existing segment analysis. As seen in *Table 3-3*, all segments are calculated to operate at LOS Cor better except the following:

- Murrieta Hot Springs Road: Between Hancock Avenue and I-215 – LOS E
- Murrieta Hot Springs Road: Between I-215 and Alta Murrieta Drive – LOS F

Appendix C contains the Existing peak hour intersection analysis worksheets.

TABLE 3-2
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Delay ^a	LOS ^b
1. Sparkman Ct / Walsh Center Dr	No Control ^c	AM	0.0	A
		PM	0.0	A
3. Hancock Ave / Walsh Center Dr	TWSC	AM	18.8	C
		PM	18.8	C
4. Hancock Ave / Medical Center Dr	Signal	AM	15.3	B
		PM	16.0	B
5. Sparkman Ct / Medical Center Dr	TWSC	AM	9.8	A
		PM	9.7	A

Continued on the Next Page

TABLE 3-2 (CONTINUED)
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Delay ^a	LOS ^b
Continued From the Previous Page				
6. Madison Ave / Murrieta Hot Springs Rd	Signal	AM	43.1	D
		PM	47.1	D
7. I-15 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	19.8	B
		PM	17.1	B
8. I-15 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	15.1	B
		PM	17.6	B
9. Murrieta Hot Springs Rd / Sparkman Ct	TWSC	AM	12.9	B
		PM	15.2	C
10. Murrieta Hot Springs Rd / Hancock Ave	Signal	AM	15.8	B
		PM	14.4	B
11. I-215 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	12.2	B
		PM	17.5	B
12. I-215 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	7.0	A
		PM	11.3	B
13. Alta Murrieta Dr / Murrieta Hot Springs Rd	Signal	AM	47.4	D
		PM	65.4	E
14. Vista Murrieta Rd / Project Driveway #2	DNE	AM	0.0	A
		PM	0.0	A
15. Monroe Ave / Project Driveway #3	DNE	AM	0.0	A
		PM	0.0	A

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. This is currently not an intersection, but a turn in the road.
- d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

- DNE – Does Not Exist
- NA – Not Applicable
- Bold** indicates LOS E or F operations.

SIGNALIZED		UNSIGNALIZED	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

**TABLE 3-3
EXISTING SEGMENT OPERATIONS**

Segment	General Plan Classification^a	Functional Classification^b	LOS E^c Capacity	Volume^d	LOS^e	V/C^f
Vista Murrieta South of Los Alamos	Collector	2-Ln Collector	13,000	850	A	0.065
Medical Center Drive Sparkman Ct to Hancock Ave	Unclassified 2-Ln Road	2-Ln Collector	13,000	2,470	A	0.190
Murrieta Hot Springs Rd Madison Ave to I-15 Ramps	Augmented Urban Arterial	6-Ln Urban Arterial	53,900	41,310	C	0.766
I-15 Ramps to Sparkman Ct	Augmented Urban Arterial	8-Ln Aug Urban Art	71,800	52,610	C	0.733
Sparkman Ct to Hancock Ave	Augmented Urban Arterial	7-Ln Aug Urban Arterial	62,850	50,200	C	0.799
Hancock Ave to I-215 Ramps	Augmented Urban Arterial	7-Ln Aug Urban Arterial	62,850	57,830	E	0.920
I-215 Ramps to Alta Murrieta Dr	Multi Modal Transportation Corridor	6-Ln Multi Modal Transp Cor	53,900	61,570	F	1.142
Sparkman Court Vista Murrieta Rd to Walsh Center Dr	Major Road	2-Ln Collector	13,000	0	A	0.000
Walsh Center Dr to Medical Center Dr	Major Road	2-Ln Collector	13,000	340	A	0.026
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	2-Ln Collector	13,000	2,760	A	0.212

Continued on the Next Page

**TABLE 3-3
EXISTING SEGMENT OPERATIONS**

Segment	General Plan Classification ^a	Functional Classification ^b	LOS E ^c Capacity	Volume ^d	LOS ^e	V/C ^f
Continued from the Previous Page						
Hancock Avenue						
Los Alamos Rd to Parkcrest Dr	Major Road	4-Ln Major Road	34,100	11,690	A	0.343
Parkcrest Dr to Walsh Center Dr	Major Road	4-Ln Major Road	34,100	12,910	A	0.379
Walsh Center Dr to Medical Center Dr	Major Road	4-Ln Major Road	34,100	13,470	A	0.395
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	4-Ln Major Road	34,100	12,830	A	0.376

Footnotes:

- a. The City of Murrieta roadway General Plan classification.
- b. The City of Murrieta roadway classification at which the roadway currently functions.
- c. The capacity of the roadway at Level of Service E.
- d. Existing daily segment volumes from *Table 3-1*.
- e. Level of Service.
- f. The Volume to Capacity ratio.

General Notes:

Daily Roadway Capacity Values that were not provided by the *City of Murrieta* were calculated by LLG
Bold indicates LOS E or F operations.

3.5 Existing Bicycle Facilities

Currently, there is a Class II bike lane on Hancock Avenue from Medical Center Drive to Los Alamos Road. South of Medical Center Drive, there are no bike lanes approaching Murrieta Hot Springs Road. No bike lanes are provided on Murrieta Hot Springs Road, Sparkman Court, Vista Murrieta or Walsh Center Drive.

Per the City of Murrieta General Plan, Class II bike lanes are planned for the entirety of Hancock Avenue. Additionally, a Class II bike lane is planned for Murrieta Hot Springs Road.

3.6 Transit Facilities

The Riverside Transit Agency (RTA) operates within the study area. A description of the transit services within the Project vicinity are as follows:

Riverside Transit Agency (RTA)

Bus stops providing route signage and benches are located near the intersection of Hancock Avenue and Medical Center Drive on both sides of the street. Based on information provided by the Riverside Transit Authority (RTA), ridership at these stops is low with a daily average of five boardings/ five alightings northbound along the route and six boardings/ six alightings in the southerly direction.

City Route 61:

- Route 61 provides service from Perris to Temecula via Promenade Mall, Hancock Avenue & Los Alamos Road, McElwain at Super Target, Mt. San Jacinto College Menifee, Cherry Hills & Bradley, Encanto & McCall, and Perris Station Transit Center. The route traverses the cities of Perris, Menifee, Murrieta, and Temecula.
- During the weekday AM and PM peak hours, Route 61 has approximate headways of 80 minutes in the northbound and southbound directions.

City Route 23:

- Route 23 provides service from Temecula to Wildomar via Winchester Road, Murrieta Hot Springs Road, and Hancock Avenue. Route 23 travels along other roads outside of the project area as well. The route traverses the cities of Wildomar, Murrieta, and Temecula.
- During the weekday AM and PM peak hours, Route 23 has approximate headways of 70 minutes in the northbound and southbound directions.

Appendix B contains the most current public transit route schedules and maps for the aforementioned bus routes. It should be noted that the bus stops nearest to the Project site are located along Hancock Avenue, just north of Murrieta Hot Springs Road.

3.7 Pedestrian Facilities

Continuous sidewalks are provided along both sides of Hancock Avenue, Medical Center Drive, and Murrieta Hot Springs Road. A continuous sidewalk is on the south curb of Walsh Center Drive.

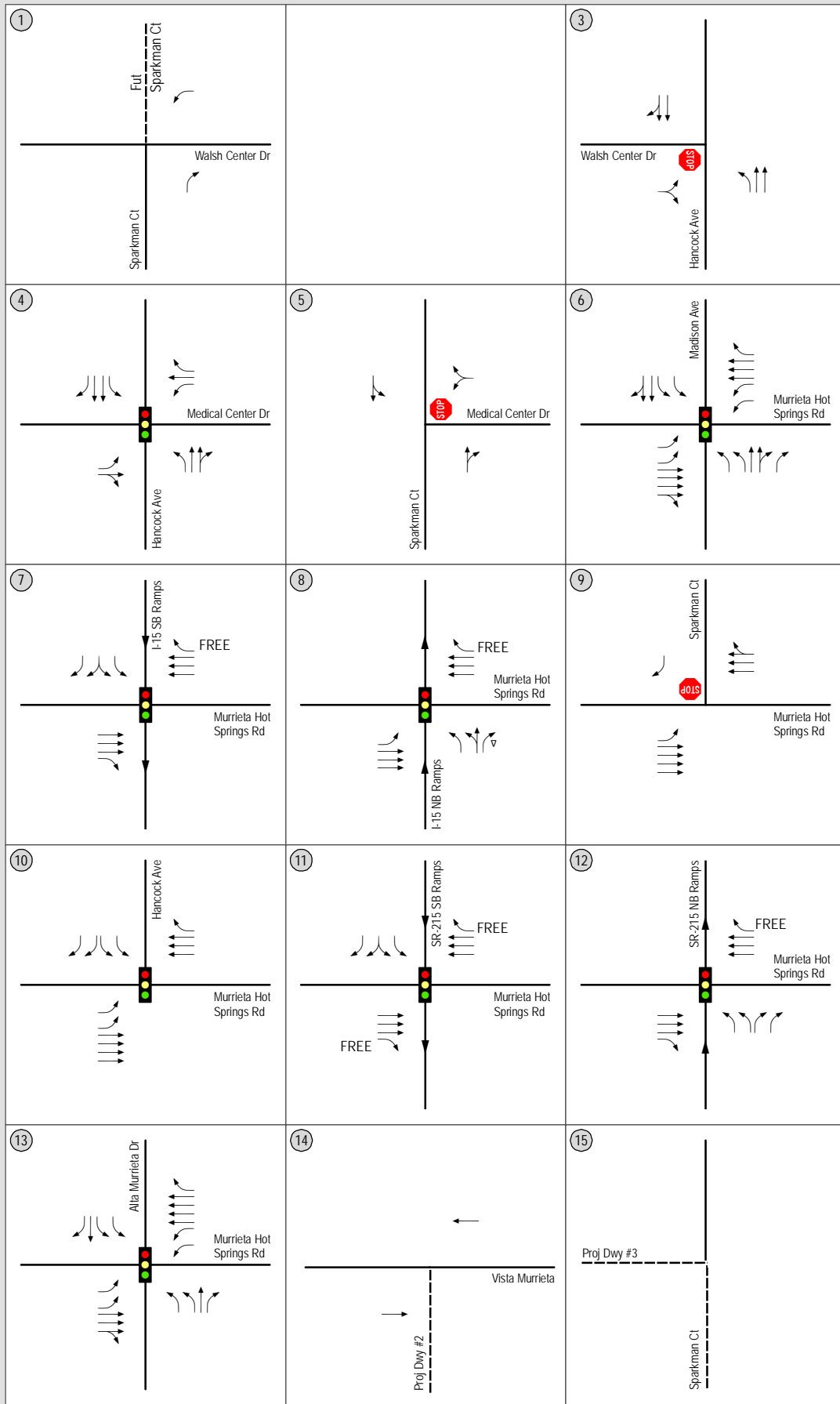
No sidewalks are provided on the following study are roadways as described below:

- The west curb of Sparkman Court
- North curb of Walsh Center Drive except for a portion 300 feet west of Hancock Avenue
- Both sides of Vista Murrieta, except for a portion 1,300 feet south of Los Alamos

ADA compliant curb ramps are provided at the signalized intersections of Murrieta Hot Springs Road/ Hancock Avenue and Medical Center Drive/ Hancock Avenue.

The signalized intersection of Murrieta Hot Springs Road/ Hancock Avenue allows pedestrian crossing along the north leg of the intersection. There are no land uses on the south side of Murrieta Springs Road that pedestrians are currently destined to or oriented from that would necessitate a crossing along Murrieta Hot Springs Road. A flashing pedestrian signal is provided for the existing striped crosswalk.

The signalized intersection of Medical Center Drive/ Hancock Avenue provides striped pedestrian crossings on all four legs of the intersection controlled by pedestrian signals.



- # Study Intersection
- Traffic Signal
- STOP Stop Sign
- Turning Movements
- 2/4/6 Number of Travel Lanes
- 35mph Posted Speed Limit
- U/D Divided / Undivided Roadway
- + Two-Way Left-Turn Median
- BL Bike Lane
- Future Roadway

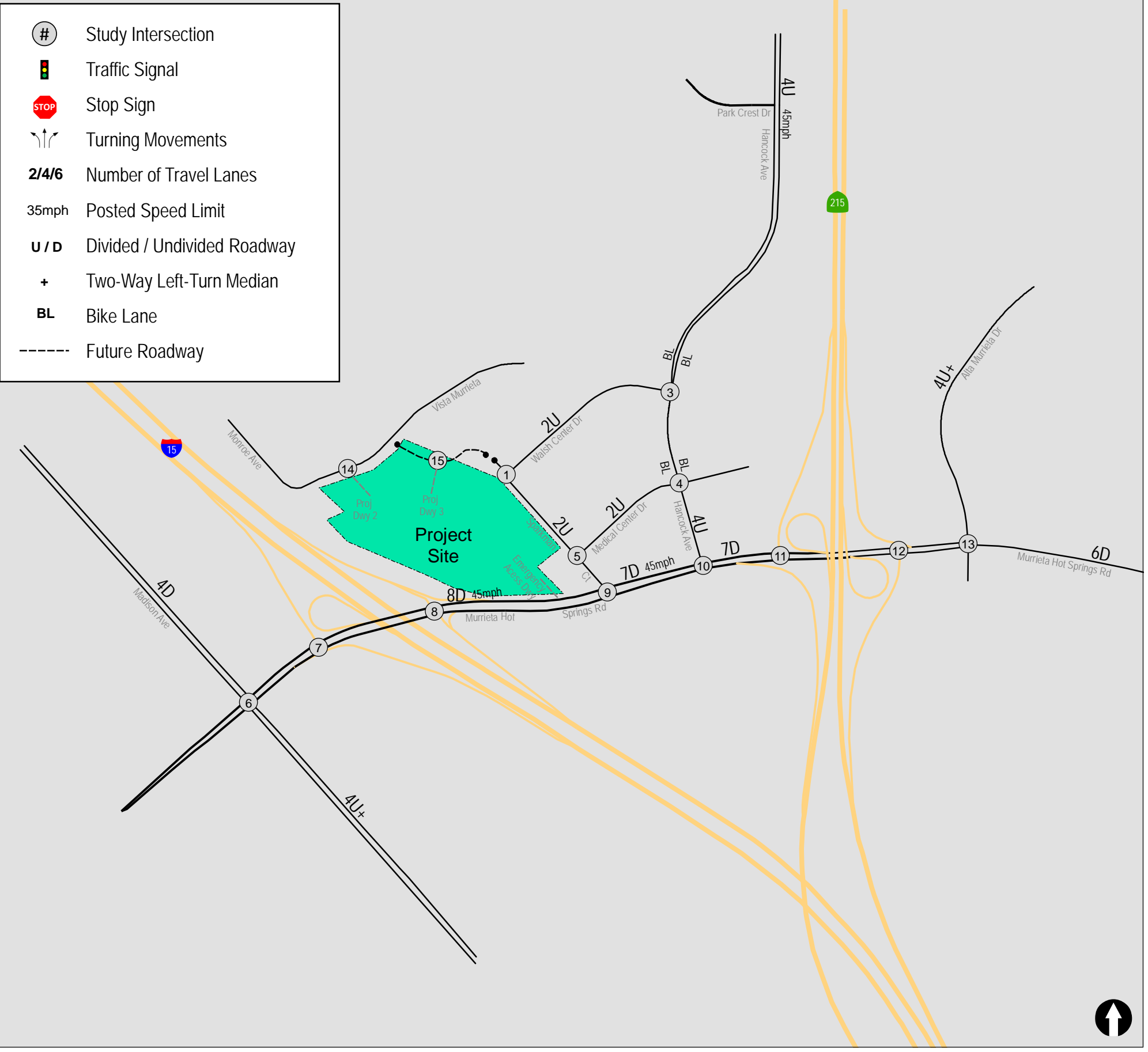


Figure 3-1
Existing Conditions Diagram

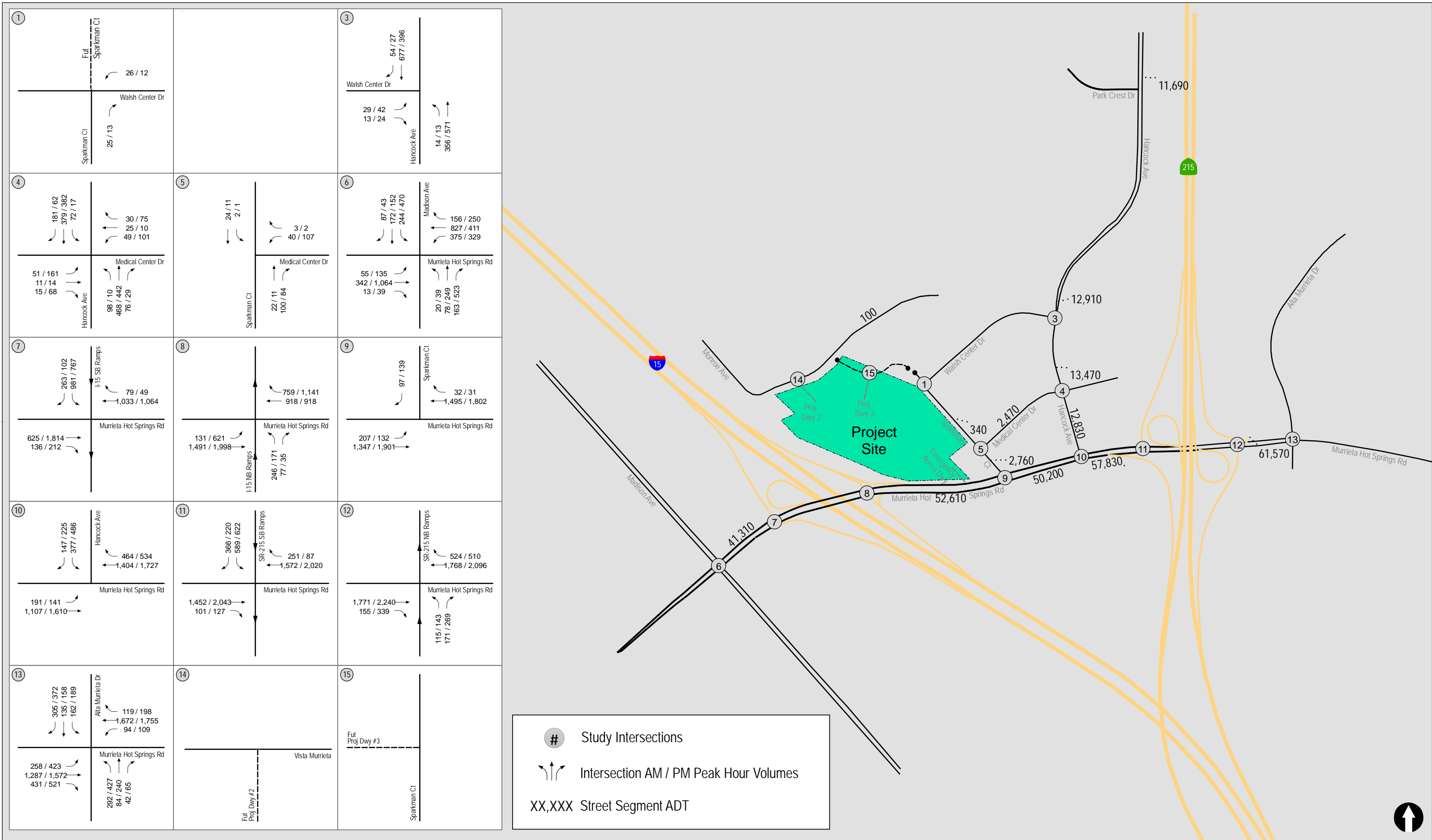
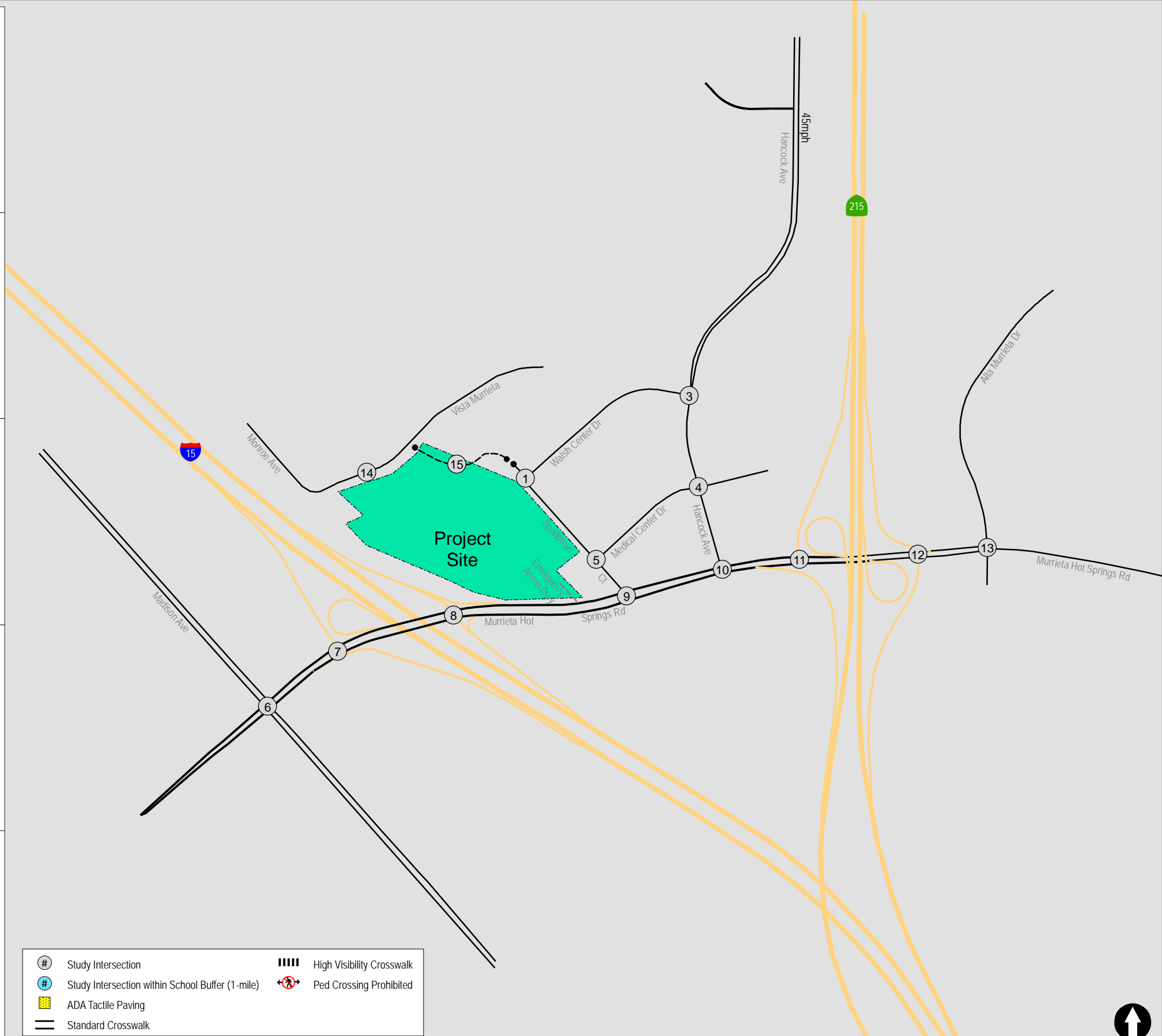
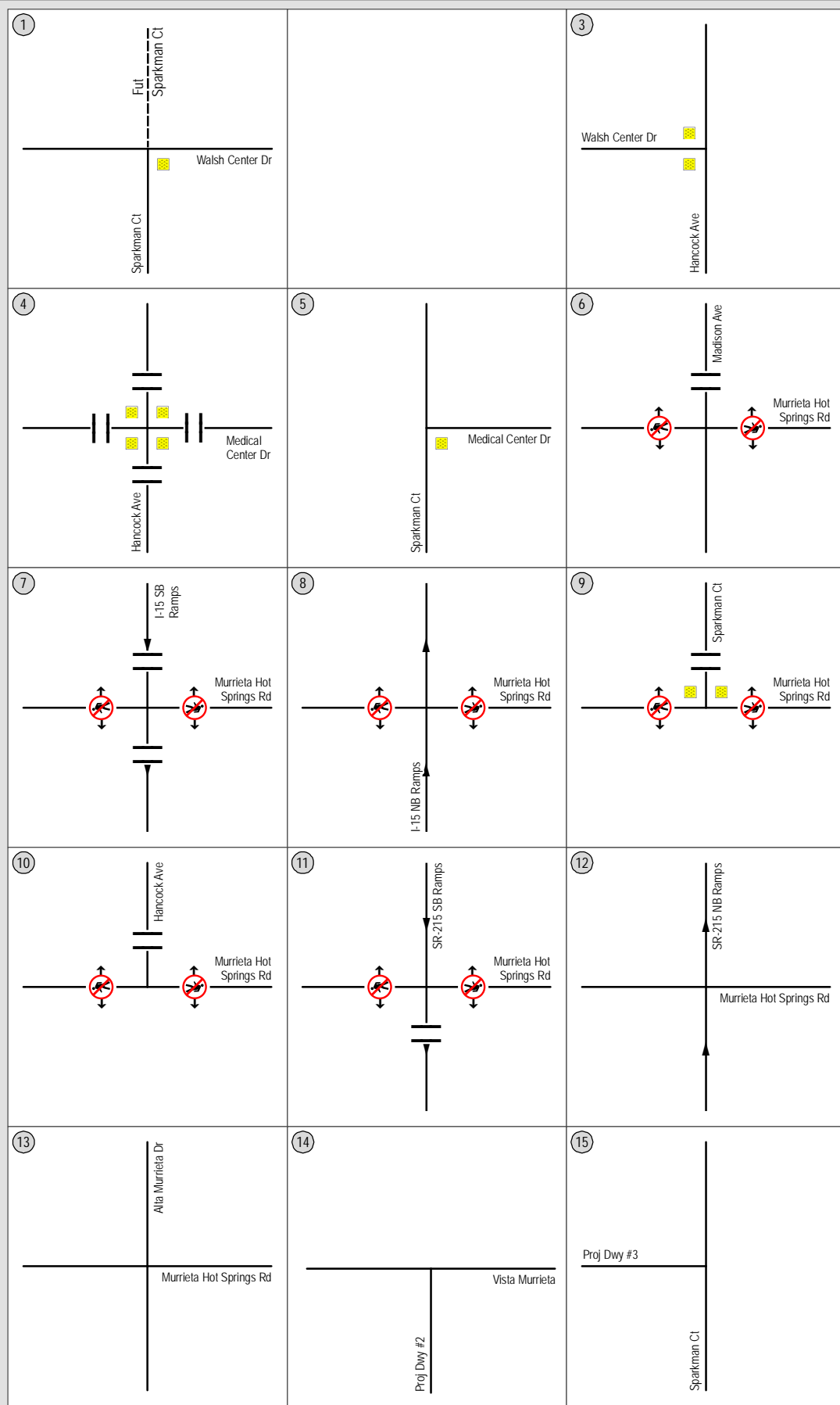


Figure 3-2
Existing Traffic Volumes



- # Study Intersection
- # Study Intersection within School Buffer (1-mile)
- ADA Tactile Paving
- Standard Crosswalk
- ▬ High Visibility Crosswalk
- ⊘ Ped Crossing Prohibited

Figure 3-3
Existing Pedestrian Conditions

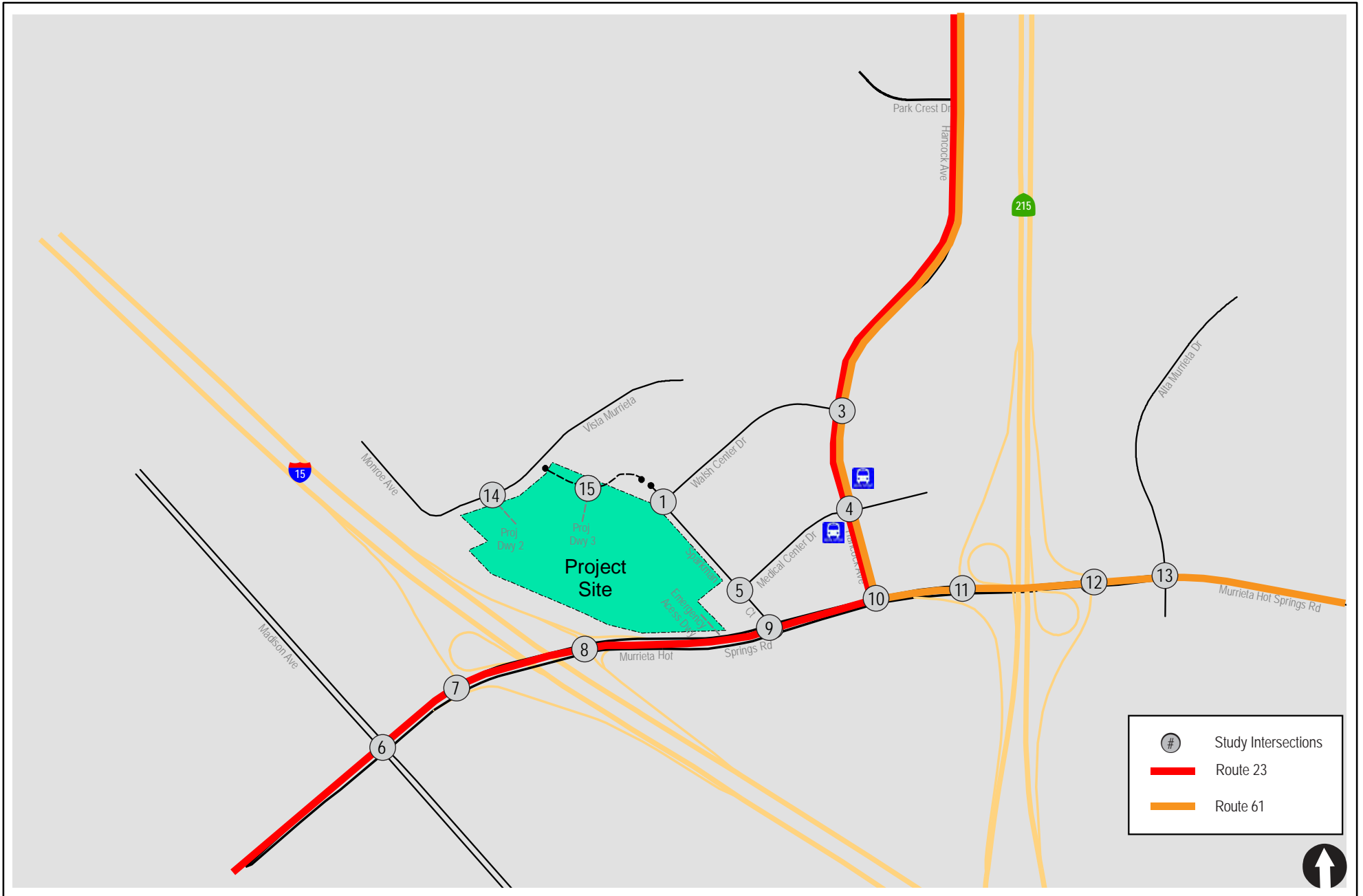


Figure 3-4

Transit Conditions

THE TERRACES AT MURRIETA

4.0 PROJECT TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

4.1.1 Trip Generation

Traffic generation is expressed as vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the 11th Edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE). Land Use 221: Multifamily Housing Mid-Rise trip rates were used to estimate the trip generation for the Proposed Project.

Table 4-1 summarizes the trip generation rates used in forecasting the vehicular trips generated by the proposed Project and presents the forecast daily and peak hour project traffic volumes for a “typical” weekday.

Project Phase 1 – Year 2025

As shown in *Table 4-1*, in the Year 2025, Project Phase 1 is estimated to generate 3,064 daily trips, with 275 trips (63 inbound, 212 outbound) in the AM peak hour and 254 trips (155 inbound, 99 outbound) in the PM peak hour.

Project Phase 2 – Year 2028

As shown in *Table 4-1*, in the Year 2028, Project Phase 2 is estimated to generate 1,132 daily trips, with 97 trips (22 inbound, 75 outbound) in the AM peak hour and 97 trips (59 inbound, 38 outbound) in the PM peak hour.

It should be noted that the trip generation methodology and forecasts were approved by City of Murrieta staff prior to proceeding with further analysis.

Entire Project – Year 2028

The Entire Project is estimated to generate a total of approximately 4,196 daily trips, with 372 trips (85 inbound, 287 outbound) in the AM peak hour and 351 trips (214 inbound, 137 outbound) in the PM peak hour on a “typical” weekday.

It should be noted that the trip generation methodology and forecasts were approved by City of Murrieta staff prior to proceeding with further analysis.

4.2 Project Traffic Distribution and Assignment

Figure 4-1 and **Figure 4-2** depict the general directional traffic distribution patterns for Project Phase 1 and the Entire Project, respectively. The trip distribution was approved by City of Murrieta staff prior to proceeding with further analysis. Project traffic volumes both entering and exiting the project site have been distributed and assigned to the adjacent street system based on the following considerations:

- Directional flows on the freeways in the immediate vicinity of the project site (i.e. I-15 and I-215 Freeways),

- The site's proximity to major traffic carriers (i.e. Murrieta Hot Springs Road and Hancock Road, etc.),
- Expected localized traffic flow patterns based on adjacent street channelization and presence of traffic signals, and
- Ingress/egress availability at the project site.
- Sparkman Court will be a cul-de-sac just south of Vista Murrieta and not connect to Vista Murrieta.

Project Phase 1 traffic volumes are presented in *Figure 4-3*, while *Figure 4-4* depicts the Entire Project traffic volumes.

4.3 Grading / Soil Importation Trips

The project would require approximately 4,300 cubic yards of imported material. Assuming 16 cubic yards per truck, a total of 538 one-way truck trips would be required. The site preparation and grading phases, during which fill material will be delivered to the site, is projected to occur over 105 days. Assuming truck trips occur at the same rate each day, approximately 5 daily trips would be required to deliver the fill material. The likely route of travel will be Murrieta Hot Springs Road to either I-5 or I-215. The temporary addition of 5 daily truck trips to Murrieta Hot Springs Road and Sparkman Court is not expected to affect the intersections and segments along the route significantly.

**TABLE 4-1
TRIP GENERATION - TERRACES**

Land Use	Size	Daily Trip Ends (ADTs)		AM Peak Hour					PM Peak Hour					
		Rate ^a	Volume	Rate	In:Out Split ^a	Volume			Rate	In:Out Split	Volume			
						In	Out	Total			In	Out	Total	
Phase 1														
Apartments	652 DU	b	3,064	b	23 : 77	63	212	275	b	61 : 39	155	99	254	
Phase 2														
Apartments	247 DU	b	1,132	b	23 : 77	22	75	97	b	61 : 39	59	38	97	
Entire Project (Phases 1 & 2)	899 DU		4,196			85	287	372			214	137	351	

Footnotes:

- a. Trip Generation rates are based on the 11th Edition of the Trip Generation Manual, Institute of Transportation Engineers.
- b. Rates for Land Use 221, Multifamily Housing (Mid-Rise). Daily: $T = 4.77(X) - 46.46$; AM: $T = 0.44(X) - 11.61$; and PM: $T = 0.39(X) + 0.34$.

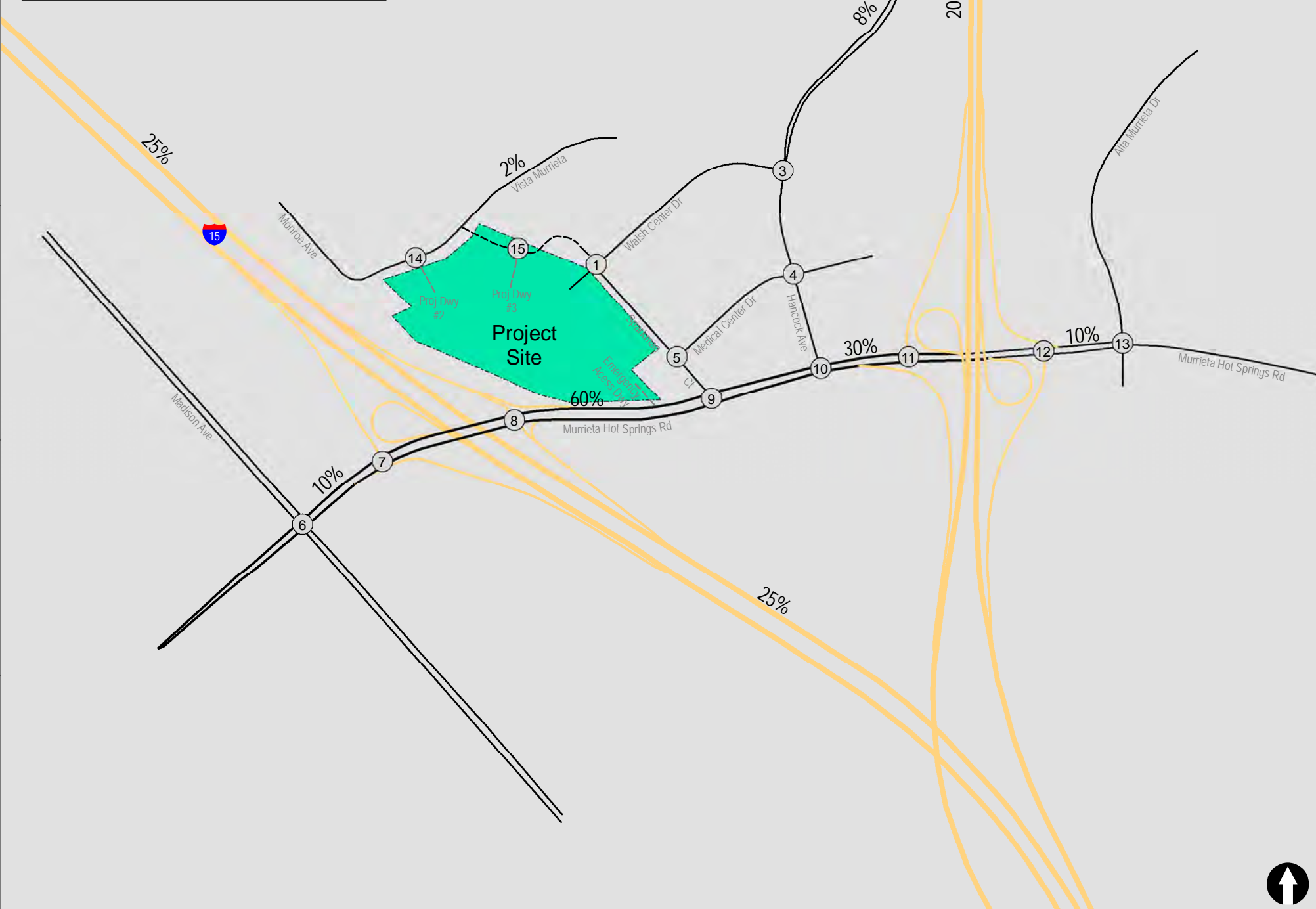
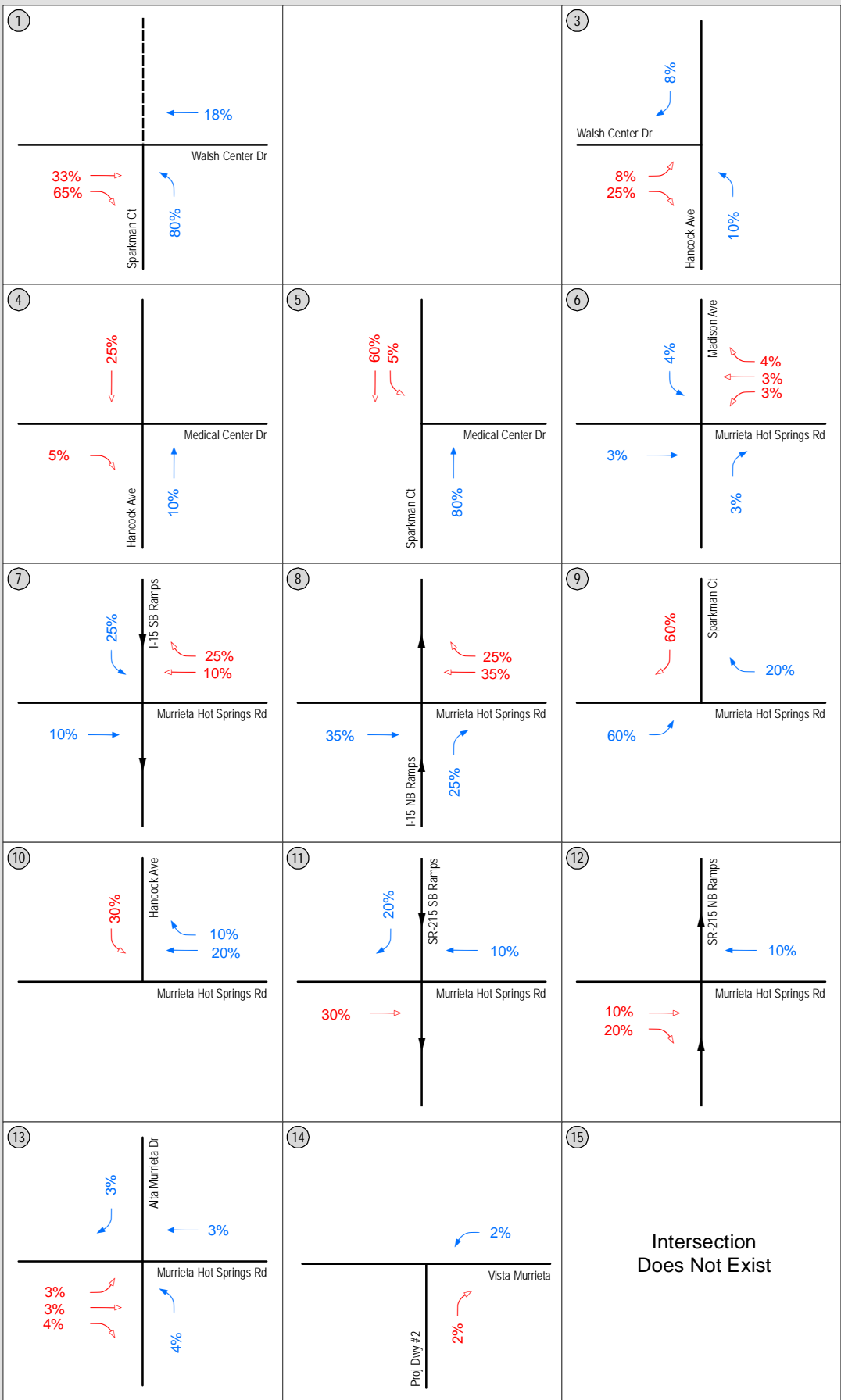
Study Intersection

Inbound Trip Distribution

Outbound Trip Distribution

XX % Regional Trip Distribution

Future Roadway

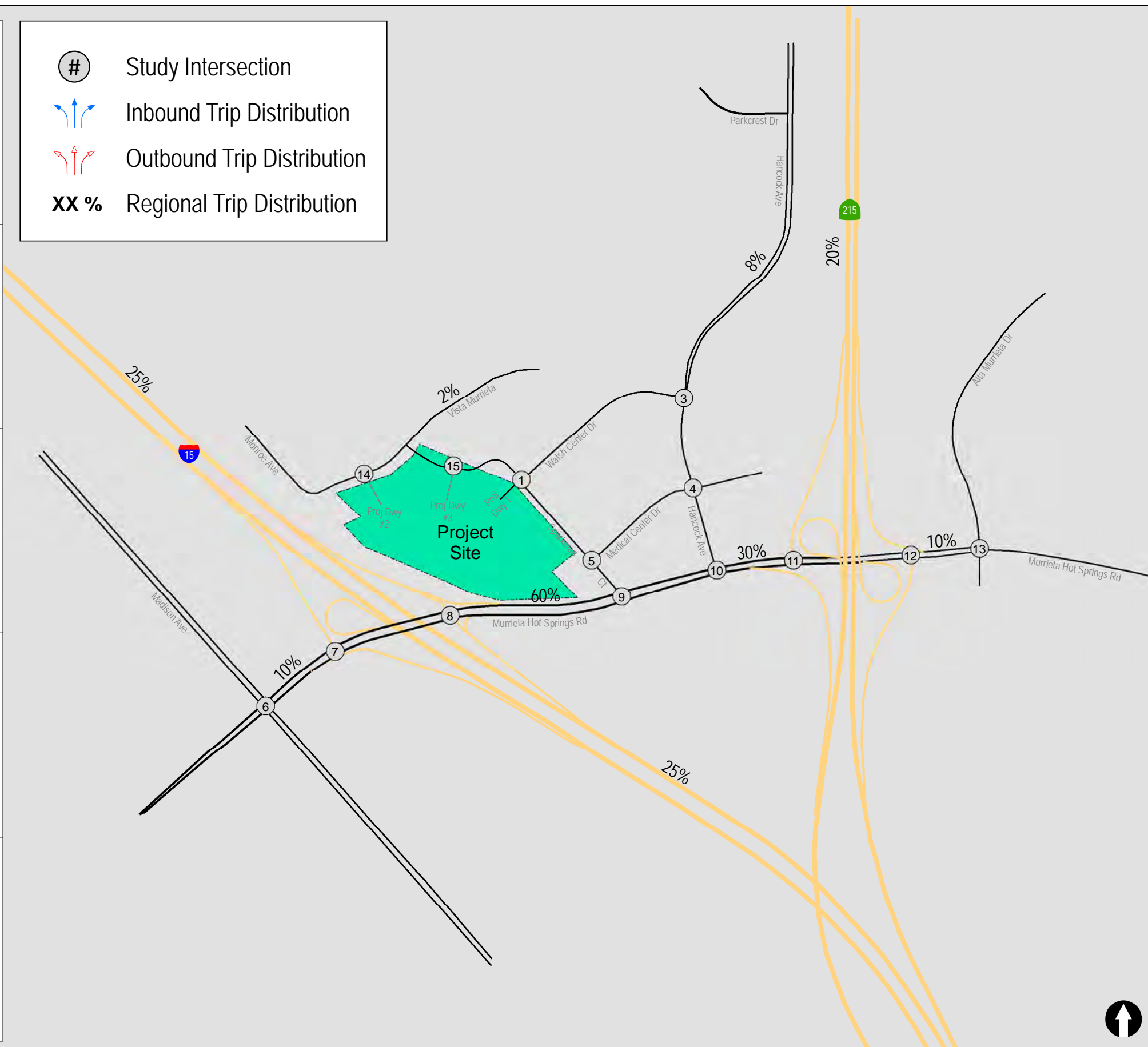
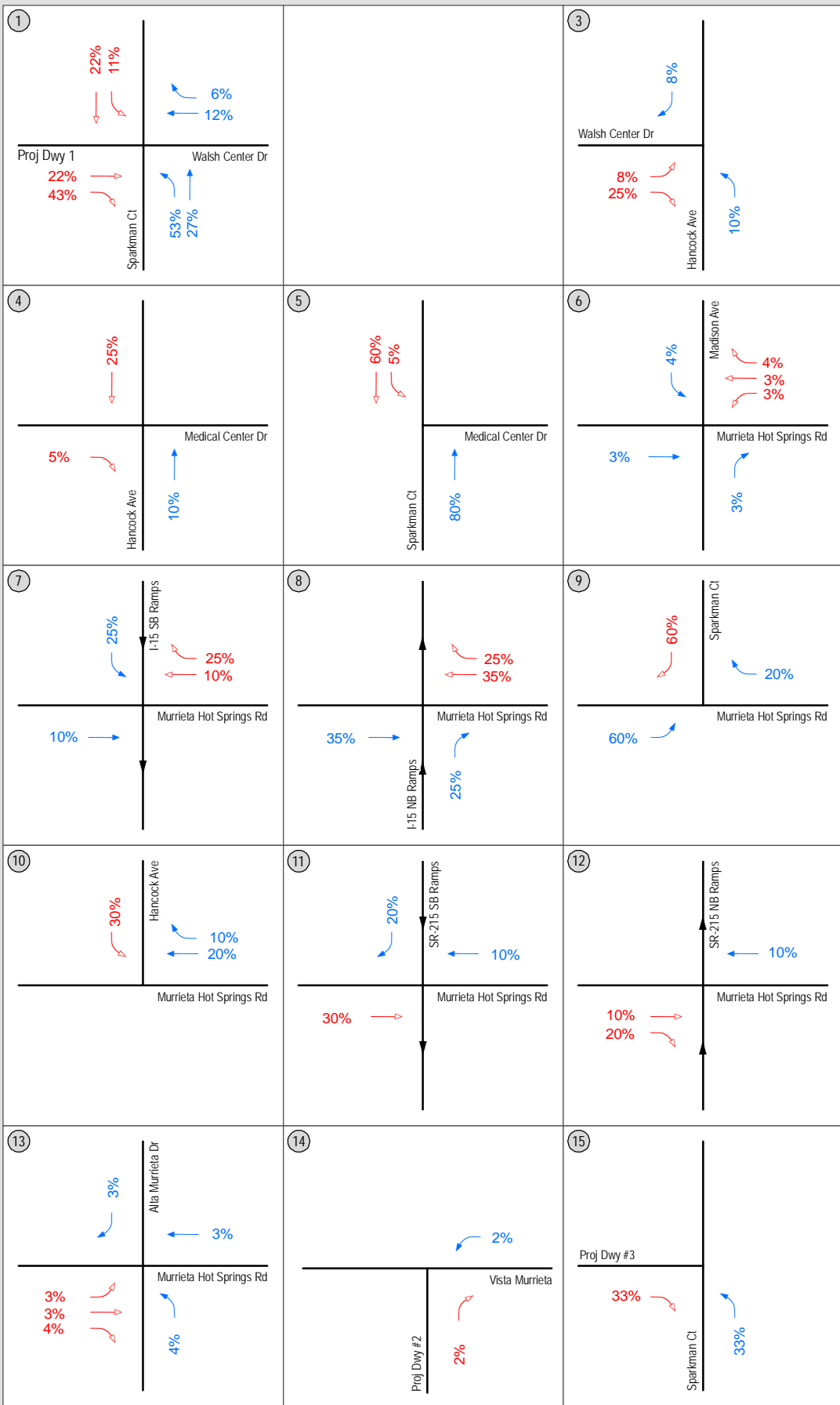


Study Intersection

Inbound Trip Distribution

Outbound Trip Distribution

XX % Regional Trip Distribution



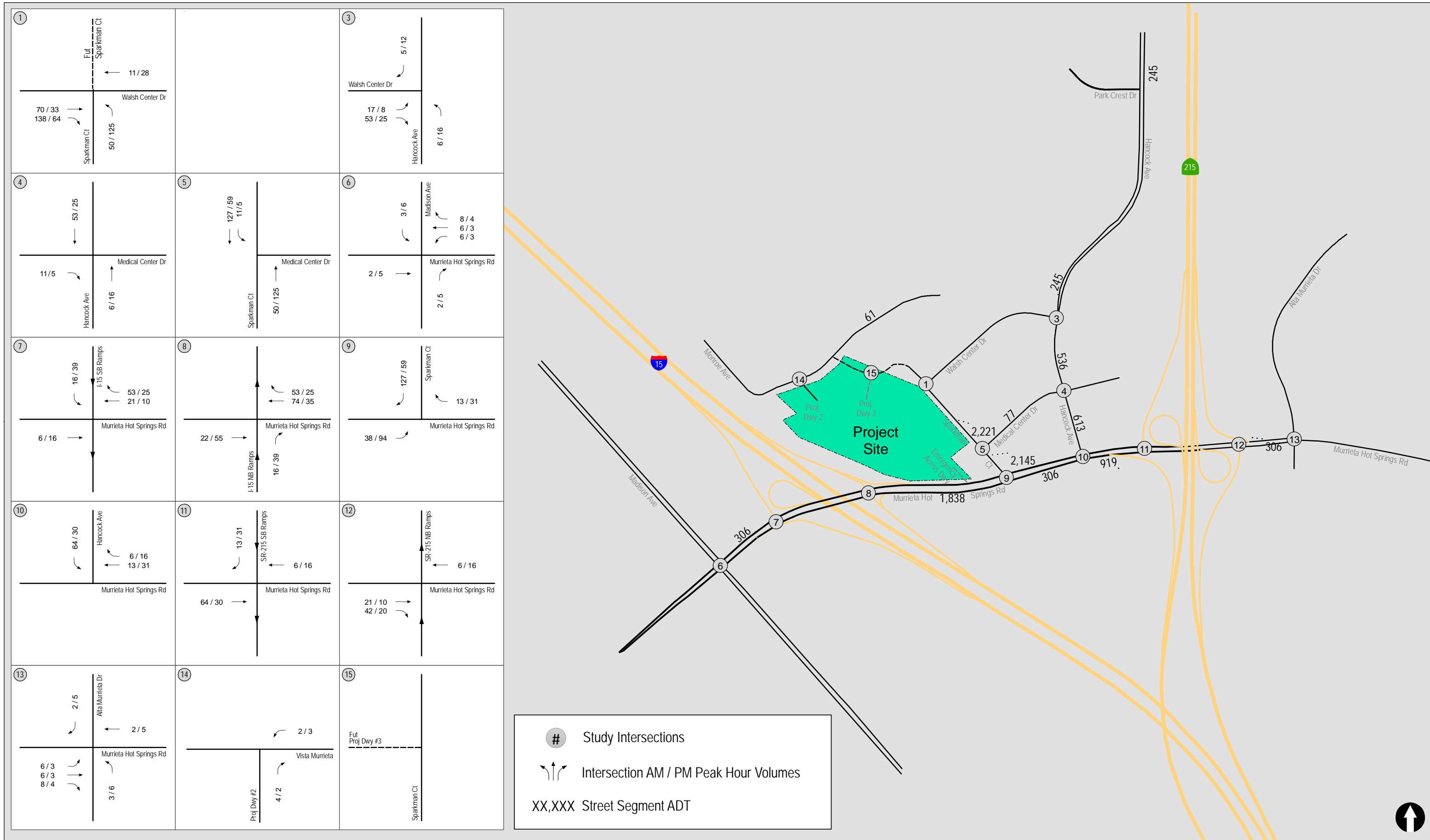


Figure 4-3
Project Phase I Traffic Volumes

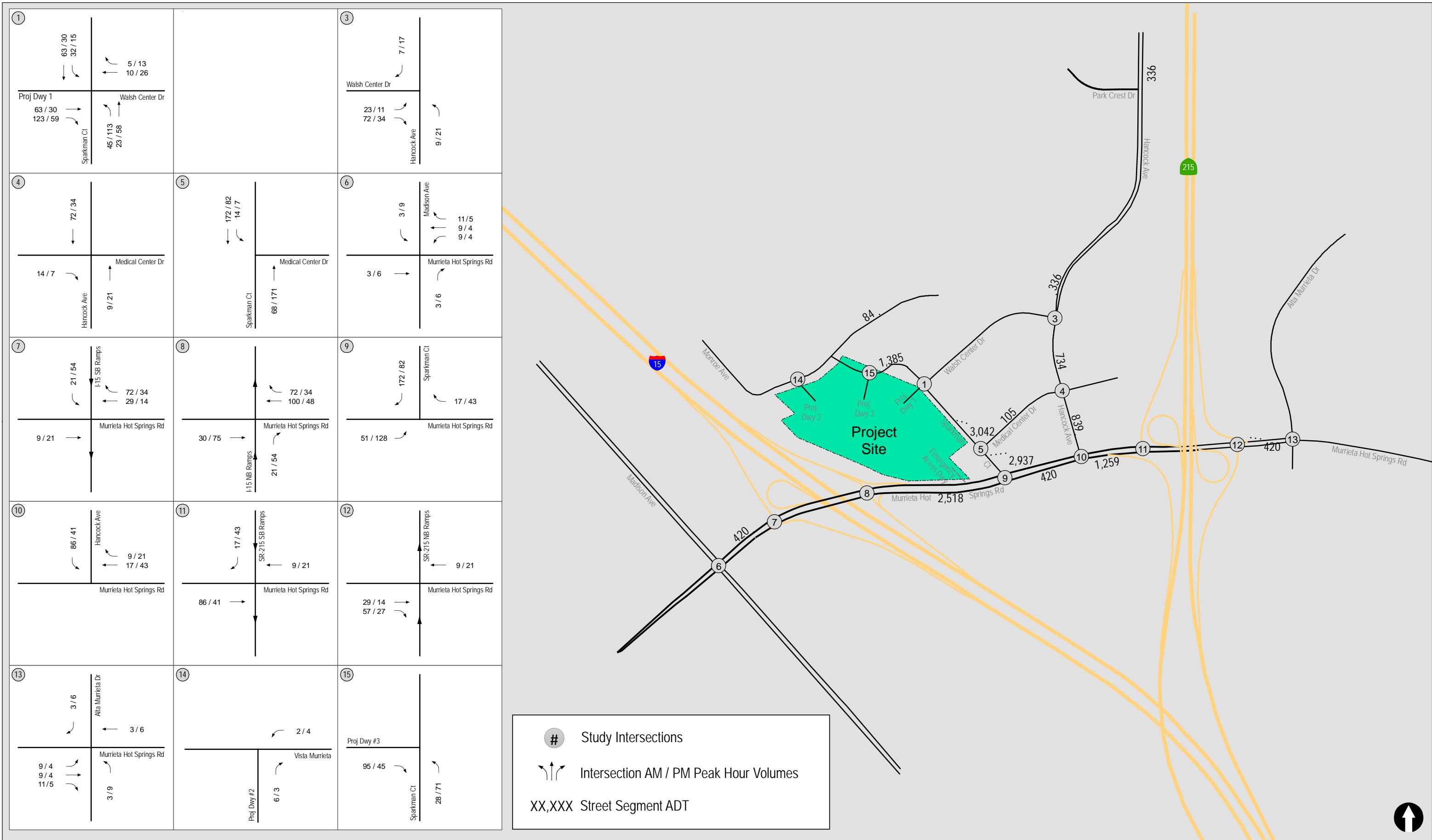


Figure 4-4

Entire Project Traffic Volumes

5.0 NEAR-TERM (OPENING YEAR 2025) TRAFFIC VOLUMES

5.1 Approved (Cumulative) Projects Trip Generation

The list of cumulative projects in the Project vicinity, that would contribute traffic to the Project study area intersections and segments was obtained from the City of Murrieta. Following are brief descriptions of the cumulative projects.

1. Los Alamos Community (DP-2014-490)

The proposed Los Alamos Community Project includes the development of approximately 542 multi-family residential dwelling units. The site is located south of Los Alamos Road and east of Monroe Avenue in the City of Murrieta. The Project is estimated to generate 3,604 daily trips with 276 AM peak hour trips (54 inbound and 222 outbound) and 336 PM peak hour trips (217 inbound and 119 outbound).

2. Sial Medical Plaza (DP-2016-785)

The Sial Medical Plaza Project is proposed to consist of a 2-story 20,826 square feet of Medical Office use. The Project is located at 25142 Hancock Avenue, in the City of Murrieta. The Project is estimated to generate 725 daily trips with 58 AM peak hour trips (45 inbound and 13 outbound) and 72 PM peak hour trips (20 inbound and 52 outbound).

3. Corporate Crossroads/Whittaker Office Complex (DP-02-474/RPO-007-2570)

The proposed Corporate Crossroad/Whittaker Office Complex Project includes the development of four buildings with a total of 273,120 sq. ft. The site is located on a vacant parcel between Hancock Avenue and Interstate 215 (I-215) Freeway, in the “Golden Triangle” area of the City of Murrieta. The Project is estimated to generate 2,871 daily trips with 415 AM peak hour trips (365 inbound and 50 outbound) and 386 PM peak hour trips (66 inbound and 320 outbound).

4. Jefferson & Ivy (DP-2017-1397)

The Ranch Project is proposed to be developed with approximately 333 multi-family residential dwelling units by 2021. The site is located northwest corner of Jefferson Avenue / Ivy Street intersection in the City of Murrieta. The Project is estimated to generate 2,214 daily trips with 170 AM peak hour trips (33 inbound and 137 outbound) and 206 PM peak hour trips (133 inbound and 73 outbound).

5. Murrieta Gateway Business Park (DP-2017-1391)

The Murrieta Gateway Project is proposed 188,910 SF industrial park with 131,255 SF of business park, a 158-room all suites hotel, and a gas station/convenience store/car wash with 16 fueling positions. The site is located on the southwest quadrant of Jefferson Avenue and the future Hawthorn Street in the City of Murrieta, California. The Project is estimated to generate 5,439 daily trips with 333 AM peak hour trips (199 inbound and 134 outbound) and 356 PM peak hour trips (153 inbound and 203 outbound).

6. Downtown Market Place (DP-2018-1741)

The Downtown Marketplace Project proposes for a 51,455 square foot three-story commercial and office building. The site is located on the southeast corner of Washington Avenue and Ivy Street in the City of Murrieta, California. The Project is estimated to generate 704 daily trips with 74 AM peak hour trips (61 inbound and 13 outbound) and 75 PM peak hour trips (19 inbound and 56 outbound).

7. Mar Vista Business Park Development (DP-2018-1792)

The Mar Vista Business Park Development Project is proposed to develop 5 individual warehouse buildings. The site is located at the intersection of Jefferson Avenue and Fig Avenue in the southwest corner on a vacant lot in the City of Murrieta, California. The Project is estimated to generate a maximum of 187 daily trips with 26 AM peak hour trips (23 inbound and 3 outbound) and 24 PM peak hour trips (3 inbound and 21 outbound).

8. Murrieta Town Shopping Center Expansion (DP-2018-1802)

The Murrieta Town Shopping Center Expansion Project is proposed to construct an additional two new buildings (10,000 square feet and 5,000 square feet) to the existing Murrieta Town Shopping Center. The site is located on the northwest quadrant of Murrieta Hot Springs Road and Alta Murrieta Drive in the City of Murrieta, California. The Project is estimated to generate 566 daily trips with 45 AM peak hour trips (22 inbound and 23 outbound) and 64 PM peak hour trips (32 inbound and 32 outbound).

9. Jefferson & Fig (DP-2019-1919)

The Jefferson & Fig Project is proposed to develop a Multi-Use Fueling Station with a car-wash. The proposed site includes a 3,592 square foot convenience store with 12 fueling stations and a 960 square foot carwash. The site is located at the southwest corner of Jefferson Avenue / Fig Street intersection in the City of Murrieta. The Project is estimated to generate 2,355 daily trips with 238 AM peak hour trips (118 inbound and 120 outbound) and 197 PM peak hour trips (98 inbound and 99 outbound).

10. Hotel Murrieta (DP-2019-2031)

The Hotel Murrieta Project is proposed to develop a 257-room hotel. The site is generally located between Monroe Avenue and the I-15/I-215 interchange between Newton Azrak and Fig Street in the City of Murrieta. The Project is estimated to generate 2,149 daily trips with 121 AM peak hour trips (71 inbound and 50 outbound) and 155 PM peak hour trips (79 inbound and 76 outbound).

11. Hancock Children's Clinic (DP-2020-2206)

The Hancock Children's Clinic Project is proposed to develop a 3,760 square foot Children's Medical Office Building. The site is located along Hancock Avenue, between Avenida Venida and Parkcrest Drive. The Project is estimated to generate 131 daily trips with 13 AM peak hour trips (8 inbound and 5 outbound) and 15 PM peak hour trips (6 inbound and 9 outbound).

12. Rancho Springs Medical Center (DP-2020-2199)

The Rancho Spring Medical Center Project is proposed to expand the existing 170,995 square foot hospital/medical center by an additional 36,000 square feet. The site is generally bordered to the south by Murrieta Hot Springs Road, to the east by Interstate 215, Hancock Avenue to the west, and to the north by undeveloped parcels. The Project is estimated to generate 461 daily trips with 38 AM peak hour trips (26 inbound and 12 outbound) and 42 PM peak hour trips (13 inbound and 29 outbound).

13. Jefferson Apartments (DP-2020-2170)

The Jefferson Apartments Project is proposed to develop 160 dwelling units of market rate apartments. The site is located along Jefferson Avenue and is slightly north of Murrieta Hot Springs Road in the City of Murrieta. The Project is estimated to generate 1,172 daily trips with 74 AM peak hour trips (17 inbound and 57 outbound) and 90 PM peak hour trips (56 inbound and 33 outbound).

14. Beyond Food Mart (DP-2020-2171)

The Beyond Foot Mart Project is proposed to develop a 7,274 square foot super convenience store/gas station with a drive through window, 16 fueling positions, and an 1,893 square foot automated car wash. The site is located at the northeast corner of Jackson Avenue and Murrieta Hot Springs Road in the City of Murrieta. The Project is estimated to generate 2,766 daily trips (including a 25% pass-by reduction) with 337 AM peak hour trips (169 inbound and 168 outbound) and 275 PM peak hour trips (138 inbound and 137 outbound).

15. U-Haul (DP-2020-2359)

The U-Haul Project is proposed to develop an 11,609 square foot U-Haul Warehouse Building. The site is located at 41458 Los Alamos Road in the City of Murrieta, California. The Project is estimated to generate 21 daily trips with 2 AM peak hour trips (1 inbound and 1 outbound) and 2 PM peak hour trips (1 inbound and 1 outbound).

16. Walsh Center Dr Apartments

The Walsh Center Drive Apartments Project is proposed to construct 380 apartment units on a 12.65-acre site (30 units/acre). The site is located northeast of the intersection of Walsh Center Drive and Sparkman Court (i.e., Sparkman Drive) in the City of Murrieta. The Project is estimated to generate 2,782 daily trips with 175 AM peak hour trips (40 inbound and 135 outbound) and 213 PM peak hour trips (134 inbound and 79 outbound).

Triangle Project

In addition to the above, the Triangle Specific Plan bounded by I-15 to the west, 1-215 to the east and Murrieta Hot Springs Road to the north was first approved by City Council back in 2008, and then subsequently again in 2013. This project has not begun construction on any of the five phases of development. No Development Plans have been submitted to the City and therefore, this project was not included as a Cumulative project.

5.2 Summary of Cumulative Projects Trips

Table 5-1 summarizes the trip generation for the cumulative projects. As seen in **Table 5-1**, the 16 cumulative projects are estimated to generate a total of 28,147 daily trips with 2,396 AM peak hour trips (1,253 inbound and 1,143 outbound) and 2,640 PM peak hour trips (1,168 inbound and 1,473 outbound).

5.3 Ambient Growth

A portion of the increase in traffic on roadways include vehicles that either originate or terminate from outside the study area and pass through the study area. In order to account for this traffic, an ambient growth of 2% per Year was applied to the existing traffic. This rate of ambient growth has been reviewed and approved by the City of Murrieta Transportation Department staff.

5.3.1 Opening Year 2025 Volumes

Year 2025 volumes were developed as follows:

1. The ambient growth of 8% (2% per Year from 2021 to 2025) was added to the existing (Year 2021) traffic as described above.
2. The trips generated by the cumulative projects were assigned to the Project study area intersections and segments
3. The ambient growth and the cumulative projects traffic volumes were then added to the existing volumes to obtain the Year 2025 volumes without Project traffic.
4. The Project Phase 1 traffic volumes were then added to obtain the Year 2025 volumes with Project Phase 1 traffic volumes.

5.3.2 Year 2028 Volumes

Year 2028 volumes were developed as follows:

1. The ambient growth 14% (2% per Year from 2021 to 2028) was added to the existing (Year 2021) traffic as described above.
2. The cumulative projects traffic volumes were then added to obtain the Year 2028 volumes without Project traffic.
3. The traffic volumes generated by the Entire Project were added to the above to obtain the Year 2028 volumes with Entire Project traffic volumes.

Figure 5-1 depicts the Cumulative Projects traffic volumes. **Figure 5-2** depicts the Near-Term (Opening Year 2025) without Project (with Ambient Growth and Cumulative Projects) traffic volumes while **Figure 5-3** depicts the Near-Term (Opening Year 2025) + Project Phase 1 traffic volumes. **Figure 5-4** depicts the Near-Term (Opening Year 2028) without Project (with Ambient Growth and Cumulative Projects) traffic volumes while **Figure 5-5** depicts the Near-Term (Opening Year 2025) + Entire Project traffic volumes.

**TABLE 5-1
CUMULATIVE PROJECTS TRIP GENERATION SUMMARY**

Project	Land Use	Size	Daily Volume	AM Peak Hour Volume			PM Peak Hour Volume		
				In	Out	Total	In	Out	Total
1. Los Alamos Community Plan	Apartment	542 DU	3604	54	222	276	217	119	336
2. Sial Medical Plaza	Medical Office	20.826 KSF	725	45	13	58	20	52	72
3. Whittaker Office Complex	Office	237.12 KSF	2871	365	50	415	66	320	386
4. Jefferson & Ivy	Apartment	333 DU	2214	33	137	170	133	206	339
5. Murrieta Gateway Business Park									
Hotel	Hotel	158 Rooms	705	29	25	54	27	30	57
Gas Station	Gas Station	16 Pumps	2464	76	74	150	85	83	168
Business Park	Business Park	131.26 KSF	1633	32	21	53	25	30	55
Industrial Park	Industrial Park	1 KSF	637	62	14	76	16	60	76
	<i>Subtotal</i>		5439	199	134	333	153	203	356
6. Downtown Market Place	Commercial Office	51.455 KSF	704	61	13	74	19	56	75
7. Mar Vista Business Park	General Light Industrial	37.783 KSF	187	23	3	26	3	21	24
8. Murrieta Town Shopping Center Exp	Shopping Center	15 KSF	566	22	23	45	32	32	64
9. Jefferson & Fig									
	Super Convenience Market / Gas Stn	3.009 KSF	3009	149	149	298	124	125	249
	Automated Car Wash	0.131 KSF	131	9	5	14	7	7	14
	(Pass-by reduction)		-785	-40	-38		-33	-33	
	<i>Subtotal</i>		2355	118	120	238	98	99	197

Continued on the Next Page

TABLE 5-1 (CONTINUED)
CUMULATIVE PROJECTS TRIP GENERATION SUMMARY ^a

Project	Land Use	Size	Daily Volume	AM Peak Hour Volume			PM Peak Hour Volume			
				In	Out	Total	In	Out	Total	
Continued from the Previous Page										
10. Hotel Murrieta	Hotel	257 Rooms	2,149	71	50	121	79	76	155	
11. Hancock Children's Clinic	Medical Office Building	3.76 KSF	131	8	5	13	6	9	15	
12. Rancho Springs Medical Center	Hospital	43 KSF	461	26	12	38	13	29	42	
13. Jefferson Apartments	Residential	160 DU	1171	17	57	74	56	33	90	
14. Beyond Food Mart	Super Convenience Market / Gas Stn (Pass-by reduction)	16 Pumps	3688	225	224	449	184	183	367	
			-922	-56	-56		-46	-46		
	<i>Subtotal</i>		2766	169	168	337	138	137	275	
15. U-Haul	Warehouse	11.608 KSF	21	1	1	2	1	1	2	
16. Walsh Center Apartments		380 DU	2782	40	135	175	134	79	213	
Total Cumulative Projects Trips			28,147	1,253	1,143	2,396	1,168	1,473	2,640	

General Note:

1. Trip generation obtained from City of Murrieta traffic studies.

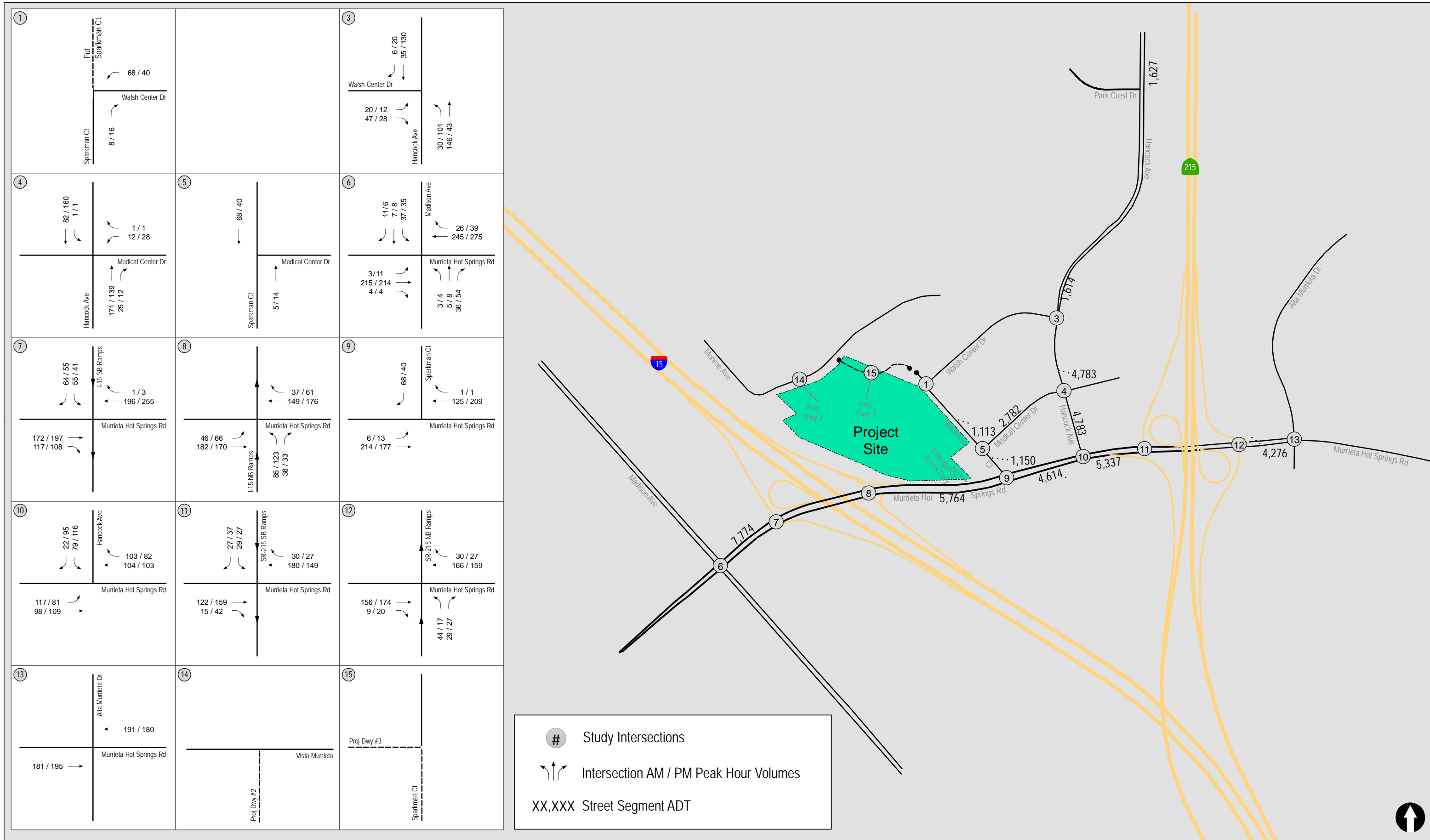


Figure 5-1
Cumulative Projects Traffic Volumes

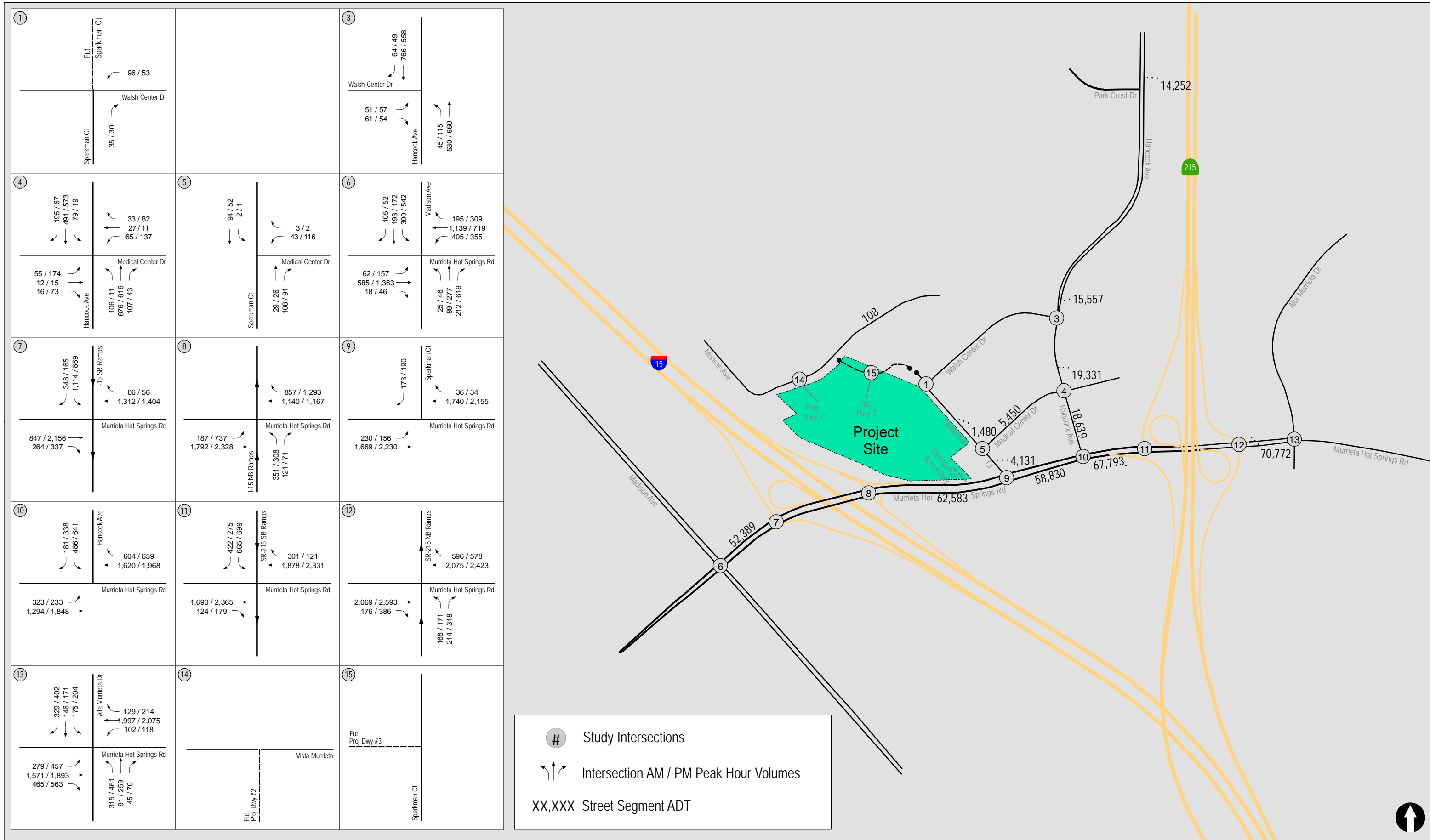


Figure 5-2
Year 2025 without Project Traffic Volumes

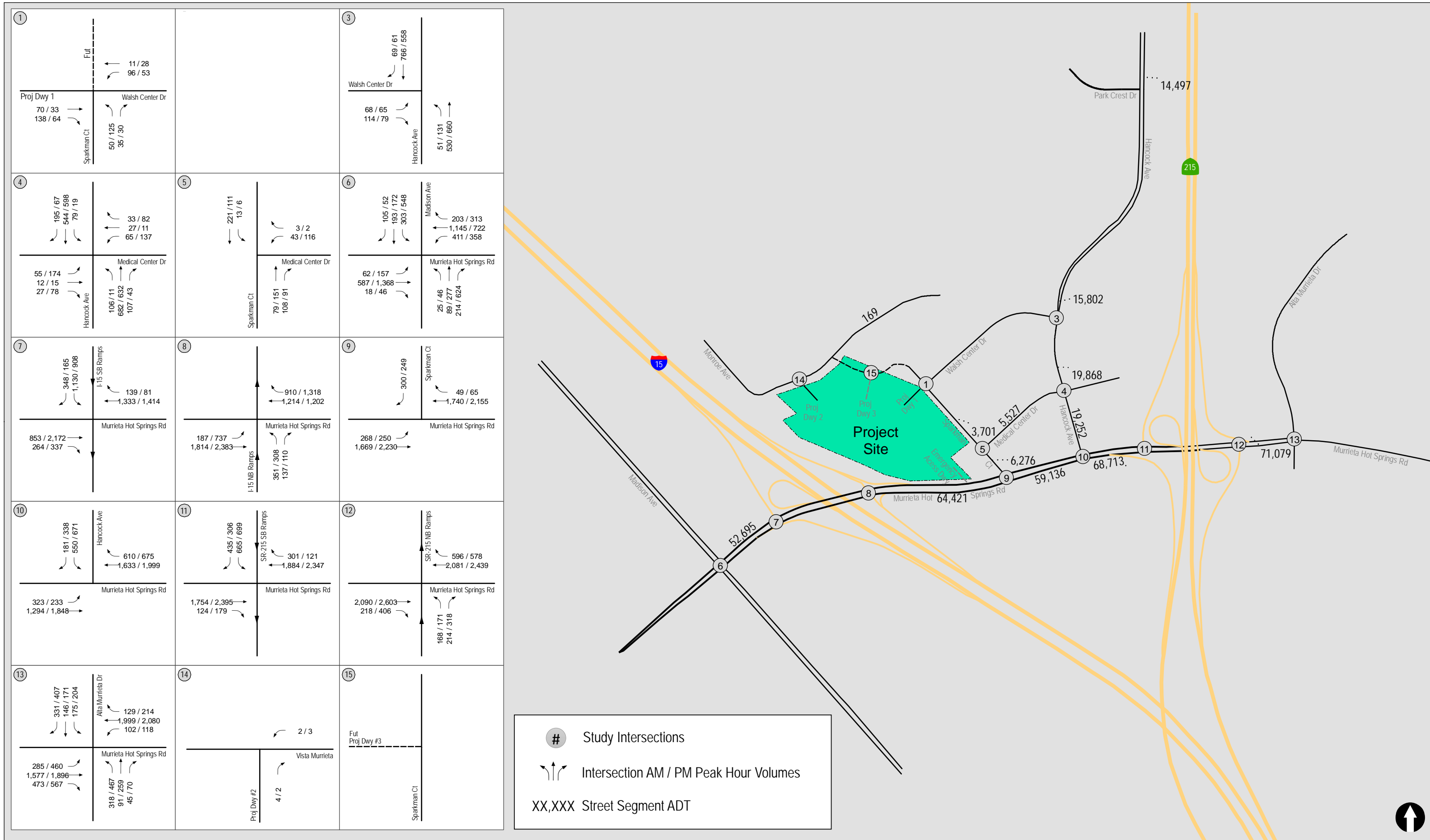
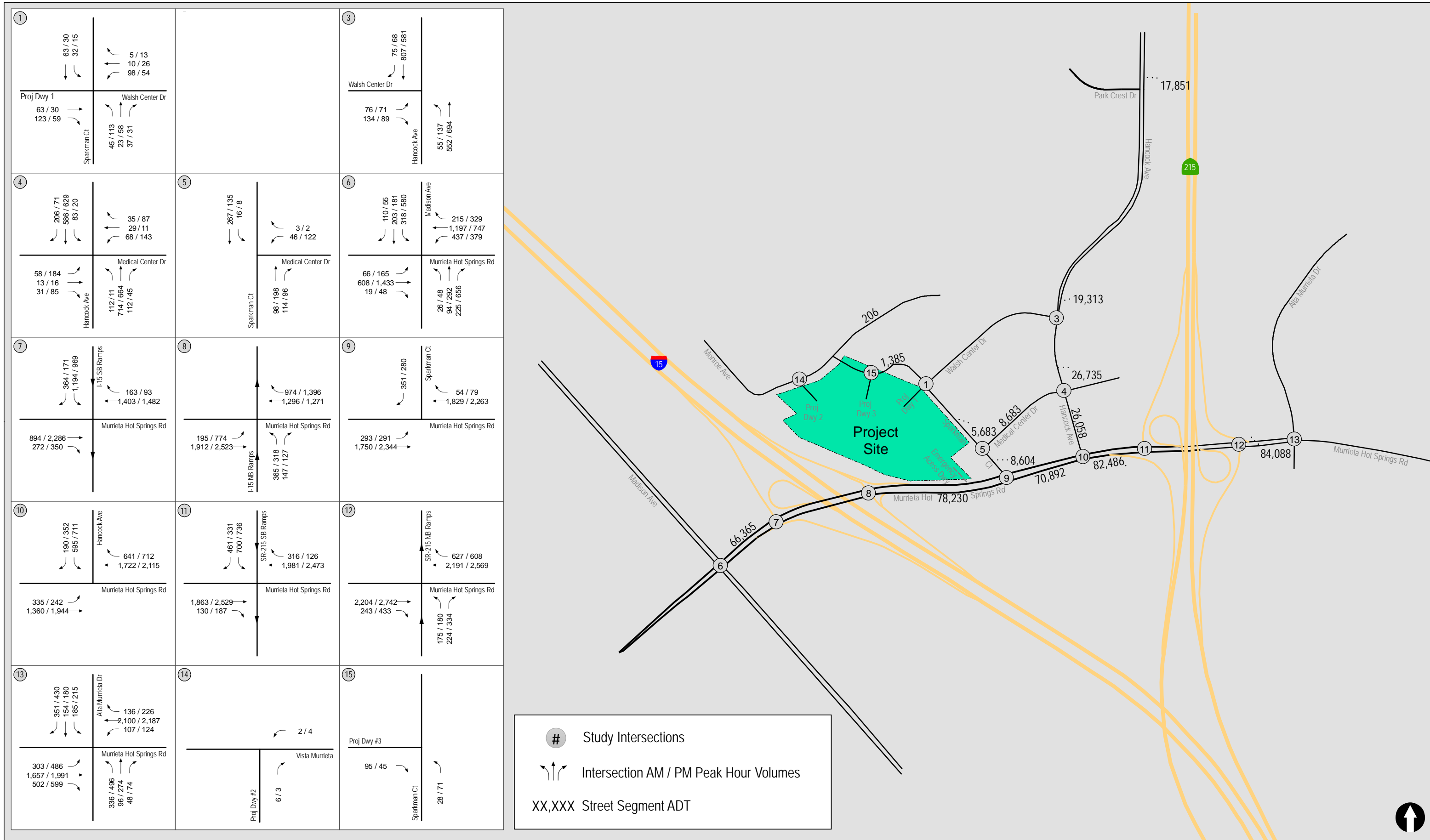


Figure 5-3
Year 2025 + Project Traffic Volumes



Figure 5-4
Year 2028 without Project Traffic Volumes



6.0 ANALYSIS OF NEAR-TERM SCENARIOS

6.1 Opening Year 2025 without Project Analysis

6.1.1 Intersection Analysis

Table 6-1 summarizes the Opening Year 2025 without Project peak hour intersection operations. As seen in *Table 6-1*, with the addition of the ambient growth and anticipated cumulative projects, all study area intersections are calculated to operate at LOS D or better except the following:

- Unsignalized Hancock Avenue / Walsh Center Drive intersection (Minor Street approach - LOS F during the PM peak hour)
- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E during the AM peak hour and LOS F during the PM peak hour)

Appendix D contains the Opening Year 2025 without Project peak hour intersection analysis worksheets.

6.1.2 Segment Operations

By 2025, Murrieta Hot Springs Road will be improved between Monroe Avenue and I-215 ramps to an 8-Lane, Augmented Urban Arterial. Therefore, the segments between Hancock Avenue and I215 are analyzed as 8-Lane, Augmented Urban Arterial.

Table 6-2 summarizes the Opening Year 2025 No Project segment operations. As seen in *Table 6-2*, with the addition of the Ambient Growth, all study area segments are calculated to operate at LOS C or better except the following:

- Murrieta Hot Springs Road: Madison Ave to I-15 Ramps – LOS E
- Murrieta Hot Springs Road: I-15 Ramps to Monroe Avenue – LOS D
- Murrieta Hot Springs Road: Monroe Avenue to Hancock Avenue – LOS D
- Murrieta Hot Springs Road: Hancock Avenue to I-215 – LOS E
- Murrieta Hot Springs Road: I-215 and Alta Murrieta Drive – LOS F

6.2 Opening Year 2025 Plus Project Phase 1 Analysis

6.2.1 Intersection Analysis

Table 6-1 summarizes the Opening Year 2025 Plus Project Phase 1 peak hour intersection operations. As seen in *Table 6-1*, with the addition of the Project traffic, all intersections are calculated to continue to operate at LOS D or better except the minor street approach at the following unsignalized intersections, which are calculated to continue to operate at LOS F:

- Unsignalized Hancock Avenue / Walsh Center Drive intersection (Minor Street approach - LOS E during the AM peak hour and LOS F during the PM peak hour)
- Signalized Alta Murrieta Drive/ Murrieta Hot Springs Road (LOS E during the AM peak hour and LOS F during the PM peak hour)

Improvement Not Required

The increase in delay due to the Project at the signalized Alta Murrieta Drive / Murrieta Hot Springs Road intersection is less than 5 seconds and therefore, the Project is not required to make improvements at this intersection.

Improvement Required

The increase in delay due to the Project at the unsignalized Hancock Avenue / Walsh Center Drive intersection is more than 5 seconds and the Project is required to make improvements at this intersection to improve the operations to LOS D or better. The recommended improvements are described in detail in Section 11.1 Proposed Improvements.

Appendix E contains the Opening Year 2025 with Project peak hour intersection analysis worksheets.

6.2.2 Segment Operations

Table 6-2 summarizes the Opening Year 2025 Plus Project Phase 1 segment operations. As seen in *Table 6-2*, with the addition of the Project traffic the following all study area segments are calculated to operate at LOS C or better except the following:

- Murrieta Hot Springs Road: Madison Ave to I-15 Ramps – LOS E
- Murrieta Hot Springs Road: I-15 Ramps to Monroe Avenue – LOS D
- Murrieta Hot Springs Road: Monroe Avenue to Hancock Avenue – LOS D
- Murrieta Hot Springs Road: Hancock Avenue to I-215 – LOS E
- Murrieta Hot Springs Road: I-215 and Alta Murrieta Drive – LOS F

However, the increase in V/C ratio on the above segments due to the Project traffic is less than the City of Murrieta threshold of 0.05 (5%) and therefore no improvements are necessary.

TABLE 6-1
NEAR-TERM (OPENING YEAR 2025) INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Near-Term (Opening Year 2025) No Project		Near-Term (Opening Year 2025) + Project Phase 1		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
1. Sparkman Ct / Walsh Center Dr	TWSC ^d	AM	0.0	A	13.6	B	13.6	No
		PM	0.0	A	13.6	B	13.6	No
3. Hancock Ave / Walsh Center Dr	TWSC ^d	AM	28.5	D	37.7	E	9.2	Yes
		PM	79.3	F	134.6	F	55.3	Yes
4. Hancock Ave / Medical Center Dr	Signal	AM	16.1	B	16.2	B	0.1	No
		PM	17.4	B	17.4	B	0.0	No
5. Sparkman Ct / Medical Center Dr	TWSC ^d	AM	10.6	B	13.5	B	2.9	No
		PM	10.3	B	12.7	B	2.4	No
6. Madison Ave / Murrieta Hot Springs Rd	Signal	AM	45.2	D	45.3	D	0.1	No
		PM	54.1	D	54.6	D	0.5	No
7. I-15 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	19.9	B	20.0	C	0.1	No
		PM	18.9	B	19.7	B	0.8	No
8. I-15 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	17.9	B	18.3	B	0.4	No
		PM	23.0	C	23.1	C	0.1	No
9. Murrieta Hot Springs Rd / Sparkman Ct	TWSC ^d	AM	15.8	C	22.5	C	6.7	No
		PM	21.6	C	27.3	D	5.7	No
10. Murrieta Hot Springs Rd / Hancock Ave	Signal	AM	18.7	B	19.4	B	0.7	No
		PM	17.7	B	18.3	B	0.6	No
11. I-215 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	16.2	B	16.3	B	0.1	No
		PM	19.7	B	20.0	C	0.3	No

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TABLE 6-1 (CONTINUED)
NEAR-TERM (OPENING YEAR 2025) INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Near-Term (Opening Year 2025) No Project		Near-Term (Opening Year 2025) + Project Phase 1		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
CONTINUED FROM THE PREVIOUS PAGE								
12. I-215 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	8.3	A	8.3	A	0.0	No
		PM	11.6	B	11.6	B	0.0	No
13. Murrieta Hot Springs Rd / Alta Murrieta Dr	Signal	AM	58.6	E	59.6	E	1.0	No
		PM	103.3	F	104.2	F	0.9	No
14. Vista Murrieta Rd / Project Driveway #2	TWSC ^d	AM	0.0	A	8.5	A	8.5	No
		PM	0.0	A	8.5	A	8.5	No
15. Monroe Ave / Project Driveway #3	DNE	AM	0.0	A	0.0	A	0.0	No
		PM	0.0	A	0.0	A	0.0	No

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Increase in delay due to Project Traffic
- d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

- DNE – Does Not Exist
- NA – Not Applicable
- Bold** indicates Improvements potentially required.

SIGNALIZED		UNSIGNALIZED	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

**TABLE 6-2
NEAR-TERM (OPENING YEAR 2025) STREET SEGMENT OPERATIONS**

Street Segment	General Plan Classification ^a	Functional Classification ^a	Capacity (LOS E) ^c	Near-Term (Opening Year 2025) No Project			Near-Term (Opening Year 2025) + Project Phase 1			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
Vista Murrieta											
South of Los Alamos	Collector	2-Ln Collector	13,000	108	A	0.008	169	A	0.013	0.005	No
Medical Center Drive											
Sparkman Ct to Hancock Ave	Unclassified Road	2-Ln Collector	13,000	5,450	A	0.419	5,527	A	0.425	0.006	No
Murrieta Hot Springs Rd											
Madison Ave to I-15 Ramps	Aug Urban Art	6-Ln Urban Art	53,900	52,389	E	0.972	52,695	E	0.978	0.006	No
I-15 Ramps to Sparkman Ct	Aug Urban Art	8-Ln Aug Urban Art	71,800	62,583	D	0.872	64,421	D	0.897	0.025	No
Sparkman Ct to Hancock Ave	Aug Urban Art	8-Ln Aug Urban Art	71,800	58,830	D	0.819	59,136	D	0.824	0.005	No
Hancock Ave to I-215 Ramps	Aug Urban Art	8-Ln Aug Urban Art	71,800	67,793	E	0.944	68,713	E	0.957	0.013	No
I-215 Ramps to Alta Murrieta Dr	Multi Modal Transp Corridor	6-Ln Multi Modal Transp Corridor	53,900	70,772	F	1.313	71,079	F	1.319	0.006	No
Sparkman Court											
Vista Murrieta Rd to Walsh Center Dr	Major Road	2-Ln Collector	13,000	0	A	0.000	0	A	0.000	0.000	No
Walsh Center Dr to Medical Center Dr	Major Road	2-Ln Collector	13,000	1,480	A	0.114	3,701	A	0.285	0.171	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	2-Ln Collector	13,000	4,131	A	0.318	6,276	A	0.483	0.165	No

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TABLE 6-2 (CONTINUED)
NEAR-TERM (OPENING YEAR 2025) STREET SEGMENT OPERATIONS

Street Segment	General Plan Classification ^a	Functional Classification ^b	Capacity (LOS E) ^c	Near-Term (Opening Year 2025) No Project			Near-Term (Opening Year 2025) + Project Phase 1			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
CONTINUED FROM THE PREVIOUS PAGE											
Hancock Avenue											
Los Alamos Rd to Parkcrest Dr	Major Road	4-Ln Major Road	34,100	14,252	A	0.418	14,497	A	0.425	0.007	No
Parkcrest Dr to Walsh Center Dr	Major Road	4-Ln Major Road	34,100	15,557	A	0.456	15,802	A	0.463	0.007	No
Walsh Center Dr to Medical Center Dr	Major Road	4-Ln Major Road	34,100	19,331	A	0.567	19,868	A	0.583	0.016	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	4-Ln Major Road	34,100	18,639	A	0.547	19,252	A	0.565	0.018	No

Footnotes:

- a. The City of Murrieta roadway General Plan classification.
- b. The City of Murrieta roadway classification at which the roadway currently functions.
- c. The capacity of the roadway at Level of Service E.
- d. Level of Service.
- e. The Volume to Capacity ratio.
- f. Increase in V/C ratio due to the addition of project traffic.

6.3 Year 2028 No Project Analysis

6.3.1 Intersection Analysis

Table 6-3 summarizes the Year 2028 No Project peak hour intersection operations. As seen in Table 6-3, with the addition of the Ambient Growth, all intersections are calculated to operate at LOS D or better except the minor street approach at the following unsignalized intersections:

- Unsignalized Hancock Avenue / Walsh Center Drive intersection (Minor Street approach - LOS F during the PM peak hour)
- Signalized Madison Avenue / Murrieta Hot Springs Road (LOS E during the PM peak hour)
- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E during the AM peak hour and LOS F during the PM peak hour)

Appendix F contains the Year 2028 without Project peak hour intersection analysis worksheets.

6.3.2 Segment Operations

Table 6-4 summarizes the Year 2028 No Project segment operations. As seen in Table 6-4, with the addition of the Ambient Growth, all study area segments are calculated to operate at LOS C or better except the following:

- Murrieta Hot Springs Road: Madison Avenue to I-15 Ramps – LOS F
- Murrieta Hot Springs Road: I-15 Ramps to Sparkman Court – LOS F
- Murrieta Hot Springs Road: Sparkman Court to Hancock Avenue – LOS E
- Murrieta Hot Springs Road: Hancock Avenue to I-215 Ramps – LOS F
- Murrieta Hot Springs Road: I-215 Ramps to Alta Murrieta Drive – LOS F

6.4 Year 2028 Plus Entire Project Analysis

6.4.1 Intersection Analysis

Table 6-3 summarizes the Year 2028 Plus Entire Project peak hour intersection operations. As seen in Table 6-3, with the addition of the Ambient Growth + Cumulative Projects + Entire Project traffic, all intersections are calculated to operate at LOS D or better except the minor street approach at the following unsignalized intersections:

- Unsignalized Hancock Avenue / Walsh Center Drive intersection (Minor Street approach - LOS F during the AM and PM peak hours)
- Signalized Madison Avenue / Murrieta Hot Springs Road (LOS E during the PM peak hour)
- Unsignalized Murrieta Hot Springs Road / Sparkman Court intersection (Minor Street approach - LOS E during the PM peak hour)
- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E during the AM peak hour and LOS F during the PM peak hour)

Though the intersections are calculated to operate below City standards the increase in delay at most of them is less than 5 seconds and hence no improvements are required at these intersections. Following is a description of improvements that are required or not required per City standards.

Improvement not Required

The increases in delay due to the Project at the two signalized Madison Avenue / Murrieta Hot Springs Road and Madison Avenue / Murrieta Hot Springs Road intersections is less than 5 seconds and therefore, the Project is not required to make improvements at these intersections.

Improvements Required

With the addition of cumulative projects traffic, the Walsh Center Drive / Hancock Avenue and the Murrieta Hot Springs Road / Sparkman Court intersections are calculated to operate a LOS F with increases in delay due to Project traffic of more than 5 seconds, the acceptable threshold. Hence the project has a cumulative significant impact at these intersections.

The recommended improvements are described in detail in Section 11.1 Proposed Improvements.

Appendix G contains the Year 2028 with Project peak hour intersection analysis worksheets.

6.4.2 Segment Operations

Table 6-4 summarizes the Year 2028 Plus Project segment operations. As seen in *Table 6-4*, with the addition of the Ambient Growth + Cumulative Projects + Entire Project traffic, all study area segments are calculated to operate at LOS C or better, except the following:

- Murrieta Hot Springs Road: Madison Avenue to I-15 Ramps – LOS F
- Murrieta Hot Springs Road: I-15 Ramps to Sparkman Court – LOS F
- Murrieta Hot Springs Road: Sparkman Court to Hancock Avenue – LOS E
- Murrieta Hot Springs Road: Hancock Avenue to I-215 Ramps – LOS F
- Murrieta Hot Springs Road: I-215 Ramps to Alta Murrieta Drive – LOS F

However, the increase in V/C ratio on the above segments due to the Project traffic is less than the City of Murrieta threshold of 0.05 (5%) and therefore no improvements are necessary.

TABLE 6-3
YEAR 2028 INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Year 2028 No Project		Year 2028 + Entire Project		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
1. Sparkman Ct / Walsh Center Dr	TWSC ^d	AM	9.3	A	16.6	C	7.3	No
		PM	9.0	A	14.7	B	5.7	No
3. Hancock Ave / Walsh Center Dr	TWSC ^d	AM	32.3	D	56.2	F	23.9	Yes
		PM	105.4	F	220.9	F	115.5	Yes
4. Hancock Ave / Medical Center Dr	Signal	AM	16.5	B	16.6	B	0.1	No
		PM	17.9	B	18.0	B	0.1	No
5. Sparkman Ct / Medical Center Dr	TWSC ^d	AM	10.7	B	15.2	C	4.5	No
		PM	10.4	B	14.2	B	3.8	No
6. Madison Ave / Murrieta Hot Springs Rd	TWSC ^d	AM	46.0	D	46.3	D	0.3	No
		PM	58.3	E	59.2	E	0.9	No
7. I-15 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	20.1	C	20.3	C	0.2	No
		PM	20.0	B	21.0	C	1.0	No
8. I-15 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	18.2	B	18.7	B	0.5	No
		PM	23.2	C	25.0	C	1.8	No
9. Murrieta Hot Springs Rd / Sparkman Ct	TWSC ^d	AM	16.7	C	31.0	D	14.3	No
		PM	24.1	C	36.6	E	12.5	Yes
10. Murrieta Hot Springs Rd / Hancock Ave	Signal	AM	19.0	B	20.2	C	1.2	No
		PM	15.6	B	16.5	B	0.9	No
11. I-215 SB Ramps / Murrieta Hot Springs Rd	Signal	AM	16.8	B	16.8	B	0.0	No
		PM	20.8	C	21.2	C	0.4	No

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TABLE 6-3 (CONTINUED)
YEAR 2028 INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Year 2028 No Project		Year 2028 + Entire Project		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
CONTINUED FROM THE PREVIOUS PAGE								
12. I-215 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	8.5	A	8.5	A	0.0	No
		PM	12.4	B	12.4	B	0.0	No
13. Murrieta Hot Springs Rd / Alta Murrieta Dr	Signal	AM	66.0	E	68.9	E	2.9	No
		PM	125.1	F	128.9	F	3.8	No
14. Vista Murrieta Rd / Project Driveway #2	TWSC ^d	AM	0.0	A	8.5	A	8.5	No
		PM	0.0	A	8.5	A	8.5	No
15. Monroe Ave / Project Driveway #3	TWSC ^d	AM	0.0	A	8.9	A	8.9	No
		PM	0.0	A	8.6	A	8.6	No

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Increase in delay due to Project Traffic
- d. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

DNE – Does Not Exist

NA – Not Applicable

Bold indicates improvements potentially required.

SIGNALIZED		UNSIGNALIZED	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

**TABLE 6-4
YEAR 2028 STREET SEGMENT OPERATIONS**

Street Segment	General Plan Classification ^a	Functional Classification ^b	Capacity (LOS E) ^c	Year 2028 No Project			Year 2028 No Project + Entire Project			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
Vista Murrieta South of Los Alamos	Collector	2-Ln Collector	13,000	122	A	0.009	206	A	0.016	0.006	No
Medical Center Drive Sparkman Ct to Hancock Ave	Unclassified Road	2-Ln Collector	13,000	8,578	B	0.660	8,683	B	0.668	0.008	No
Murrieta Hot Springs Rd Madison Ave to I-15 Ramps	Aug Urban Art	6-Ln Urban Art	53,900	65,945	F	1.223	66,365	F	1.231	0.008	No
I-15 Ramps to Sparkman Ct	Aug Urban Art	8-Ln Aug Urban Art	71,800	75,712	F	1.054	78,230	F	1.090	0.035	No
Sparkman Ct to Hancock Ave	Aug Urban Art	8-Ln Aug Urban Art	71,800	70,472	E	0.982	70,892	E	0.987	0.006	No
Hancock Ave to I-215 Ramps	Aug Urban Art	8-Ln Aug Urban Art	71,800	81,227	F	1.131	82,486	F	1.149	0.018	No
I-215 Ramps to Alta Murrieta Dr	Multi Modal Transp Corridor	6-Ln Multi Modal Transp Corridor	53,900	83,669	F	1.552	84,088	F	1.560	0.008	No
Sparkman Court Vista Murrieta Rd to Walsh Center Dr	Major Road	2-Ln Collector	13,000	0	A	0.000	1,385	A	0.107	0.107	No
Walsh Center Dr to Medical Center Dr	Major Road	2-Ln Collector	13,000	2,641	A	0.203	5,683	A	0.437	0.234	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	2-Ln Collector	13,000	5,667	A	0.436	8,604	B	0.662	0.226	No

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TABLE 6-4 (CONTINUED)
YEAR 2028 STREET SEGMENT OPERATIONS

Street Segment	General Plan Classification ^a	Functional Classification ^b	Capacity (LOS E) ^c	Year 2028 No Project			Year 2028 No Project + Entire Project			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
CONTINUED FROM THE PREVIOUS PAGE											
Hancock Avenue											
Los Alamos Rd to Parkcrest Dr	Major Road	4-Ln Major Road	34,100	17,516	A	0.514	17,851	A	0.523	0.010	No
Parkcrest Dr to Walsh Center Dr	Major Road	4-Ln Major Road	34,100	18,977	A	0.557	19,313	A	0.566	0.010	No
Walsh Center Dr to Medical Center Dr	Major Road	4-Ln Major Road	34,100	26,001	C	0.762	26,735	C	0.784	0.022	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	4-Ln Major Road	34,100	25,219	C	0.740	26,058	C	0.764	0.025	No

Footnotes:

- a. The City of Murrieta roadway General Plan classification.
- b. The City of Murrieta roadway classification at which the roadway currently functions.
- c. The capacity of the roadway at Level of Service E.
- d. Level of Service.
- e. The Volume to Capacity ratio.
- f. Increase in V/C ratio due to the addition of project traffic.

7.0 ANALYSIS OF HORIZON YEAR (2040) SCENARIOS

7.1 Horizon Year 2040 Conditions

7.1.1 Network Conditions

In the Horizon Year, it is assumed that Sparkman Court will be renamed Monroe Avenue, be built to City of Murrieta 4-Lane Major standards and connect Murrieta Hot Springs Road with Vista Murrieta and Los Alamos Road. As a result, the geometry at the study area intersections along this road between Walsh Center Drive and Murrieta Hot Springs Road will be modified and the capacity of Monroe Avenue (Sparkman Court) at LOS E will increase to 34,100 ADT.

Figure 7-1 depicts the assumed geometry and traffic control at the study area intersections. Only intersections where modified geometry is assumed are shown on **Figure 7-1**.

7.1.2 Traffic Volumes

The Horizon Year 2040 ADT volumes for the Project study area segments were obtained from the City of Murrieta Transportation Analysis Model (MTAM). Year 2040 peak hour turning movement volumes were estimated using a template in EXCEL developed by LLG to determine peak hour traffic at an intersection from future ADT volumes using the relationship between existing peak hour turn movements and the existing ADT volumes. This same relationship can be assumed to generally continue in the future. For example, if the segment ADT on the roadway is forecast to double by the Year 2030, it is reasonable to assume that the peak hour intersection turning movement volumes will generally double.

Figure 7-2 depicts the Horizon Year 2040 without Project traffic volumes and **Figure 7-3** depicts the Horizon Year 2040 with Project traffic volumes

7.2 Horizon Year 2040 No Project Analysis

The Long-Term volumes are based on the Model and General Plan assumptions. The analysis assumes that Monroe Avenue is built to City of Murrieta 4-Lane Major standards and a connection between Murrieta Hot Springs Road, Vista Murrieta and Los Alamos Road is made. With the implementation of this connection, traffic volumes on Monroe Avenue will increase, resulting in the lowering of LOS at Monroe Avenue intersections and segments. The Murrieta Hot Springs Road / Monroe Avenue intersection is signalized.

7.2.1 Intersection Analysis

Table 7-1 summarizes the Year 2040 No Project peak hour intersection operations. As seen in **Table 7-1**, the following intersections are calculated to operate at LOS E or F:

- Unsignalized Monroe Avenue / Walsh Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours
- Unsignalized Hancock Avenue / Walsh Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours

- Unsignalized Monroe Avenue / Medical Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours
- Signalized Madison Avenue / Murrieta Hot Springs Road (LOS F in the AM and PM peak hours)
- Signalized Murrieta Hot Springs Road / Monroe Avenue intersection – LOS E in the PM peak hour
- Signalized Murrieta Hot Springs Road / Hancock Avenue intersection – LOS E in the PM peak hour
- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E in the AM and LOS F PM peak hours)

Appendix H contains the Horizon Year 2040 peak hour intersection analysis worksheets.

7.2.2 Segment Operations

As described above in Section 7.1.1, Monroe Avenue (Sparkman Court) is analyzed with a LOS E capacity of 34,100 ADT. **Table 7-2** summarizes the Year 2040 No Project segment operations. As seen in **Table 7-2**, all study area segments except the segments of Medical Center Drive and Monroe Avenue are calculated to operate at LOS C or worse.

7.3 Horizon Year 2040 Plus Entire Project Analysis

7.3.1 Intersection Analysis

Table 7-1 summarizes the Year 2040 Plus Entire Project peak hour intersection operations. As seen in **Table 7-1**, with the addition of Project traffic, the following intersections are calculated to operate at LOS E or F:

- Unsignalized Monroe Avenue / Walsh Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours
- Unsignalized Hancock Avenue / Walsh Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours
- Unsignalized Monroe Avenue / Medical Center Drive intersection – Minor Street approach LOS F in the AM and PM peak hours
- Signalized Madison Avenue / Murrieta Hot Springs Road (LOS F in the AM and PM peak hours)
- Signalized Murrieta Hot Springs Road / Monroe Avenue intersection – LOS E in the PM peak hour
- Signalized Murrieta Hot Springs Road / Hancock Avenue intersection – LOS E in the PM peak hour
- Signalized Alta Murrieta Drive / Murrieta Hot Springs Road (LOS E in the AM and LOS F PM peak hours)

Appendix I contains the Horizon Year 2040 peak hour intersection analysis worksheets.

As seen above, several intersections are calculated to operate below City standards but the increase in delay at most of them is less than 5 seconds and hence no improvements are required at those intersections. Following is a description of improvements that are required or not required per City standards.

Improvements Not Required

The increase in delay at the signalized Madison Avenue / Murrieta Hot Springs Road, Murrieta Hot Springs Road / Hancock Avenue and Alta Murrieta Drive / Murrieta Hot Springs Road intersections due to Project traffic is less than the City of Murrieta allowable threshold of 5 seconds. Therefore, no improvements are required at these intersections.

Improvements Required

- **Monroe Avenue / Walsh Center Drive Intersection**

The increase in delay at the Unsignalized Monroe Avenue / Walsh Center Drive intersection due to Project traffic is more than the City of Murrieta allowable threshold of 5 seconds. Hence improvements should be built at this intersection.

- **Hancock Avenue / Walsh Center Drive Intersection**

The increase in delay at the Unsignalized Hancock Avenue / Walsh Center Drive intersection due to Project traffic is more than the City of Murrieta allowable threshold of 5 seconds. Hence improvements should be built at this intersection.

- **Monroe Avenue / Medical Center Drive**

The increase in delay at the unsignalized Monroe Avenue / Medical Center Drive intersection due to Project traffic is more than the City of Murrieta allowable threshold of 5 seconds. Hence improvements should be built at this intersection.

- **Monroe Avenue / Murrieta Hot Springs Road Intersection**

The project has a cumulative significant impact at this intersection and hence, Hence improvements should be built at this intersection.

The recommended improvements at the above intersections are described in detail in Section 11.1 Proposed Improvements. *Figure 7-4* depicts the recommended conceptual geometry and traffic control at the intersections along the Monroe Avenue corridor between Walsh Center Drive and Murrieta Hot Springs Road.

7.3.2 Segment Operations

Table 7-2 summarizes the Year 2040 Plus Project segment operations. As seen in *Table 7-2*, with the addition of Project traffic, all study area segments except the segments of Medical Center Drive and Monroe Avenue are calculated to operate at LOS D or worse.

The increase in v/c ratio due to project traffic on the segments operating at LOS D or worse is within the allowable threshold of 0.05 and hence, no improvements are required.

**TABLE 7-1
HORIZON YEAR 2040 INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Year 2040 No Project		Year 2040 + Project		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
1. Sparkman Ct & Walsh Center Dr	TWSC	AM	>100.0	F	>100.0	F	>10.0	Yes
		PM	>100.0	F	>100.0	F	>10.0	Yes
3. Hancock Ave & Walsh Center Dr	TWSC	AM	76.1	F	>100.0	F	>10.0	Yes
		PM	>100.0	F	>100.0	F	>10.0	Yes
4. Hancock Ave & Medical Center Dr	Signal	AM	18.0	B	18.2	B	0.2	No
		PM	19.3	B	19.5	B	0.2	No
5. Sparkman Ct & Medical Center Dr	TWSC	AM	>100.0	F	>100.0	F	>10.0	Yes
		PM	>100.0	F	>100.0	F	>10.0	Yes
6. Murrieta Hot Springs Rd / Madison Ave	Signal	AM	130.4	F	132.0	F	1.6	No
		PM	327.4	F	330.5	F	3.1	No
7. I-15 SB Ramps / Murietta Hot Springs Rd	Signal	AM	19.7	B	19.9	B	0.2	No
		PM	23.6	C	26.6	C	3.0	No
8. I-15 NB Ramps / Murietta Hot Springs Rd	Signal	AM	18.5	B	18.8	B	0.3	No
		PM	21.3	C	22.3	C	1.0	No
9. Murietta Hot Springs Rd / Monroe Ave	Signal	AM	43.8	D	46.9	D	3.1	No
		PM	63.5	D	66.8	E	3.3	No
10. Murietta Hot Springs Rd / Hancock Ave	Signal	AM	38.3	D	43.1	D	4.8	No
		PM	64.0	E	68.6	E	4.6	No
11. I-215 SB Ramps / Murietta Hot Springs Rd	Signal	AM	25.4	C	25.6	C	0.2	No
		PM	25.0	C	26.3	C	1.3	No

CONTINUED ON THE NEXT PAGE

7-1 (CONTINUED)
HORIZON YEAR 2040 INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Year 2040 No Project		Year 2040 + Project		Δ Delay ^c	Improvement Required?
			Delay ^a	LOS ^b	Delay	LOS		
CONTINUED FROM THE PREVIOUS PAGE								
12. I-215 NB Ramps / Murrieta Hot Springs Rd	Signal	AM	5.5	A	5.5	A	0.0	No
		PM	8.1	A	8.1	A	0.0	No
13. Murrieta Hot Springs Rd / Alta Murrieta Dr	Signal	AM	79.4	E	79.9	E	0.5	No
		PM	151.9	F	153.8	F	1.9	No
14. Vista Murrieta Rd / Project Driveway #2	TWSC ^d	AM	0.0	A	8.6	A	8.6	No
		PM	0.0	A	8.7	A	8.7	No
15. Monroe Ave / Project Driveway #3	TWSC ^d	AM	0.0	A	8.8	A	8.8	No
		PM	0.0	A	11.0	B	11.0	No

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. Increase in delay due to Project Traffic
- a. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

General Note:

- DNE – Does Not Exist
- NA – Not Applicable
- Bold** indicates Improvements potentially required.

SIGNALIZED		UNSIGNALIZED	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

**TABLE 7-2
YEAR 2040 STREET SEGMENT OPERATIONS**

Street Segment	General Plan Classification ^a	Functional Classification ^b	Capacity (LOS E) ^c	Year 2040 No Project			Year 2040 + Project			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
Vista Murrieta											
South of Los Alamos	Collector	2-Ln Collector	13,000	17,200	F	1.323	17,284	F	1.330	0.006	No
Medical Center Drive											
Sparkman Ct to Hancock Ave	Unclassified Road	2-Ln Collector	13,000	5,100	A	0.392	5,205	A	0.400	0.008	No
Murrieta Hot Springs Rd											
Madison Ave to I-15 Ramps	Aug Urban Arterial	6-Ln Urban Art	53,900	73,000	F	1.354	73,420	F	1.362	0.008	No
I-15 Ramps to Sparkman Ct	Aug Urban Arterial	8-Ln Aug Urban Art	71,800	86,700	F	1.208	89,218	F	1.243	0.035	No
Sparkman Ct to Hancock Ave	Aug Urban Arterial	8-Ln Aug Urban Art	71,800	103,000	F	1.435	103,420	F	1.440	0.006	No
Hancock Ave to I-215 Ramps	Aug Urban Arterial	8-Ln Aug Urban Art	71,800	96,700	F	1.347	97,959	F	1.364	0.018	No
I-215 Ramps to Alta Murrieta Dr	Multi Modal Transp Corridor	6-Ln Multi Modal Transp Corridor	53,900	92,700	F	1.720	93,120	F	1.728	0.008	No
Monroe Avenue											
Vista Murrieta Rd to Walsh Center Dr	Major Road	4-Ln Major Road ^g	34,100	23,700	B	0.695	25,085	C	0.736	0.041	No
Walsh Center Dr to Medical Center Dr	Major Road	4-Ln Major Road ^g	34,100	21,400	B	0.628	24,442	C	0.717	0.089	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	4-Ln Major Road ^g	34,100	19,200	A	0.563	22,137	B	0.649	0.086	No

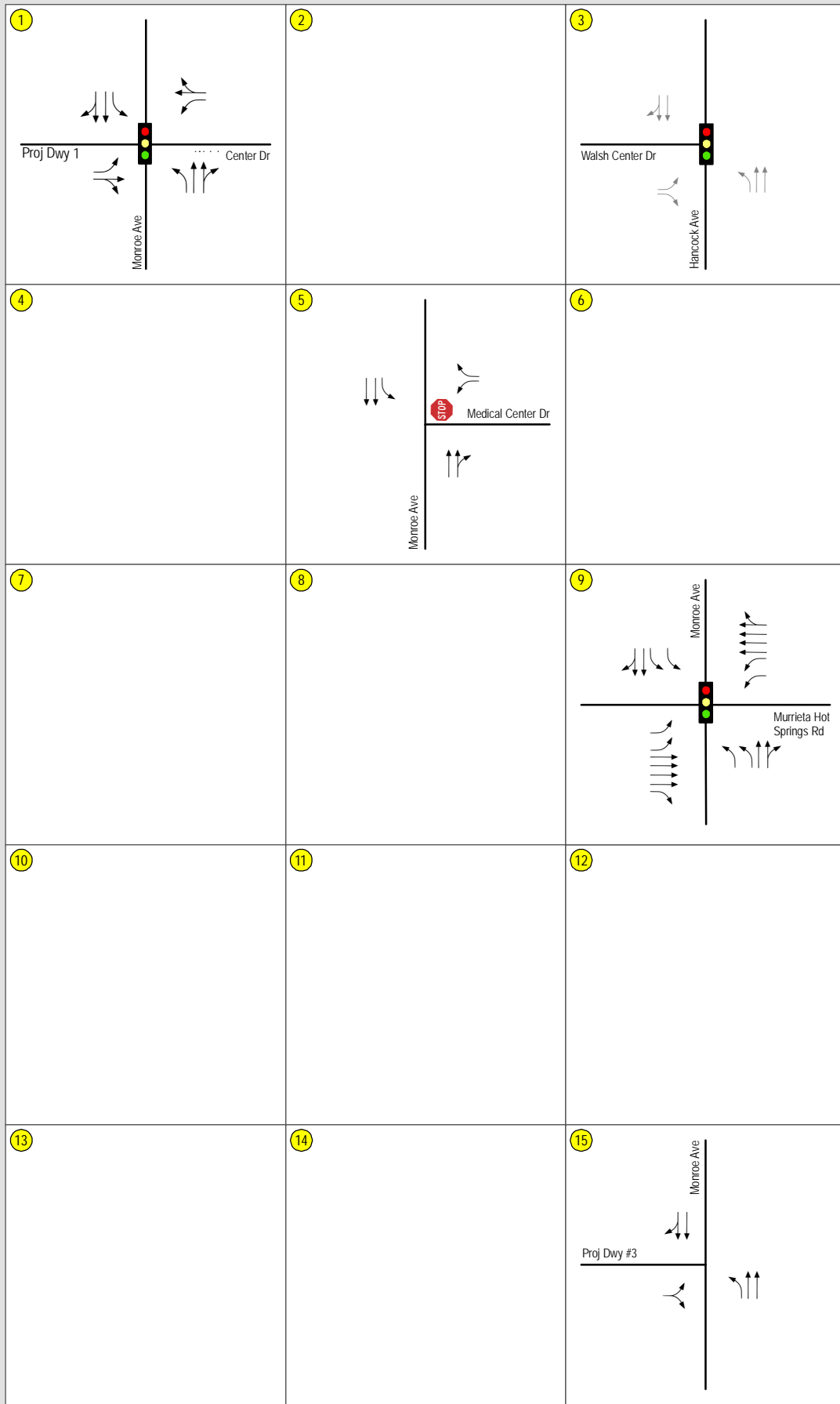
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TABLE 7-2 (CONTINUED)
YEAR 2040 STREET SEGMENT OPERATIONS

Street Segment	General Plan Classification ^a	Functional Classification ^b	Capacity (LOS E) ^c	Year 2040 No Project			Year 2040 + Project			Δ ^f V/C	Improvement Required?
				ADT	LOS ^d	V/C ^e	ADT	LOS	V/C		
CONTINUED FROM THE PREVIOUS PAGE											
Hancock Avenue											
Los Alamos Rd to Parkcrest Dr	Major Road	4-Ln Major Road	34,100	29,800	D	0.874	30,136	D	0.884	0.010	No
Parkcrest Dr to Walsh Center Dr	Major Road	4-Ln Major Road	34,100	29,800	D	0.874	30,136	D	0.884	0.010	No
Walsh Center Dr to Medical Center Dr	Major Road	4-Ln Major Road	34,100	33,100	E	0.971	33,834	E	0.992	0.022	No
Medical Center Dr to Murrieta Hot Springs Rd	Major Road	4-Ln Major Road	34,100	35,600	F	1.044	36,439	F	1.069	0.025	No

Footnotes:

- a. The City of Murrieta roadway General Plan classification.
- b. The City of Murrieta roadway classification at which the roadway currently functions.
- c. The capacity of the roadway at Level of Service E.
- d. Level of Service.
- e. The Volume to Capacity ratio.
- f. Increase in V/C ratio due to the addition of project traffic.
- g. Monroe Avenue will be improved to a 4-Lane Major Road and connected to Los Alamos Road.



Study Intersection

Traffic Signal

Stop Sign

Turning Movements

2/4/6 Number of Travel Lanes

35mph Posted Speed Limit

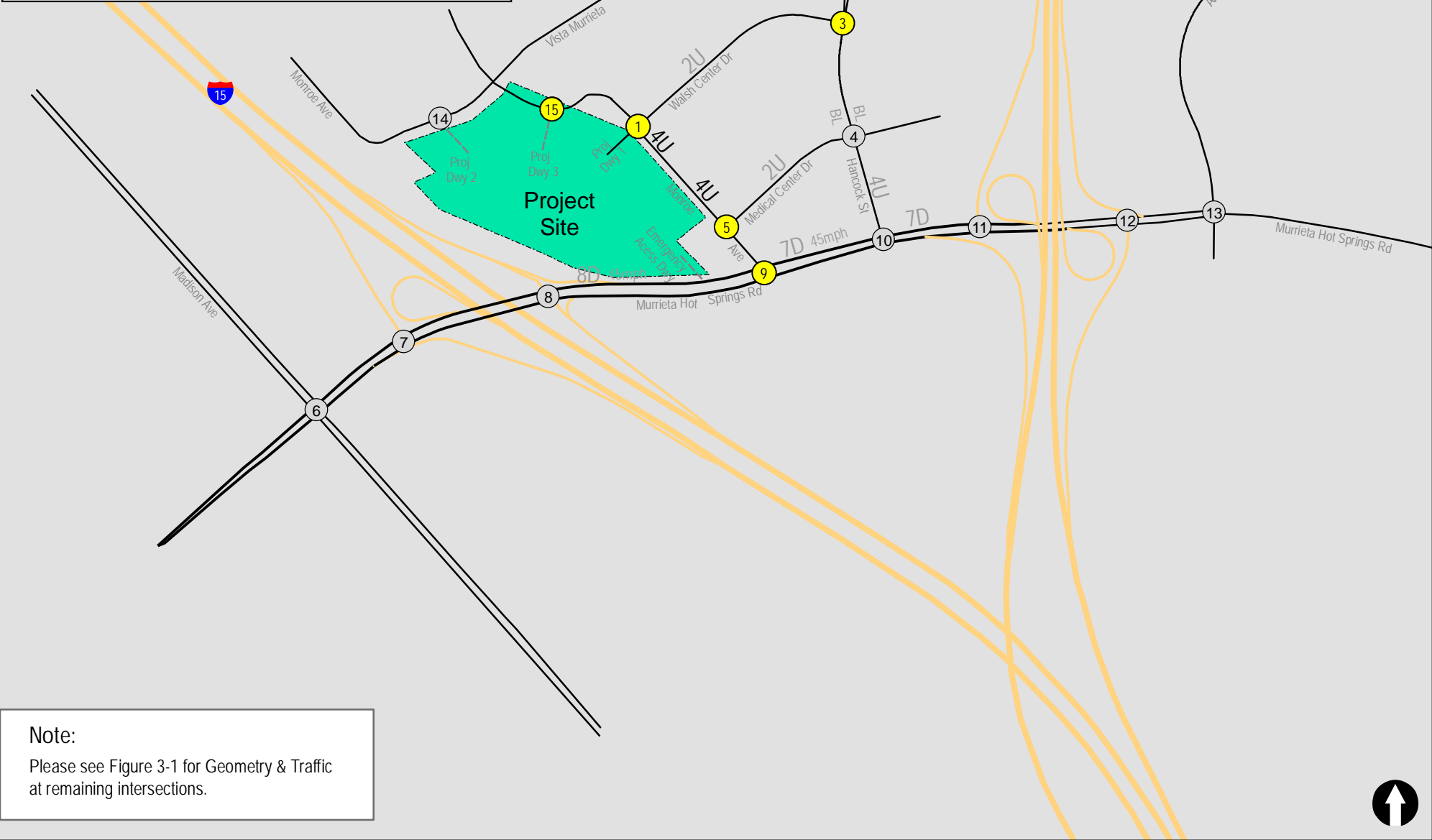
U / D Divided / Undivided Roadway

+ Two-Way Left-Turn Median

BL Bike Lane

--- Future Roadway

Future Intersection geometry shown in Bold



Note:
Please see Figure 3-1 for Geometry & Traffic at remaining intersections.

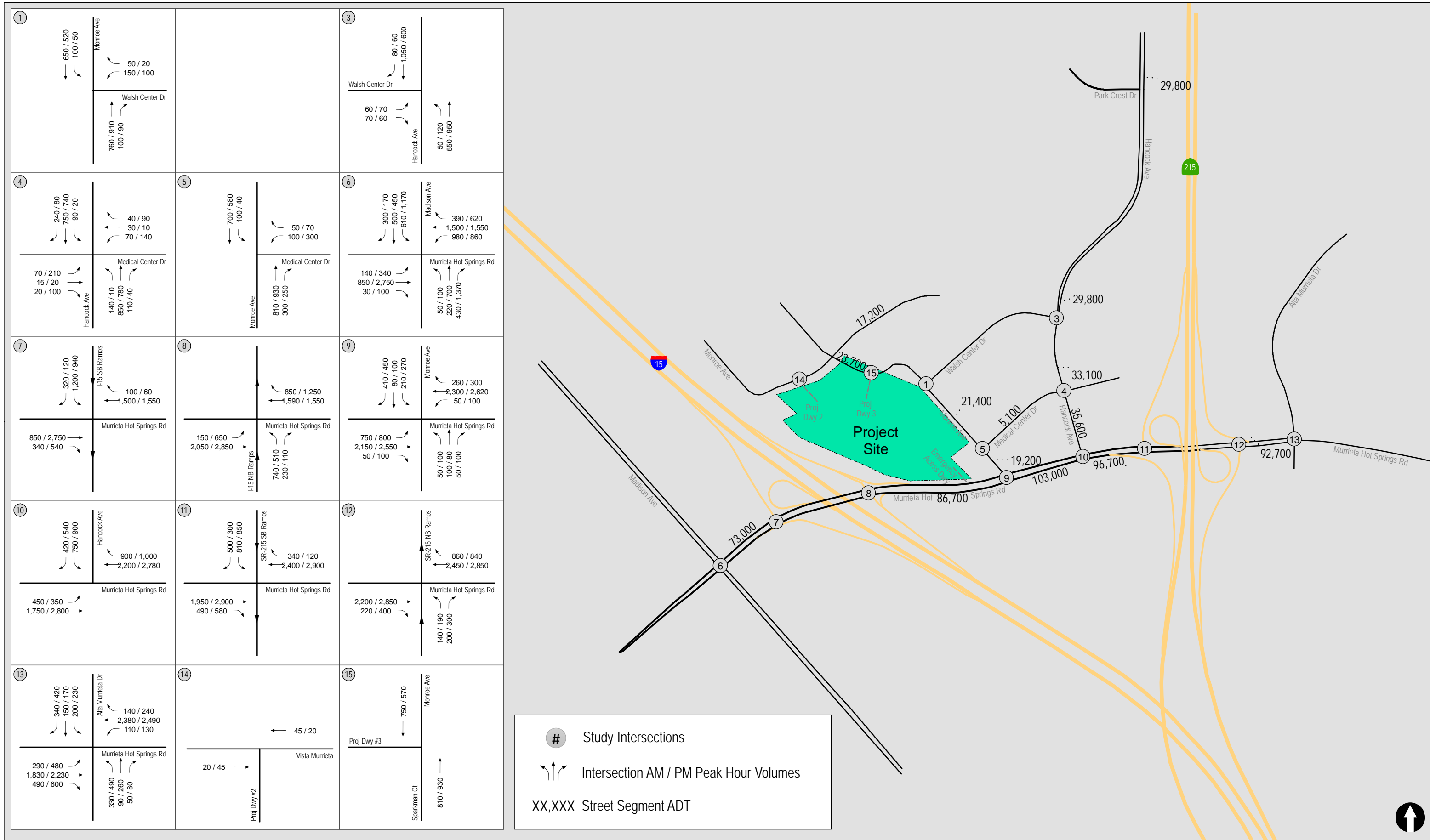
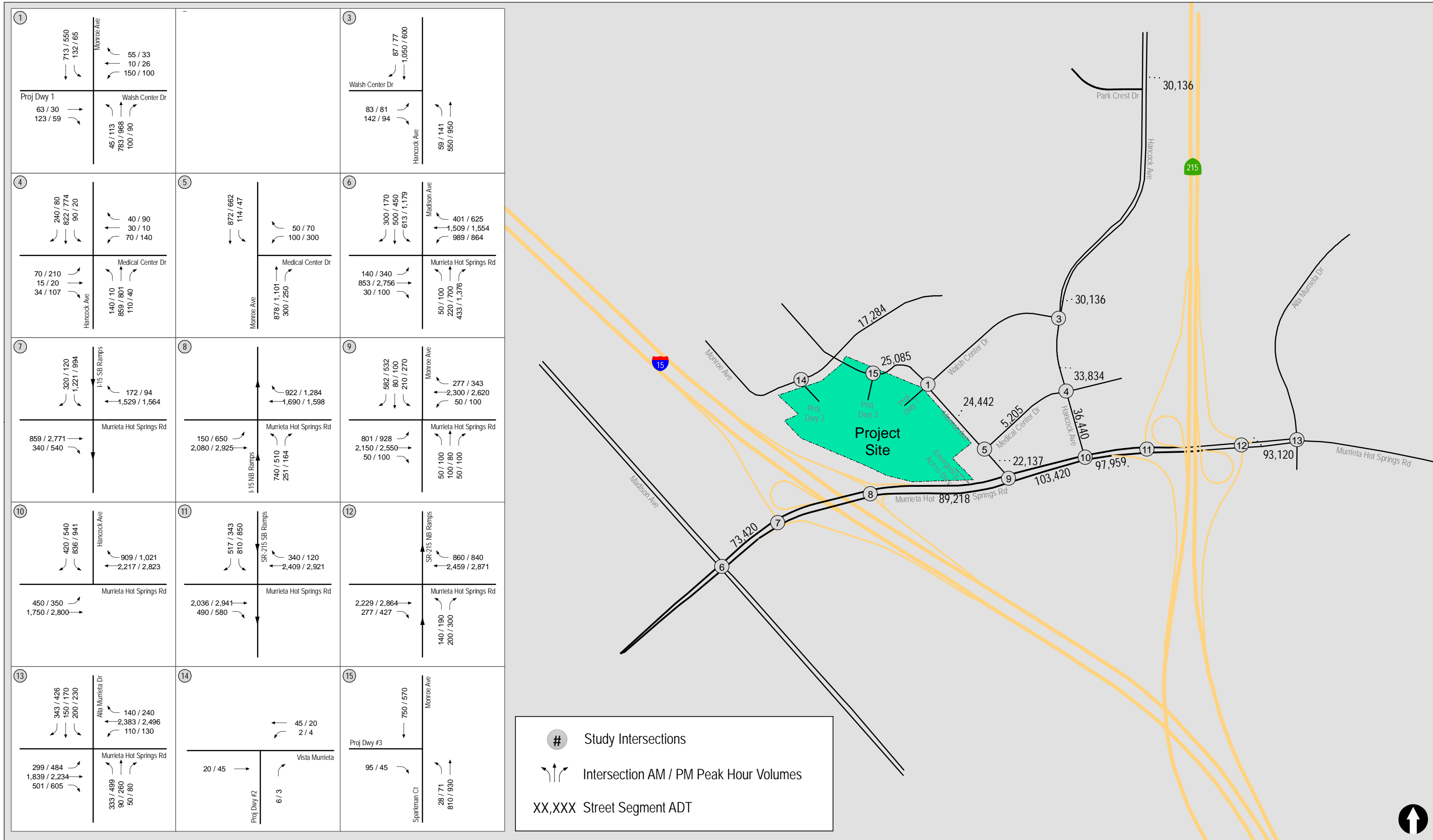


Figure 7-2
Horizon Year 2040 without Project Traffic Volumes



8.0 SITE ACCESS AND CIRCULATION

8.1 Site Access

Two access points will be provided for Phase 1 and a third will be added for Phase 2. In addition to these day-to-day access points, an emergency access will be provided via Murrieta Hot Springs Road:

Phase 1

- A full access driveway at Sparkman Court opposite Walsh Center Drive. Most of the Project traffic will use this driveway.
- A full access driveway on Vista Murrieta, along the northern boundary of the site. Vista Murrieta is currently an unpaved dirt road. The Project will pave Vista Murrieta along its Project frontage.
- An emergency access driveway at the eastern boundary of the site on Murrieta Hot Springs Road. This access will be gated and kept locked and will be opened by emergency personnel for access by emergency vehicles only.

Phase 2

- An additional driveway will be provided on Sparkman Court north of Walsh Center Drive in Phase 2.

All three access driveway intersections are analyzed under all analysis scenarios. Two of these driveways (#2 and #3 are calculated to operate adequately. In the long-term the Project Driveway #1 / Walsh Center Drive / Monroe Avenue intersection is calculated to operate at LOS F. Improvements to the intersection geometry and signalization will result in acceptable operations.

Based on the above discussion, adequate site access is planned. Adequate regional access (I-15 and I-215) and local access (Hancock Avenue) is provided to the Project site.

8.2 Onsite Circulation

The Project site is well served by a roadway network internally. All onsite buildings are connected to each other by this internal road with external connection to Sparkman Court and Vista Murrieta.

9.0 SIGNAL WARRANTS

This section includes signal warrants for the following three intersections where traffic signals are recommended:

- Hancock Avenue / Walsh Center Drive
- Murrieta Hot Springs Road / Monroe Avenue
- Walsh Center Drive / Monroe Avenue

9.1 Hancock Avenue / Walsh Center Drive

This is a T-intersection with Walsh Center Drive as the west leg and Hancock Avenue as the north and south legs. The Hancock Avenue / Walsh Center Drive intersection is calculated to operate at LOS D on Opening Day without Project. With the addition of Project Phase 1 traffic this intersection is calculated to operate at LOS E. A traffic signal is recommended at this intersection. Following is the peak hour signal warrant analysis:

The following assumptions apply at this intersection:

Hancock Avenue (major street) is a four-lane road with a dedicated NB left-turn lane on Hancock Avenue. Walsh Center Drive (minor street) is two-lane road. The major street approach will function as a two-lane approach and the minor street approach will function as a one-lane approach. and is analyzed as a One-Lane approach.

Chart 1 on the next page, depicts the Peak hour warrant plot at this intersection on Opening Day without Project traffic. As seen in *Chart 1*, the warrant is not met at this intersection.

Chart 2 on the next page, depicts the Peak hour warrant plot at this intersection on Opening Day with Project Phase 1 traffic. As seen in *Chart 1*, the warrant is met at this intersection during the AM peak hour since the plot point falls above the curve.

CHART 1

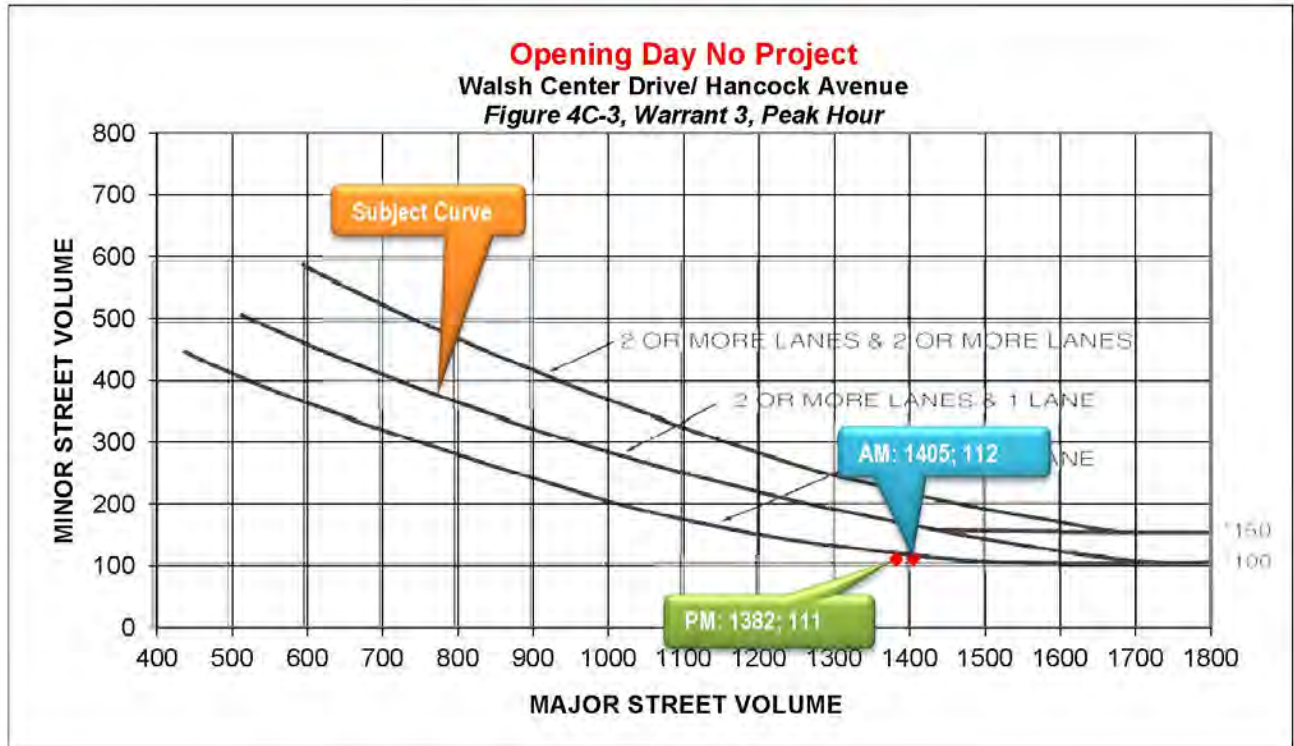


CHART 2



9.2 Murrieta Hot Springs Road / Monroe Avenue

The Murrieta Hot Springs Road / Sparkman Court (Monroe Avenue) intersection is a T-intersection with Sparkman Court as the north leg and Murrieta Hot Springs Road as the east and west legs. This intersection is calculated to operate at LOS F in the Year 2028 with Project traffic. A traffic signal is recommended at this intersection. Following is the peak hour signal warrant analysis:

The following assumptions apply at this intersection:

Murrieta Hot Springs Road (major street) is a 7-lane road with a dedicated EB left-turn and Sparkman Court (minor street) is two-lane road with a dedicated SB right-turn lane. The major street approach will function as a two-lanes or more approach and the minor street approach will function as a one-lane approach.

Chart 3 below, depicts the Peak hour warrant plot at this intersection on Opening Day without Project traffic. As seen in **Chart 3**, the warrant is met at this intersection during the AM and PM peak hours since the plot points falls above the curve.

Chart 4 on the next page, depicts the Peak hour warrant plot at this intersection on Opening Day with Project Phase 2 traffic. As seen in **Chart 3**, the warrant is met at this intersection during the AM and PM peak hours since the plot points falls above the curve.

CHART 3

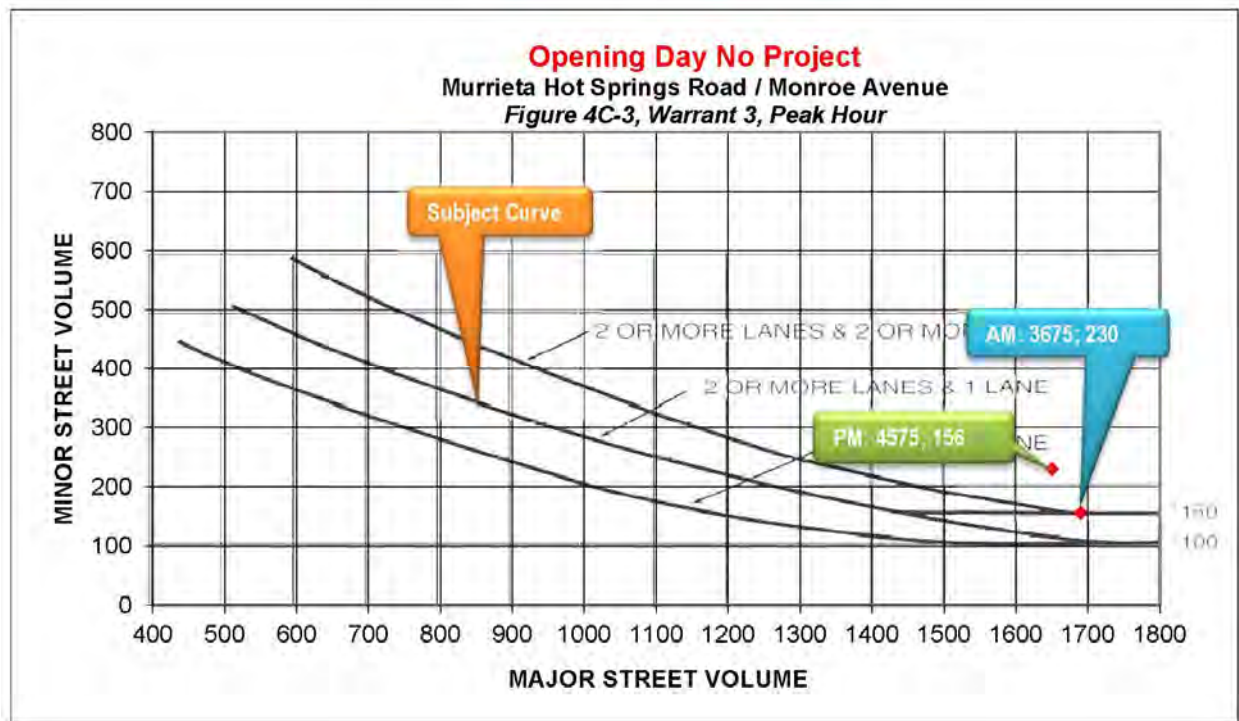
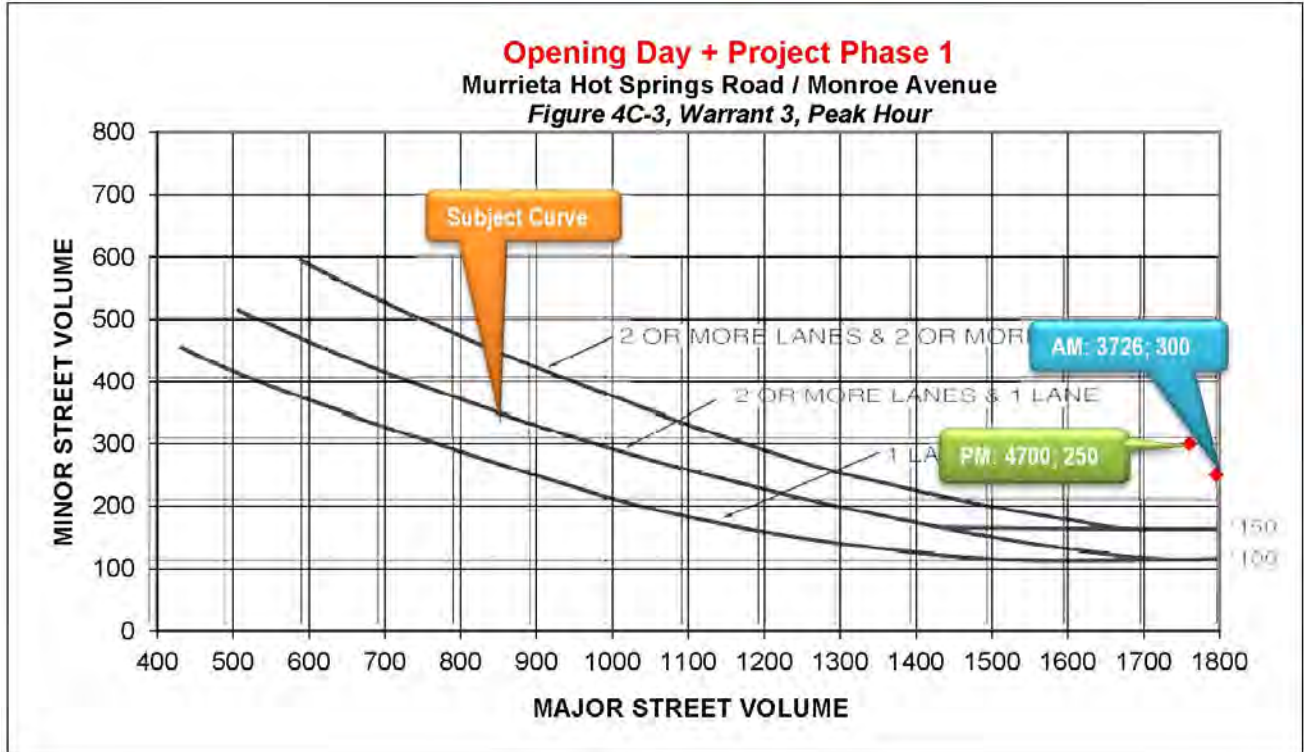


CHART 4



9.3 Walsh Center Drive / Monroe Avenue

A signal warrant analysis was conducted at the future Monroe Avenue / Walsh Center Drive intersection in the Long-Term Year 2040 without the Terraces Project traffic. This is to determine if a signal is warranted at this intersection without the Project traffic. Warrant 1, Eight-Hour Vehicular Volume and Warrant 3, Peak hour intersection Volume analyses were conducted. Following are the results of this analysis.

9.3.1 Volume Forecast

The Year 2040 northbound and southbound daily ADT volumes on the future Monroe Avenue are available from the Murrieta Transportation Analysis Model (MTAM) model. Hourly volumes are not available from the Model. Therefore, the hourly distribution of traffic was obtained from the existing 24-hour volume counts on Hancock Avenue, which is parallel to, and within a quarter mile from, Monroe Avenue. It is likely that the hourly traffic flow pattern on Monroe Avenue will be similar to that on Hancock Avenue.

The hourly approach volumes forecast on Monroe Avenue and Walsh Center Drive are included in **Appendix K**

The Year 2040 daily volumes are not available on Walsh Center Drive and therefore, these volumes were estimated based on the existing volumes on Walsh Center Drive. The hourly distribution (percentage to the daily volume) on Hancock Avenue was applied to the daily volumes on Monroe Avenue to obtain the Year 2040 hourly volumes for a 24-hour period on Monroe Avenue and Walsh Center Street. These volumes were used for the 8-Hour Warrant analysis (*Table 2*).

9.3.2 Warrant 1 – Eight-Hour Vehicular Volume

Methodology

The need for a traffic signal shall be considered if an engineering study finds that one of the following conditions exist for each of 8 hours of an average day. In applying each condition, the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

The 70% criterion applies in this study, since the speed limit on Monroe Avenue, a 4-Lane Major Road within the City of Murrieta General Plan will be 45 miles per hour. If the 70% factor applies, the thresholds corresponding to the 70% factor (**Table 1**) should be used:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-2 exist on the major-street (420 vehicles per hour) and the higher-volume minor-street (105 vehicles per hour) approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both 100 percent columns of Condition B in Table 4C-1 exist on the major-street (630 vehicles per hour) and the higher-volume minor-street (53 vehicles per hour) approaches, respectively, to the intersection.

TABLE 1
WARRANT 1: EIGHT – HOUR VEHICULAR VOLUME
70% CRITERIA

Warrant 1	Vehicles per hour on major street (Total of both approaches)	Vehicles per hour on higher-volume minor- street approach (One direction only)
Condition A	420	105
Condition B	630	53

Calculations

Table 1 summarizes the volume thresholds for two lanes or more approach on the major street and one-lane approach on the minor street for conditions A and B for the 70% factor.

Table 2 compares the actual hourly volumes for 24 hours in a day to the minimum volumes (Table B) required to satisfy this warrant. As seen in Table B, the Condition A warrant volumes are satisfied during one (1) hour in a day and the Condition B warrant volumes are satisfied for nine (9) hours on a typical day. Thus, Condition A is not met, but Condition B is met. Therefore, **Warrant 1 is satisfied.**

TABLE 2
YEAR 2040 WITHOUT PROJECT
WARRANT 1: EIGHT - HOUR VEHICULAR VOLUME
MONROE AVENUE / WALSH CENTER DRIVE

Hour Begin	Hourly Percentage		Monroe Avenue			Walsh Center Drive	Condition 1-A	Condition 1-B
	NB/WB	SB/EB	NB	SB	Total	WB		
0	0%	0%	52	30	82	4	N	N
1	0%	0%	39	13	52	2	N	N
2	0%	0%	16	19	35	3	N	N
3	0%	0%	20	36	56	5	N	N
4	0%	1%	39	94	133	13	N	N
5	0%	2%	41	240	281	33	N	N
6	1%	5%	163	594	757	81	N	N
7	4%	11%	485	1,266	1,751	173	N	Y
8	5%	10%	587	1,204	1,791	164	N	Y
9	5%	7%	585	766	1,351	105	N	Y
10	5%	7%	601	764	1,365	104	Y	Y
11	6%	7%	678	766	1,444	105	N	Y
12	6%	7%	766	862	1,628	118	N	Y
13	7%	6%	867	753	1,620	103	N	Y
14	7%	8%	858	883	1,741	121	N	Y
15	8%	6%	987	756	1,743	103	N	Y
16	11%	6%	1,341	726	2,067	99	N	N
17	14%	6%	1,639	647	2,286	88	N	N
18	9%	4%	1,140	426	1,566	58	N	N
19	4%	3%	434	324	758	44	N	N
20	2%	2%	300	268	568	37	N	N
21	2%	1%	188	125	313	17	N	N
22	1%	1%	117	89	206	12	N	N
23	1%	1%	77	68	145	9	N	N
Total	100%	100%	12,020	11,719	23,739	1,600	1	9

9.3.3 Warrant 3 – Peak Hour

Methodology

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all of the three conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals to or exceeds 4 Vehicles-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach, and
 2. The volume on the same-minor street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and

The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for the intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume on the minor – street approach (one direction only) for 1 hour (or any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

If the posted or statutory speed limit or the 85th percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to satisfy the criteria in the second category.

Calculations

The posted speed limit on Monroe Avenue will be 45 mph. Therefore, Figure 4C-4 is the proper figure to utilize. **Table 3** summarizes Warrant 3 calculations. As seen in **Table 3**, all three parts are satisfied. Hence Part A is satisfied.

Part A-1

Peak hour analysis of this intersection with a signal indicates LOS A with delays of 61.2 seconds (LOS F) and 161.3 seconds (LOS F) during the AM and PM peak hours respectively. Therefore, Part A-1 is met.

Part A-2

The volume the Walsh Street WB approach equals 150 vph for two moving lanes. Therefore, Part A-2 is met.

Part A-3

The entering volume serviced is 1,810 and 1690 during the AM and PM peak hours respectively, and therefore exceeds 650 vehicles per hour for this intersection with three approaches. Therefore, Part A-3 is met.

Thus, since all three parts of Part A are met, Part A is satisfied.

Part B

AM peak hour (8:00 am to 9:00 am) and PM peak hour (4:00 am to 6:00 am) traffic volumes fall above the curve for the appropriate number of lanes when plotted on Figure 4C-4 of the California MUTCD. Hence Part B is satisfied.

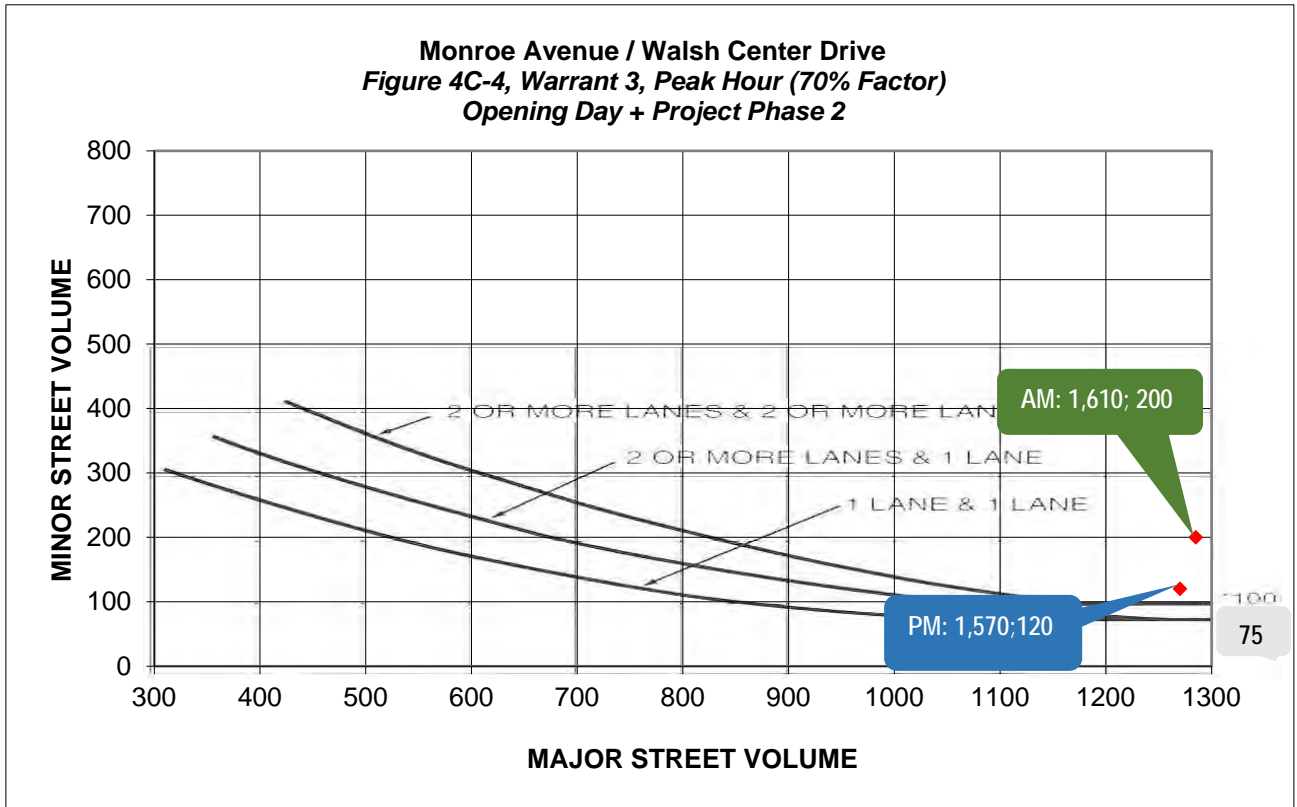
Based on the methodology above, one of the categories, Part A and part B should be satisfied. Since both Part A and Part B are met, **Warrant 3 is satisfied.**

TABLE 3
WARRANT 3: PEAK - HOUR: BASE

Warrant 3 – Peak Hour	<u>Part A</u> or <u>Part B</u> Satisfied	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<u>Part A</u>	Satisfied	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
(All Parts 1, 2, and 3 below must be satisfied)			
1.	The total delay experienced for traffic on one minor-street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; <u>AND</u>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
2.	The volume on the same-minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
3.	The entering volume serviced during the hour equals or exceeds 800 vph for the intersections with four or more approaches or 650 vehicles per hour for intersections with three approaches.	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
<u>Part B</u>	Satisfied	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

Approach Lanes	One	2 or More	AM	PM
Both Approaches -Major Street		X	Yes	No
Highest Approaches -Minor Street	X		Yes	No

The plotted points for vehicles per hour on Major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15-minute period) fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.



9.4 Conclusion

Based on the above Warrant analyses, the following is concluded:

- **Hancock Avenue / Walsh Center Drive intersection**

This intersection is calculated to operate at LOS F with the Project traffic in the Opening Year 2025. Without the Project, Warrant 3, Peak Hour Warrant is not met. However, with the addition of Project Phase 1 traffic, warrant 3 is met during the AM peak hour.

- **Murrieta Hot Springs Road / Monroe Avenue intersection**

This intersection is calculated to operate at LOS F with the Project traffic in the Year 2028. Without and with Project Phase 2 traffic, Warrant 3, Peak Hour Warrant is met during the AM and PM peak hours.

- **Monroe Avenue / Walsh Center Drive intersection**

This intersection is calculated to operate at LOS F without Project traffic in the Horizon Year 2040. Without Project traffic, Warrant 1, 8-Hour and Warrant 3 Peak hour warrants are met in the Long-Term 2040.

10.0 VEHICLE MILES TRAVELLED ANALYSIS

This section includes the Vehicle Miles Travelled (VMT) screening criteria, analysis methodology, impact thresholds and VMT analysis. The approach and methodology outlined in this Technical Memorandum is consistent with the City of Murrieta *Traffic Impact Analysis Preparation Guidelines* (Guidelines) dated March 2021, which provides additional detail on the language and analysis procedure described in this Technical Memorandum.

10.1 Project Type Screening Criteria

Under the VMT methodology, screening is used to determine if a project will be required to conduct a detailed VMT analysis. The Guidelines outlines the screening methods to determine whether the proposed Project will screen-out, either in its entirety, or partially based on individual land uses. The City's Project Type Screening criteria and its determination are listed below:

- Local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel.
- Projects generating less than 110 daily vehicle trips regardless of whether consistent with the General Plan or not. This generally corresponds to the following “typical” development potentials:
 - A Residential Parcel Map
 - 11 Single Family Housing Units
 - 16 Multi-Family, Condominiums or Townhouse Housing Units
 - 10,000 SF of Office
 - 15,000 SF of Light Industrial
 - 63,000 SF of Warehouse
- Local-serving retail that primarily serves the City and/or adjacent cities.
- Office and other employment-related land uses reducing commutes outside the local area.
- Local-serving day care centers, pre-K and K-12 schools.
- Local parks and civic uses.
- Local-serving gas stations, banks and hotels (e.g. non-destination hotels).
- Local serving community colleges that are consistent with SCAG RTP/SCS assumptions.
- Student housing projects.

As stated previously, the proposed Project consists of a 899-unit multi-family apartment complex and therefore does not satisfy any of the aforementioned City's Project Type Screening criteria.

10.2 VMT Limited Analysis

Per the City’s guidelines, projects not satisfying the Project Type Screening criteria are required to prepare a limited analysis of the VMT expected to be generated by the project and compare that to the VMT expected to be generated by the land use assumed in the General Plan.

Based on coordination with City of Murrieta Traffic Engineering staff, the VMT Limited Analysis confirms whether or not the Project is consistent with the General Plan (i.e. land use and zoning) and whether or not the Project exceeds the development envelope assumed in the 2040 General Plan for the Traffic Analysis Zone (TAZ) that the project site is located within. If the proposed Project is consistent with the assumptions in the 2040 General Plan Buildout condition and is within the 2040 General Plan development envelope, no further VMT analysis is required.

It should be noted that the Project is located in TAZ 43413201. *Figure 10-1* presents the TAZ Map from the City of Murrieta Transportation Analysis Model (MTAM).

Based on information provided by the City of Murrieta Traffic Engineering staff, 3 households are the total households development envelope assumed in the 2040 General Plan for TAZ 43413201. Given that TAZ 43413201 currently already has 3 existing households, and the proposed Project will consist of a 899-unit multi-family apartment complex, the 3-household development envelope assumed within the 2040 General Plan will be exceeded.

Since the proposed Project is inconsistent with the land use and zoning assumptions in the 2040 General Plan and the Project development tabulation is exceeded within the permitted 2040 General Plan development envelope, a detailed VMT analysis is required per the City’s guidelines.

10.3 VMT Analysis Methodology

According to the Guidelines and direction given by the City Staff, if a Project VMT is more than the land use assumed in the General Plan, a complete VMT analysis and forecasting must be done using the City of Murrieta Transportation Analysis Model (MTAM) to determine if the Project will have a significant VMT impact. This analysis includes “Project Generated VMT” and “Project Effect on VMT” estimates for the Project TAZ under the following scenarios:

- Baseline Conditions
- Baseline Plus Project
- Cumulative No Project
- Cumulative Plus Project

Based on the above, a full VMT analysis utilizing MTAM has been conducted to determine the VMT for Project and for the City of Murrieta average and will provide the following:

- Project-Generated VMT per Service Population
- Link-Level Boundary VMT per Service Population

10.4 VMT Impact Thresholds

As previously discussed, a project that does not meet the screening criteria will require preparation of a detailed transportation analysis. The Project VMT will be evaluated in order to determine if the Project is expected to cause a significant transportation impact. The VMT significance criteria as stated in the Guidelines is detailed in the section below.

10.4.1 *Project-Generated VMT Impacts*

A project would result in a significant project generated VMT impact if either of the following conditions are satisfied:

1. The baseline project generated VMT per service population exceeds the City's baseline VMT per service population, or
2. The cumulative project generated VMT per service population exceeds the City's baseline VMT per service population.

10.4.2 *Project's Effect on VMT Impacts*

The Project's effect on VMT would be considered significant if it resulted in either of the following conditions to be satisfied:

1. The baseline link-level boundary VMT per service population (City or subregional boundary) to increase under the plus project condition compared to the no project condition, or
2. The cumulative link-level boundary VMT per service population (City or subregional boundary) to increase under the plus project condition compared to the no project condition.

Please note that the cumulative no project condition shall reflect the adopted Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS); as such, if a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence.

The Project is consistent with the adopted Regional Transportation Plan Sustainable Communities Strategy (RTP/SCS) thus the cumulative impacts are considered to be less than significant. Further, it should be noted that the cumulative analysis is provided for informational purposes only.

10.5 VMT Mitigation Measures

If a significant VMT impact is identified, measures to reduce the Project's VMT impact should be identified to reduce the VMT levels to a level at or below the City's thresholds. To mitigate VMT impacts, various options can be considered, the following choices are some of those available to the applicant:

1. Changing the Project - Modify the project’s-built environment characteristics to reduce VMT generated by the project.
2. TDM - Implement Transportation Demand Management (TDM) measures to reduce VMT generated by the project. TDM measures need ongoing monitoring and performance metrics to be implemented, this must be a required condition of a project that selects this measure.
3. Impact Fee or Exchange - Participate in a VMT fee program and/or VMT mitigation exchange/banking program (if they exist) to reduce VMT from the project or other land uses to achieve acceptable levels.

Additional TDM measures appropriate to the region are identified in the WRCOG Implementation Pathway Study.

10.6 VMT Analysis

Summarized in the following section are the average VMT per Service Population values utilizing MTAM for the City of Murrieta and the proposed Project. The Project development totals were converted into Socio-Economic Data (SED) and inputted into MTAM.

10.6.1 Project-Generated VMT Thresholds

Table 10-1 summarizes the Project Generated VMT per service population. As shown in *Table 10-1*, the proposed Project baseline Project-generated VMT per Service Population is **42.25%** below the City average VMT per Service Population threshold and the cumulative Project-generated VMT per Service Population is **34.05%** below the City average VMT per Service Population threshold. Based on the criteria outlined in this report, the proposed Project will not exceed the City of Murrieta baseline VMT per Service Population of 38.91 and thus will not have a significant Project-generated VMT impact.

TABLE 10-1
PROJECT-GENERATED VMT PER SERVICE POPULATION

Description	Project	City of Murrieta	Compared to Thresholds (City of Murrieta)
Baseline	22.47	38.91	42.25% Lower
Cumulative	25.66	38.91	34.05% Lower

10.6.2 Project’s Effect on VMT Thresholds

Table 10-2 summarizes the Link-Level Boundary per service population. As shown in *Table 9-2*, the proposed Project baseline link-level boundary VMT per Service Population is **0.85%** below the “no Project” scenario link-level boundary VMT per Service Population threshold and the proposed Project cumulative link-level boundary VMT per Service Population is **1.48%** below the “no Project” Scenario VMT pe Service Population threshold. Based on the criteria outlined in this report, the proposed Project link-level boundary VMT per Service Population will not increase under the “plus Project”

condition when compared to the “no Project” condition and thus the Project’s effect on VMT will not be significant.

TABLE 10-2
LINK-LEVEL BOUNDARY PER SERVICE POPULATION

Description	Project	City of Murrieta	Compared to Thresholds (City of Murrieta)
Baseline	16.31	16.45	<i>0.85% Lower</i>
Cumulative	16.68	16.93	<i>1.48% Lower</i>

It should be noted that as previously mentioned and according to the Guidelines, if a project is consistent with the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), then the cumulative impacts shall be considered less than significant. Since, the proposed Project is consistent with the RTP/SCS, the cumulative impacts are considered to be less than significant, and the cumulative analysis is provided for informational purpose only.

10.7 Active Transportation and Public Transit Analysis

According to the Guidelines potential impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel can be evaluated using the following criteria:

- A significant impact occurs if the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

It should be noted that the proposed Project is consistent with the adopted policies, plans, or programs regarding active transportation or public transit facilities. Further, the proposed Project will not decrease the performance or safety of such facilities and does not have the potential to conflict with existing or proposed facilities supporting these travel modes.

Thus, based on the above, the proposed Project will not have a significant impact on the active transportation nor the public transit.

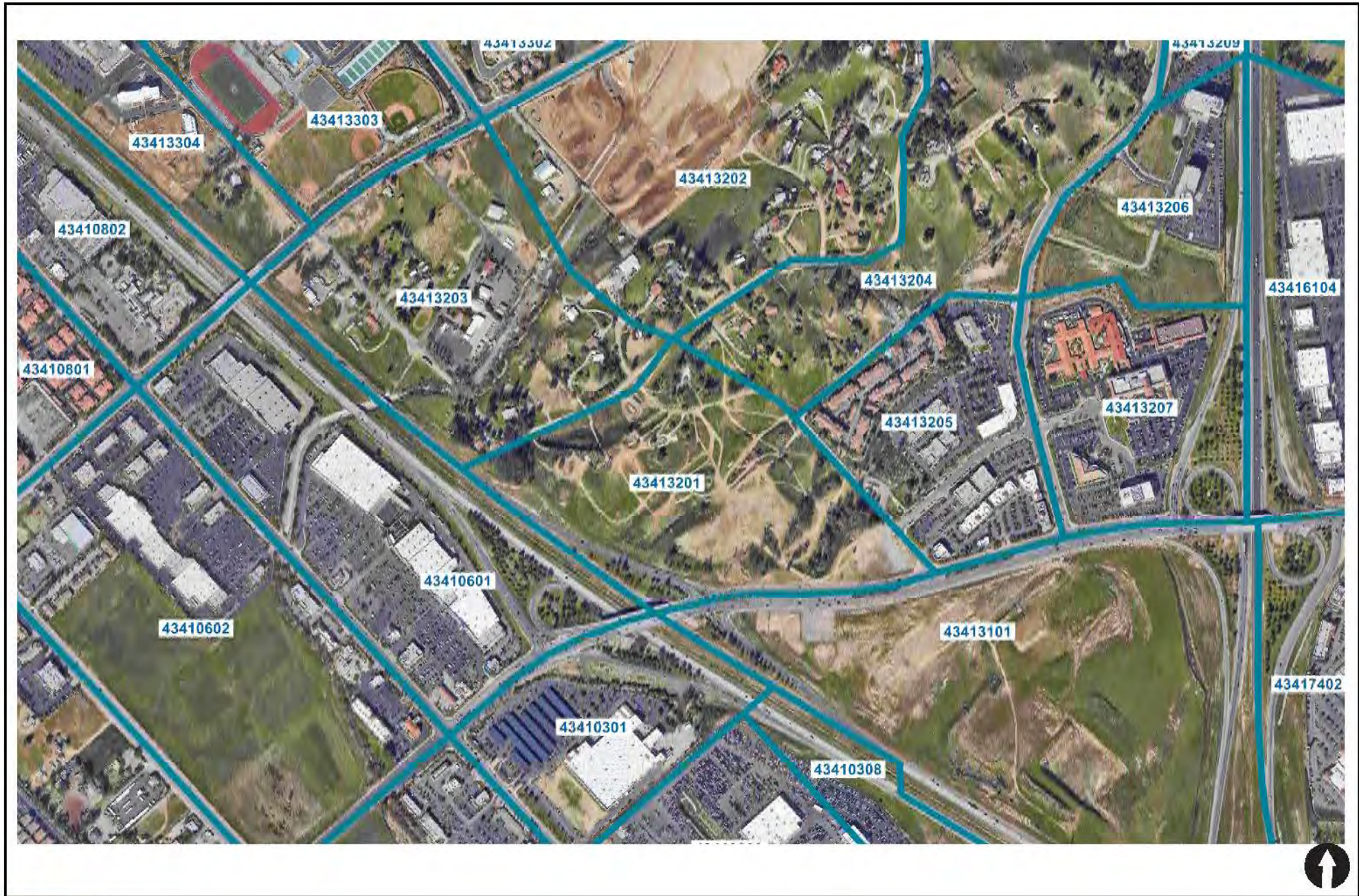


Figure 10-1

TAZ Map

The Terraces at Murrieta

11.0 CONCLUSION AND RECOMMENDATIONS

Consistent with the City of Murrieta *Traffic Impact Analysis Preparation Guidelines* dated March 2021 and based on the VMT methodology, criteria, guidelines, thresholds and results outlined in this Technical Memorandum, the proposed Project will not have a significant Project generated VMT impact nor will the Project's effect on VMT be significant for either the baseline or cumulative conditions.

Based on the intersection and segment analyses provided in this report, LOS impact thresholds were exceeded with the addition of project traffic at the following unsignalized intersections:

Near-Term and Horizon Year

- Hancock Avenue / Walsh Center Drive intersection
- Murrieta Hot Springs Road / Sparkman Court (Monroe Avenue) intersection

Horizon Year Only

- Monroe Avenue / Walsh Center Drive /Project Driveway #1 intersection
- Monroe Avenue / Medical Center Drive intersection

11.1 Proposed Improvements

11.1.1 *Project Phase 1 (Year 2025)*

The following Phase 1 improvements will also accommodate the Horizon Year traffic:

- **Hancock Avenue / Walsh Center Drive Intersection**

It is understood from discussions with the City that there is a CIP project to widen Hancock Avenue and improve intersections along Hancock Avenue including the installation of a traffic signal at the Hancock Avenue / Walsh Center Drive intersection.

The CIP project will not add extra lanes on Hancock Avenue which will be built to a 76 ft curb-to-curb Major Road per the City Standard Drawing. Walsh Center Drive will remain as is (56 ft curb-to-curb), which allows for separate left and right-turn lanes.

Without the Project traffic, signal warrants are not met at this intersection. If the improvements are not completed by others, the Project should install a traffic signal at this intersection and provide the following intersection geometry:

- **Eastbound:** Restripe existing pavement to One left-turn lane and one right-turn lane
- **Southbound:** One shared through / right lane and one through lane (currently exists)
- **Northbound:** One left-turn lane and two through lanes (currently exists)

- **Monroe Avenue / Walsh Center Drive (Project Driveway #1)**

The project should build the north and west leg of this intersection and provide a Two-Way Stop Control (TWSC) with traffic on Walsh Center Drive and the Project driveway stopping. The following interim intersection geometry should be provided prior to the occupancy of the first unit of Project Phase 1:

- **Southbound:** One left-turn lane, one through lane and one shared through/right lane
- **Westbound:** One shared right/through/ left lane
- **Northbound:** One left-turn lane, one through lane and one shared through/right lane
- **Eastbound:** One shared through/ left lane and one right-turn lane

11.1.2 *Project Phase 2 (Year 2028)*

- **Murrieta Hot Springs Road / Monroe Avenue intersection**

The Triangle Specific Plan located on the south curb of Murrieta Hot Springs Road was approved by City Council in 2008, and then again in 2013. A traffic signal is to be installed by that project at this intersection. However, construction on that project has not commenced. In order to accommodate just Project traffic, a signal would need to be installed and the southbound approach (Monroe Avenue) reconfigured to provide a dedicated right-turn lane and a left-turn lane. No other geometric improvements are needed.

- **Monroe Avenue / Medical Center Drive**

Prohibit the westbound left-turn movement and permit southbound left-turn movements and provide the following intersection geometry:

- **Southbound:** One left-turn lane and two through lanes
- **Westbound:** One right-turn lane
- **Northbound:** One through lane and one shared through/right lane.

11.1.3 *Horizon Year 2040*

- **Monroe Avenue / Walsh Center Drive (Project Driveway #1)**

The project should contribute a fair share towards installation of a traffic signal and the following geometric improvement shall be implemented:

- **Westbound:** One shared through/ left lane and one exclusive right-turn lane

- **Monroe Avenue / Murrieta Hot Springs Road**

The Project should contribute a fair share towards the ultimate improvements at this intersection. If the improvements are not built by The Triangle Specific Plan, the Project should install a traffic signal at this intersection and provide the following ultimate intersection geometry based on the geometry assumed in the Triangle Specific Plan.

- **Southbound:** Two left-turn lanes, one through and one shared through/right lane
- **Westbound:** Two left-turn lanes, three through lanes and one shared through/right lane
- **Northbound:** Two left-turn lanes, one through and one shared through/right lane
- **Eastbound:** Two left-turn lanes, four through lanes and one right-turn lane

The ultimate configuration is shown on *Figure 11-1*.

11.1.4 Additional Improvements

In addition to the above, the following improvements should be implemented.

- Build Vista Murrieta to City of Murrieta half-width 2-Lane Collector standards along the Project’s frontage.
- Build half width improvement along Monroe Avenue to City of Murrieta 4-Lane Major Road standards along the Project frontage.
- Provide an emergency only access on Murrieta Hot Springs Road as shown in the site plan. This access should be kept gated and locked, to be used only in an emergency.

Figure 11-1 depicts the ultimate recommended geometry and traffic control at the above-mentioned intersections.

11.2 Intersection Operations with Improvements

Table 11-1 summarizes the intersections with the recommended improvements described in Section 11.1. As seen in *Table 11-1*, with the implementation of the recommended improvements, all three intersections are calculated to operate at LOS C or better.

Appendix I includes the Post-Improvement peak hour intersection analysis worksheets with the recommended improvements.

11.3 Fair Share Calculations

The Project’s fair share contribution was calculated using the formula on page 13 of the City of Murrieta *Traffic Impact Analysis Preparation Guideline*, May 2020.

$$\text{Fair share} = \text{project trips} / \text{project trips} + \text{future development trips}$$

The fair share calculations were done based on the AM and PM peak hour entering volumes at the three intersections. *Table 11-2* summarizes the results of fair share contribution calculations. As seen in *Table 11-2*, the fair share contribution by the Project for the following intersections is summarized below:

1. Monroe Avenue / Walsh Center Drive (Project Driveway) – 17%
5. Monroe Avenue / Murrieta Hot Springs Road – 13%

**TABLE 11-1
LONG-TERM WITH PROJECT INTERSECTION ANALYSIS**

Intersection	Control Type	Peak Hour	Year 2040 Without Project		Year 2040 With Project				
					Without Improvements		With Improvements		
			Delay	LOS	Delay	LOS	Control Type	Delay	LOS
1. Monroe Ave / Walsh Center Dr	TWSC	AM	>100.0	F	>100.0	F	Signal	11.5	B
		PM	23.0	C	42.0	E		11.1	B
3. Hancock Ave / Walsh Center Dr	TWSC	AM	76.1	F	>100.0	F	Signal	9.5	A
		PM	>100.0	F	>100.0	F		8.5	A
5. Monroe Ave / Medical Center Dr	TWSC	AM	>100.0	F	>100.0	F	TWSC ^d	21.4	C
		PM	>100.0	F	>100.0	F		19.8	C

Footnotes:

- a. All intersections are two-way Stop controlled prior to improvements. Delay reported is for the worst-case minor street left-turn movement.
- b. Average delay expressed in seconds per vehicle.
- c. Level of Service.
- d. Westbound left-turn not permitted.

General Note:

NA – Not Applicable

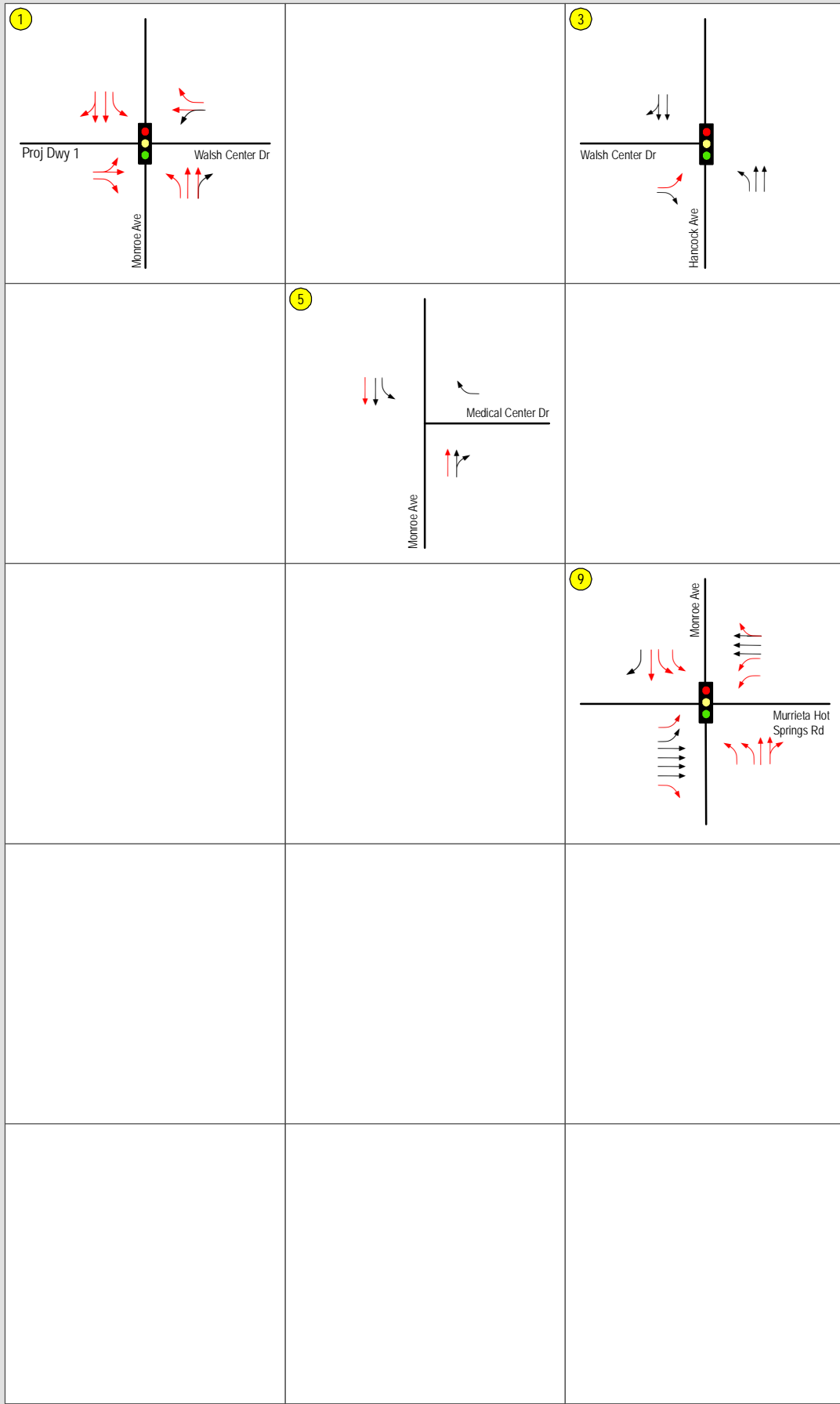
SIGNALIZED		UNSIGNALIZED	
Delay	LOS	Delay	LC
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

**TABLE 11-2
FAIR SHARE CALCULATIONS**

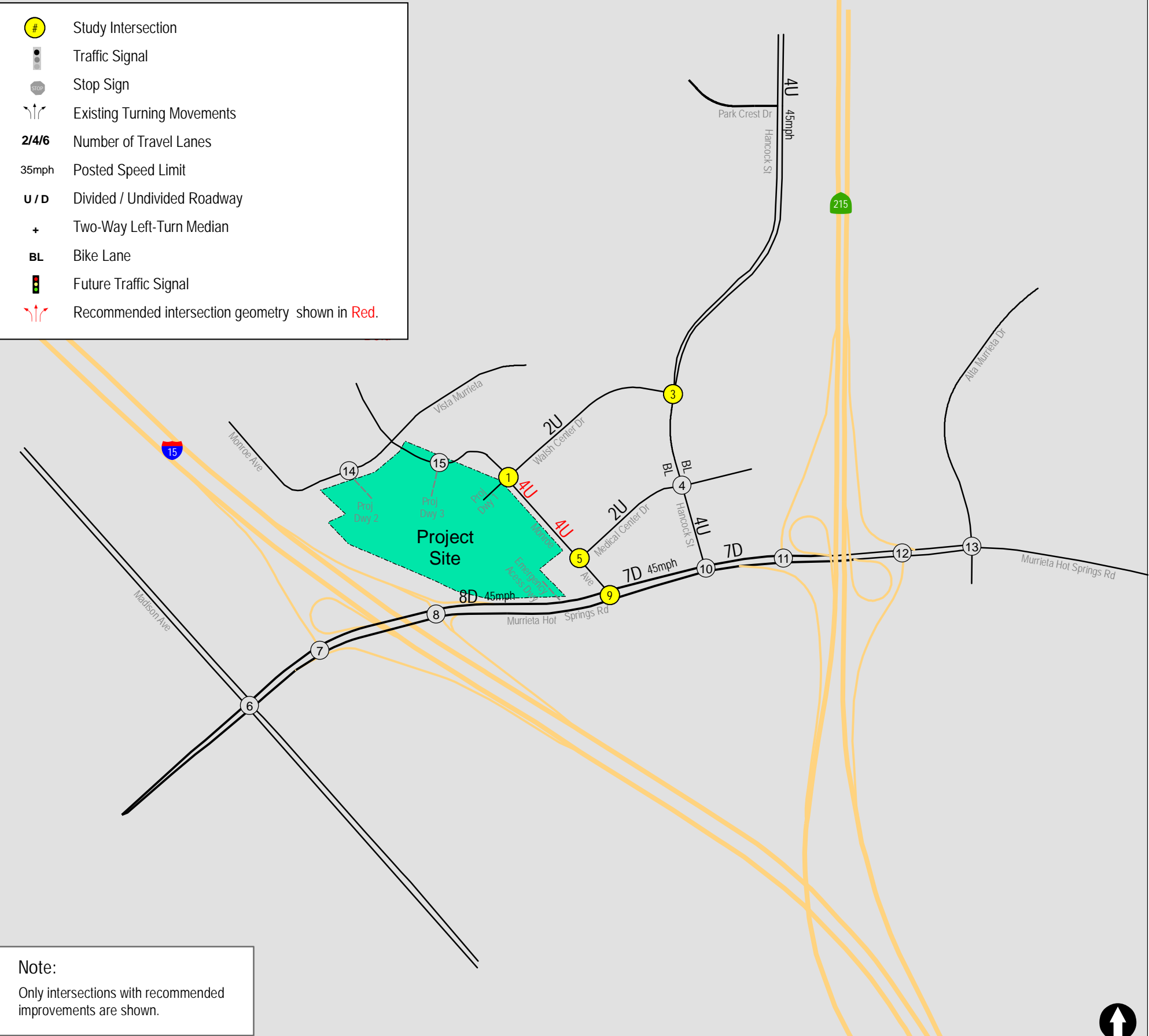
Intersection	Existing		2028 + Project		Project + Future Development Trips		Total Project Trips		Fair Share (%)		Project's Fair Share ^c (%)
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
A	B		C		D = C-B		E		F=E/D		G
Monroe Ave / Walsh Center Dr (Project Dwy) ^a	51	25	2,174	2,034	2,123	2,009	364	344	17%	17%	17%
Monroe Ave / Murrieta Hot Springs Rd ^b	3,178	4,005	4,843	6,076	1,665	2,071	240	253	14%	12%	13%

Footnote:

- a. Impact is in the long-term. Fair Share calculated using long-term volumes.
- b. Impact is in Phase 2. Fair Share calculated using Phase 2 volumes.
- c. Higher of AM and PM peak hour fair share (Column F).



- # Study Intersection
- Traffic Signal
- Stop Sign
- Existing Turning Movements
- 2/4/6** Number of Travel Lanes
- 35mph Posted Speed Limit
- U / D** Divided / Undivided Roadway
- +** Two-Way Left-Turn Median
- BL** Bike Lane
- Future Traffic Signal
- ↔ Recommended intersection geometry shown in Red.



Note:
Only intersections with recommended improvements are shown.