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June 11, 2012

Mr. John Criste
TERRA NOVA PLANNING & RESEARCH
42365 Melanie Place
Palm Desert, CA 92211

Subject: Ramon Road Widening Project Transportation Analysis Letter Report

Dear Mr. Criste:

The firm of Urban Crossroads, Inc. is pleased to provide this letter report documenting the results of the traffic study for the proposed Ramon Road Widening Project. The Ramon Road Widening Project proposes to construct improvements along Ramon Road from San Luis Rey Drive to Landau Boulevard in the Cities of Palm Springs and Cathedral City. Exhibit A illustrates the location of the project area which lies along the jurisdictional boundary of City of Palm Springs and City of Cathedral City. This letter report summarizes the traffic operations analysis completed in support of the subject project. Analysis of Existing (2012), Interim Year (2019), and Design Year (2040) conditions has been conducted to evaluate the current General Plan roadway designations in relation to anticipated future traffic volumes in order to provide recommendations regarding refinements (if necessary) to the General Plan Circulation Element.

The long range General Plan analysis is intended to confirm that the proposed circulation system is adequate to serve all of the development that is anticipated within the City of Palm Springs and City of Cathedral City General Plan Land Use Element (and surrounding areas), in addition to identifying the improvements necessary to provide acceptable traffic operations.

PROJECT DESCRIPTION

This project is proposed to widen Ramon Road (EW) between San Luis Rey Drive (EW) to Landau Boulevard (EW) to its ultimate width in the Cities of Palm Springs and Cathedral City, including the widening of the existing four-lane bridge over the Whitewater River to six-lanes.. The primary purpose of this letter report is to determine the improvements necessary to achieve acceptable Levels of Service for General Plan Buildout conditions and provide design year recommendations for the study area.

STUDY AREA

This traffic study also provides intersection improvement recommendations necessary to achieve acceptable Levels of Service for the study area. Exhibit B graphically illustrates the study area. The study area consists of the following three (3) intersections:

ID	Intersection Location	Existing Traffic Control
1	San Luis Rey Drive (NS) / Ramon Road (EW)	Signalized
2	Crossley Road (NS) / Ramon Road (EW)	Signalized
3	Landau Boulevard (NS) / Ramon Road (EW)	Signalized

TRAFFIC OPERATIONS ANALYSIS METHODOLOGIES

Each of the various operations analysis methodologies utilized for traffic studies in the City of Palm Springs are presented in this section of the letter report. The Highway Capacity Manual (HCM) intersection operations analysis methodology is presented first, followed by the queuing analysis methodology.

Highway Capacity Manual (HCM) Analysis Methodology

The current technical guide to the evaluation of peak hour traffic operations is the 2000 Highway Capacity Manual (HCM) (Transportation Research Board Special Report 209). The 2000 HCM defines level of service as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate LOS (Level of Service) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted. The traffic software utilized to evaluate peak hour traffic operations and vehicle queuing in this study is Synchro Version 7 plus SimTraffic 7.

The definitions of level of service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

- LOS "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.

- LOS "C" is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.

- LOS "D" represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.

- LOS "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.

- LOS "F" is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations.

The definitions of level of service for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The levels of service determined in this study are determined using the HCM methodology.

For signalized intersections, average stopped delay per vehicle for the overall intersection is used to determine level of service. Levels of service at signalized study intersections have been evaluated using HCM intersection analysis programs (Synchro and SimTraffic).

The levels of service are defined for the various analysis methodologies as follows:

Level of Service	Description	Average Control Delay (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up

Source: HCM 2000, Chapter 16

Additionally, any location where the volume exceeds the capacity is defined as LOS "F" conditions.

Queuing Analysis

Traffic signal progression analysis has been conducted to evaluate vehicular queuing and stacking length requirements by considering the signal timing and physical spacing of intersections. The progression results have been based on the output from the Synchro SimTraffic software program.

It should be noted that the Synchro SimTraffic software program calculates the 95th Percentile Queue based on the Average Queue plus a 1.65 standard deviation. The 95th Percentile Queue, which may not ever be observed, is simply based on statistical calculations. In many cases, the 95th Percentile Queue will not be experienced due to upstream metering. If the intersection is at or near capacity, the 50th Percentile Queue (or the Average Queue) represents the maximum queue experienced on a typical cycle.

DEFINITION OF DEFICIENCY

The definition of an intersection deficiency is based on the City of Palm Springs General Plan Update Traffic Analysis, dated May 25, 2007. As stated in the City of Palm Springs General Plan Update, the City has adopted LOS "D" as the threshold for acceptable traffic conditions on the circulation network for both arterial segments and intersections. The City of Cathedral City also uses LOS "D" as the threshold for acceptable traffic conditions on the circulation network for both arterial segments and intersections Therefore, any intersection within the study area that is operating at LOS "E" or LOS "F" will be considered deficient for the purposes of this analysis.

EXISTING TRAFFIC CONDITIONS

Exhibit C identifies the existing roadway through lanes for the study area roadways and the intersection controls at existing intersection analysis locations. The existing conditions of the study area roadways are described below and future General Plan roadway cross-sections are shown subsequently for the study area:

Ramon Road is a major regional arterial. Ramon Road is a six-lane divided roadway west of San Luis Rey Drive, a five-lane divided roadway between San Luis Rey Drive and Crossley Road, a four-lane divided roadway between Crossley Road and Landau Boulevard (including the bridge over Whitewater River Channel), and transitions back to a six-lane divided roadway east of Landau Boulevard. The bridge over Whitewater River Channel provides connectivity between the City of Palm Springs and the City of Cathedral City. The posted speed limit on Ramon Road within the study area ranges from 40 miles per hour (mph) to 45 mph.

San Luis Rey Drive is a two-lane divided roadway south of Ramon Road and widens to a three-lane divided roadway north of Ramon Road. The intersection of San Luis Rey Drive and Ramon Road is currently signalized.

Crossley Road is a four-lane divided roadway south of Ramon Road and narrows to a two-lane undivided roadway north of Ramon Road. The intersection of Crossley Road and Ramon Road is currently signalized.

Landau Boulevard is a four-lane divided roadway north of Ramon Road. The intersection of Landau Boulevard at Ramon Road is currently a signalized 3-leg intersection.

Exhibit D shows the City of Palm Springs General Plan Circulation Element and Exhibit E presents the City of Palm Springs typical roadway cross-sections. As shown, Ramon Road (within the study area) is a six (6) lane divided "Major Thoroughfare" with a 10' median and a typical right-of-way (ROW) width of 110'. The typical roadway cross-sections exhibit from the City of Palm Springs General Plan notes that additional right-of-way may be required to accommodate sidewalks and bike lanes.

Exhibit F illustrates the City of Cathedral City General Plan Circulation Element and Exhibit G presents the City of Cathedral City roadway cross-sections. Similar to City of Palm Springs Circulation Element, Ramon Road is shown as a six (6) lane divided "Arterial Highway". However, the cross-section is somewhat larger, with a 14' median and a typical ROW of 126'.

Existing and planned bicycle facilities and recreational trails are depicted on Exhibit H. A Class III bicycle route (signed for bicycles) are planned on Ramon Road between Crossley Road and Landau Boulevard. Class II bicycle lanes (signed and striped) are planned on Ramon Road east of Landau Boulevard. Existing Class II bicycle lanes already exist on Landau Boulevard north of Ramon Road, and Class II bicycle lanes are planned on Crossley Road south of Ramon Road. A Class I bicycle path is planned along the Whitewater River, and connectivity between this Class I bicycle facility and the planned Class III bicycle path on Ramon Road should be included in the proposed project, if possible.

Peak hour and daily traffic count data has been collected as part of this study effort. Existing average daily traffic (ADT) on roadways adjacent to study area intersections throughout the study area are shown on Exhibit I. Existing ADT volumes are based upon traffic data compiled by Urban Crossroads, Inc. Where daily traffic count data was unavailable, peak hour data has been used to estimate the average daily traffic volumes. Attachment "A" contains the daily traffic count worksheets, Attachment "B" contains the peak hour traffic count worksheets, and Attachment "C" contains the analysis of the relationship between the peak hour and daily traffic volume data.

The AM peak hour data ranges between 5% to 7% of the daily traffic. The average AM peak hour was 6.8% of the daily traffic volume. The PM peak hour data is a slightly higher proportion of the overall day,

with data analyzed ranging from a low of 6% to a high of 9%. The average PM peak hour was 7.80% of the daily traffic volume. Based on the averages, the combined AM and PM peak hour volumes are multiplied by **6.849** (derivation of this factor is also included in Attachment "C") to estimate ADT volumes (where daily count data was unavailable).

The highest daily traffic volumes along Ramon Road occur immediately west of Landau Boulevard with approximately 35,300 vehicles per day (VPD). The daily traffic volume along Ramon Road ranges between 29,100 VPD west of San Luis Rey Drive to the previously mentioned maximum volume of 35,300 VPD west of Landau Boulevard. The highest volume on any of the north–south streets in the study area occurs on Landau Boulevard north of Ramon Road (16,500 VPD).

EXISTING CONDITIONS TRAFFIC OPERATIONS ANALYSIS

Existing peak hour traffic operations have also been evaluated for the study area intersections. Existing intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts conducted in March 2012 (see Exhibit J for AM peak hour volumes and Exhibit K for PM peak hour volumes). Existing Conditions HCM calculation worksheets are provided as Attachment "D". The results of this analysis are summarized in Table 1, along with the existing intersection geometrics and traffic control devices at the analysis locations. For existing traffic conditions, all study area intersections operate at an acceptable Level of Service.

The existing conditions intersection 50th percentile and 95th percentile queuing analysis results are summarized on Table 2 and Table 3, respectively. The intersection queuing analysis calculation worksheets for existing traffic conditions are included in Attachment "E". There is only one (1) instance where the 50th percentile queue length exceeds the available storage (the eastbound left turns at Landau Boulevard) and five (5) instances where the 95th percentile queue length exceeds the available storage (various locations). The eastbound left turn storage at Landau Boulevard is problematic, as vehicles spill into the eastbound through lane at this location. The queuing issues at this location occur for both average (50th %) and desirable design (95th %) conditions. The other existing 95th % issues occur at locations where the median is striped and vehicles can queue beyond the end of the striped left turn lane without impeding through traffic.

EXISTING ACCIDENT DATA ANALYSIS

Collision (accident) data in the study area were obtained from the California Highway Patrol (CHP) for the study area. The five-year time period obtained for use in this report is from 2007 through available 2012 data. The collision data summarized on Table 4 is recorded by the type of accident (e.g. – rear end, sideswipe, etc.) and severity (e.g. – injury, fatality, etc.). As shown on Table 4, a total of 84 accidents took place in the study area from 2007 to available 2012, with 49 of the accidents resulting in injuries. There is one (1) collision involving a pedestrian. Table 4 also indicates approximately 58% of accidents resulted in injuries and 1% of accidents involved a pedestrian. Broadside accidents along Ramon Road are the most common and would likely be reduced through construction of the raised median proposed as a part of the overall widening project.

Over 25% of the total accidents in the entire study area (23 of 84) occurred in the immediate vicinity of the Crossley Road at Ramon Road intersection. Similarly, 15 of the 49 recorded injury accidents within the study area occurred in the immediate vicinity of Crossley Road and Ramon Road intersection.

Ramon Road

In the study period (2007 to available 2012), roadway segments and intersections along Ramon Road (in the study area) has experienced 74 accidents, with forty-two (42) resulting in injury and one (1) involving a pedestrian. The majority of accidents along Ramon Road were broadside collisions (29 incidents). Other accidents recorded along Ramon Road include: twenty-seven (27) rear-end collisions; seven (7) sideswipe collisions; four (4) head-on collisions; three (3) accidents with unknown cause; two (2) accident stemmed from a vehicle hitting an object on the roadway; one (1) overturned collision; and one (1) accident involving a vehicle hitting a pedestrian at the crosswalk.

San Luis Rey Drive

In the study period (2007 to available 2012), roadway segments along San Luis Rey Drive (in the study area) has experienced 5 accidents, with two (2) resulting in injury. The recorded accidents along San Luis Rey Drive study area roadway segments were two (2) rear-end collisions, two (2) broadside collisions, and one (1) accident stemmed from hitting an object on the roadway. There were no pedestrians involved in any of the recorded accidents.

Crossley Road

In the study period (2007 to available 2012), the roadways segments along Crossley Road (in the study area) has experienced five (5) accidents and all resulting in injury. The recorded accidents along Crossley Road study area roadway segments were four (4) broadside collisions and one (1) accident stemmed from a vehicle hitting an object on the roadway. There were no pedestrians involved in any of the recorded accidents.

Collision Rates

Table 5 presents the collision rates in "collisions per million vehicle miles" (c/mvm) for each study area location where collision data was reported. The detailed collision rate calculations are provided in Attachment "F" of this traffic study. Analysis locations where the calculated rates for one or more categories exceed the statewide average rates include the following locations:

- Ramon Road at San Luis Rey Drive intersection
- Ramon Road at Crossley Road intersection

The calculated collision rate (19.748 c/mvm) for the intersection of Ramon Road at San Luis Rey Drive and (32.785 c/mvm) and Ramon Road at Crossley Road is substantially higher than the statewide average rate for similar signalized intersections (0.430 c/mvm). It should be noted that the project is anticipated to improve both of these intersections and is expected to reduce the frequency of accidents for both locations.

FUTURE TRAFFIC CONDITIONS

The four (4) future scenarios evaluated in this letter report are referred to as:

1. Interim Year (2019) With Existing Lanes Conditions – this scenario evaluates the entire study area based on existing geometry. It should be noted Landau Boulevard, south of Ramon Road is assumed as being built under 2019 with existing lanes conditions. Since the south leg of Landau Boulevard does not currently exist, this new roadway segment is presented as part of the Ramona Widening Project and is shown as an improvement in the Tables and Exhibits of this report.

2. Interim Year (2019) With Project Conditions – this scenario evaluates the entire study area based on the proposed Ramon Road Widening Project improvement plans.

3. Design Year (2040) With Existing Lanes Conditions – this scenario evaluates the entire study area based on existing geometry. It should be noted Landau Boulevard, south of Ramon Road is assumed as built under 2040 with existing lanes conditions. Since the south leg of Landau Boulevard does not currently exist, this new roadway segment is presented as part of the Ramona Widening Project and is shown as an improvement in the Tables and Exhibits of this report.

4. Design Year (2040) With Project Conditions – this scenario evaluates the entire study area based on the proposed Ramon Road Widening Project improvement plans.

The traffic volumes for the four (4) future scenarios evaluated in this report have been developed based on a review of the Riverside County Traffic Analysis Model (RivTAM) projections and other recently published studies, including:

- Cross Pointe
- Palm Springs General Plan Update
- Gene Autry
- Ramon Village
- The Springs
- Cathedral City General Plan Update

Review of these studies suggest that long range mid-day and PM peak hour conditions are generally the time frames that are of greatest concern from a traffic operations standpoint. The Cross Pointe project study volumes were the highest within the study area, as the volumes in this study were based on the City of Palm Springs General Plan Update analysis along with the inclusion of several additional cumulative projects.

The RivTAM data is primarily useful for purposes of obtaining forecasts to the south leg of Landau Boulevard. It should be noted that review of previous traffic studies and existing traffic count data, Mid-day peak volumes on Ramon Road were higher and is therefore substituted for AM peak hour volumes in the future conditions analysis. In addition to RivTAM, the Existing and Long Range traffic volumes

from the Cross Pointe Traffic Impact Study (prepared by Endo Engineering, dated June 2007) have also been used to develop future traffic volumes for 2019 and 2040 traffic conditions since the Cross Pointe traffic study was the most conservative of all the other studies that were reviewed (e.g., Mid-day and PM peak hour were consistent with or higher than other studies reviewed).

The Cross Pointe Traffic Study and calculation of future traffic volumes are included as Attachment "G" of this report. A design year of 2040 reflects a horizon of 21 years after the anticipated completion of the proposed interchange in 2019. All of the volumes described in this report represent typical weekday conditions.

The traffic volumes presented for 2019 and 2040 traffic conditions include both daily roadway segment and peak hour intersection turning movement data. All of the data has been developed to represent typical weekday conditions. The average daily traffic (ADT) is useful for multiple reasons. It has been used to evaluate the reasonableness of the peak hour traffic in terms of peak hour to daily traffic analysis. The ADT volumes can also be used for purposes of estimating vehicle-miles and vehicle-hours of travel and is a key input to any necessary noise or air quality analysis. The peak hour turning movement data is used directly in evaluating the operations of the roadway system.

Interim Year (2019) Conditions

The 2019 traffic volumes have been developed by interpolating the growth between Design Year (2040) conditions and Existing (2007) Mid-day (from Cross Pointe Traffic Study) and Existing (2012) PM conditions, with the exception of Landau Boulevard, south of Ramon Road. Traffic volumes for Landau Boulevard, south of Ramon Road were derived based on fifty percent (50%) total of the Design Year (2040) traffic volumes. The Interim Year (2019) ADT volumes are presented on Exhibit L. The Mid-Day and PM peak hour volumes are depicted on Exhibit M and Exhibit N, respectively.

Design Year (2040) Conditions

As mentioned previously, the Design Year (2040) traffic volumes have been developed using the Riverside County Traffic Analysis Model (RivTAM) and Cross Pointe Traffic Study (prepared by Endo Engineering, and dated June 2007). The Design Year (2040) volumes are presented on Exhibit O. The Mid-Day and PM peak hour volumes are depicted on Exhibit P and Exhibit Q, respectively. Ongoing growth in traffic is anticipated to be substantial over the next 25 – 30 years. The daily volumes on Ramon Road are

projected to increase to between 57,000 vehicles per day (VPD) and 60,300 VPD. The highest north south daily volumes are projected to occur on Landau Boulevard north of Ramon Road, which will serve over 25,000 VPD under 2040 conditions.

FUTURE CONDITIONS TRAFFIC OPERATIONS ANALYSIS

Future conditions operations analysis has been conducted for both 2019 and 2040 conditions. The analysis has been completed for both the existing lanes (No Project conditions) and with the proposed project. The proposed project conceptual improvements are shown on Exhibit R.

Interim Year (2019) Conditions

Projected 2019 Conditions peak hour traffic operations have been evaluated for each of the study area intersections. Interim Year (2019) Conditions HCM calculation worksheets are provided as Attachment "H". The results of this analysis are summarized in Table 6, along with the existing intersection geometrics, proposed improvements, and traffic control devices at the analysis locations.

For Interim Year (2019) With Existing Lanes traffic conditions, all study area intersections are projected to operate at acceptable Level of Service, although the peak hour levels of service at San Luis Rey Road and Landau Boulevard are projected to worsen to LOS D for both the mid-day and PM peak hours of traffic.

For Interim Year (2019) With Project Improvements traffic conditions, all study area intersections are projected to operate at acceptable Level of Service, and LOS “B” or “C” conditions will result. In general, the proposed project will improve the level of service by one level for each intersection and time frame.

The Interim Year (2019) With Project Improvements traffic conditions 50th percentile and 95th percentile intersection queuing analysis results are summarized on Table 7 and Table 8, respectively. It appears that the 50th percentile queue length are not anticipated to exceed the available storage. However, there are four (4) instances where the 95th percentile queue length exceeds the available storage (various locations). The intersection queuing analysis calculation worksheets for Interim Year (2019) With Project Improvements traffic conditions are included in Attachment “I”.

Design Year (2040) Conditions

2040 peak hour traffic operations have also been evaluated for the study area intersections. Design Year (2040) Conditions HCM calculation worksheets are provided as Attachment "J". The results of this analysis are summarized in Table 9, along with the existing intersection geometrics, proposed improvements, and traffic control devices at the analysis locations.

For Design Year (2040) With Existing Lanes traffic conditions, all study area intersections are projected to operate at unacceptable Level of Service and exceed a 1.0 volume to capacity (V/C) ratio. For Design Year (2040) With Project Improvements traffic conditions, all study area intersections are projected to experience acceptable traffic operations (LOS D or better), if the recommended improvements are implemented. In addition to the improvements explicitly shown on the project concept improvement plans, a northbound right turn overlap signal indication should be included in the traffic signal modification at the intersection of Crossley Road (NS) at Ramon Road (EW). Also, the southbound through lane at the intersection of Landau Boulevard (NS) at Ramon Road (EW) should be striped to allow both the through movement and right turning traffic to use the lane. This will better serve the heavy southbound right turn movement at this location.

The Design Year (2040) With Project Improvements traffic conditions 50th percentile and 95th percentile intersection queuing analysis results are summarized on Table 10 and Table 11, respectively. There are four (4) instances where the 50th percentile queue length exceeds the available storage (various locations) and ten (10) instances where the 95th percentile queue length exceeds the available storage (various locations). The intersection queuing analysis calculation worksheets for Design Year (2040) With Project Improvements traffic conditions are included in Attachment “K”.

RECOMMENDATIONS / CLOSING

Based on the analysis and findings presented in the previous sections of this report, the following recommendations have been developed and are shown on Exhibit S:

- The overall Ramon Road corridor within the project limits should be constructed as a six (6) lane divided roadway.

- The majority of the available / planned turn lane storage distances (shown on Table 10 and Table 11) are adequate to accommodate the anticipated long range traffic volumes. However, the following issues and recommendations have been identified in the study area for Design Year (2040) With Project conditions:

  - San Luis Rey Drive (NS) at Ramon Road (EW)
    - Northbound:
      - Extend the existing left turn lane to provide at least 150 feet of vehicle storage capacity.
    - Southbound:
      - Extend the existing left turn lane to provide at least 175 feet of vehicle storage capacity.
    - Eastbound:
      - Extend the existing left turn lane to provide at least 200 feet of vehicle storage capacity.

  - Crossley Road (NS) at Ramon Road (EW)
    - Northbound:
      - It is recommended that right turn overlap phasing be provided and extend the project proposed left turn lane improvement to provide at least 150 feet of vehicle storage capacity.

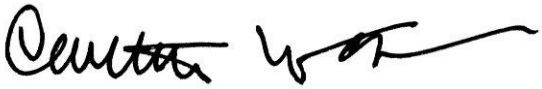
  - Landau Boulevard (NS) at Ramon Road (EW)
    - Southbound:
      - Extend the existing left turn lane to provide at least 300 feet of vehicle storage capacity.
      - Modify the project proposed through lane improvement as a shared through-right turn lane improvement.
      - Extend the existing right turn lane to provide at least 175 feet of vehicle storage capacity.

- Eastbound:
  - The Eastbound dual left turn lanes have been extended to 450 feet as result of the analysis included in this report. Although this exceeds the recommended maximum of 300 feet, it is infeasible to provide triple left turn lanes at this location and the additional storage will avoid potential spillover into the through lanes.
- Westbound:
  - Extend the project proposed left turn lane improvement to provide at least 175 feet of vehicle storage capacity.
  - Extend the existing right turn lane to provide at least 400 feet of vehicle storage capacity.

Urban Crossroads, Inc. is pleased to provide this traffic analysis letter report for your use. If you have any questions, please contact us at (949) 660-1994.

Respectfully submitted,

URBAN CROSSROADS, INC.



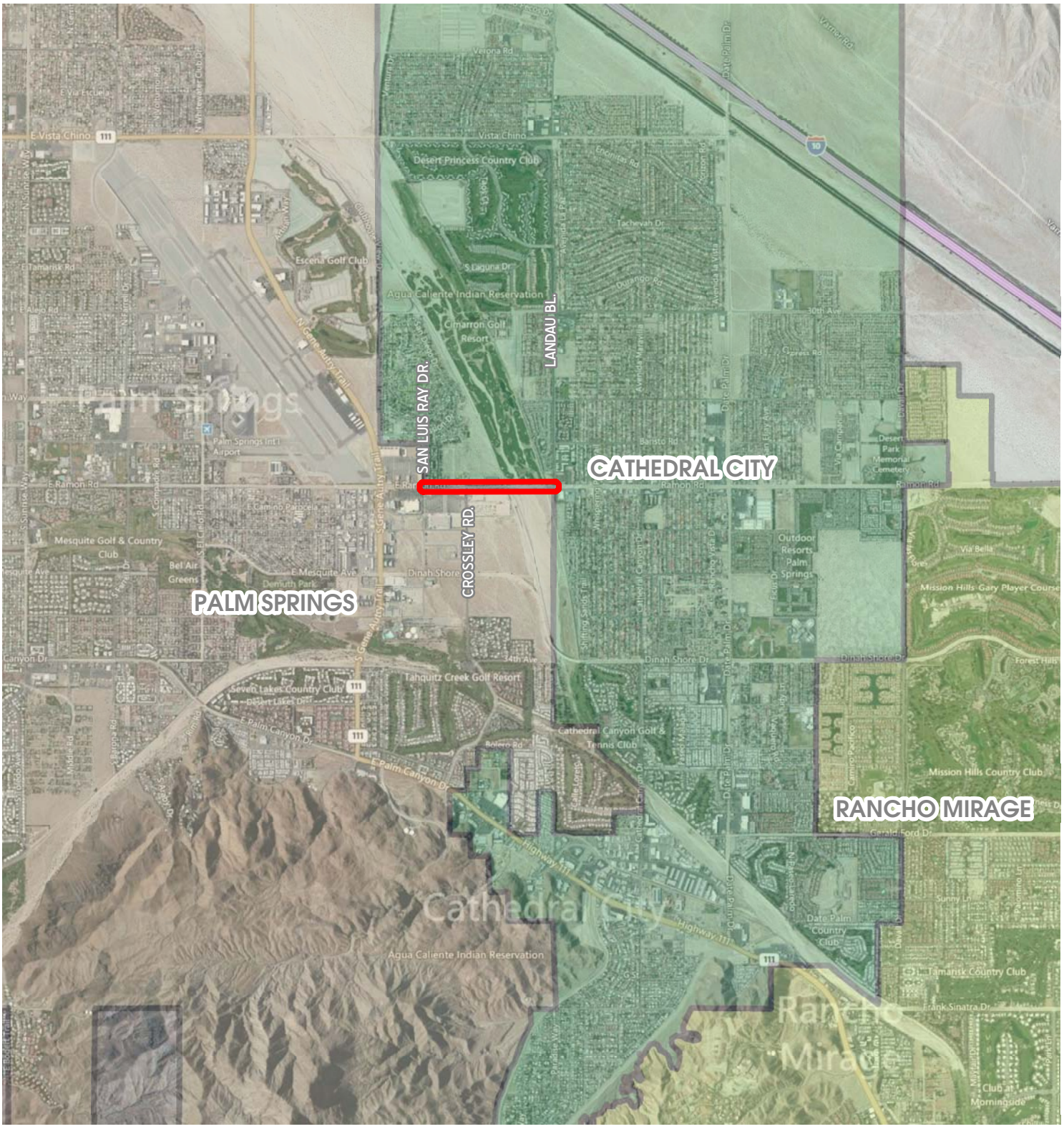
Carleton Waters, P. E.
Principal

CW:DM:JC
JN:07961-07 Ramon Road Traffic Analysis Report

Attachments

EXHIBIT A

PROJECT AREA



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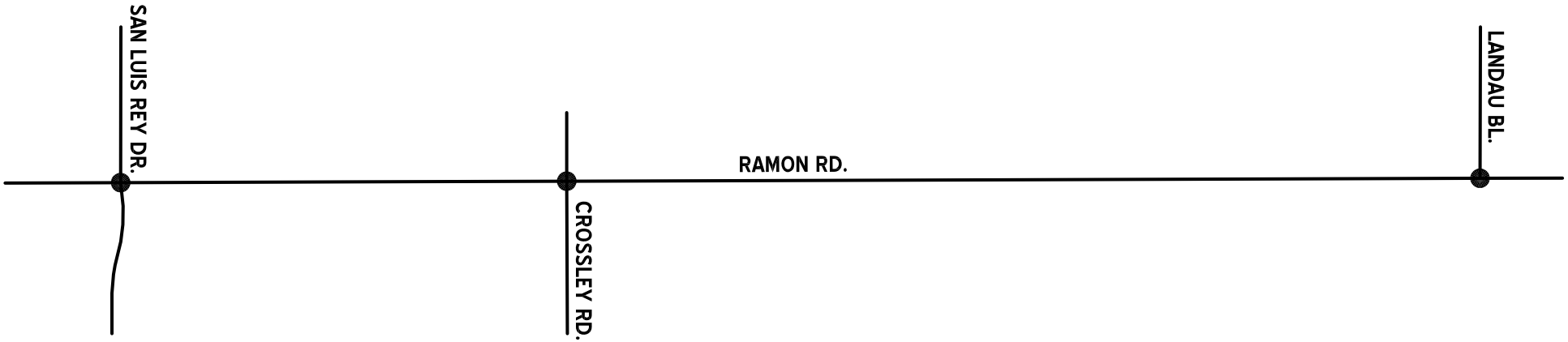
Ramon Road Widening Project Traffic Analysis
City of Palm Springs, CA (JN - 07961:projectarea.mxd)

URBAN CROSSROADS

EXHIBIT B

LOCATION MAP



LEGEND:

● = INTERSECTION ANALYSIS LOCATION

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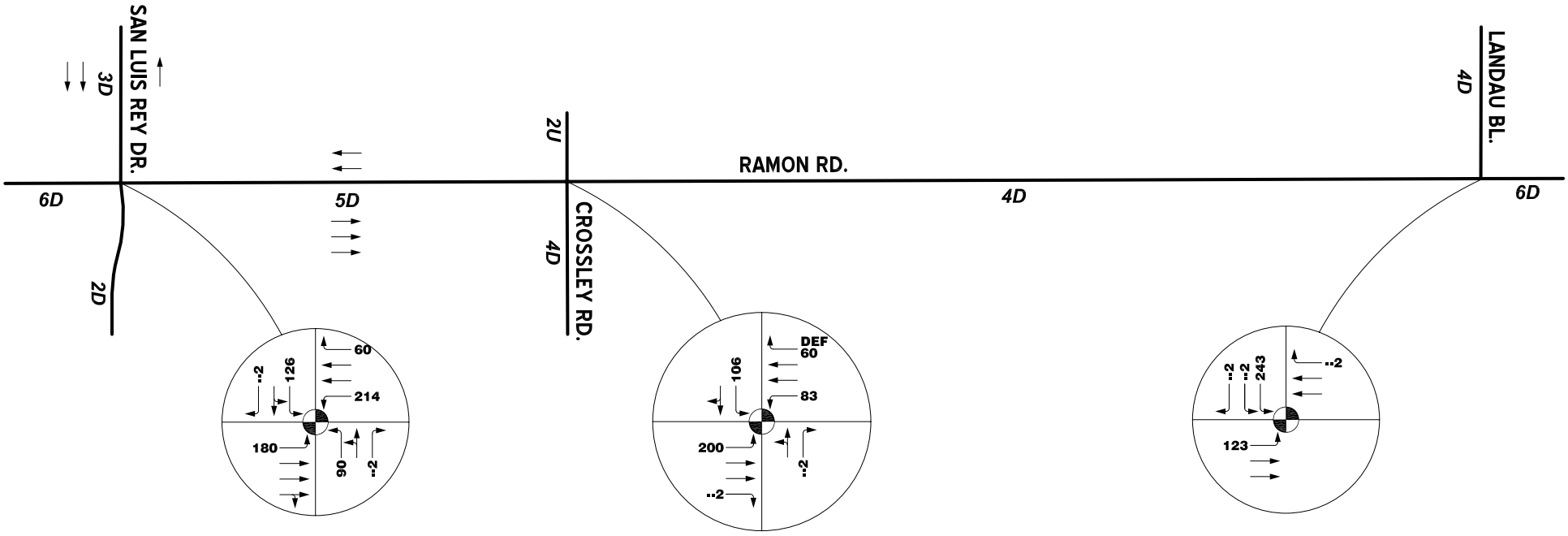
EXHIBIT C

EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



LEGEND:

- = TRAFFIC SIGNAL
- *4* = NUMBER OF LANES
- *D* = DIVIDED
- *U* = UNDIVIDED
- DEF = DEFACTO RIGHT TURN LANE
- 150 = TURN POCKET LENGTH (IN FEET)
- --2 = EXISTING STORAGE LENGTH IS THE INTERNAL LINK DISTANCE TO UPSTREAM INTERSECTION

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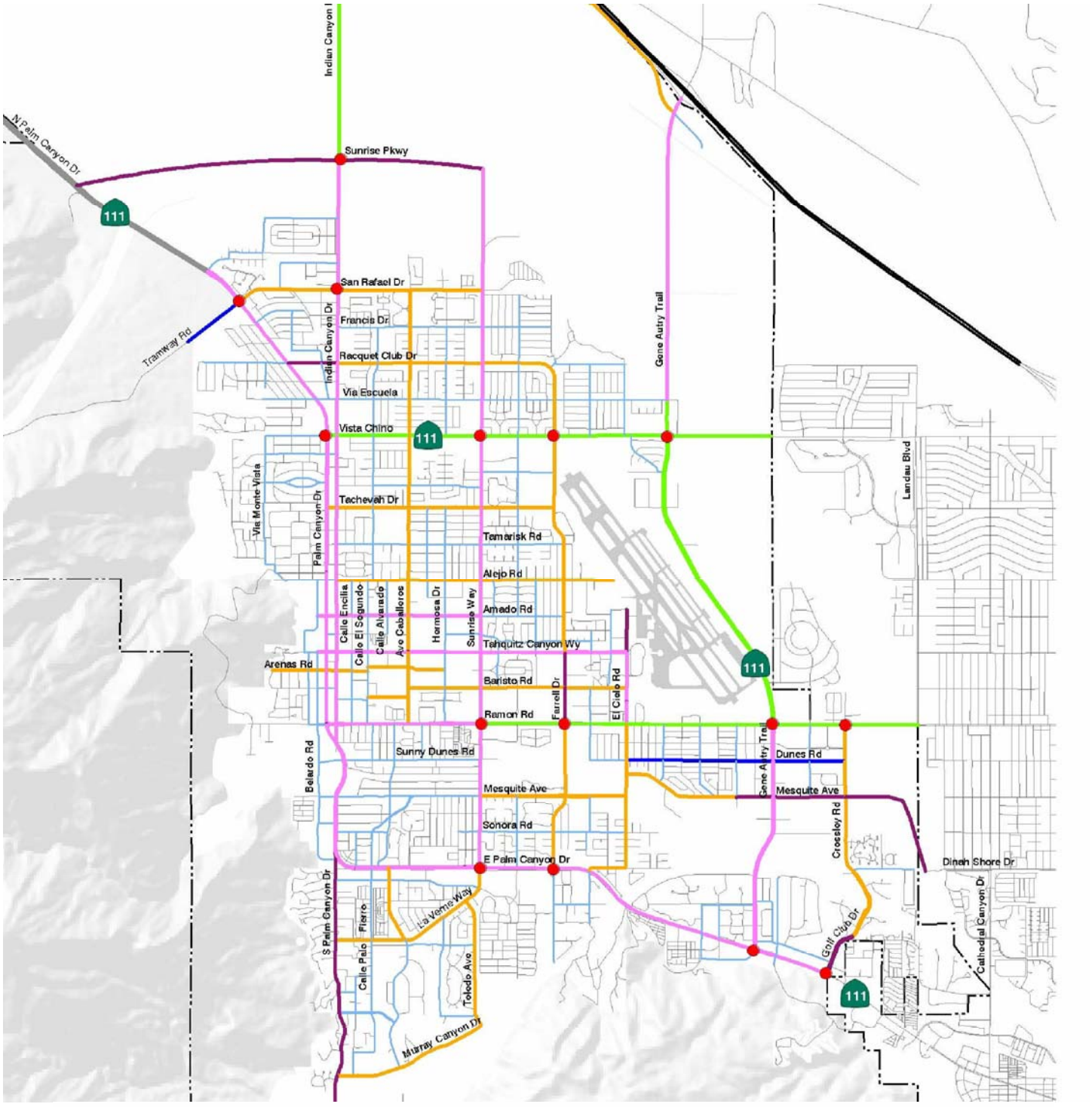
EXHIBIT D

CITY OF PALM SPRINGS
GENERAL PLAN CIRCULATION ELEMENT



LEGEND:

- Freeway
- Expressway
- Major Thoroughfare (6 - lane divided)
- Major Thoroughfare (4 - lane divided)
- Secondary Thoroughfare (4 - lane divided)
- Secondary Thoroughfare (4 - lane undivided)
- Collector (2 - lane divided)
- Collector (2 - lane undivided)
- Local
- City Boundary
- Sphere of Influence
- Critical Intersection*

*Intersection improvements required to maintain acceptable LOS.

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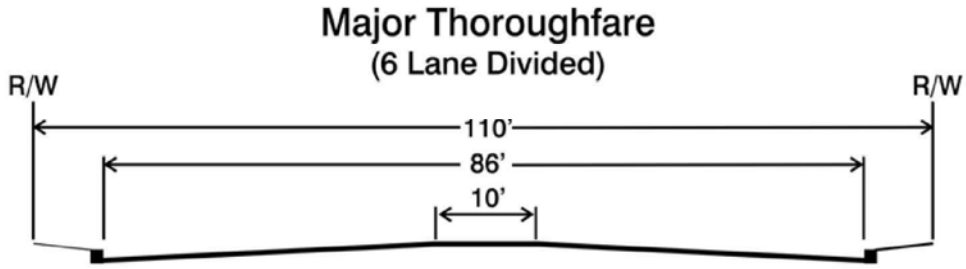
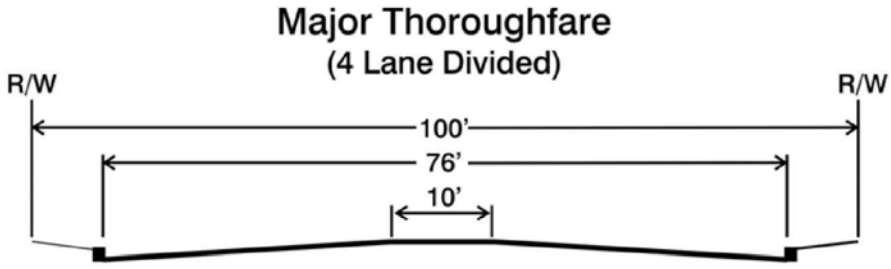
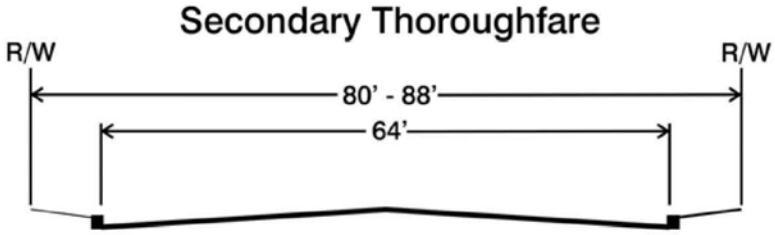
SOURCE: CITY OF PALM SPRINGS (03-2007)

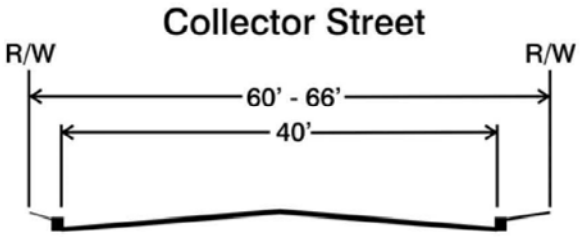
EXHIBIT E

CITY OF PALM SPRINGS
GENERAL PLAN ROADWAY CROSS-SECTIONS









Note: Sidewalks and bike lanes are not shown on these street sections. In some cases, additional right-of-way easements may need to be established to incorporate these additional features.

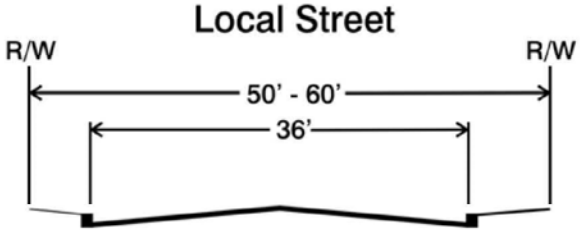
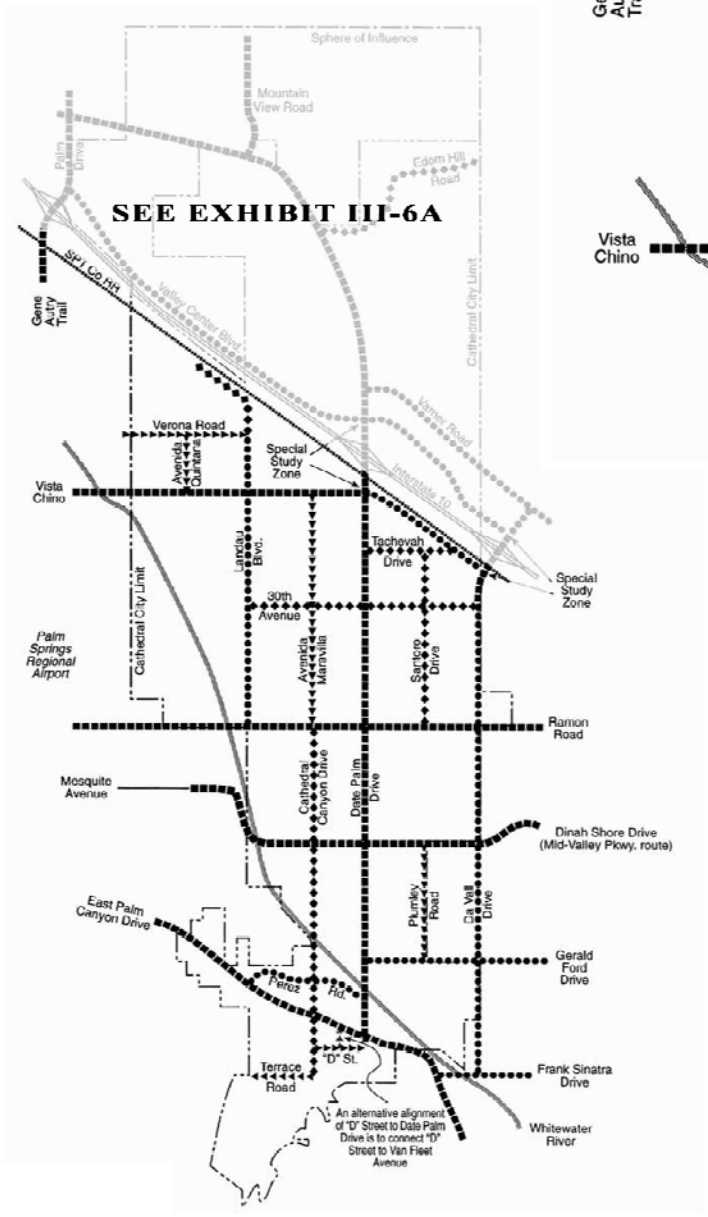
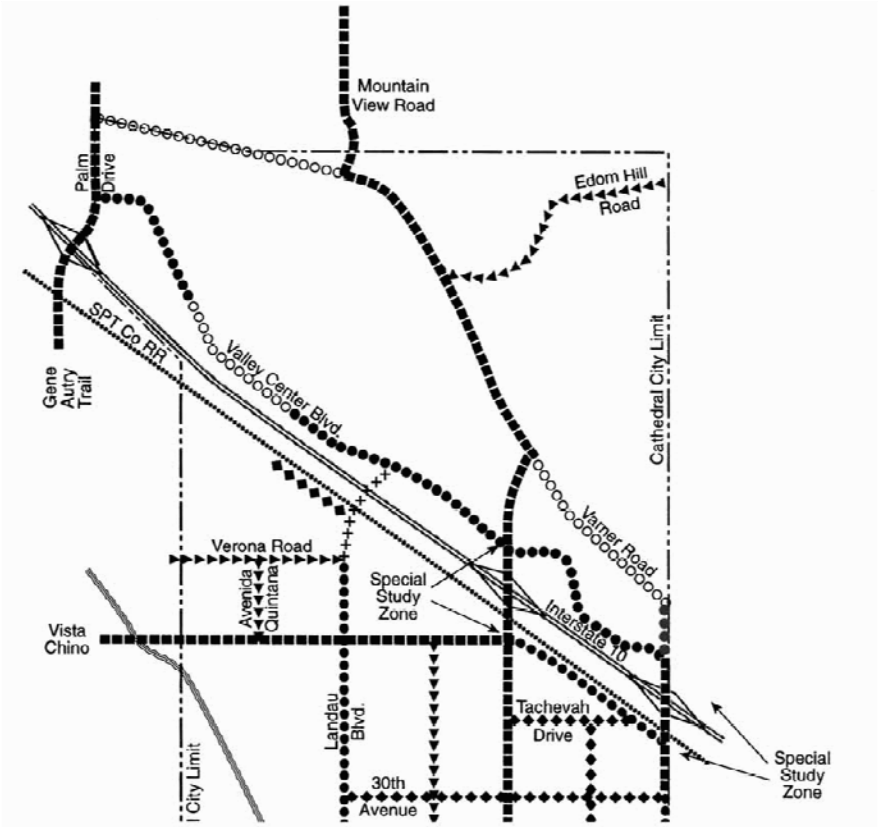


EXHIBIT F

CITY OF CATHEDRAL CITY
GENERAL PLAN BUILDOUT ROADWAY CLASSIFICATIONS





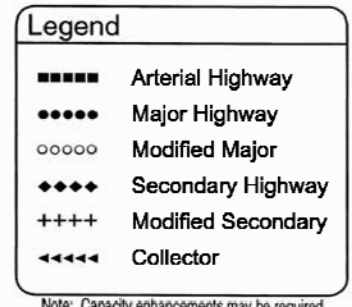


EXHIBIT G

CITY OF CATHEDRAL CITY
GENERAL PLAN STREET CROSS-SECTIONS

Arterial Highway

R/W			126'					R/W
16'	16'	12'	12'	14'	12'	12'	16'	16'
Pkwy				Median				Pkwy

(Six Lanes divided)

Modified Major Highway

R/W			102'			R/W
16'	18'	12'	14'	12'	18'	16'
Pkwy			Median			Pkwy

Major Highway

R/W			112'			R/W
16'	20'	12'	16'	12'	20'	16'
Pkwy			Median			Pkwy

(Four Lanes divided)

Modified Secondary Highway

R/W				92'				R/W
10'	5'	12'	12'	14'	12'	12'	5'	10'
Pkwy	Bike			Median			Bike	Pkwy

Secondary Highway

R/W			88'			R/W
12'	20'	12'	12'	20'	12'	
Pkwy					Pkwy	

(Four Lanes undivided)

North City Collector

R/W				70'				R/W
10'	8'	5'	12'	12'	5'	8'	10'	
Pkwy	Pkg	Bike			Bike	Pkg	Pkwy	

Industrial/Residential Collector

R/W			66'			R/W
9'	12'	12'	12'	12'	9'	
Pkwy					Pkwy	

(Two Lanes)

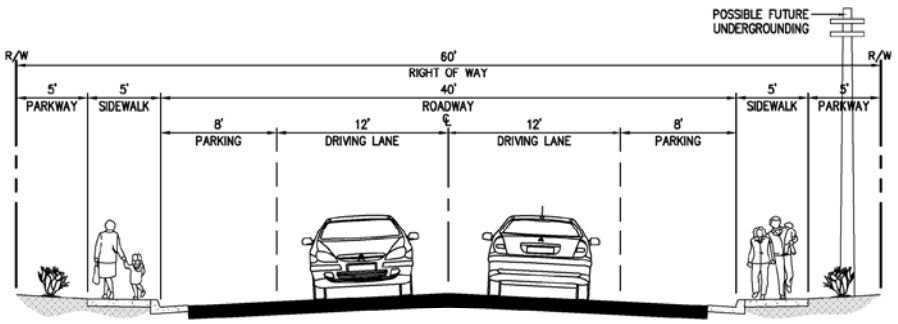
North City Local

R/W			56'			R/W
10'	7'	11'	11'	7'	10'	
Pkwy					Pkwy	

Local Collector

R/W		60'		R/W
10'	20'	20'	10'	
Pkwy			Pkwy	

(Two Lanes)

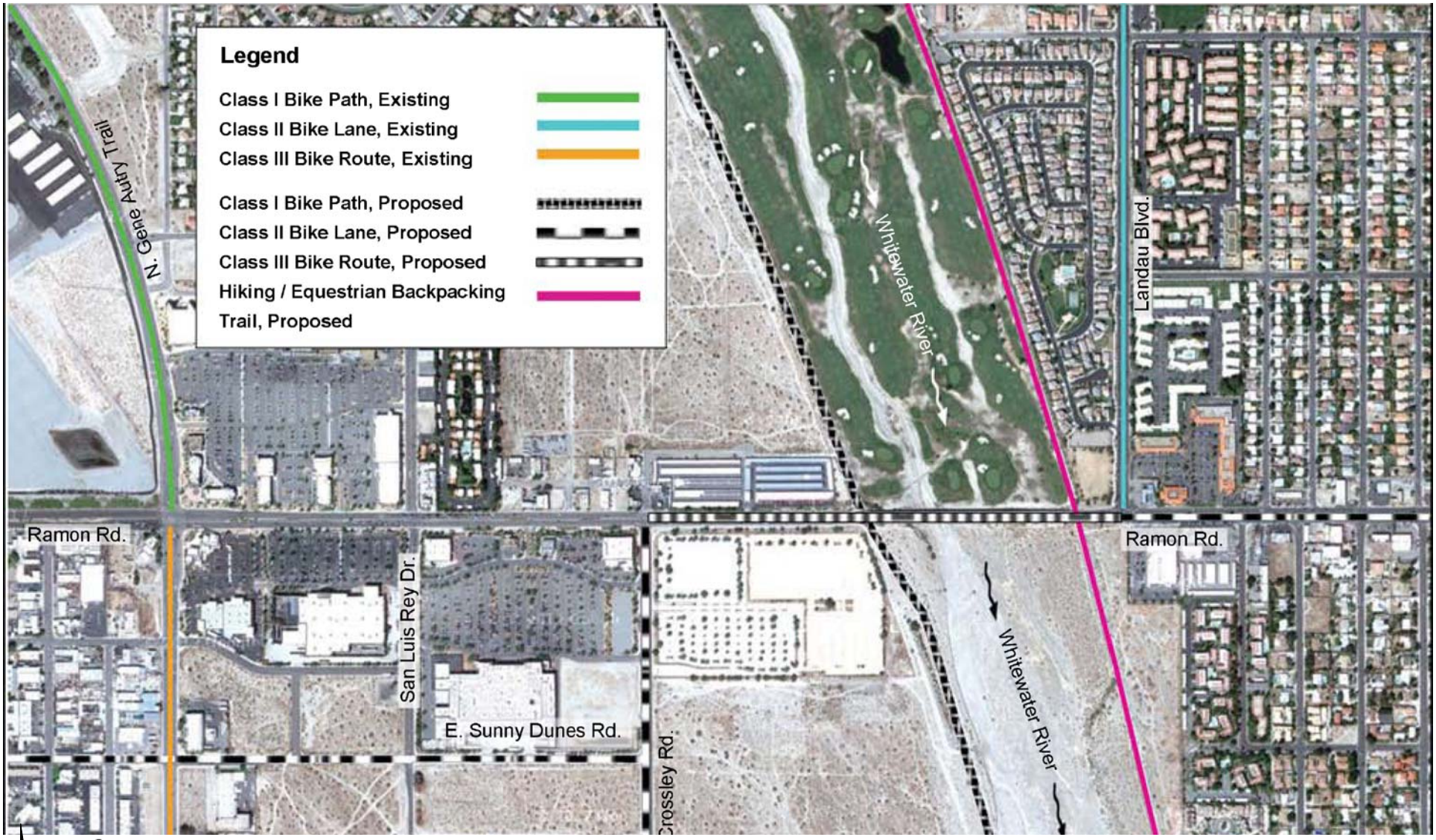


CROSSLEY ROAD

COLLECTOR STREET
CROSSLEY ROAD
FROM RAMON ROAD TO DESERT PRIMROSE TRAIL

EXHIBIT H

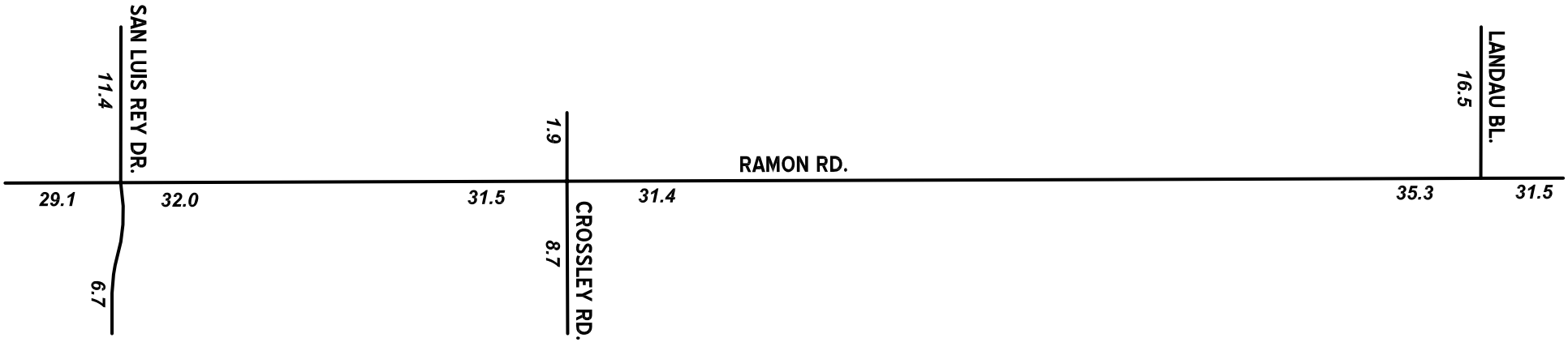
EXISTING / PLANNED BICYCLE FACILITIES AND RECREATIONAL TRAILS



Sources:
CVAG Non-Motorized Transportation Plan Update, 2010
City of Palm Springs General Plan, Figures 4-4 and 4-5
Google Map 2011

EXHIBIT I

EXISTING (2012) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT J

EXISTING (2012) AM PEAK HOUR INTERSECTION VOLUMES

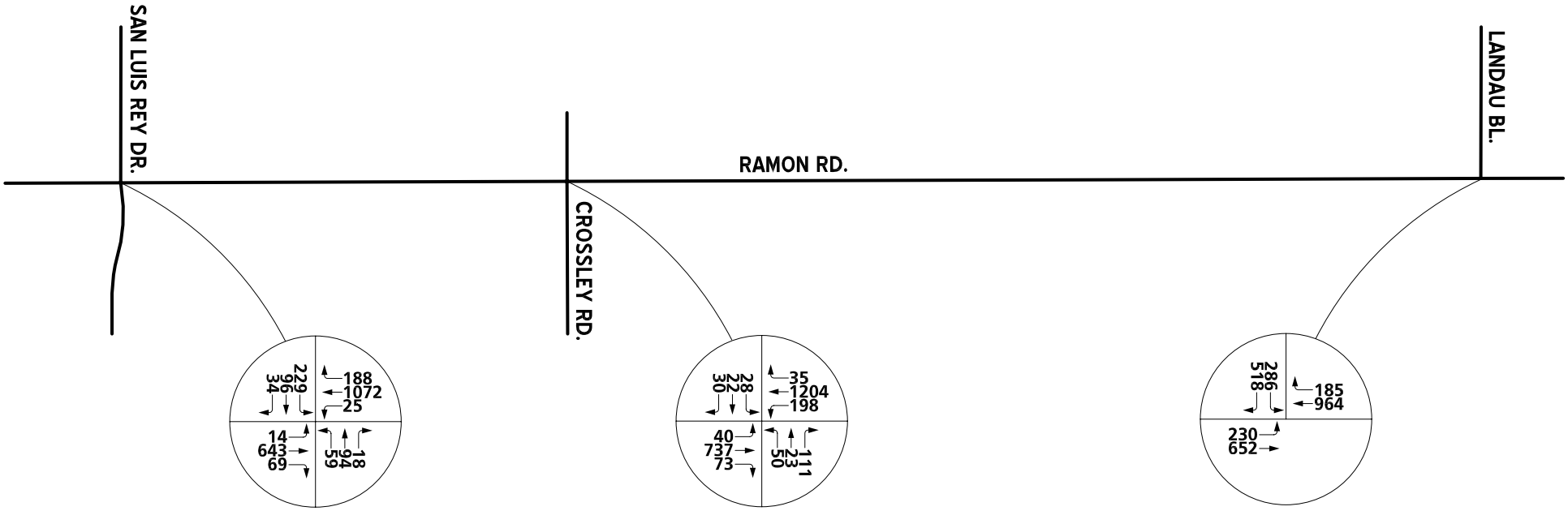


EXHIBIT K

EXISTING (2012) PM PEAK HOUR INTERSECTION VOLUMES

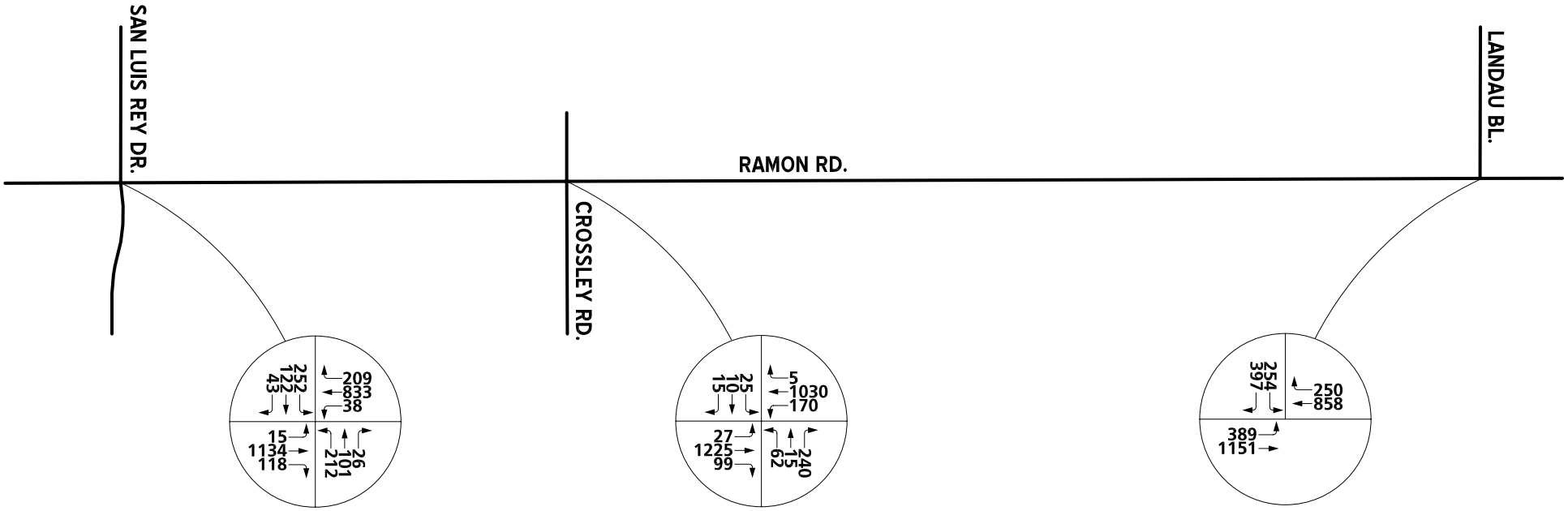
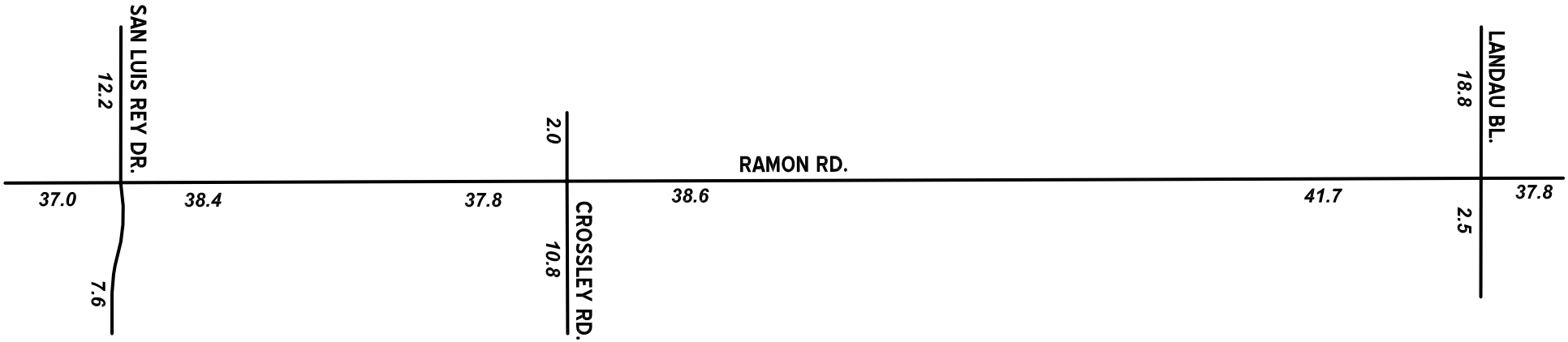


EXHIBIT L

INTERIM YEAR (2019) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT M

INTERIM YEAR (2019)
MID-DAY PEAK HOUR INTERSECTION VOLUMES

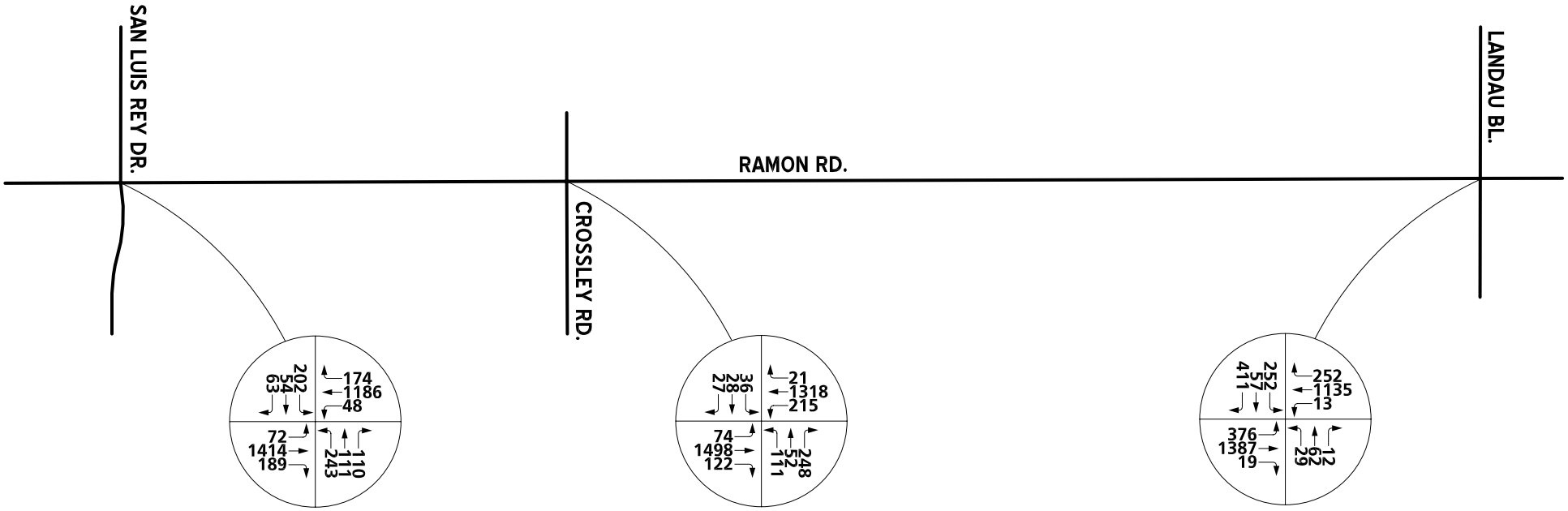


EXHIBIT N

INTERIM YEAR (2019)
PM PEAK HOUR INTERSECTION VOLUMES

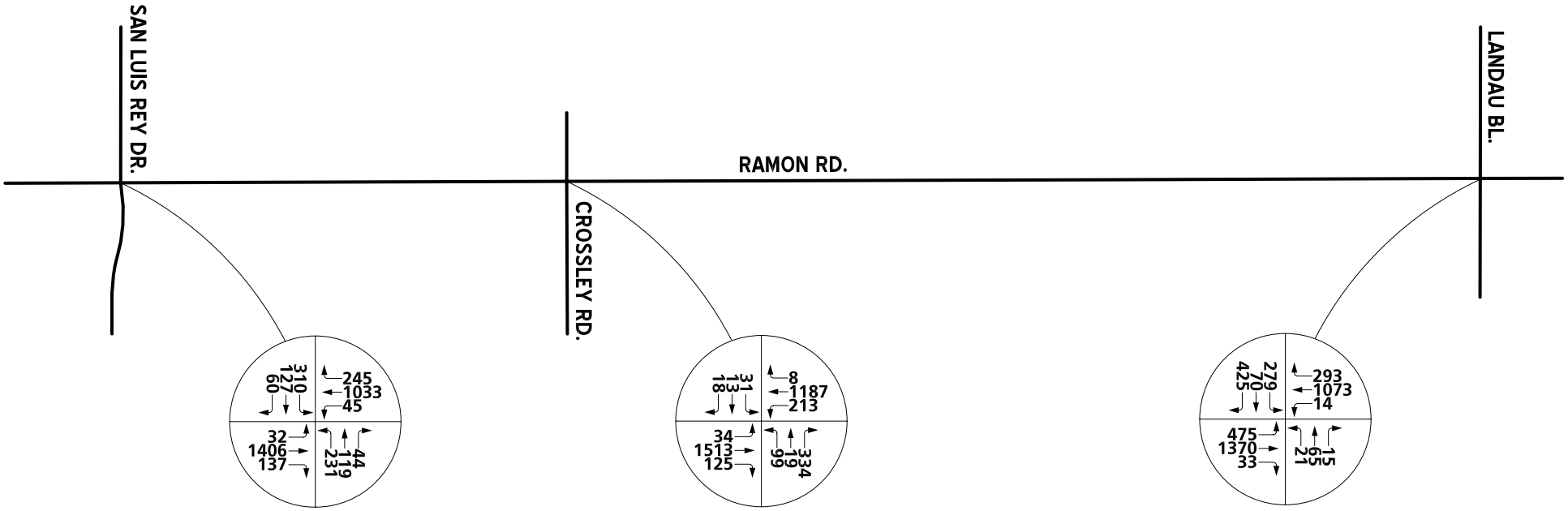
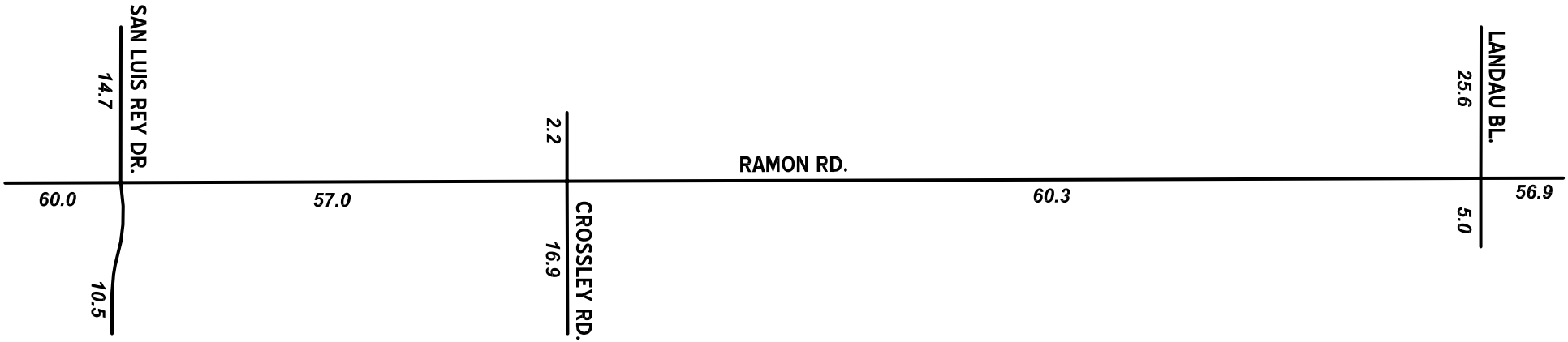


EXHIBIT O

DESIGN YEAR (2040) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT P

DESIGN YEAR (2040)
MID-DAY PEAK HOUR INTERSECTION VOLUMES

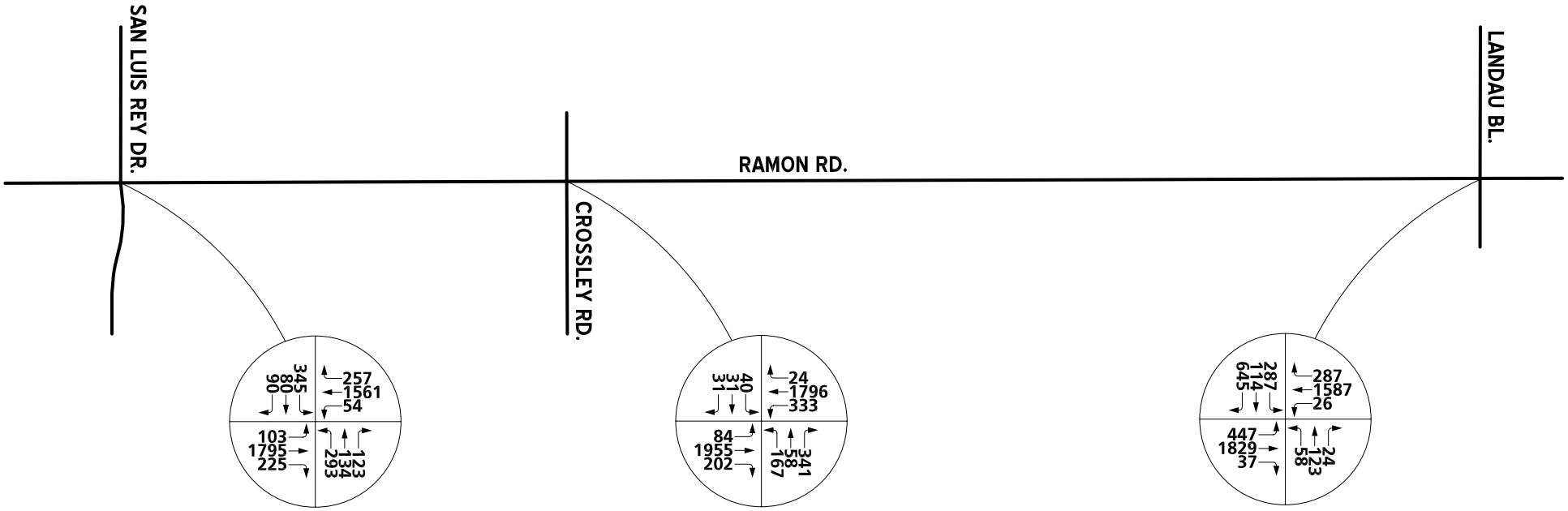
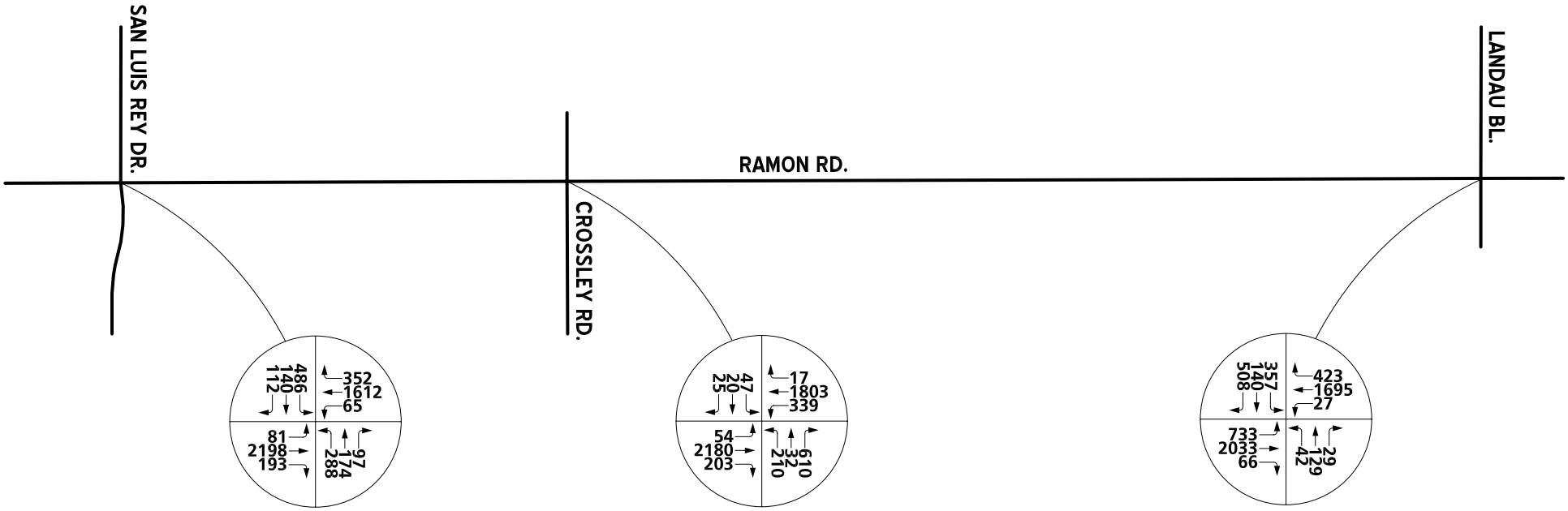
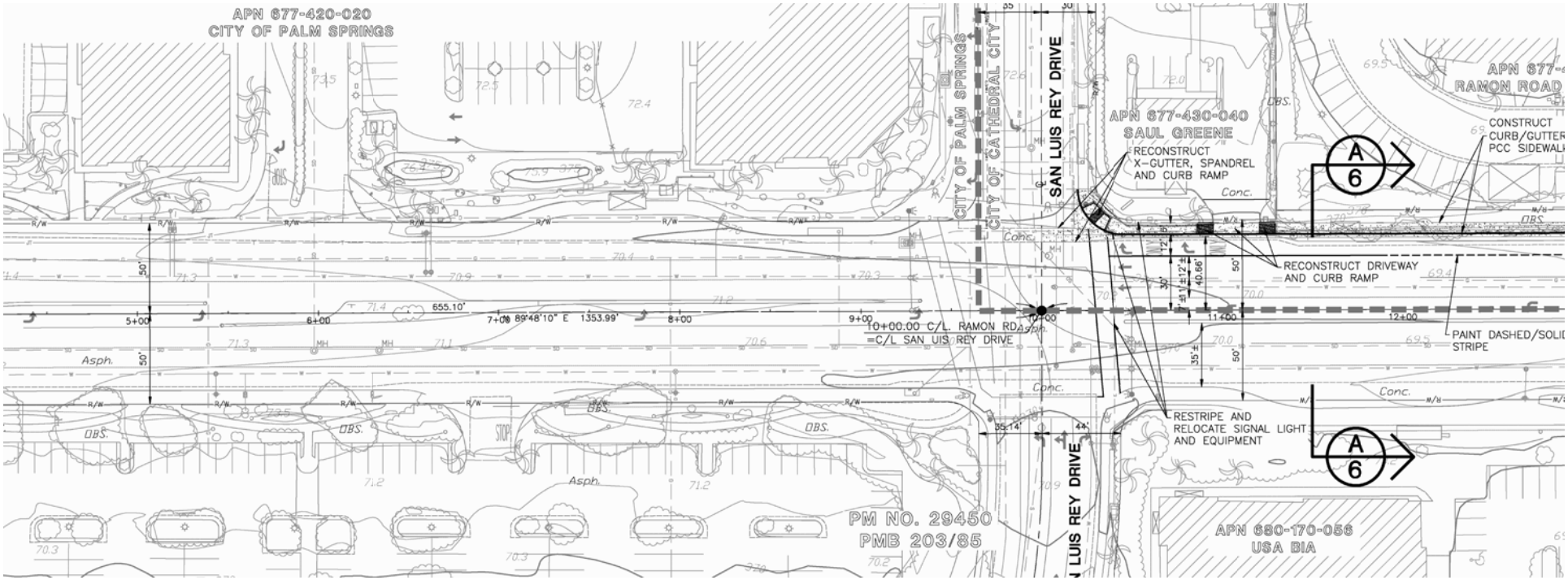


EXHIBIT Q

DESIGN YEAR (2040)
PM PEAK HOUR INTERSECTION VOLUMES



RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



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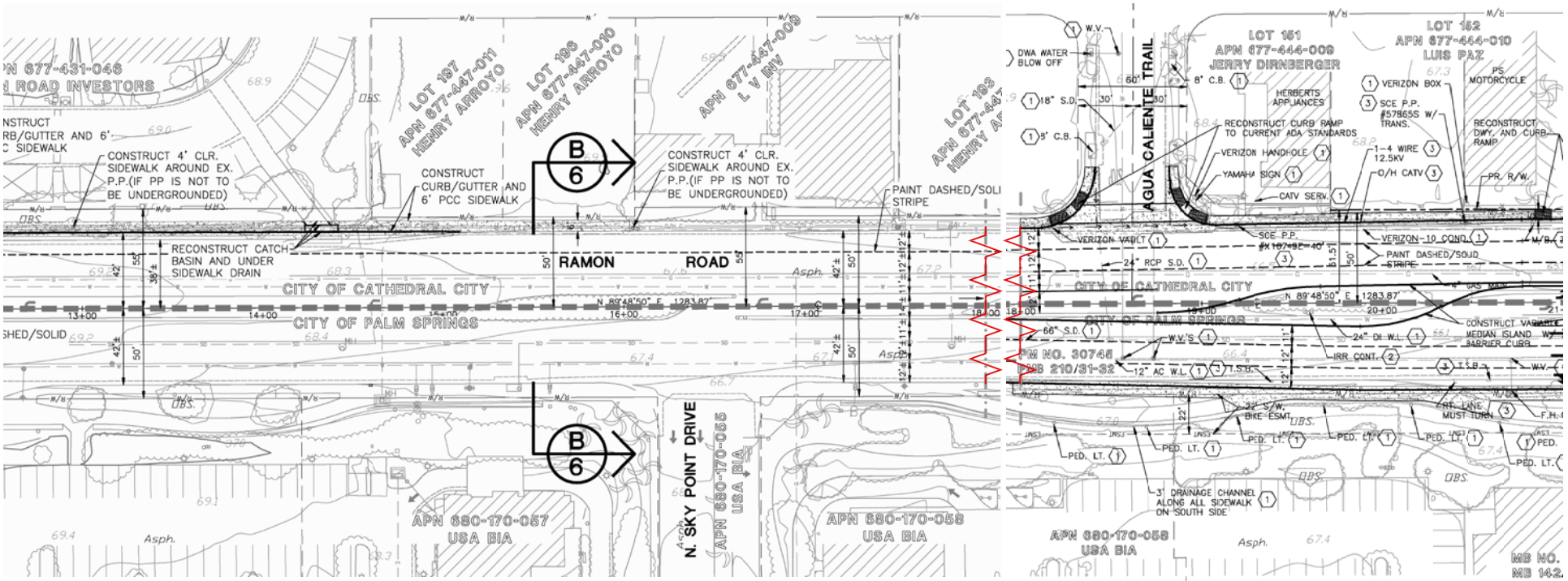
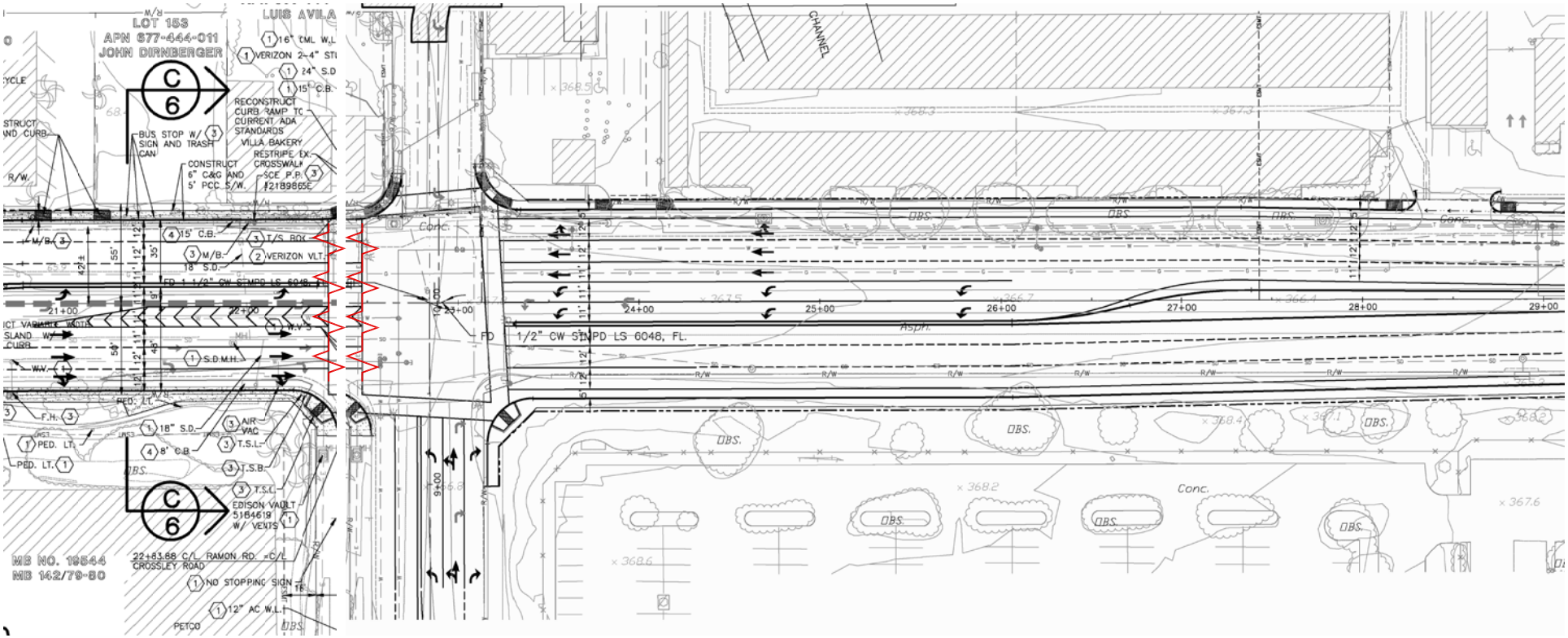
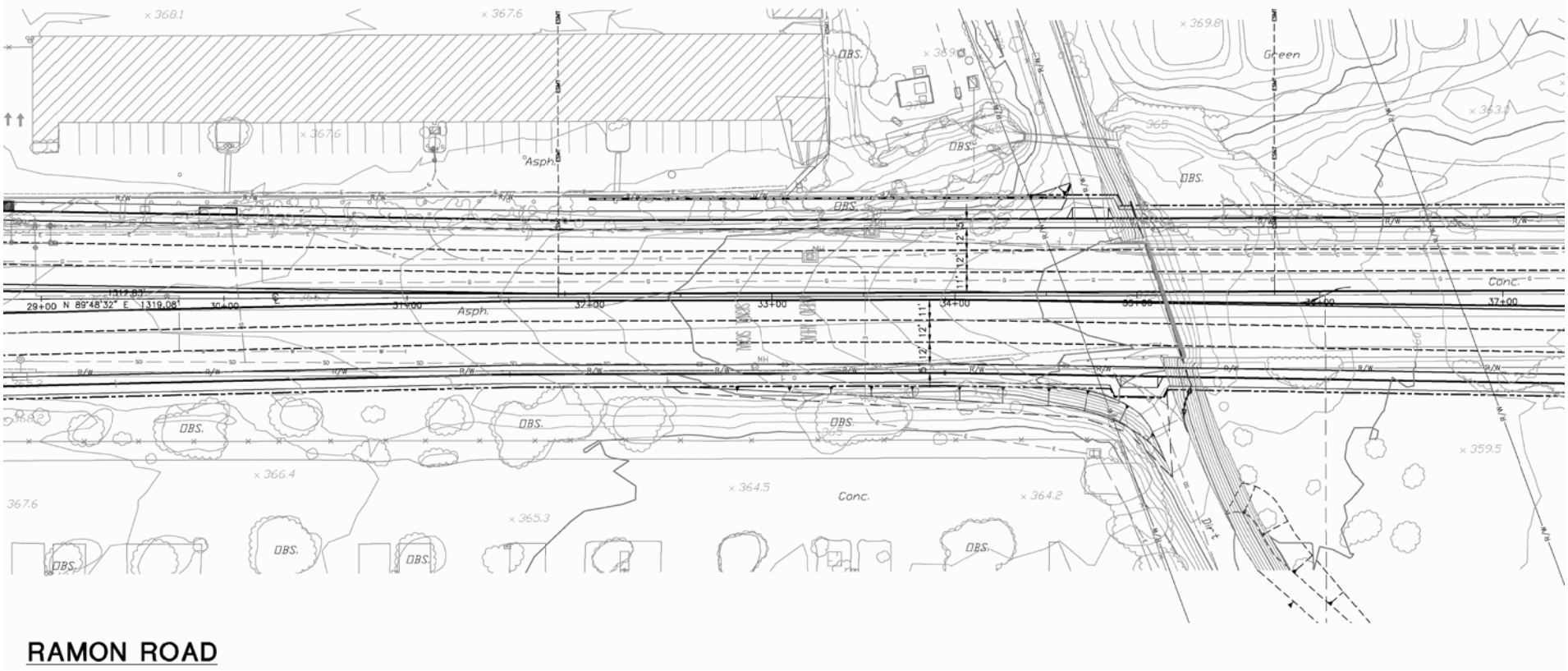
RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



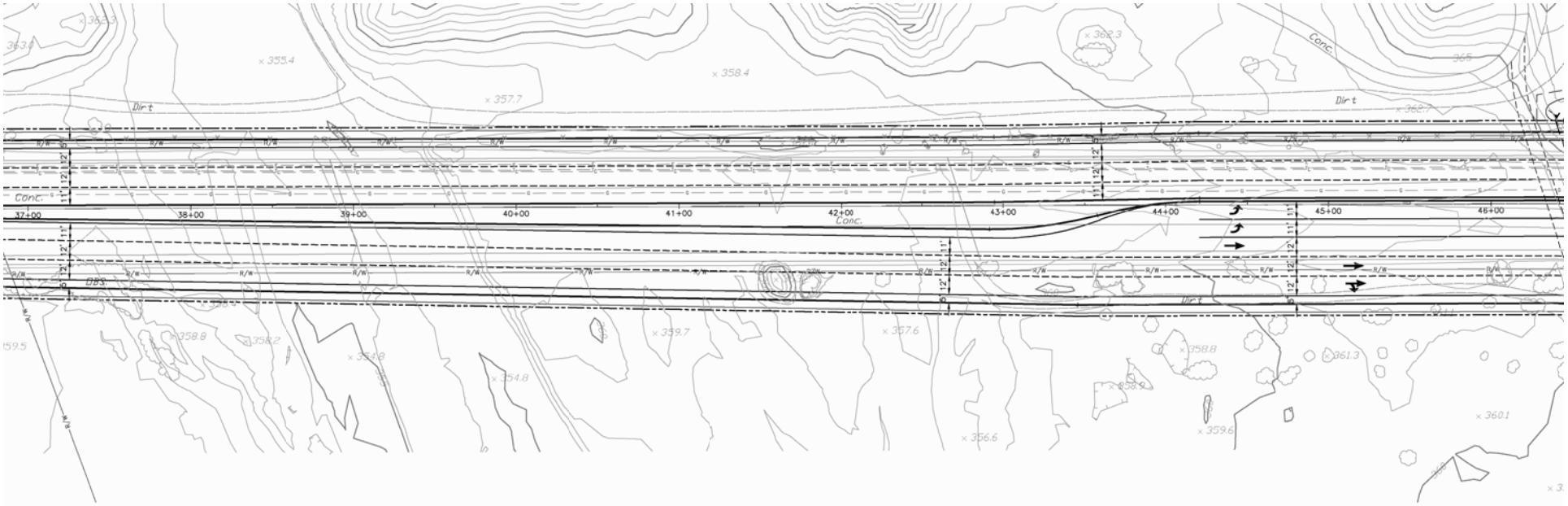
RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



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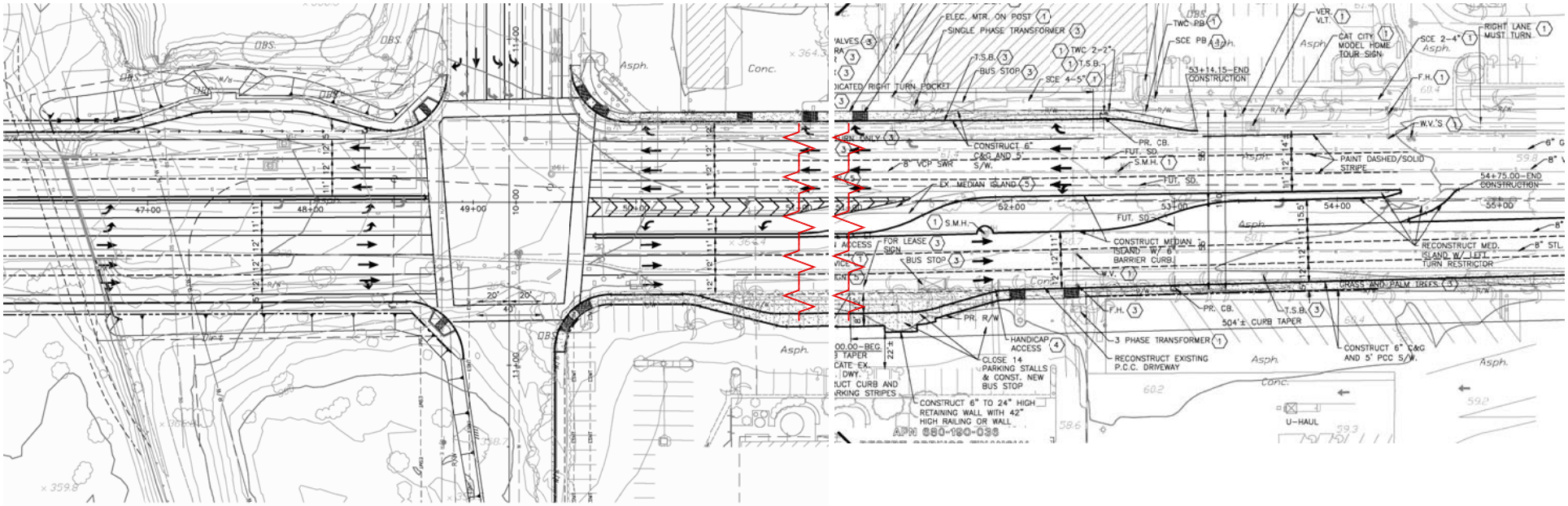
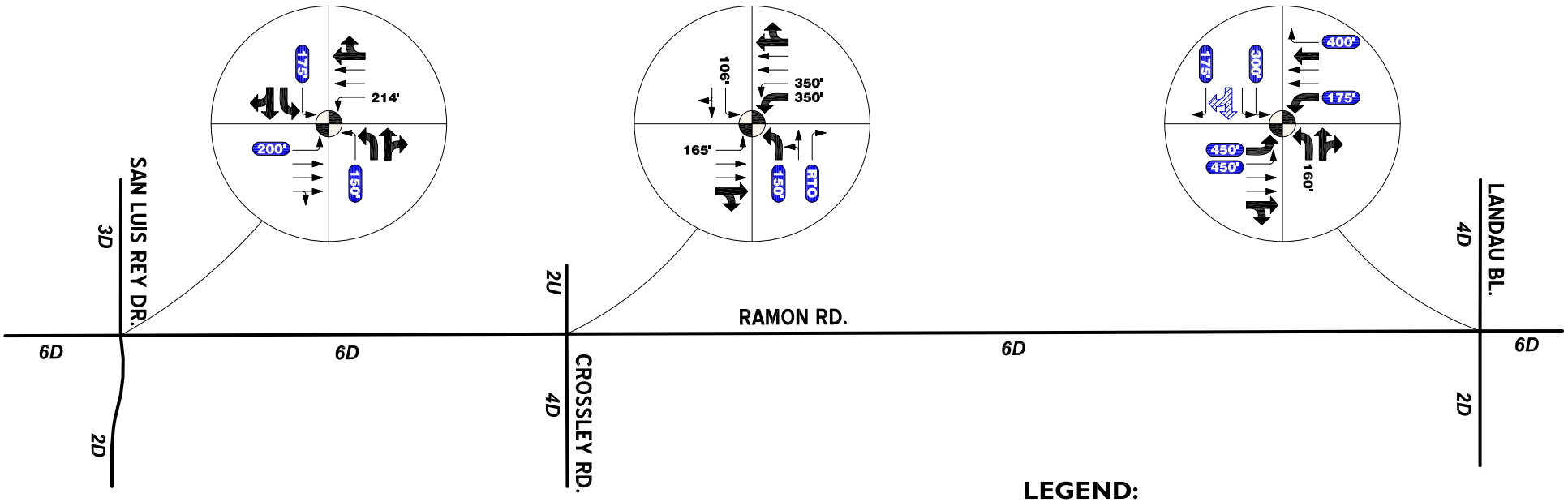
RAMON ROAD CONCEPTUAL IMPROVEMENT PLANS



N

EXHIBIT S

RECOMMENDED IMPROVEMENTS FOR DESIGN YEAR (2040) WITH PROJECT CONDITIONS



LEGEND:

- = TRAFFIC SIGNAL
- *4* = NUMBER OF LANES
- *D* = DIVIDED
- *U* = UNDIVIDED
- = EXISTING LANE
- = PROJECT IMPROVEMENT PLAN
- = PROJECT IMPROVEMENT PLAN SHOULD BE MODIFIED TO INCLUDE THIS IMPROVEMENT
- RTO = PROJECT IMPROVEMENT PLAN SHOULD BE MODIFIED TO INCLUDE THIS RIGHT TURN OVERLAP PHASING IMPROVEMENT
- 150' = EXISTING/PROJECT PROPOSED POCKET LENGTH
- 150' = RECOMMENDED POCKET LENGTH

N

TABLE 1

EXISTING CONDITIONS
INTERSECTION ANALYSIS SUMMARY

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
San Luis Rey (NS) at:																	
• Ramon Road (EW)	TS	1.5	0.5	1	1.5	0.5	1	1	3	0	1	2	1	24.4	27.7	C	C
Crossley Road (NS) at:																	
• Ramon Road (EW)	TS	0.5	0.5	1	1	1	0	1	2	1	1	2	d	13.4	15.8	B	B
Landau Boulevard (NS) at:																	
• Ramon Road (EW)	TS	0	0	0	2	0	1	1	2	0	0	2	1	35.6	22.6	D	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes (greater than or equal to 19').

L = Left; T = Through; R = Right; d = defacto right turn lane; 1! = Shared Left-Through-Right Turn Lane

[2] Delay and level of service calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

[3] TS = Traffic Signal

TABLE 2

EXISTING CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL	90	75	23	75	YES	YES
	NBL/T	--[2]	175	95	159	YES	YES
	NBR	--[2]	25	10	21	YES	YES
	SBL	126	100	85	77	YES	YES
	SBL/T	--[2]	125	101	117	YES	YES
	SBR	--[2]	25	11	11	YES	YES
	EBL	180	25	23	8	YES	YES
	EBT1	--[2]	200	64	179	YES	YES
	EBT2	--[2]	175	72	172	YES	YES
	EBT/R	--[2]	125	29	123	YES	YES
	WBL	214	25	19	17	YES	YES
	WBT1	--[2]	150	119	133	YES	YES
	WBT2	--[2]	175	163	158	YES	YES
	WBR	62	75	35	62	YES	YES
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL/T	--[2]	100	77	43	YES	YES
	NBR	--[2]	75	30	70	YES	YES
	SBL	106	50	19	29	YES	YES
	SBT/R	--[2]	25	23	12	YES	YES
	EBL	200	50	30	9	YES	YES
	EBT1	--[2]	175	73	171	YES	YES
	EBT2	--[2]	175	84	174	YES	YES
	EBR	--[2]	25	12	18	YES	YES
	WBL	83	75	59	65	YES	YES
	WBT1	--[2]	125	123	74	YES	YES
	WBT2	--[2]	175	155	94	YES	YES
	WBR(d)	60	25	5	0	YES	YES

TABLE 2

EXISTING CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	SBL	243	100	59	76	YES	YES
	SBL2	--[2]	100	75	93	YES	YES
	SBR	--[2]	225	209	120	YES	YES
	EBL	123	150	147	142	**NO**	**NO**
	EBT1	--[2]	900	309	894	YES	YES
	EBT2	--[2]	725	226	706	YES	YES
	WBT1	--[2]	250	217	229	YES	YES
	WBT2	--[2]	225	218	221	YES	YES
	WBR	--[2]	75	64	66	YES	YES

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

= 50th% deficiency

TABLE 3

EXISTING CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL	90	150	59	134	YES	**NO**
	NBL/T	--[2]	275	149	252	YES	YES
	NBR	--[2]	50	31	38	YES	YES
	SBL	126	150	132	108	**NO**	YES
	SBL/T	--[2]	175	149	172	YES	YES
	SBR	--[2]	25	24	24	YES	YES
	EBL	180	75	62	25	YES	YES
	EBT1	--[2]	250	107	247	YES	YES
	EBT2	--[2]	250	133	248	YES	YES
	EBT/R	--[2]	225	56	207	YES	YES
	WBL	214	50	45	50	YES	YES
	WBT1	--[2]	250	238	229	YES	YES
	WBT2	--[2]	325	318	302	YES	YES
	WBR	62	125	91	112	**NO**	**NO**
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL/T	--[2]	175	154	89	YES	YES
	NBR	--[2]	125	66	112	YES	YES
	SBL	106	75	48	64	YES	YES
	SBT/R	--[2]	50	47	35	YES	YES
	EBL	200	75	59	30	YES	YES
	EBT1	--[2]	425	161	402	YES	YES
	EBT2	--[2]	425	167	412	YES	YES
	EBR	--[2]	50	32	44	YES	YES
	WBL	83	125	105	109	**NO**	**NO**
	WBT1	--[2]	325	317	182	YES	YES
	WBT2	--[2]	350	349	204	YES	YES
	WBR(d)	60	25	18	0	YES	YES

TABLE 3

EXISTING CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	SBL	243	175	88	156	YES	YES
	SBL2	--[2]	200	108	184	YES	YES
	SBR	--[2]	325	312	240	YES	YES
	EBL	123	175	150	168	**NO**	**NO**
	EBT1	--[2]	1450	465	1443	YES	YES
	EBT2	--[2]	1200	390	1179	YES	YES
	WBT1	--[2]	375	272	361	YES	YES
	WBT2	--[2]	375	261	367	YES	YES
	WBR	--[2]	125	116	120	YES	YES

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

= also 50th% and 95% deficiency

= 95th% deficiency

TABLE 4
COLLISION DATA SUMMARY (2007 - AVAILABLE 2012)

Roadway	Limits		Total Number of Accidents	Number of Accidents Resulting in Injuries	Number of Accidents Involving Pedestrians	Type of Collision	Number of Accidents
	From	To					
Ramon Road	West of San Luis Rey Drive	San Luis Rey Drive	5	4	--	Rear End	3
						Broadside	1
						Hit Object	1
	At San Luis Rey Drive (in intersection)		19	12	1	Head-On	1
						Sideswipe	2
						Rear End	4
						Broadside	10
						Hit Object	1
						Pedestrian Hit	1
	San Luis Rey Drive	Crossley Road	17	6	--	Sideswipe	2
						Rear End	13
						Broadside	2
	At Crossley Road (in intersection)		23	15	--	Head-On	3
						Sideswipe	1
						Rear End	4
						Broadside	13
						Other	2
	Crossley Road	Landau Boulevard	10	5	--	Sideswipe	2
						Rear End	3
						Broadside	3
						Overturned	1
						Other	1
	Subtotal		74	42	1		74
San Luis Rey Drive	North of Ramon Road	Ramon Road	3	--	--	Rear End	2
						Hit Object	1
	Ramon Road	South of Ramon Road	2	2	--	Broadside	2
	Subtotal		5	2	--		5
Crossley Road	Ramon Road	South of Ramon Road	5	5	--	Broadside	4
						Hit Object	1
	Subtotal		5	5	0		5
TOTALS			**84**	**49**	**1**	**TOTAL**	**84**
PERCENTAGE OF TOTAL ACCIDENTS			**100%**	**58%**	**1%**		**100%**

Note: Roadway segments and intersections (in the study area) that are not listed on this table do not have any reported collision data. In addition, no accidents resulting to fatalities were recorded within the study area.

TABLE 5

STATEWIDE AND ACTUAL ACCIDENT RATES COMPARISON

Roadway	Limits		NUMBER OF ACCIDENTS				ACTUAL RATES[1]			STATEWIDE AVERAGE RATES[1]		
	From	To	Fatalities	Injuries	Fatalities + Injuries	Total # of Accidents	Fatalities	Fatalities + Injuries	Total # of Accidents	Fatalities	Fatalities + Injuries	Total # of Accidents
Ramon Road	West of San Luis Rey Drive	San Luis Rey Drive	0	4	4	5	0.000	0.313	0.391	0.017	1.380	2.400
	At San Luis Rey Drive (in intersection)		0	12	12	19	0.000	12.473	19.748	0.002	0.190	0.430
	San Luis Rey Drive	Crossley Road	0	6	6	17	0.000	0.434	1.229	0.017	1.380	2.400
	At Crossley Road (in intersection)		0	15	15	23	0.000	21.382	32.785	0.002	0.190	0.430
	Crossley Road	Landau Boulevard	0	5	5	10	0.000	0.155	0.309	0.017	1.434	3.350
San Luis Rey Drive	North of Ramon Road	Ramon Road	0	0	0	3	0.000	0.000	0.475	0.018	0.797	2.050
	Ramon Road	South of Ramon Road	0	2	2	2	0.000	0.680	0.680	0.041	0.583	1.202
Crossley Road	Ramon Road	South of Ramon Road	0	5	5	5	0.000	1.254	1.254	0.017	1.434	3.350

shaded = actual rates > statewide average rates

[1]Rates are shown in "Accidents / Million Vehicle Miles"

TABLE 6

INTERIM YEAR (2019) CONDITIONS
INTERSECTION ANALYSIS SUMMARY

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	MD	PM	MD	PM
San Luis Rey (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes	TS	1.5	0.5	1	1.5	0.5	1	1	3	0	1	2	1	37.2	38.7	D	D
- With Crosse Pointe Improvements	TS	**2**	**1**	0	**2**	**1**	0	1	3	0	1	**3**	0	33.0	33.6	C	C
Crossley Road (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes	TS	0.5	0.5	1	1	1	0	1	2	1	1	2	d	33.7	31.4	C	C
- With Project Improvements	TS	**1.5**	0.5	**1>**	1	1	0	1	**3**	0	**2**	**3**	0	15.0	13.5	B	B
Landau Boulevard (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes [4]	TS	**1**	**1**	0	2	1	1	1	2	0	1	2	1	47.7	48.5	D	D
- With Project Improvements	TS	**1**	**1**	0	2	0.5	**1.5**	**2**	**3**	0	1	**3**	1	28.5	30.1	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes (greater than or equal to 19').

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; d = defacto right turn lane; 1! = Shared Left-Through-Right Turn Lane; **1** = New Lane / Improvement

[2] Delay and level of service calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

[3] TS = Traffic Signal

[4] Landau Boulevard, south of Ramon Boulevard currently does not exist and is part of the Project's improvement plan. However, this segment is assumed built to analyze 2019 with Existing Lanes conditions and account for the traffic volumes for this new roadway segment.

= Current improvement plans should be modified to include this improvement.

TABLE 7

INTERIM YEAR (2019) WITH PROJECT CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				MD	PM	MD	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL1	90	100	75	90	YES	YES
	NBL2	--[2]	125	98	122	YES	YES
	NBT/R	--[2]	175	169	145	YES	YES
	SBL1	126	100	82	86	YES	YES
	SBL2	--[2]	100	97	100	YES	YES
	SBT/R	--[2]	125	85	116	YES	YES
	EBL	180	50	47	42	YES	YES
	EBT1	--[2]	275	215	255	YES	YES
	EBT2	--[2]	275	219	255	YES	YES
	EBT/R	--[2]	275	250	268	YES	YES
	WBL	214	50	24	37	YES	YES
	WBT1	--[2]	225	222	173	YES	YES
	WBT2	--[2]	250	250	197	YES	YES
	WBT/R	--[2]	300	280	255	YES	YES
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL	100	50	42	35	YES	YES
	NBL/T	--[2]	100	76	71	YES	YES
	NBR	--[2]	150	71	134	YES	YES
	SBL	106	50	35	17	YES	YES
	SBT/R	--[2]	50	30	25	YES	YES
	EBL	165	75	70	16	YES	YES
	EBT1	--[2]	100	97	84	YES	YES
	EBT2	--[2]	125	102	86	YES	YES
	EBT/R	--[2]	125	114	124	YES	YES
	WBL1	350	100	96	56	YES	YES
	WBL2	350	125	105	69	YES	YES
	WBT1	--[2]	75	55	27	YES	YES
	WBT2	--[2]	75	75	54	YES	YES
	WBT/R	--[2]	100	86	72	YES	YES

TABLE 7

INTERIM YEAR (2019) WITH PROJECT CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable?[1]	Acceptable?[1]
				MD	PM	MD	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	NBL	160	50	33	29	YES	YES
	NBT/R	--[2]	100	69	81	YES	YES
	SBL1	243	100	85	70	YES	YES
	SBL2	--[2]	125	102	95	YES	YES
	SBT/R	--[2]	150	111	137	YES	YES
	SBR	105	100	81	93	YES	YES
	EBL1	450	175	107	168	YES	YES
	EBL2	450	200	121	188	YES	YES
	EBT1	--[2]	125	49	119	YES	YES
	EBT2	--[2]	150	87	150	YES	YES
	EBT/R	--[2]	225	117	212	YES	YES
	WBL	165	25	10	18	YES	YES
	WBT1	--[2]	200	194	182	YES	YES
	WBT2	--[2]	200	177	197	YES	YES
	WBT3	--[2]	225	187	201	YES	YES
	WBR	275	100	88	75	YES	YES

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

TABLE 8

INTERIM YEAR (2019) WITH PROJECT CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL1	90	150	141	132	NO	NO
	NBL2	--[2]	200	150	180	YES	YES
	NBT/R	--[2]	275	273	206	YES	YES
	SBL1	126	150	136	141	NO	NO
	SBL2	--[2]	175	164	161	YES	YES
	SBT/R	--[2]	200	179	195	YES	YES
	EBL	180	150	79	136	YES	YES
	EBT1	--[2]	350	308	347	YES	YES
	EBT2	--[2]	375	280	364	YES	YES
	EBT/R	--[2]	375	309	371	YES	YES
	WBL	214	100	54	84	YES	YES
	WBT1	--[2]	300	276	221	YES	YES
	WBT2	--[2]	325	315	254	YES	YES
	WBT/R	--[2]	375	355	296	YES	YES
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL	100	125	108	107	NO	NO
	NBL/T	--[2]	150	130	127	YES	YES
	NBR	--[2]	275	126	259	YES	YES
	SBL	106	100	76	48	YES	YES
	SBT/R	--[2]	75	53	40	YES	YES
	EBL	165	150	126	41	YES	YES
	EBT1	--[2]	200	168	179	YES	YES
	EBT2	--[2]	200	172	191	YES	YES
	EBT/R	--[2]	225	179	222	YES	YES
	WBL1	350	175	170	82	YES	YES
	WBL2	350	175	170	102	YES	YES
	WBT1	--[2]	150	134	94	YES	YES
	WBT2	--[2]	175	164	151	YES	YES
	WBT/R	--[2]	200	173	178	YES	YES

TABLE 8

INTERIM YEAR (2019) WITH PROJECT CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	NBL	160	75	70	75	YES	YES
	NBT/R	--[2]	175	103	168	YES	YES
	SBL1	243	150	130	93	YES	YES
	SBL2	--[2]	175	155	128	YES	YES
	SBT/R	--[2]	250	174	241	YES	YES
	SBR	105	175	145	154	**NO**	**NO**
	EBL1	450	300	227	279	YES	YES
	EBL2	450	300	233	299	YES	YES
	EBT1	--[2]	300	122	290	YES	YES
	EBT2	--[2]	350	197	344	YES	YES
	EBT/R	--[2]	400	254	398	YES	YES
	WBL	165	50	28	40	YES	YES
	WBT1	--[2]	325	320	218	YES	YES
	WBT2	--[2]	325	305	259	YES	YES
	WBT3	--[2]	300	288	253	YES	YES
	WBR	275	225	209	125	YES	YES

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

= 95th% deficiency

TABLE 9

DESIGN YEAR (2040) CONDITIONS
INTERSECTION ANALYSIS SUMMARY

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	MD	PM	MD	PM
San Luis Rey (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes	TS	1.5	0.5	1	1.5	0.5	1	1	3	0	1	2	1	46.8	--[4]	D	F
- With Crosse Pointe Improvements	TS	**2**	**1**	0	**2**	**1**	0	1	3	0	1	**3**	0	40.0	53.3	D	D
Crossley Road (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes	TS	0.5	0.5	1	1	1	0	1	2	1	1	2	d	--[4]	--[4]	F	F
- With Project Improvements	TS	**1.5**	0.5	**1>**	1	1	0	1	**3**	0	**2**	**3**	0	18.1	45.5	B	D
Landau Boulevard (NS) at:																	
• Ramon Road (EW)																	
- With Existing Lanes [5]	TS	**1**	**1**	0	2	1	1	1	2	0	1	2	1	--[4]	--[4]	F	F
- With Project Improvements	TS	**1**	**1**	0	2	0.5	**1.5**	**2**	**3**	0	1	**3**	1	36.9	41.8	D	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes (greater than or equal to 19').

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; d = defacto right turn lane; 1! = Shared Left-Through-Right Turn Lane; **1** = New Lane / Improvement

[2] Delay and level of service calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

[3] TS = Traffic Signal

[4] -- = V/C is greater than/equal to 1.00; Level of Service "F"

[5] Landau Boulevard, south of Ramon Boulevard currently does not exist and is part of the Project's improvement plan. However, this segment is assumed built to analyze 2040 with Existing Lanes conditions and account for the traffic volumes for this new roadway segment.

= Current improvement plans should be modified to include this improvement.

TABLE 10

DESIGN YEAR (2040) WITH PROJECT CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL1	90	100	96	66	**NO**	YES
	NBL2	--[2]	325	319	109	YES	YES
	NBT/R	--[2]	350	146	331	YES	YES
	SBL1	126	150	99	139	YES	**NO**
	SBL2	--[2]	250	120	240	YES	YES
	SBT/R	--[2]	200	96	178	YES	YES
	EBL	180	100	80	47	YES	YES
	EBT1	--[2]	450	347	449	YES	YES
	EBT2	--[2]	475	354	452	YES	YES
	EBT/R	--[2]	475	358	452	YES	YES
	WBL	214	50	37	42	YES	YES
	WBT1	--[2]	400	386	293	YES	YES
	WBT2	--[2]	450	444	334	YES	YES
	WBT/R	--[2]	475	471	380	YES	YES
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL	100	100	50	78	YES	YES
	NBL/T	--[2]	150	94	136	YES	YES
	NBR	--[2]	275	135	273	YES	YES
	SBL	106	50	26	31	YES	YES
	SBT/R	--[2]	25	23	15	YES	YES
	EBL	165	100	79	59	YES	YES
	EBT1	--[2]	800	112	778	YES	YES
	EBT2	--[2]	725	141	712	YES	YES
	EBT/R	--[2]	750	196	728	YES	YES
	WBL1	350	150	148	100	YES	YES
	WBL2	350	175	154	114	YES	YES
	WBT1	--[2]	200	189	153	YES	YES
	WBT2	--[2]	225	219	178	YES	YES
	WBT/R	--[2]	250	248	210	YES	YES

TABLE 10

DESIGN YEAR (2040) WITH PROJECT CONDITIONS
50TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 50th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	NBL	160	100	86	45	YES	YES
	NBT/R	--[2]	150	132	108	YES	YES
	SBL1	243	275	95	254	YES	**NO**
	SBL2	--[2]	375	108	371	YES	YES
	SBT/R	--[2]	275	268	219	YES	YES
	SBR	105	125	111	113	**NO**	**NO**
	EBL1	450	325	134	307	YES	YES
	EBL2	450	325	148	322	YES	YES
	EBT1	--[2]	250	234	236	YES	YES
	EBT2	--[2]	300	285	205	YES	YES
	EBT/R	--[2]	350	348	269	YES	YES
	WBL	165	75	41	57	YES	YES
	WBT1	--[2]	400	329	387	YES	YES
	WBT2	--[2]	375	353	372	YES	YES
	WBT3	--[2]	400	326	381	YES	YES
	WBR	275	275	117	260	YES	YES

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

= 50th% deficiency

TABLE 11

DESIGN YEAR (2040) WITH PROJECT CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
San Luis Rey (NS) at:							
• Ramon Road (EW)	NBL1	90	150	135	97	NO	NO
	NBL2	--[2]	575	556	194	YES	YES
	NBT/R	--[2]	500	246	497	YES	YES
	SBL1	126	175	157	161	NO	NO
	SBL2	--[2]	350	192	342	YES	YES
	SBT/R	--[2]	300	144	295	YES	YES
	EBL	180	200	190	83	NO	YES
	EBT1	--[2]	475	470	464	YES	YES
	EBT2	--[2]	475	465	457	YES	YES
	EBT/R	--[2]	475	470	461	YES	YES
	WBL	214	100	76	90	YES	YES
	WBT1	--[2]	550	542	376	YES	YES
	WBT2	--[2]	625	623	418	YES	YES
	WBT/R	--[2]	650	649	438	YES	YES
Crossley Road (NS) at:							
• Ramon Road (EW)	NBL	100	150	97	135	YES	NO
	NBL/T	--[2]	250	160	234	YES	YES
	NBR	--[2]	325	240	316	YES	YES
	SBL	106	100	71	82	YES	YES
	SBT/R	--[2]	75	51	41	YES	YES
	EBL	165	175	163	141	YES	YES
	EBT1	--[2]	975	177	953	YES	YES
	EBT2	--[2]	900	246	887	YES	YES
	EBT/R	--[2]	925	307	913	YES	YES
	WBL1	350	275	271	146	YES	YES
	WBL2	350	275	270	154	YES	YES
	WBT1	--[2]	300	290	210	YES	YES
	WBT2	--[2]	325	324	223	YES	YES
	WBT/R	--[2]	350	345	239	YES	YES

TABLE 11

DESIGN YEAR (2040) WITH PROJECT CONDITIONS
95TH PERCENTILE INTERSECTION QUEUING ANALYSIS SUMMARY[3]

Intersection	Movement	Existing / Proposed Storage Length (Feet)	Minimum Required 95th% Storage Length (Feet)[3]	Queue Length Per Lane (Feet)		Acceptable? [1]	Acceptable? [1]
				AM	PM	AM	PM
Landau Boulevard (NS) at:							
• Ramon Road (EW)	NBL	160	150	138	94	YES	YES
	NBT/R	--[2]	225	203	191	YES	YES
	SBL1	243	300	145	284	YES	**NO**
	SBL2	--[2]	400	149	386	YES	YES
	SBT/R	--[2]	450	435	358	YES	YES
	SBR	105	175	162	163	**NO**	**NO**
	EBL1	450	450	217	444	YES	YES
	EBL2	450	450	228	444	YES	YES
	EBT1	--[2]	600	366	584	YES	YES
	EBT2	--[2]	425	418	361	YES	YES
	EBT/R	--[2]	450	435	440	YES	YES
	WBL	165	175	124	170	YES	**NO**
	WBT1	--[2]	500	426	482	YES	YES
	WBT2	--[2]	475	462	429	YES	YES
	WBT3	--[2]	500	467	478	YES	YES
	WBR	275	400	274	386	YES	**NO**

[1] Stacking distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided.

[2] -- = Existing storage length is the internal link distance to upstream intersection

[3] Queuing requirements calculated using the following analysis software: Synchro (Version 7) plus SimTraffic 7

= also 50th% and 95% deficiency

= 95th% deficiency