City/County Association of Governments of San Mateo County

2023 CMP Monitoring Report

San Mateo County, California

Draft Report

September 11, 2023

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EXECUTIVE SUMMARY

US-101 during peak hour conditions

San Mateo County maintains a Congestion Management Program (CMP) through the City/County Association of Governments of San Mateo County (C/CAG), the designated Congestion Management Agency (CMA), as required by the California Government Code 65089. C/CAG is also required to monitor the implementation of all elements of the CMP and prepare a monitoring report every other year. This report fulfils the biennial monitoring task as required by the State. This 2023 CMP Monitoring Report provides an insight into the performance of various freeways, multilane highways, two-lane highways, arterials and intersections throughout the County, and assists with key decisions on future investment of transportation dollars.

CMP and Companion Monitoring Network

C/CAG established the CMP Network in 1991 that included all state highways and principal arterials in the County. In total, the 464.7 directional miles of the CMP network includes 301.4 miles of arterials/highways and 163.3 miles of freeways. The CMP network also includes 16 arterial intersections. Each CMP segment and intersection has an adopted LOS standard, discussed further in Chapter 1. This CMP monitoring effort also includes the Companion Monitoring Network (Companion Network), which grew out of a desire to see additional locations monitored besides the CMP network. There are a total of 10 roadway segments and 17 intersections in this network. This network is not subject to the standards and are monitored for information only.

Data Collection and Congestion Analysis

The biennial monitoring task requires extensive data collection for all established CMP and Companion Network segments and intersections included in the network. With changing needs and technological advancements, the data collection methodology has evolved over the last three decades since the first CMP was adopted.
In order to collect accurate and useful data that is consistent with prior monitoring efforts, certain data collection methods were followed. The data was collected during May 2023 only on normal commute travel days (i.e.

Tuesdays, Wednesday, and Thursdays), while non-school days and days with any special events or incidents were eliminated. Available commercial speed data, 72-hour traffic counts, turning movement counts, and floating car surveys were utilized for the analysis. The commercial speed data was analyzed to obtain average speeds for each freeway segment and convert to LOS using Highway Capacity Manual (HCM) 1994 methodologies. Arterials and highways were monitored using 72-hour traffic counts and turning movement counts which were used to calculate a volume/capacity (V/C) ratio and assign the LOS based on HCM 1994 procedures. Intersections were modeled in Synchro using either HCM 2010 or 2000 methodology. Further discussion on data collection efforts is included in Chapter 2.

Monitoring Results

A total of 53 roadway segments and 16 intersections were monitored in this report during the AM and PM peak periods. The worst case direction was chosen as the official LOS, and a summary of these monitoring results are provided in **Table 1.**

Table 1: 2023 CMP Network Monitoring Results

Roadway Type	# of CMP Segments	Before Interregional Exemption		After Interregional Exemption	
		LOS Standard Met	LOS Standard Not Met	LOS Standard Met	LOS Standard Not Met
Arterials	27	26	1	27	0
Multilane Highways	1	0	1	1	0
Two-Lane Highways	9	9	0	9	0
Freeways	16	6	10	16	0
Intersections	16	15	1	16	0
TOTAL	**69**	**56**	**13**	**69**	**0**

In the 2023 Monitoring Cycle, one arterial segment, one multi-lane highway segment, ten freeway segments and one intersection falls below the LOS standard prior to the interregional exemption. However, all roadway segments met the LOS standard after interregional exemptions.

Multi-Modal Performance Measures

C/CAG monitors four multi-modal performance measures: LOS, multi-modal travel times, bicycle and pedestrian counts, and transit ridership/person throughput. LOS results are provided in Chapter 3. Multi-modal travel times along the US-101 corridor are reported with each biannual CMP monitoring effort. Travel times are measured from county line to county line on US-101 for four modes: single occupancy vehicle, HOV lane, Caltrain, and SamTrans. Travel times improved for vehicles in the HOV lane due to the 16 mile extension of HOV lane on I-101. Single occupant travel times increased significantly compared to 2021, but are the same or less than 2019 travel times. Caltrain travel times decreased slightly from 2021, while SamTrans travel times decreased except for the southbound direction during the PM peak period.

Bicycle/pedestrian planning efforts and counts with historical comparisons are summarized in this section, as is transit ridership for SamTrans, BART, and Caltrain. Overall, all three agencies have seen ridership increase since the pandemic decline as measured in FY 21. However, the increase is still significantly short of the ridership volume measured pre-pandemic in FY 19. This indicates that transit ridership is slowly recovering and still has more growth to return to pre-pandemic levels.

CHAPTER 1: INTRODUCTION

C/CAG has an established CMP to monitor the transportation network within the county. All roadways included in the CMP network are evaluated for conformity at least every two years by the agency, which is the designated CMA for San Mateo County. The goal of the monitoring program is to improve the performance of the transportation system by identifying congested areas and related transportation deficiencies. This information is then used to help prioritize transportation funding decisions in light of system performance, land use factors, multimodal characteristics, and other considerations.

CMP Intersection SR-82 at Whipple Avenue in Redwood City

Biennial monitoring provides an opportunity to monitor established LOS standards for the arterial, highway, and freeway segments, and identify appropriate strategies to employ when a segment fails to meet the established LOS standards. While the CMP is very critical to San Mateo County's transportation vision, it also supports the broader transportation goals of the Regional Transportation Plan (RTP) developed by the Metropolitan Transportation Commission (MTC), the San Francisco Bay Area's regional transportation planning agency. The San Mateo CMP roadway system is consistent with the RTP, as well as the CMPs of adjoining San Francisco, Alameda, and Santa Clara counties.

1.1: Designated CMP Network

Per state statute, all state highways are included in the CMP network. The current San Mateo County CMP network includes approximately 464.7 directional miles of freeways and arterials, as well as 16 highway and arterial intersections. The segments and intersections are summarized below in **Tables 2** and **3**, and mapped in **Figure 1**.

Table 2: CMP Network Segments

Route	From	To	Facility Type
SR-1	San Francisco County Line	Linda Mar Blvd	Multi-Lane Highway
SR-1	Linda Mar Blvd	Frenchmans Creek Rd	Two-Lane Highway
SR-1	Frenchmans Creek Rd	Miramontes Rd	Two-Lane Highway
SR-1	Miramontes Rd	Santa Cruz County Line	Two-Lane Highway
SR-35	San Francisco County Line	Sneath Ln	Arterial
SR-35	Sneath Ln	I-280	Arterial
SR-35	I-280	SR-92	Two-Lane Highway
SR-35	SR-92	SR-84	Two-Lane Highway
SR-35	SR-84	Santa Clara County Line	Two-Lane Highway
SR-82	San Francisco County Line	John Daly Blvd	Arterial
SR-82	John Daly Blvd	Hickey Blvd	Arterial
SR-82	Hickey Blvd	I-380	Arterial
SR-82	I-380	Trousdale Dr	Arterial
SR-82	Trousdale Dr	3rd Ave	Arterial
SR-82	3rd Ave	SR-92	Arterial
SR-82	SR-92	Hillsdale Ave	Arterial
SR-82	Hillsdale Ave	42nd Ave	Arterial
SR-82	42nd Ave	Holly St	Arterial
SR-82	Holly St	Whipple Ave	Arterial
SR-82	Whipple Ave	SR-84	Arterial
SR-82	SR-84	Glenwood Ave	Arterial
SR-82	Glenwood Ave	Santa Cruz Ave	Arterial
SR-82	Santa Cruz Ave	Santa Clara County Line	Arterial
SR-84	SR-1	Portola Rd	Two-Lane Highway
SR-84	Portola Rd	I-280	Two-Lane Highway
SR-84	I-280	Alameda de las Pulgas	Arterial
SR-84	Alameda de las Pulgas	US-101	Arterial
SR-84	US-101	Willow Rd	Arterial
SR-84	Willow Rd	University Ave	Arterial
SR-84	University Ave	Alameda County Line	Arterial
SR-92	SR-1	I-280	Two-Lane Highway
SR-92	I-280	US-101	Freeway
SR-92	US-101	Alameda County Line	Freeway
US-101	San Francisco County Line	I-380	Freeway
US-101	I-380	Millbrae Ave	Freeway

Route	From	To	Facility Type
US-101	Millbrae Ave	Broadway	Freeway
US-101	Broadway	Peninsula Ave	Freeway
US-101	Peninsula Ave	SR-92	Freeway
US-101	SR-92	Whipple Ave	Freeway
US-101	Whipple Ave	Santa Clara County Line	Freeway
SR-109	Kavanaugh Dr	SR-84	Arterial
SR-114	US-101	SR-84	Arterial
I-280	San Francisco County Line	SR-1 (North)	Freeway
I-280	SR-1 (North)	SR-1 (South)	Freeway
I-280	SR-1 (South)	San Bruno Ave	Freeway
I-280	San Bruno Ave	SR-92	Freeway
I-280	SR-92	SR-84	Freeway
I-280	SR-84	Santa Clara County Line	Freeway
I-380	I-280	US-101	Freeway
I-380	US-101	Airport Access Rd	Arterial
Mission St	San Francisco County Line	SR-82	Arterial
Geneva Ave	San Francisco County Line	Bayshore Blvd	Arterial
Bayshore Blvd	San Francisco County Line	Geneva Ave	Arterial

Table 3: CMP Network Intersections

ID	Jurisdiction	Intersection
1	Daly City/Brisbane	Bayshore Blvd/Geneva Ave
2	Daly City	SR-35/John Daly Blvd
3	Daly City	SR-82/Hillside Blvd/John Daly Blvd
4	San Bruno	SR-82/San Bruno Ave
5	Millbrae	SR-82/Millbrae Ave
6	Burlingame	SR-82/Broadway
7	Burlingame/San Mateo	SR-82/Peninsula Ave/Park Rd
8	Belmont	SR-82/Ralston Ave
9	San Carlos	SR-82/Holly St
10	Redwood City	SR-82/Whipple Ave
11	Menlo Park	University Ave/SR-84
12	Menlo Park	Willow Rd/SR-84
13	Menlo Park	Marsh Rd/SR-84
14	Redwood City	Middlefield Rd/SR-84
15	Half Moon Bay	SR-1/SR-92
16	Half Moon Bay	SR-92/Main St

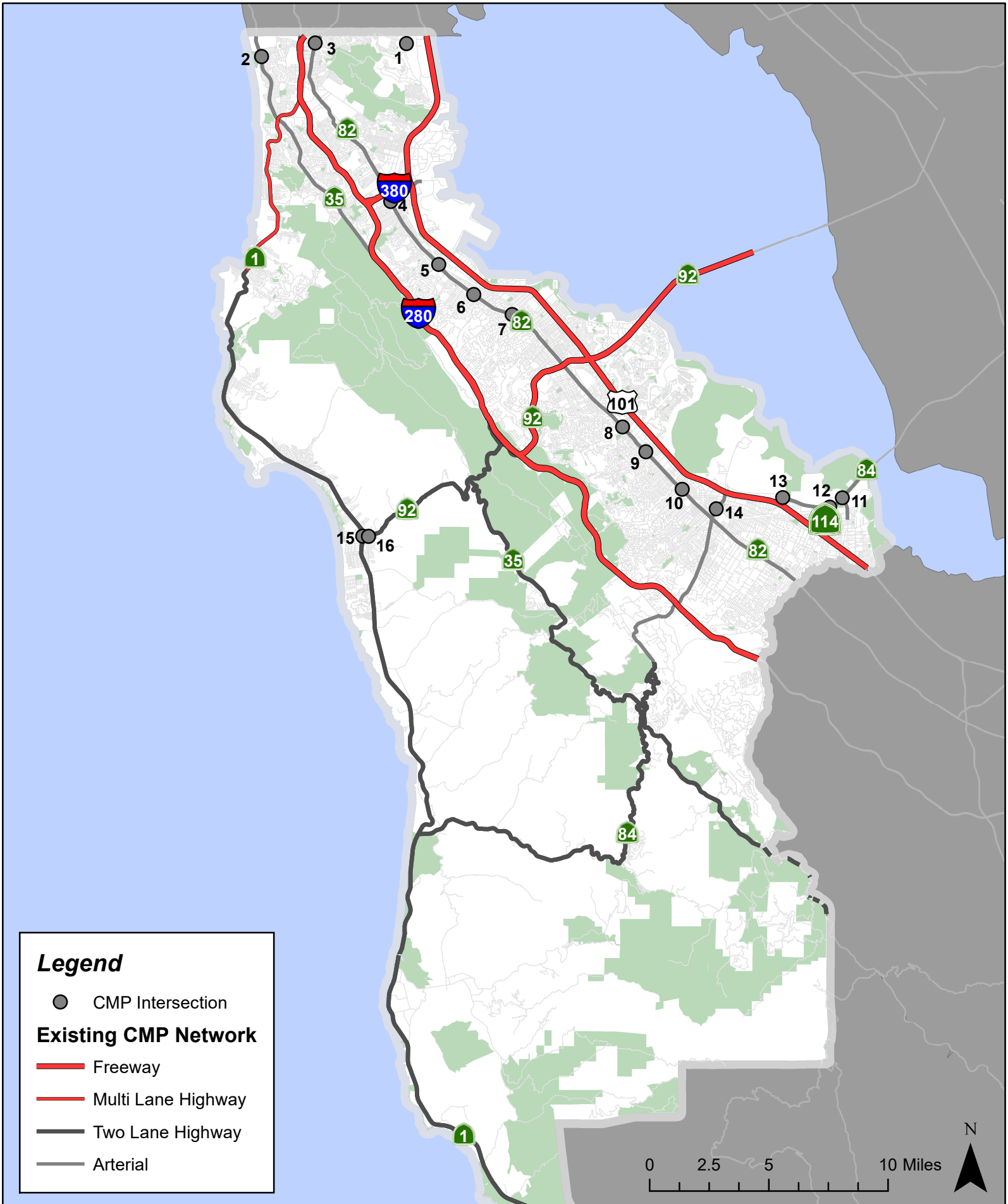

FIGURE 1

EXISTING CMP NETWORK

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1.2: Companion Network

John Daly Boulevard in Daly City looking west from SR-82; one of the Companion Network segments

The 2023 CMP Update continues with the monitoring of the Companion Network which was developed for the 2021 CMP Update. C/CAG staff developed a new Companion Network alongside the CMP network, including ten roadway segments and 17 intersections. The purpose of this network is to monitor congestion in other areas of the county that may not be on the CMP network, such as local arterial roadways. The Companion Network includes roadway segments other than freeways and state routes (as these are already in the CMP network), however, intersections with state routes as the major street may be included as part of the Companion Network so long as they are not an existing CMP intersection. These locations are monitored for informational purposes.

The criteria used to select the Companion Network focused on roadway classification/function, past collision history, bicycle Level of traffic stress, facilities that were identified in local city/county plans, and locations that connected to existing CMP segments that had a failing LOS in 2019.

The Companion Network is detailed in **Tables 4** and **5**, and mapped in **Figure 2**.

Table 4: CMP Companion Network Intersections

#	Jurisdiction	Intersection
17	San Mateo	SR-82/3rd Ave
18	Unincorporated San Mateo County	Skyline Blvd (SR-35)/SR-92
19	San Carlos	Holly St/Industrial Rd
20	Redwood City	Whipple Ave/Veterans Blvd
21	Atherton	Middlefield Rd/Marsh Rd
22	Menlo Park	Sand Hill Rd/Santa Cruz Ave
23	East Palo Alto	Bay Rd/University Ave
24	Woodside/Redwood City	SR-84/Alameda de las Pulgas
25	Portola Valley	Alpine Rd/Portola Rd
26	Unincorporated San Mateo County	SR-35/SR-92
27	Colma	El Camino Real (SR-82)/Mission Rd
28	Half Moon Bay	SR-1/Main St
29	South San Francisco	El Camino Real (SR-82)/Westborough Blvd
30	Unincorporated San Mateo County (El Granada/Coastside)	SR-1/Capistrano Blvd
31	Unincorporated San Mateo County (SFO Airport)	S. Airport Blvd/San Bruno Ave
32	Pacifica	SR-1/Reina del Mar Ave
33	Unincorporated San Mateo County (Moss Beach/Coastside)	SR-1/Cypress Ave

Table 5: CMP Companion Network Roadway Segments

ID	Jurisdiction	Name	Extent
R1	Belmont	Ralston Avenue	US-101 to Alameda de las Pulgas
R2	Unincorporated San Mateo County (North Fair Oaks), Atherton, Redwood City	Middlefield Road	SR-84 to Marsh Rd
R3	Burlingame	California Drive	Broadway to Peninsula Ave
R4	Brisbane	Bayshore Boulevard	Geneva Ave to US-101 NB Off-Ramp
R5	Daly City	John Daly Boulevard	SR-35 to Mission St
R6	Foster City	Foster City Boulevard	E. 3rd Ave to Beach Park Blvd
R7	Hillsborough	Chateau Drive/Ralston Avenue	I-280 to El Camino Real
R8	Millbrae	Millbrae Avenue	SR-82 to Old Bayshore Hwy
R9	Pacifica	Sharp Park Boulevard	SR-1 to SR-35
R10	San Bruno	Sneath Lane	SR-35 to Huntington Ave

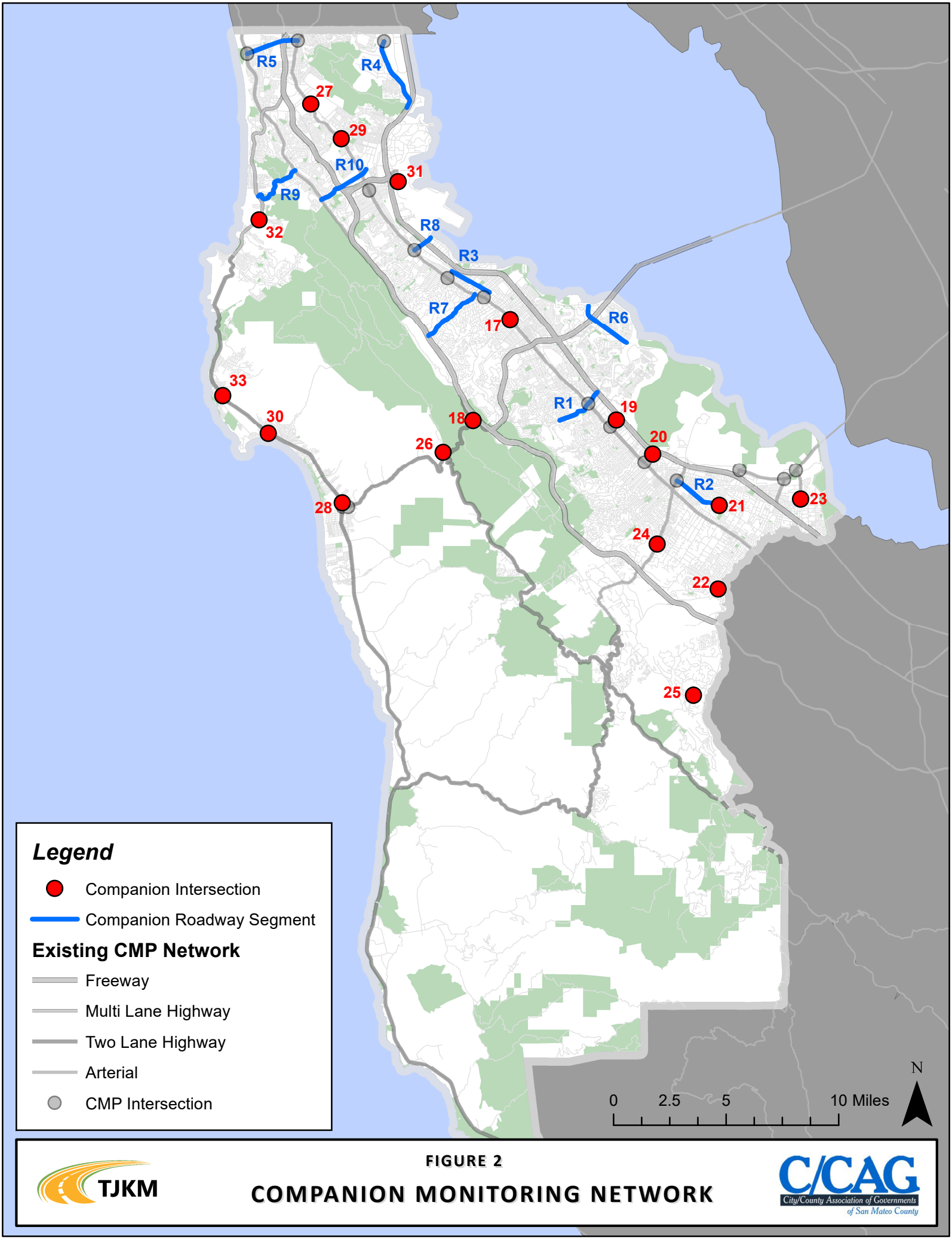

FIGURE 2

COMPANION MONITORING NETWORK

1.3: Level of Service Standards

Level of service (LOS) is a qualitative term used to describe a roadway's operating condition. The LOS of a road or street is designated by a letter grade ranging from A to F, with LOS A representing free-flow conditions with little or no delay and LOS F representing forced flow with excessive delays. California Government Code Sections 65089.1 (A) and (B) requires that LOS standards be established by, in this case, C/CAG for the roadways and intersections designated to be in the CMP Roadway System. Furthermore, roadway levels of service (LOS) are to be measured by methods described in one of the following documents: The Transportation Research Board's *Circular 212,* the latest version of the HCM, or a uniform methodology adopted by the CMA that is consistent with the HCM. An explanation of the various levels of service is shown below in **Table 6.**

Table 6: LOS Definitions

LOS Level	Description
A	Free-flow conditions with unimpeded maneuverability.
B	Reasonably unimpeded operations with slightly restricted maneuverability.
C	Stable operations with somewhat more restrictions. Motorists will experience appreciable tension while driving.
D	Approaching unstable operations where small increases in volume produce substantial increases in delay and decreases in speed.
E	Unstable flow at or near capacity levels with poor levels of comfort and convenience.
F	Forced traffic flow in which the amount of traffic approaching a point exceeds the amount that can be served. Characterized by stop-and-go waves and poor travel times.

Sources: San Mateo CCAG Traffic LOS Calculation Methods, Highway Capacity Manual

The CMP legislation stipulates that the CMP's LOS standards can be set at any LOS - A through F. However, only roadway segments or intersections operating at LOS F when the CMP network was established may have a LOS F standard set for them. The LOS standards established for San Mateo County vary by roadway segment. By adopting LOS standards based on geographic differences, C/CAG signaled that it intends to use the CMP process to prevent future congestion levels in San Mateo County from getting worse than currently anticipated. At the same time, the variations in LOS standards by geographic area conform to current land use plans and development differences between the Coastside and Bayside, between older downtowns near Caltrain stations and other areas of San Mateo County.

Based on data collected during the 1991 CMP monitoring process, the following LOS standards were selected for the roadway segments:

- If the existing (1990/91) LOS was F, then the standard was set to be LOS F.
- If the existing or future LOS was or will be E, then the standard was set to be LOS E.
- The standard for roadway segments near the San Francisco, Santa Clara, and Alameda County borders, with one exception,[1] was set to be LOS E to be consistent with the recommendations in those counties' 1991 CMPs. (This standard would apply unless those roadway segments were already operating at LOS F.)
- On SR-82 (El Camino Real), the standard was set to be LOS E.
- For the remaining roadway segments, the standard was set to be one letter designation worse than the LOS projected for the year 2000.

Intersection LOS standards were selected based on the following considerations:

- If the existing (1990/91) LOS is F, then the standard is set to be LOS F.
- If the existing or future LOS is or will be E, then the standard is also set to be E.
- The standard of the intersections near the San Francisco, Santa Clara, and Alameda Counties will be LOS E to be consistent with the LOS standards adopted in those counties.
- On SR-82 (El Camino Real), the standard is set to be LOS E to be consistent with the roadway segment standards.
- For the remaining intersections, the standard is set to be LOS E to correspond to the standard established for the adjacent roadway segment. (All the segments on which these intersections are located have standards set to LOS E).
- Note that as the Companion Network is not part of the CMP network, it does not have an established LOS standard and is monitored for informational purposes only. CMP and Companion Network locations monitored on weekends similarly have no adopted LOS standard and are also monitored for informational purposes only.
- The LOS standards for roadway segments and intersections is mapped below in **Figure 3**.

[1]For I-280 south of SR 84, the adopted standard is LOS D.

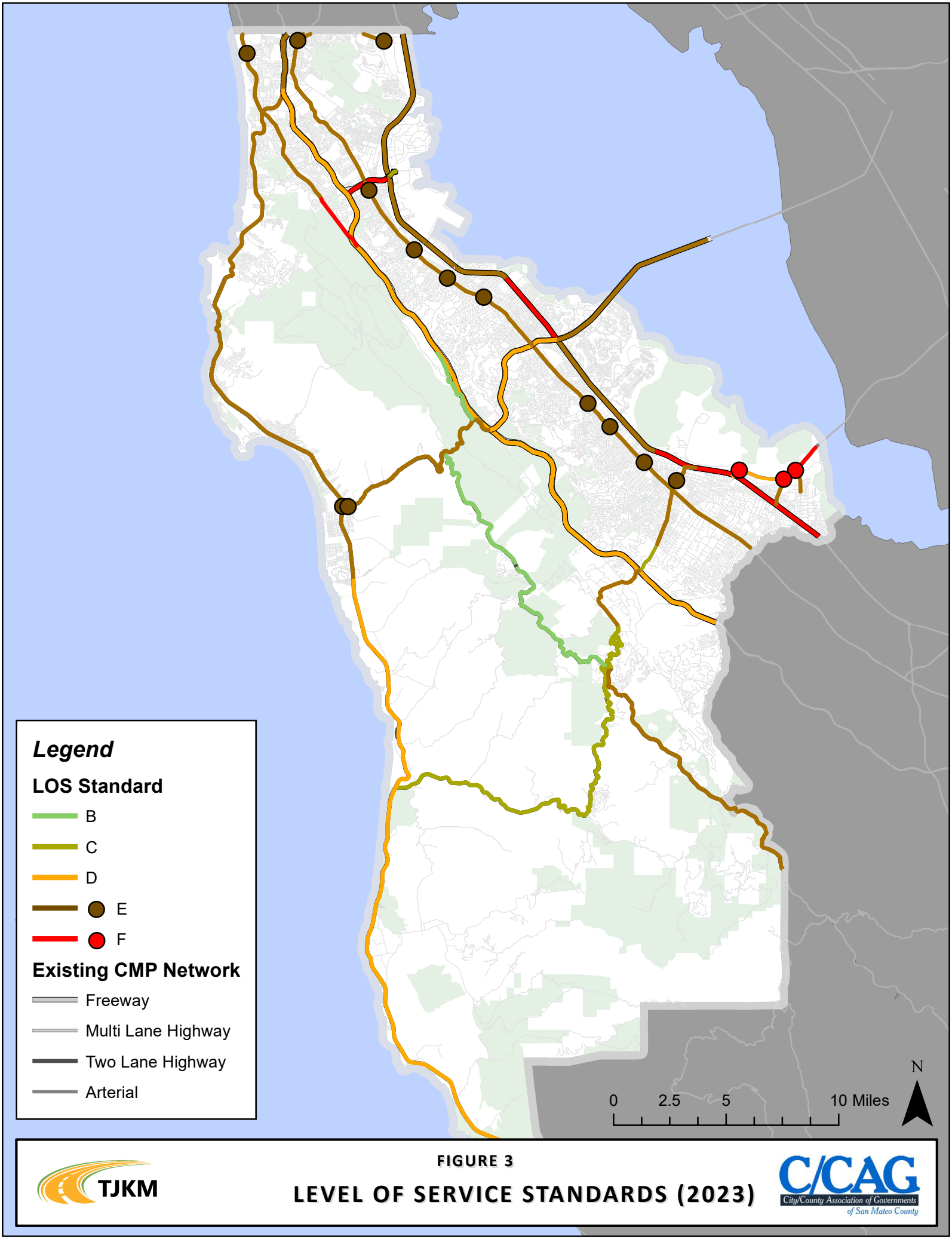

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FIGURE 3

LEVEL OF SERVICE STANDARDS (2023)

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CHAPTER 2: STUDY METHODOLOGY

CMP Intersection of SR-92 and Main Street in Half Moon Bay

This section discusses the methodology utilized for measuring LOS on freeways, multi-lane highways, two-lane highways, arterials, and intersections throughout San Mateo County. The process begins with screening days within the monitoring period to ensure that only those expected to result in normal commuter traffic conditions are retained. Days that could produce lighter or heavier than usual traffic conditions, such as public holidays or special event days, were identified for removal.

2.1: Data Collection

This year's monitoring study was conducted in May 2023 on mid-week days (Tuesday-Thursday) during the AM (7:00 AM – 9:00 PM) and PM (4:00 PM – 6:00 PM) peak periods. Note that in monitoring efforts prior to 2021, the PM peak period was listed as 4:00 PM – 7:00 PM; however, in practice the actual peak period used varied across locations. In order to ensure uniformity, the PM peak period was set to 4pm-6pm across all locations and methodologies.

The CMP data collection takes place under normal traffic conditions, including clear weather conditions and not during special events or holidays. It is unknown when or even if traffic conditions/patterns will return to pre-pandemic levels. This CMP will identify how traffic has changed compared to pandemic levels during the 2021 CMP Monitoring Report as well as compared to pre-pandemic levels during the 2019 CMP Monitoring Report.

This section describes the type of data used and their collection methods.

Travel Speed Data

This LOS Monitoring Study used the commercial speed data from INRIX for all freeways in San Mateo County. INRIX aggregates traffic data from GPS-enabled vehicles and mobile devices, traditional road sensors and hundreds of other sources.

Once collected from the INRIX database, the commercial speed data points will be associated with the appropriate CMP segment. Once reduced, the data will be averaged on each segment to determine the average speed for all selected data points. Only data points derived from observed, real-time sources will be used. The data will then be processed to present average speed and travel time on each CMP segment during the AM and PM peak periods.

72-Hour Traffic Counts

Two-lane highways and arterial segments are primarily monitored using data from 72-hour traffic counts, which are performed using pneumatic tubes that are laid in the road. The tubes record volumes, speeds, and vehicle classifications in each direction during the specified count period. These counts were conducted by TJKM and IDAX Data Solutions at 25 CMP locations and 10 Companion Network locations countywide. At four CMP locations on the Coastside (three on SR-1 and one on SR-92), these counts were also conducted on a Saturday and Sunday to provide weekend monitoring of tourist traffic.

Intersection Turning Movement Counts

Turning movement counts (TMCs) record the total volume of vehicles, bicycles, and pedestrians that pass through an intersection observed periods. Typically, the data is recorded showing how many cars make each possible movement (left turn, proceed straight, right turn, etc.) as they approach the intersection from each direction. Bicycles are recorded in a similar manner, while pedestrians are recorded by how many use the crosswalk on each leg of the intersection. TMCs were conducted at 16 CMP intersections and 17 Companion Network intersections during the AM and PM peak period. At eight of the locations on the Coastside (two CMP and six Companion Network), TMCs were conducted on a Saturday during the AM, Mid-Day (11:00 AM – 1:00 PM), and PM peak periods.

HOV Lane Floating Car Survey

Floating car surveys are a method by which average speed and travel time can be measured along a defined roadway segment. As INRIX does not separate out High Occupancy Vehicle (HOV) lanes in their data, floating car surveys were conducted in the US-101 HOV lane from the Santa Clara County Line to Grand Avenue. The surveys

were completed using GPS technology to determine the travel time between the start and end of the segment. A minimum of five surveys were completed for each peak period and in each direction of travel.

Transit Ridership and Schedule Data

As part of the multi-modal performance element, transit ridership for all three major transit agencies serving San Mateo County (BART, Caltrain, and SamTrans) was collected for FY 23. Total ridership and average weekday ridership was reported. Transit schedules for Caltrain and SamTrans applicable during the monitoring period (April-May 2023), were obtained to calculate multi-modal travel times along the US-101 corridor.

Caltrans PeMS Data

To conduct an assessment of travel time reliability along San Mateo County freeway corridors, travel time index data was obtained from Caltrans Performance Monitoring System (PeMS).

2.2: LOS Methodology

All freeway segments in the network were monitored using the INRIX travel time data, which allows for determination of LOS on the basis of average operating speed. C/CAG primarily uses the 1994 and 2010 HCM methodology to monitor LOS on the CMP network. The specific methodologies used for monitoring freeway and arterial segments are listed below per HCM definitions:

Freeway and Multilane Highway Segments (HCM 1994 - Chapter 3) – All freeway and multilane highway segments were evaluated using the "basic freeway sections" and "multilane highways" methodology of HCM 1994 where the LOS for each freeway segment was determined using its average travel speed. Travel speed data was pulled from INRIX for April-May 2023, discussed above in Section 2.1. The routes that fall into this classification include:

- SR-1 from San Francisco County Line to Linda Mar Avenue
- SR-92 from I-280 to Alameda County Line
- US-101
- I-280
- I-380[2]

[2] Although travel speed data is used to determine LOS on all segments of I-380, one segment (US-101 to Airport Access Road) is classified as an Arterial and as such the "Arterial" criteria in HCM 1994 is used.

Two-Lane and Arterial Segments (HCM 1994 – Chapters 7, 8, and 11) – All non-freeway surface street segments were evaluated based on the volume to capacity ratio (V/C) dependent on the local free-flow speed, cross-section, number of lanes, % no-passing zones, and functional class.

Two-lane highways and arterials were evaluated primarily based on the current volumes as measured through 72-hour traffic counts at 35 CMP and Companion Network locations and turning movement counts at 10 locations throughout the county. These counts and resulting V/C were then compared to the applicable criteria in the HCM 1994 to determine the respective LOS. Companion Network segments were monitored using the same methodology as the CMP network.

The routes that fall into this classification include:

- SR-1 (south of Linda Mar Avenue)
- SR-35
- SR-82
- SR-84
- SR-92 (from SR-1 to I-280)
- SR-109
- SR-114
- Mission Street
- Geneva Avenue
- Bayshore Boulevard

Intersections – Turning movement counts were conducted at each CMP and Companion Network intersection during the AM and PM peak periods (for intersections that were analyzed on Saturday, mid-day peak period was also collected). These were modeled in Synchro and used the HCM 2010 methodology. Where intersection parameters did not allow the use of HCM 2010 in Synchro (one example is split signal phasing), HCM 2000 was used. The applicable methodology used is noted in the LOS results tables for intersections.

Figure 4 maps the CMP network with the applicable LOS methodology used. Detailed explanations of the LOS methodologies used is included in **Appendix B**.

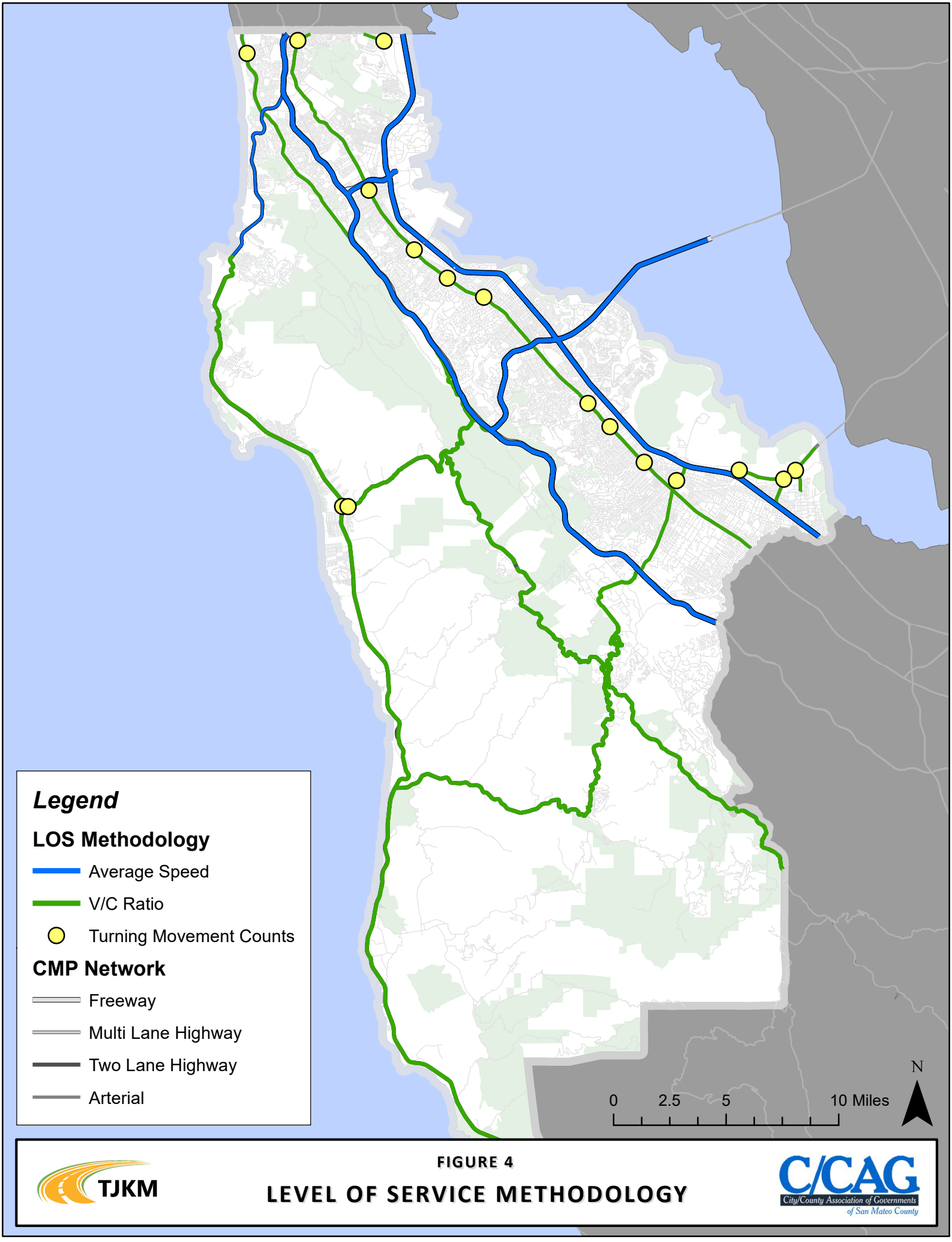

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FIGURE 4

LEVEL OF SERVICE METHODOLOGY

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2.3: Data Analysis

As has been previously mentioned, C/CAG uses three methodologies for monitoring the CMP and Companion Network in San Mateo County: Average Speed, V/C Ratio, and Turning Movement Counts. The methodology to analyze each is described below.

Average Speed – Commercial Speed Data (INRIX)

Once collected from the INRIX database, the commercial speed data points filtered to ensure a high quality data sample. Three grades (10, 20, or 30) are associated with INRIX data, with a grade of 10 representing low quality, historical speed data, 30 representing high-quality probe data, and 20 representing a mixture of the two. The collected datasets were graded and then filtered to ensure only grade 30 INRIX data was used in the analysis. The data was then associated with the appropriate CMP segment. Once reduced, the travel time data was extracted for each segment in seconds. This was then converted to an hour metric, and divided by the length of the INRIX segment, producing an average speed for the segment. This average speed was then compared against HCM 1994 methodologies to report the appropriate LOS. This methodology is consistent with past monitoring efforts. LOS is reported for both directions, however, only the worst case direction is listed. The official result is the worst case LOS between the AM and PM peak period.

Volume/Capacity Ratio

V/C ratios are used to calculate LOS on two-lane highway and arterial CMP and Companion Network segments. These ratios are calculated based on 72-hour traffic counts taken at 25 CMP locations and 10 Companion Network locations. Once the data had been received and quality checks had been performed on the data collected, the highest one hour traffic volume was calculated for each peak period in each direction across all three days. Consistent with past monitoring efforts, the highest one hour in each peak period and each direction across these three hours was selected as the official volume per hour to calculate the V/C ratio. On 10 segments, 72-hour counts were not conducted instead turning movement counts from intersections on that applicable segment were used. To extract the volumes, all movements approaching to moving away from the intersection in a certain direction during the intersection's peak one hour of traffic, were combined to form the official volume. For example, if volumes from north of an intersection were used, then the SBL, SBT, and SBR movements were used for southbound volumes, while NBT, WBL, and EBR movements were used for northbound movements. For arterials, LOS is reported for both directions, however, only the worst case direction is listed. Two-lane highways are reported as bi-directional LOS. The official result is the worst case LOS between the AM and PM peak period.

Consistent with past monitoring efforts and HCM methodology, the capacity of each segment was assumed to be 1,100 vehicles per lane, per hour; with the exception of two-lane highways, where the capacity was assumed to be 2,800 vehicles per hour in both directions combined. For arterials, the subsequent V/C was compared to the "Arterials" criteria under HCM 1994 to assign the appropriate LOS. For two-lane highways, two additional inputs are required: terrain (level, rolling, or mountainous), and percent no passing. These are used to find the correct criteria under HCM 1994 and assign the correct LOS.

Intersections

16 CMP intersections and 17 Companion Network intersections were analyzed as part of the 2023 LOS Monitoring. The performance measure for intersections is LOS, but different from freeways and highways, the HCM 2010 was used to determine the LOS (Note: where signal timing parameters prevented Synchro from using HCM 2010, HCM 2000 was used). Turning movement counts were collected for each intersection on a weekday during the AM and PM peak periods and modeled in Synchro. For eight Coastside intersections, counts were also conducted on a Saturday in the AM, Mid-Day (11am-1pm) and PM peak periods. In addition to turning movement counts, pedestrian and bike counts were collected. The intersections were analyzed as if they were isolated (not coordinated or part of a signal system) and optimized given the current geometry. The modeled results provide an estimate of the optimized LOS and may not represent the actual conditions if the intersection is either using less than optimal phasing, splits or cycle length. TJKM updated the Synchro file from past CMP monitoring years to more accurately reflect current signal parameters and intersection controls observed out in field (for one example, changing a Permissive + Protected left turn to a Protected left turn if it was observed in current conditions). This modification in signal control changes the operation of the intersection in field and hence to reflect the current conditions this change was also modeled in Synchro. As such, the LOS at some intersections may be higher or lower than in previous years due to these changes.

CHAPTER 3: LOS MONITORING RESULTS

3.1: 2023 LOS Monitoring Results

This chapter discusses the 2023 LOS monitoring results for roadway segments and intersections based on the data collected for the project during May 2023. Recovery from the COVID-19 pandemic has seen an increase closer to pre-pandemic levels in traffic across San Mateo County. This is evidenced by the fact that in 2021 only five roadway segments were failing before interregional exemptions compared to 14 pre-exemption failing segments in 2023 (all of which improved to an acceptable LOS after interregional exemptions). However, these 14 failing segments in 2023 does not reflect the same level of traffic congestion compared to pre-pandemic conditions since there were 19 segments that were failing in 2019.

There were no significant changes in intersection LOS as 2023, 2021 and 2019 each had one intersection which was failing, but improved to an acceptable LOS after interregional reductions.

The Companion Network includes 10 roadway segments and 17 intersections beyond the CMP network countywide. Additionally, weekend LOS monitoring is conducted at select locations on the Coastside. The Companion Network was designated in 2021 out of a desire to see additional locations monitored countywide which are not included in the CMP network. Weekend monitoring is done at select Coastside locations due to the high amounts of weekend tourist traffic experienced at these locations (causing traffic levels oftentimes greater than experienced on weekdays). These are presented alongside the CMP LOS monitoring results for informational purposes only.

Tables 7 and 8 list out the reported worst case direction LOS for each roadway segment on the CMP and Companion Networks. The CMP segments are then mapped in **Figure 5** (AM Peak Period) and **Figure 6** (PM Peak Period), while the Companion Network segments are mapped in **Figure 7** (AM Peak Period) and **Figure 8** (PM Peak Period). CMP and Companion Network intersection LOS is reported in **Tables 8** and **9**, and mapped in **Figure 9** (CMP AM), **Figure 10** (CMP PM), **Figure 11** (Companion Network AM), and **Figure 12** (Companion Network PM). Weekend LOS is reported in **Tables 10** and **11**, and mapped in **Figure 13** (AM), **Figure 14** (Mid-Day)**, and Figure 15** (PM). Lastly, roadway segments and intersections that are failing before interregional travel exemptions is mapped in **Figure 16**.

Table 7: 2023 CMP Roadway Segment LOS

Route	Roadway Segment	LOS Standard	2023 LOS	
			AM Peak Hour	PM Peak Hour
SR-1	San Francisco County Line to Linda Mar Blvd	E	F	F
SR-1	Linda Mar Blvd to Frenchmans Creek Rd	E	D	D
SR-1	Frenchmans Creek Road to Miramontes Rd	E	E	E
SR-1	Miramontes Rd to Santa Cruz County Line	D	B	C
SR-35	San Francisco Co Line to Sneath Ln	E	B	A
SR-35	Sneath Ln to I-280	F	F	F
SR-35	I-280 to SR-92	B	C	C
SR-35	SR-92 to SR-84	B	B	B
SR-35	SR-84 to Santa Clara County Line	E	B	B
SR-82	San Francisco County Line to John Daly Blvd	E	A	A
SR-82	John Daly Blvd to Hickey Blvd	E	A	A
SR-82	Hickey Blvd to I-380	E	A	A
SR-82	I-380 to Trousdale Dr	E	A	A
SR-82	Trousdale Dr to 3rd Ave	E	A	A
SR-82	3rd Ave to SR-92	E	A	A
SR-82	SR-92 to Hillsdale Ave	E	A	B
SR-82	Hillsdale Ave to 42nd Ave	E	A	A
SR-82	42nd Ave to Holly St	E	A	A
SR-82	Holly St to Whipple Ave	E	A	A
SR-82	Whipple Ave to SR-84	E	A	A
SR-82	SR-84 to Glenwood Ave	E	A	A
SR-82	Glenwood Ave to Santa Cruz Ave	E	A	B
SR-82	Santa Cruz Ave to Santa Clara County Line	E	A	A

Route	Roadway Segment	LOS Standard	2023 LOS	
			AM Peak Hour	PM Peak Hour
SR-84	SR-1 to Portola Rd	C	B	B
SR-84	Portola Rd to I-280	E	B	B
SR-84	I-280 to Alameda de las Pulgas	C	**C**	C
SR-84	Alameda de las Pulgas to US-101	E	B	B
SR-84	US-101 to Willow Rd	D	B	A
SR-84	Willow Rd to University Ave	E	F	A
SR-84	University Ave to Alameda County Line	F	F	E
SR-92	SR-1 to I-280	E	E	E
SR-92	I-280 to US-101	D	F	F
SR-92	US-101 to Alameda County Line	E	F	F
US-101	San Francisco County Line to I-380	E	E	F
US-101	I-380 to Millbrae Ave*	E	E	F
US-101	Millbrae Ave to Broadway*	E	F	F
US-101	Broadway to Peninsula Ave*	E	F	F
US-101	Peninsula Ave to SR-92*	F	F	F
US-101	SR-92 to Whipple Ave*	E	E	F
US-101	Whipple Ave to Santa Clara County Line	F	F	F
SR-109	Kavanaugh Dr to SR-84 (Bayfront Expwy.)	E	A	C
SR-114	US-101 to SR-84 (Bayfront Expressway)	E	A	B
I-280	San Francisco County Line to SR-1 (north)	E	D	E
I-280	SR-1 (north) to SR-1 (south)	E	D	E
I-280	SR-1 (south) to San Bruno Ave	D	F	F
I-280	San Bruno Ave to SR-92	D	A	A
I-280	SR-92 to SR-84	D	A	E
I-280	SR-84 to Santa Clara County Line	D	A	F
I-380	I-280 to US-101	F	F	F
I-380	US-101 to Airport Access Road	C	A	A
Mission St	San Francisco County Line to SR-82	E	A	A
Geneva Ave	San Francisco County Line to Bayshore Blvd	E	A	A
Bayshore Blvd	San Francisco County Line to Geneva Ave	E	A	A

Red shading indicates below LOS standard

Table 8: 2023 Companion Network Roadway Segment LOS

Route	Roadway Segment	2023 LOS	
		AM Peak Hour	PM Peak Hour
Ralston Ave	US-101 to Alameda de las Pulgas	A	A
Middlefield Rd	SR-84 to Marsh Rd	A	A
California Dr	Broadway to Peninsula Ave	A	A
Bayshore Blvd	Geneva Ave to US-101 NB Off Ramp	A	B
John Daly Blvd	SR-35 to Mission St	A	A
Foster City Blvd	E. 3rd Ave to Beach Park Dr	A	A
Chateau Dr/Ralston Ave	I-280 to El Camino Real	C	C
Millbrae Ave	SR-82 to Old Bayshore Hwy	A	B
Sharp Park Blvd	SR-1 to SR-35	A	A
Sneath Ln	SR-35 to Huntington Ave	A	A

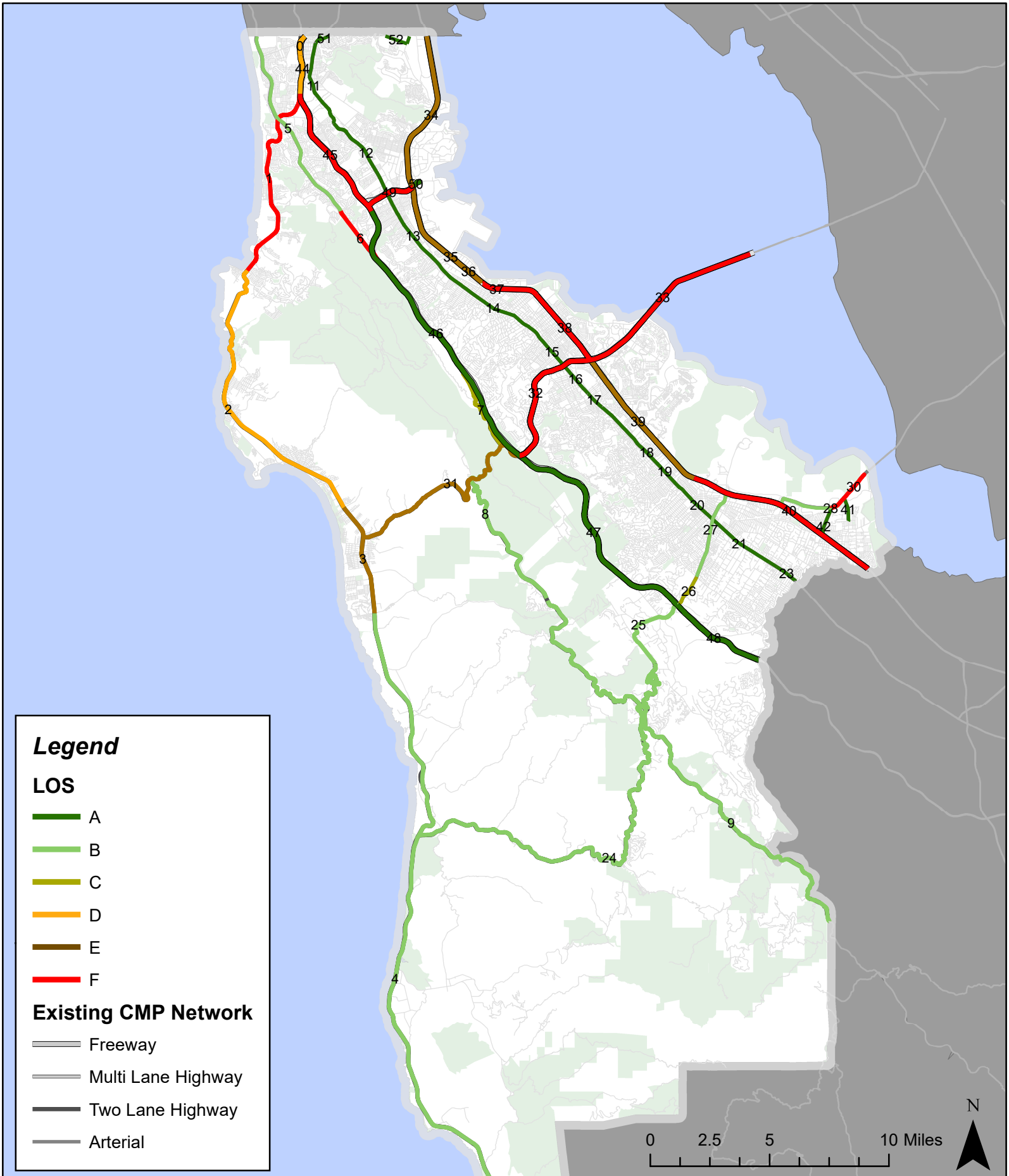

FIGURE 5

CMP ROADWAY SEGMENT LOS - AM PEAK PERIOD

(WITHOUT INTERREGIONAL EXEMPTION) (2023)

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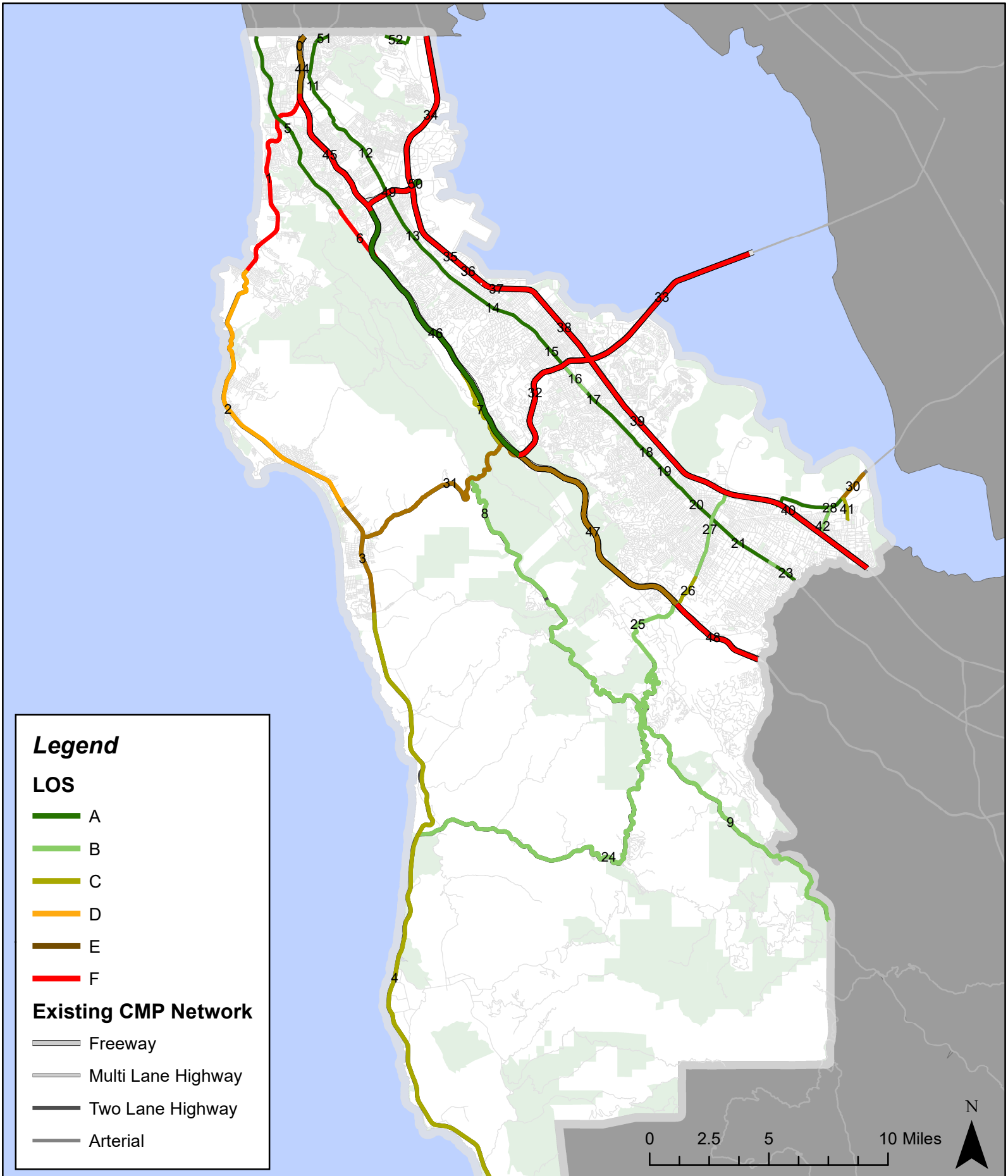

FIGURE 6

CMP ROADWAY SEGMENT LOS - PM PEAK PERIOD

(WITHOUT INTERREGIONAL EXEMPTION) (2023)

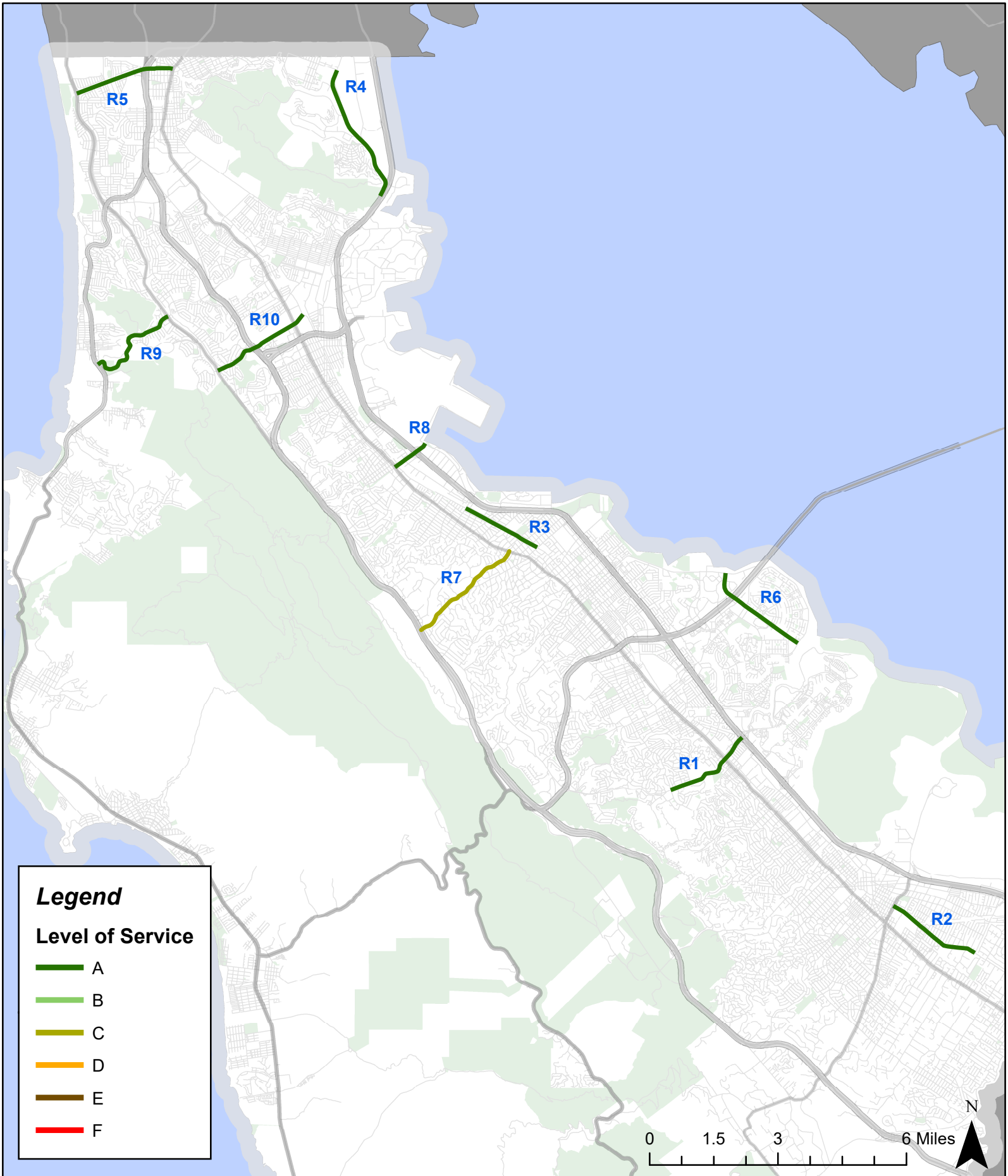

FIGURE 7

COMPANION ROADWAY SEGMENT LOS AM PEAK PERIOD (2023)

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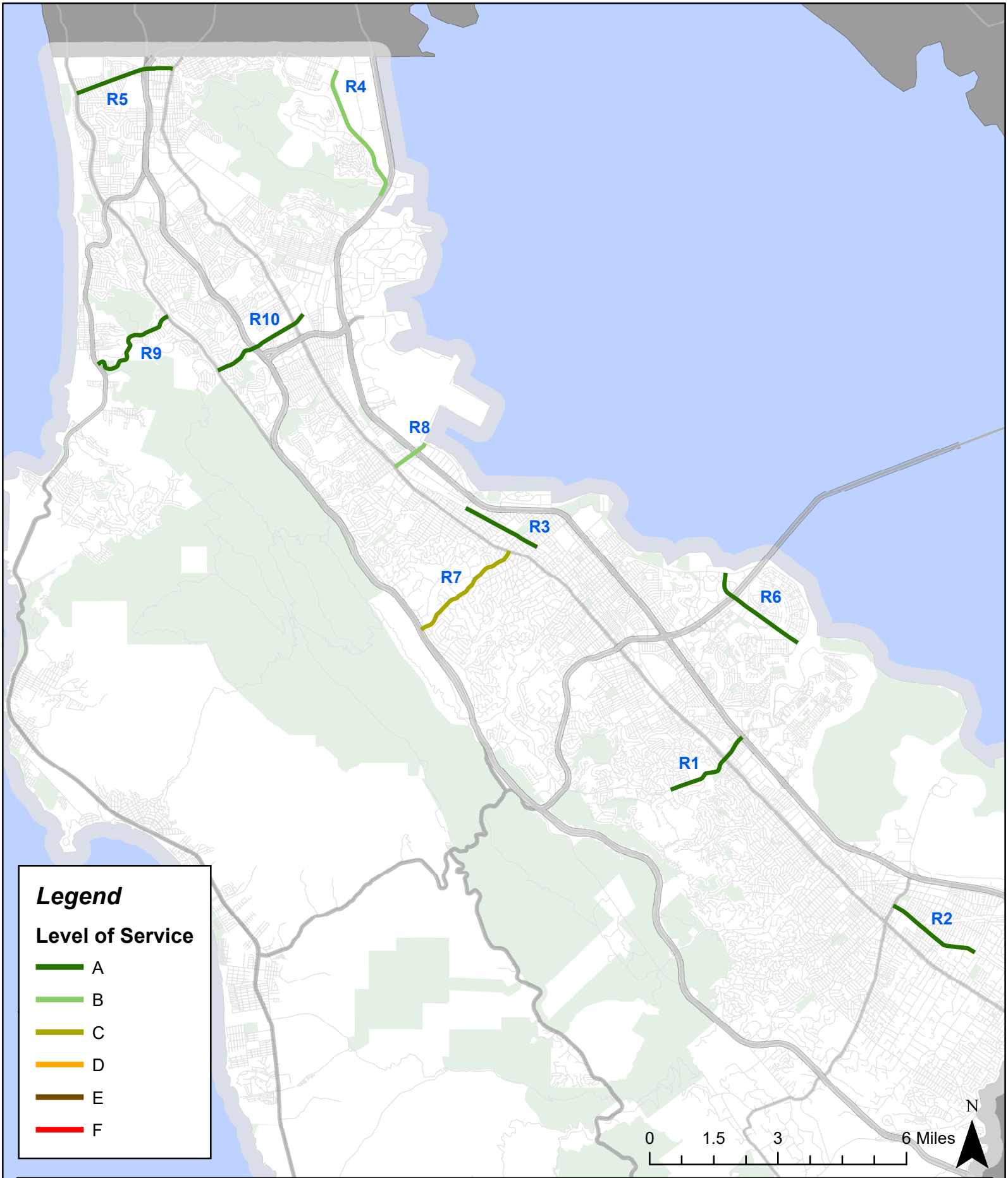

FIGURE 8

COMPANION ROADWAY SEGMENT LOS PM PEAK PERIOD (2023)

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Table 9: 2023 CMP Intersection LOS

ID	Intersection	Methodology	LOS Standard	AM Peak Hour		PM Peak Hour	
				Delay (sec)	LOS	Delay (sec)	LOS
1	Bayshore Blvd/Geneva Ave	HCM 2000	E	15.7	B	25.1	C
2	SR-35/John Daly Blvd	HCM 2000	E	24.3	C	32.5	C
3	SR-82/John Daly Blvd/Hillside Ave	HCM 2010	E	40.6	D	38.1	D
4	SR-82/San Bruno Ave	HCM 2010	E	45.9	D	67.1	E
5	SR-82/Millbrae Ave	HCM 2010	E	80.6	F	89.5	F
6	SR-82/Broadway	HCM 2010	E	14.8	B	13.7	B
7	SR-82/Park Rd/Peninsula Ave	HCM 2000	E	21.6	C	18	B
8	SR-82/Ralston Ave	HCM 2000	E	57.7	E	61.5	E
9	SR-82/Holly St	HCM 2010	E	44	D	45.4	D
10	SR-82/Whipple Ave	HCM 2010	E	39	D	38.3	D
11	University Ave/SR-84	HCM 2000	F	22.5	C	153.7	F
12	Willow Rd/SR-84	HCM 2010	F	46.1	D	58.5	E
13	SR-84/Marsh	HCM 2000	F	179.3	F	197.1	F
14	SR-84/Middlefield Rd	HCM 2010	E	49.9	D	50.9	D
15	SR-1/SR-92	HCM 2000	E	53.6	D	49	D
16	Main St/SR-92	HCM 2010	F	41.4	D	65.1	E

Table 10: 2023 Companion Network Intersection LOS

ID	Intersection	Methodology	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
17	El Camino Real/3rd Ave	HCM 2000	16.7	B	17.2	B
18	SR-92/Skyline Blvd (SR-35)	HCM 2000	31.9	C	35.9	D
19	Industrial Rd/Holly St	HCM 2010	80.9	F	47.9	D
20	Veterans Blvd/Whipple Ave	HCM 2010	51.2	D	32.9	C
21	Middlefield Rd/Marsh Rd	HCM 2010	31.4	C	48.5	D
22	Santa Cruz Ave/Sand Hill Rd	HCM 2010	54.9	D	29.5	C
23	University Ave/Bay Rd	HCM 2000	49.4	D	49.1	D
24	SR-84/Alameda de las Pulgas	HCM 2010	106.1	F	41.8	D
25	Alpine Rd/Portola Rd	HCM 2010	15.5	C	10.5	B
26	SR-92/SR-35	HCM 2010	44.4	E	24.8	C
27	El Camino Real/Mission Rd	HCM 2010	12.8	B	18.9	C
28	SR-1/Main St	HCM 2000	72.3	E	45.7	D
29	El Camino Real/Westborough Blvd	HCM 2000	51.4	D	49.5	D
30	SR 1/Capistrano Rd	HCM 2010	17.1	B	18.8	B
31	S Airport Blvd/San Bruno Ave	HCM 2000	15.6	B	15.7	B
32	SR-1/Reina del Mar Ave	HCM 2000	139.6	F	55.6	E
33	SR-1/Cypress Ave	HCM 2010	33.9	D	97.4	F

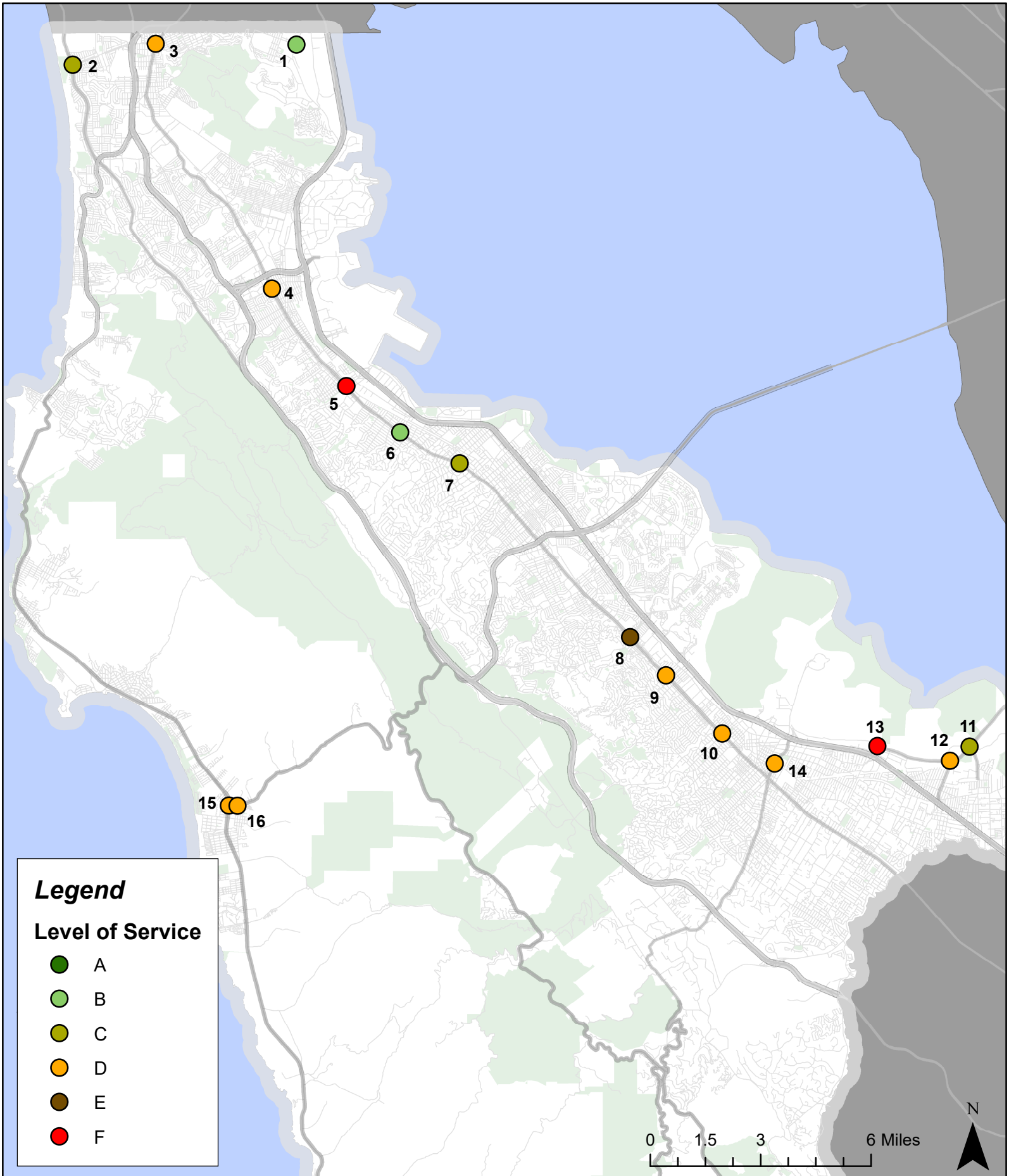

FIGURE 9

CMP INTERSECTION LOS - AM PEAK PERIOD

(WITHOUT INTERREGIONAL EXEMPTION (2023)

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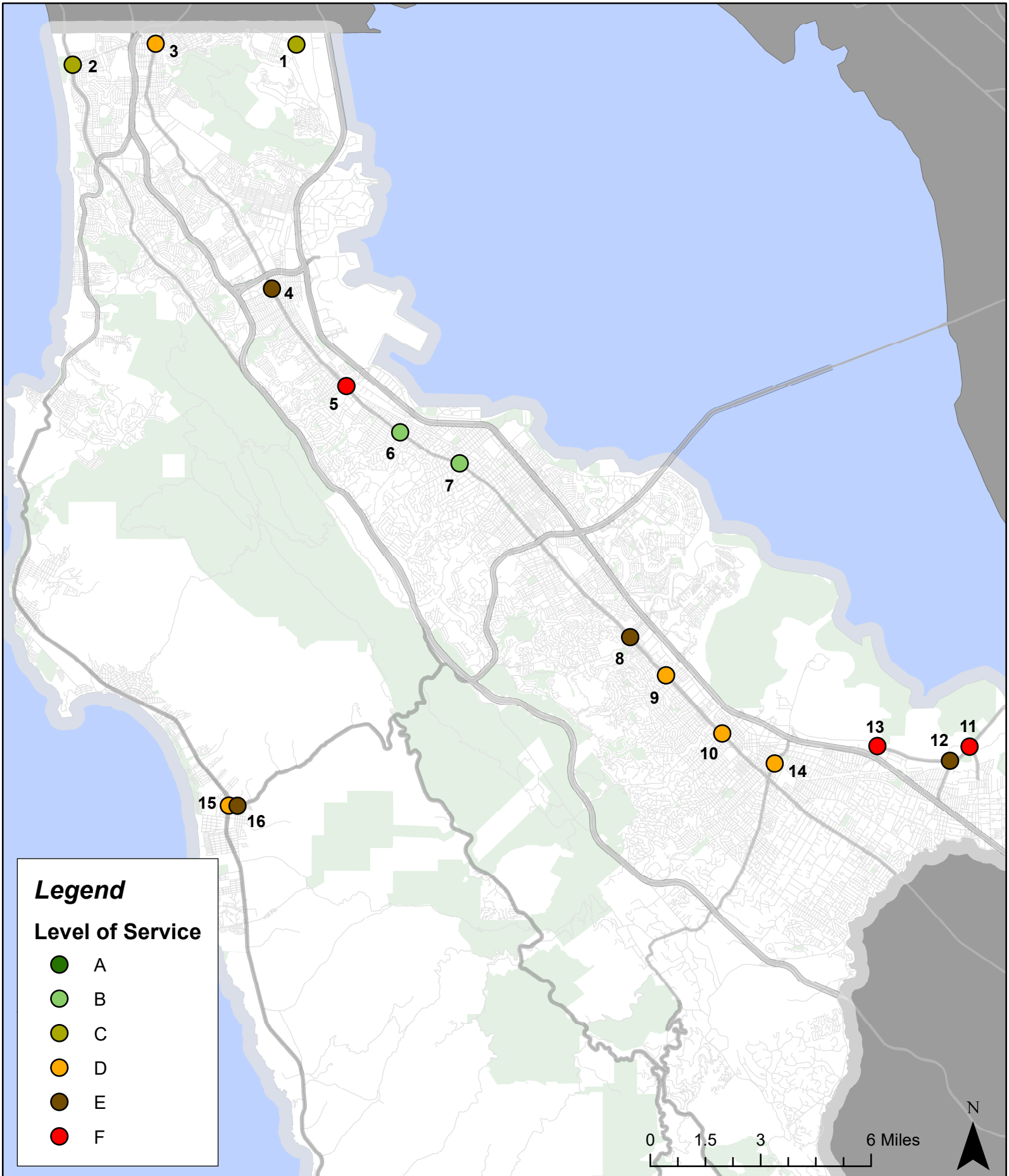

FIGURE 10

CMP INTERSECTION LOS - PM PEAK PERIOD

(WITHOUT INTERREGIONAL EXEMPTION (2023)

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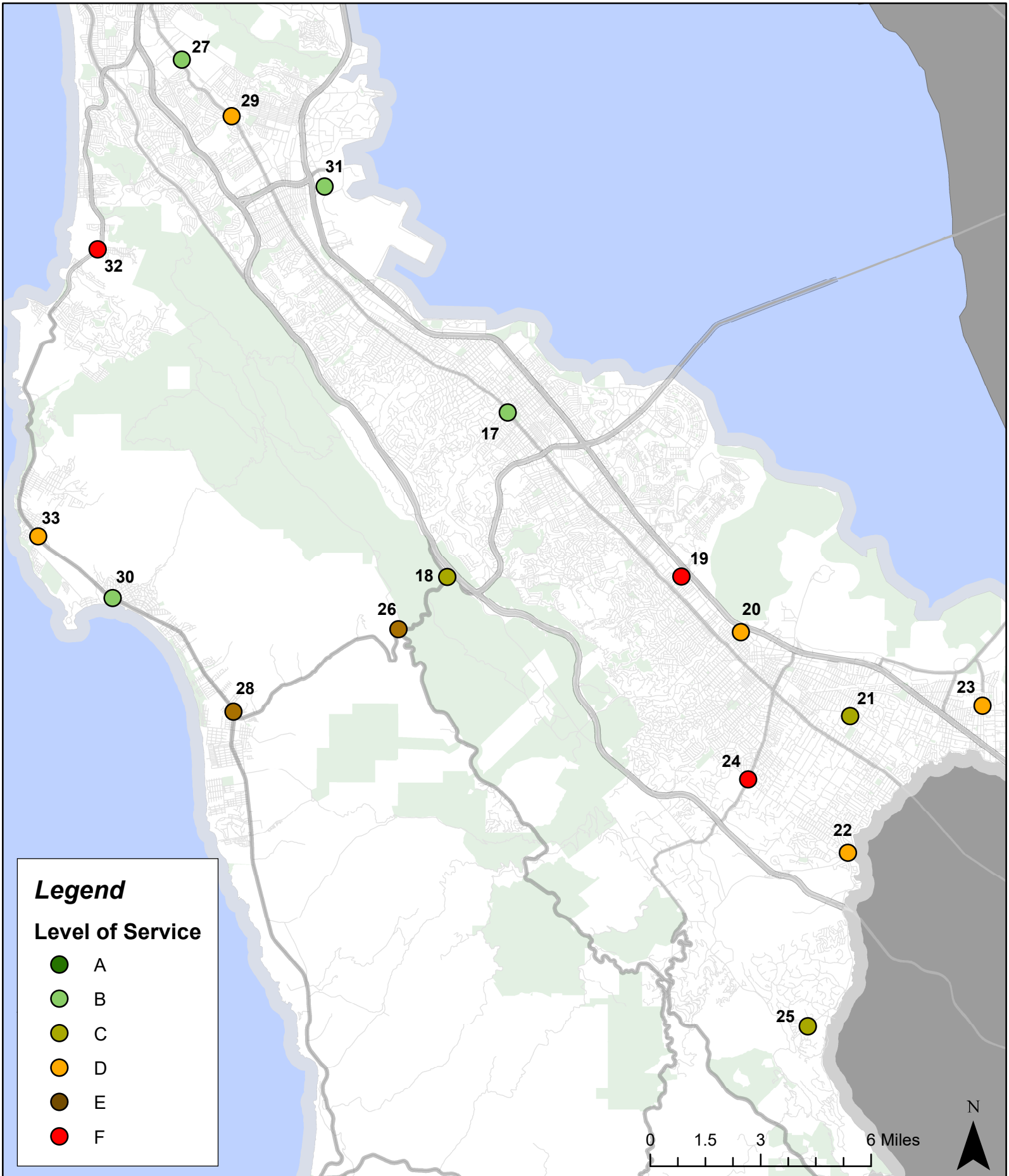

FIGURE 11

COMPANION INTERSECTION LOS AM PEAK PERIOD (2023)

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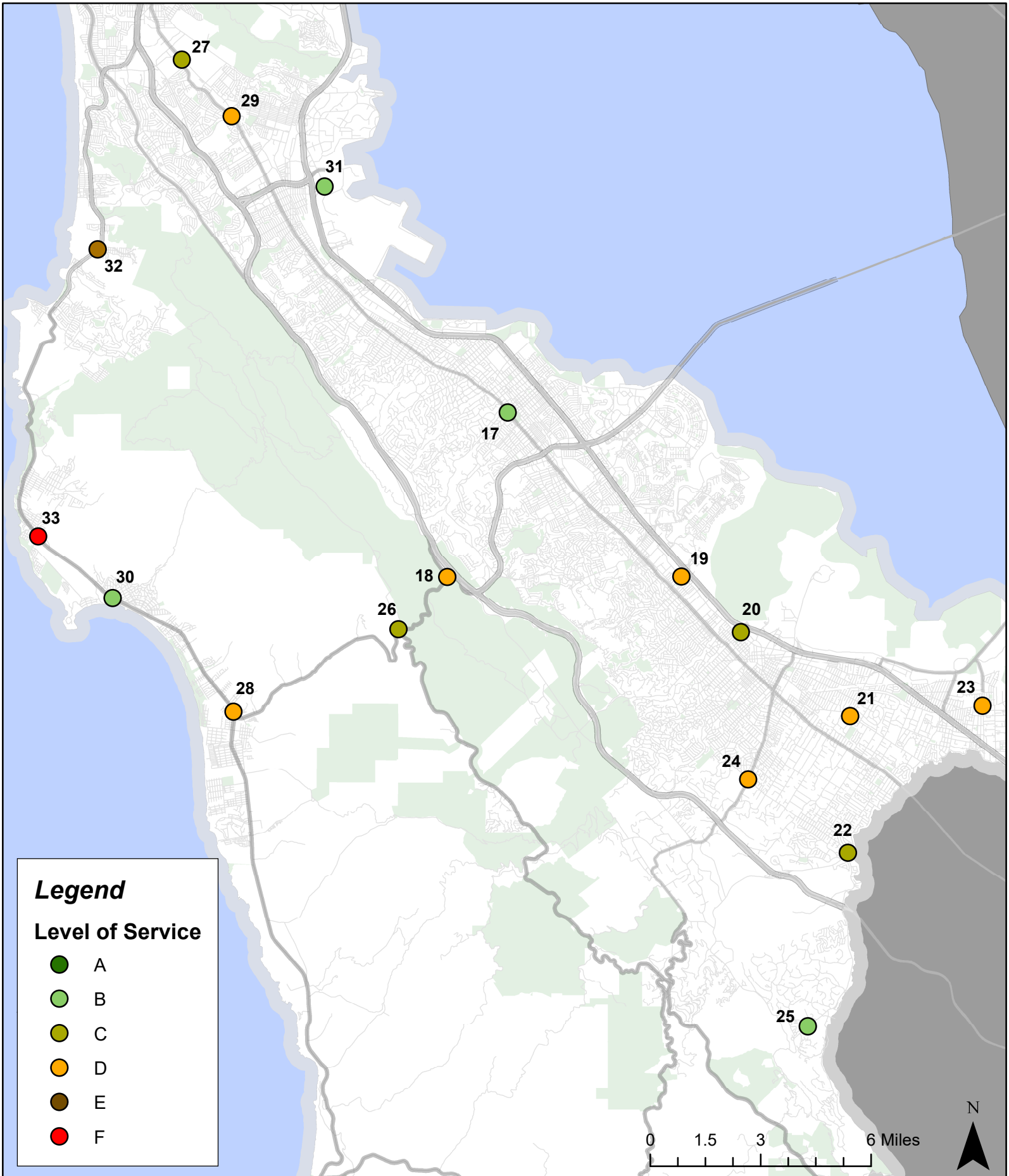

FIGURE 12

COMPANION INTERSECTION LOS PM PEAK PERIOD (2023)

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Table 11: 2023 Roadway Segment Weekend LOS

Route	Roadway Segment	2023 LOS		
		AM Peak Period	Mid-Day Peak Hour	PM Peak Hour
SR-1	Linda Mar Blvd to Frenchmans Creek Rd	C	D	E
SR-1	Frenchmans Creek Rd to Miramontes Rd	D	E	E
SR-1	Miramontes Rd to Santa Cruz County Line	B	C	D
SR-92	SR-1 to I-280	E	E	E

Table 12: 2023 Intersection Weekend LOS

ID	Intersection	AM Peak		Mid-Day Peak		PM Peak	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
15	SR-1/SR-92	39.4	D	49.4	D	36.2	D
16	Main St/SR-92	27.4	C	70.1	E	35	D
18	SR-92/Skyline Blvd (SR-35)	67.1	E	115.2	F	83.3	F
26	SR-35/SR-92	16.8	C	110.8	F	67.7	F
28	SR-1/Main St	47.2	D	40.8	D	39.7	D
30	SR-1/Capistrano Rd	15.5	B	20.8	C	21.4	C
32	SR-1/Reina Del Mar Ave	32.3	C	59.2	E	102.4	F
33	SR-1/Cypress Ave	23.4	C	254.7	F	285.8	F

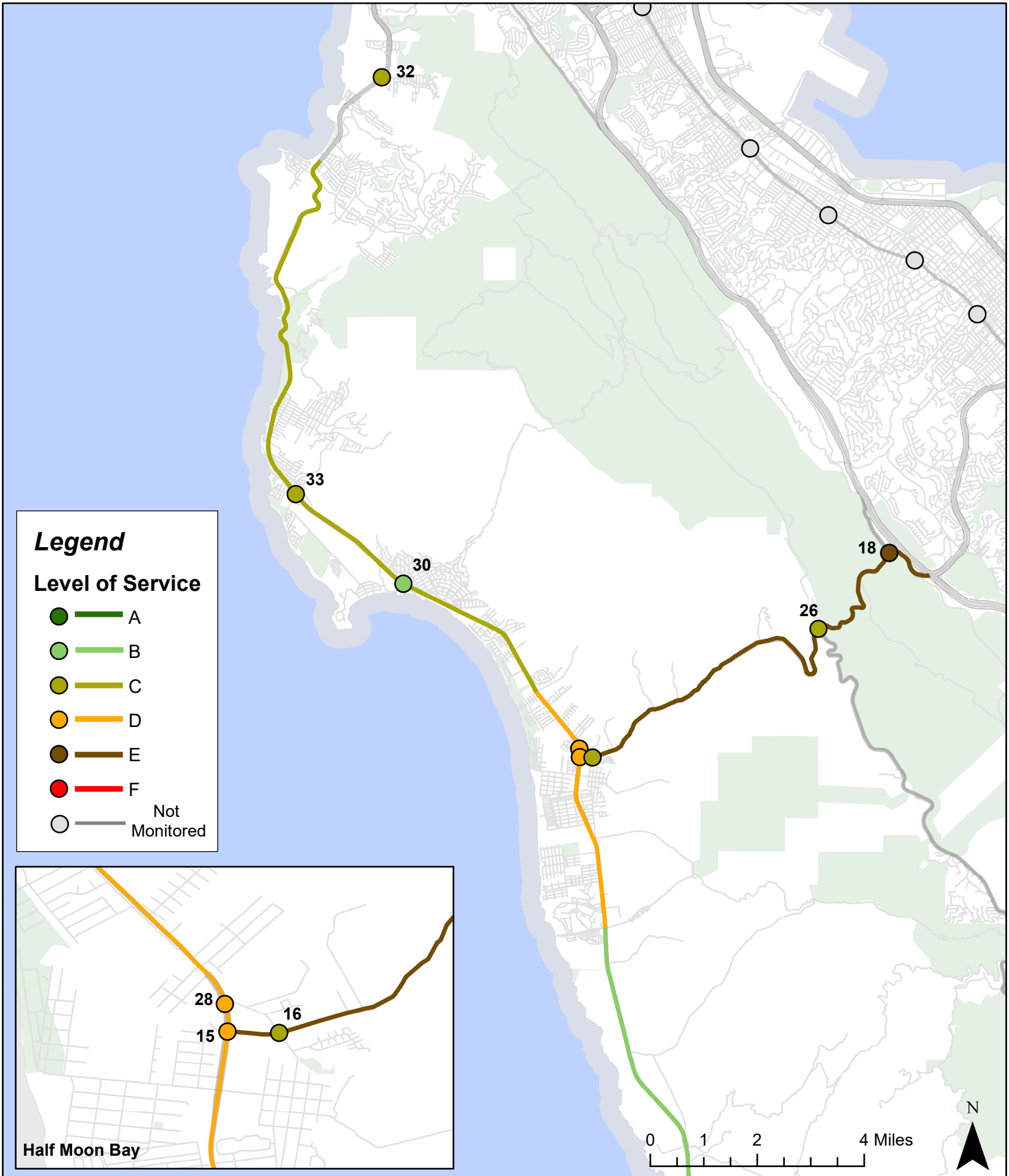

FIGURE 13

WEEKEND SEGMENT & INTERSECTION LOS AM PEAK PERIOD (2023)

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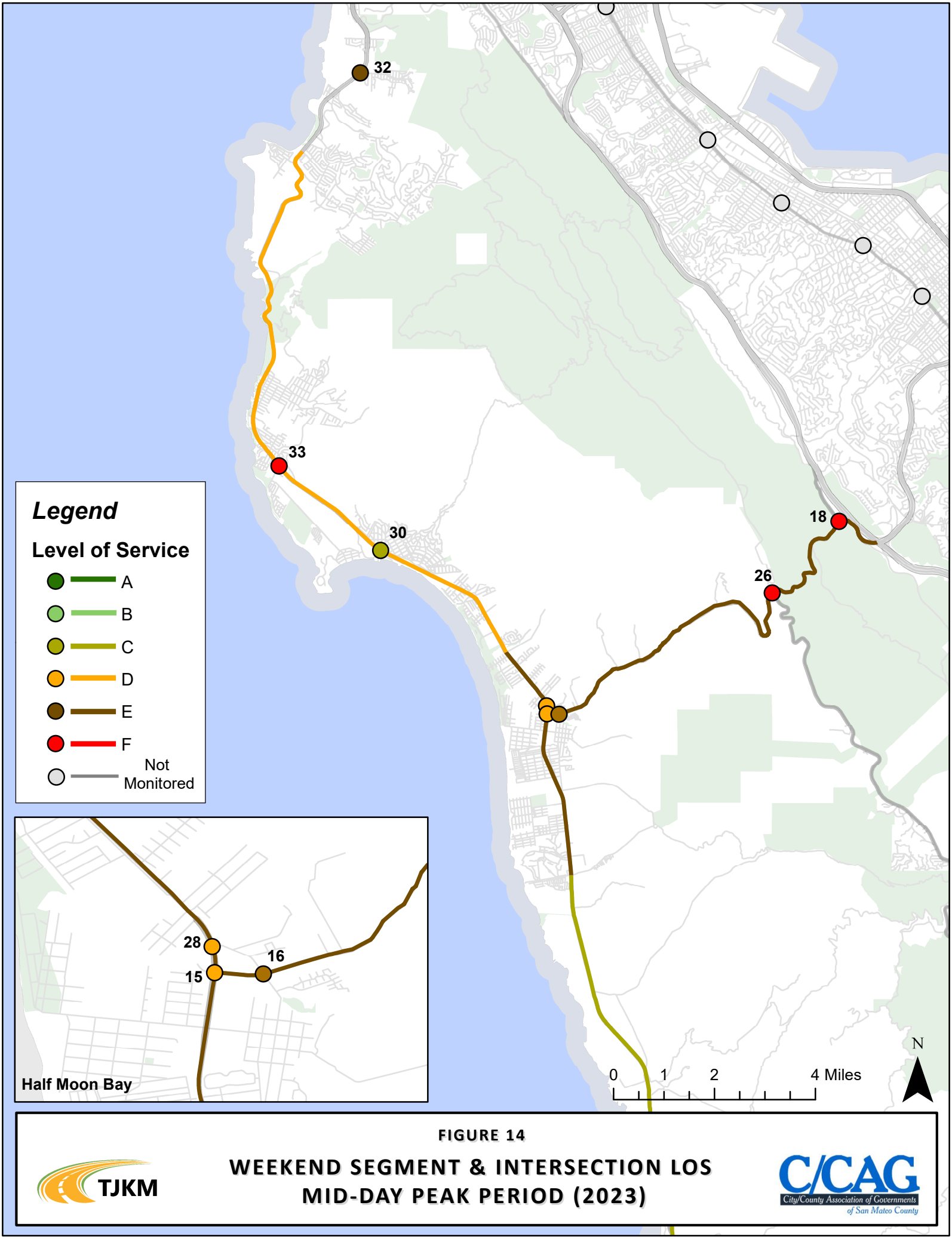

FIGURE 14

WEEKEND SEGMENT & INTERSECTION LOS MID-DAY PEAK PERIOD (2023)

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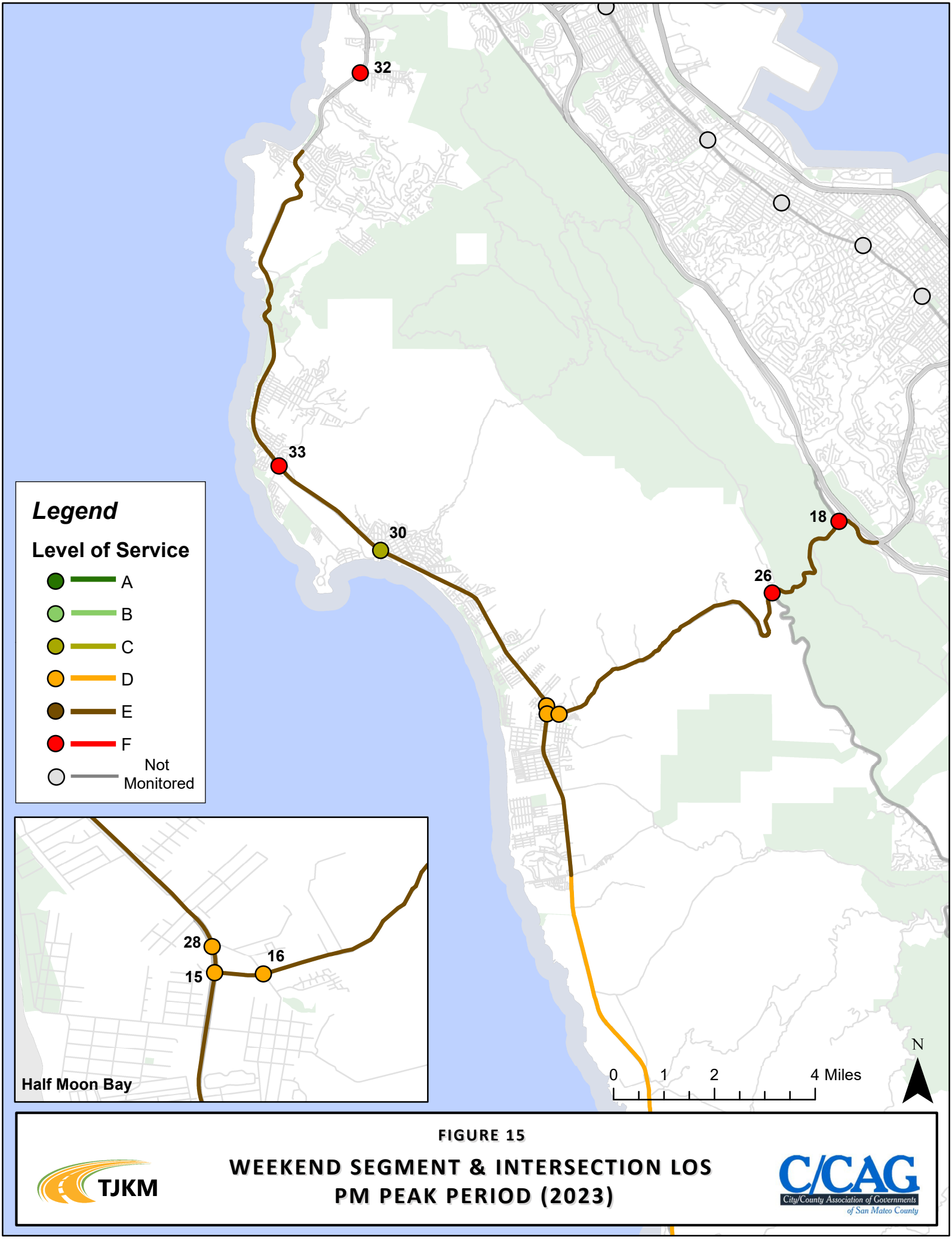

FIGURE 15

WEEKEND SEGMENT & INTERSECTION LOS PM PEAK PERIOD (2023)

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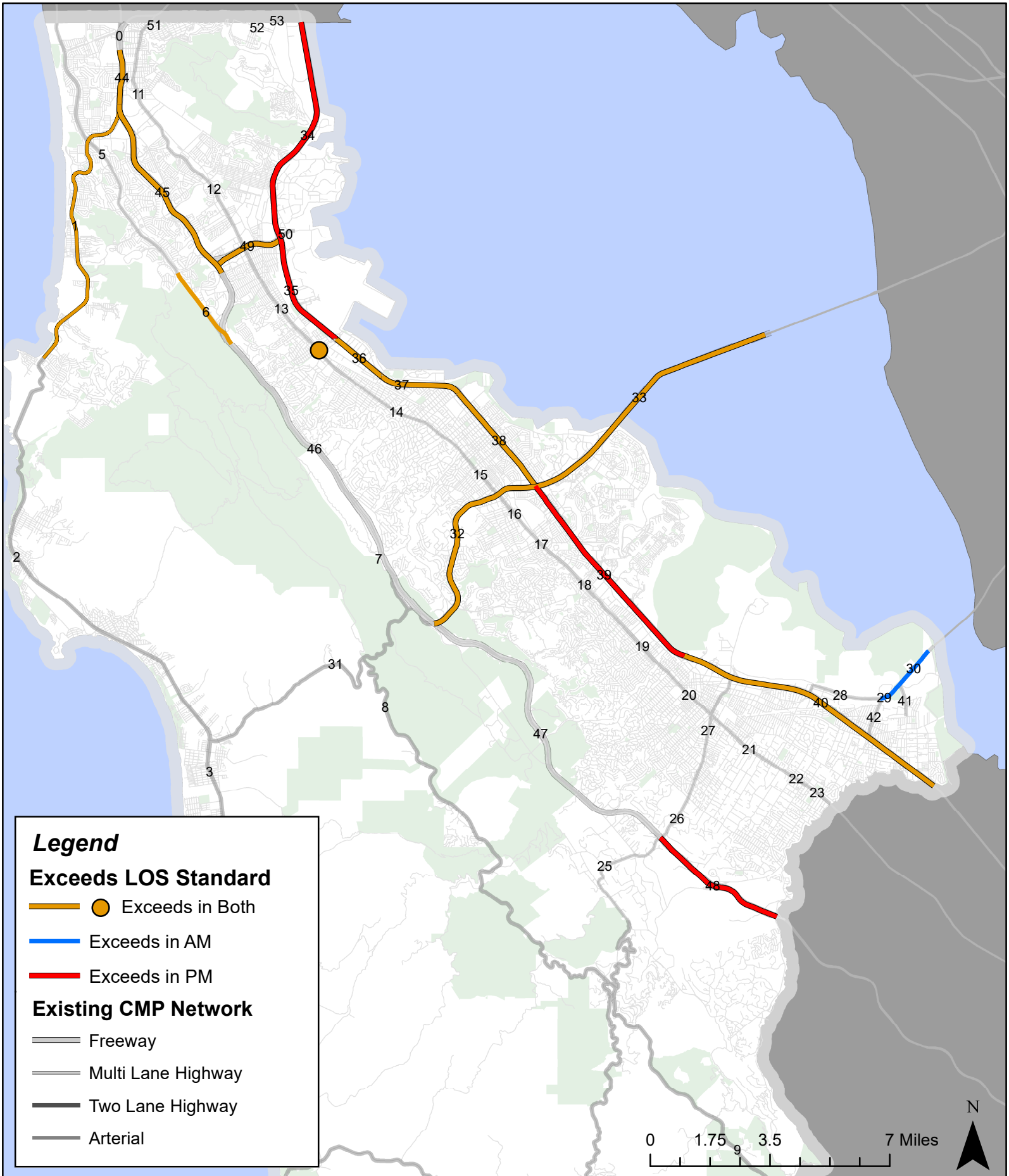

FIGURE 16

FAILING ROADWAY SEGMENTS/INTERSECTIONS

(WITHOUT INTERREGIONAL EXEMPTION) (2023)

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3.2: Reduction in Volumes Due to Interregional Trips

The CMP legislation allows for the reduction in volume for those trips that are interregional. In this case, "interregional" are those trips that originate from outside the county (either traversing the county or ending within the county). For those CMP segments found with a LOS below the standard, the county travel demand model (C/CAG-VTA Model) is used to determine the proportion of the volume estimated to be from interregional travel. As shown in **Tables 4** and **6**, there were twelve segments and one intersection that had at least one direction in either the AM or PM peak period that had a lower LOS than the established standard. **Table 13** includes the resulting percentage of traffic from the C/CAG-VTA Model that is estimated to be interregional by segment and **Table 14** includes the resulting percentage of traffic that is estimated to be interregional by intersection.

Table 13: Interregional Trips by Failing Segment

Route	Roadway Segment	Direction	Peak Hour	% Reduction
SR-1	San Francisco Co Line to Linda Mar Blvd	NB	AM	22.9%
			PM	27.6%
		SB	PM	18.3%
SR-92	I-280 to US-101	EB	AM	26.8%
			PM	33.3%
		WB	AM	27.3%
			PM	25.8%
SR-92	US-101 to Alameda Co Line	EB	PM	37.8%
		WB	AM	26.0%
US-101	San Francisco Co Line to I-380	NB	PM	16.0%
		SB	PM	19.8%
US-101	I-380 to Millbrae Ave	SB	PM	30.4%
US-101	Millbrae Av to Broadway	SB	AM	30.3%
		SB	PM	27.8%
US-101	Broadway to Peninsula Ave	NB	AM	26.1%
			PM	26.2%
		SB	AM	28.9%
			PM	24.9%
US-101	SR 92 to Whipple Ave	NB	PM	22.2%
I-280	SR-1 (South) to San Bruno Ave	NB	PM	21.9%
		SB	AM	30.1%
I-280	SR-84 to Santa Clara Co Line	NB	PM	32.1%

Table 14: Interregional Trip Percentage Reduction by Failing Intersection

#	Intersection	Peak Hour	% Reduction
5	SR-82 / Millbrae Ave	AM	8.10%
		PM	7.10%

When applying reductions, they can be deducted directly for those where V/C is the performance measure used, but for those segments that use INRIX travel speed, a few extra steps are required to reflect the exemption. Historically, the LOS Monitoring Study has made use of the LOS tables as included in the HCM 1994 that include reference speeds for given free-flow speeds and LOS. In order to reflect the reduction, the V/C must first be estimated from the same tables. This adds a level of error given that density is the preferred performance measure and the methodology is to use a secondary measure to estimate another secondary measure, take the reduction, and then reverse the calculation using the V/C and determine the adjusted LOS with the exemption. After incorporating the reduction in volumes for segments and intersections found to have an LOS lower than the standard, all raised to an acceptable LOS. Therefore, for the 2021 CMP monitoring cycle, ***there are no deficient segments or intersections after interregional reductions***. Failing segments and intersections after their respective interregional reductions are mapped in **Figures 17** and **18.**

Table 15: 2023 CMP Roadway Segment LOS with Interregional Reductions

Route	Roadway Segment	LOS Standard	2023 LOS		LOS with Interregional Reduction - AM	LOS with Interregional Reduction - PM
			AM Peak Period	PM Peak Period		
SR-1	San Francisco County Line to Linda Mar Blvd	E	F	F	E	E
SR-1	Linda Mar Blvd to Frenchmans Creek Rd	E	D	D	-	-
SR-1	Frenchmans Creek Road to Miramontes Rd	E	E	E	-	-
SR-1	Miramontes Rd to Santa Cruz County Line	D	B	C	-	-
SR-35	San Francisco Co Line to Sneath Ln	E	B	A	-	-
SR-35	Sneath Ln to I-280	F	F	F	-	-
SR-35	I-280 to SR-92	B	C	C	-	-
SR-35	SR-92 to SR-84	B	B	B	-	-
SR-35	SR-84 to Santa Clara County Line	E	B	B	-	-
SR-82	San Francisco County Line to John Daly Blvd	E	A	A	-	-
SR-82	John Daly Blvd to Hickey Blvd	E	A	A	-	-
SR-82	Hickey Blvd to I-380	E	A	A	-	-
SR-82	I-380 to Trousdale Dr	E	A	A	-	-
SR-82	Trousdale Dr to 3rd Ave	E	A	A	-	-
SR-82	3rd Ave to SR-92	E	A	A	-	-
SR-82	SR-92 to Hillsdale Ave	E	A	B	-	-
SR-82	Hillsdale Ave to 42nd Ave	E	A	A	-	-
SR-82	42nd Ave to Holly St	E	A	A	-	-
SR-82	Holly St to Whipple Ave	E	A	A	-	-

Route	Roadway Segment	LOS Standard	2023 LOS		LOS with Interregional Reduction - AM	LOS with Interregional Reduction - PM
			AM Peak Period	PM Peak Period		
SR-82	Whipple Ave to SR-84	E	A	A	-	-
SR-82	SR-84 to Glenwood Ave	E	A	A	-	-
SR-82	Glenwood Ave to Santa Cruz Ave	E	A	B	-	-
SR-82	Santa Cruz Ave to Santa Clara County Line	E	A	A	-	-
SR-84	SR-1 to Portola Rd	C	B	B	-	-
SR-84	Portola Rd to I-280	E	B	B	-	-
SR-84	I-280 to Alameda de las Pulgas	C	**C**	C	-	-
SR-84	Alameda de las Pulgas to US-101	E	B	B	-	-
SR-84	US-101 to Willow Rd	D	B	A	-	-
SR-84	Willow Rd to University Ave	E	F	A	C	-
SR-84	University Ave to Alameda County Line	F	F	E	-	-
SR-92	SR-1 to I-280	E	E	E	-	-
SR-92	I-280 to US-101	D	F	F	D	D
SR-92	US-101 to Alameda County Line	E	F	F	D	D
US-101	San Francisco County Line to I-380	E	E	F	-	E
US-101	I-380 to Millbrae Ave*	E	E	F	-	E
US-101	Millbrae Ave to Broadway*	E	F	F	E	D
US-101	Broadway to Peninsula Ave*	E	F	F	D	D
US-101	Peninsula Ave to SR-92*	F	F	F	-	-
US-101	SR-92 to Whipple Ave*	E	E	F	-	D
US-101	Whipple Ave to Santa Clara County Line	F	F	F	-	-
SR-109	Kavanaugh Dr to SR-84 (Bayfront Expwy.)	E	A	C	-	-
SR-114	US-101 to SR-84 (Bayfront Expressway)	E	A	B	-	-
I-280	San Francisco County Line to SR-1 (north)	E	D	E	-	-
I-280	SR-1 (north) to SR-1 (south)	E	D	E	-	-
I-280	SR-1 (south) to San Bruno Ave	D	F	F	D	D
I-280	San Bruno Ave to SR-92	D	A	A	-	-
I-280	SR-92 to SR-84	D	A	E	-	D
I-280	SR-84 to Santa Clara County Line	D	A	F	-	D
I-380	I-280 to US-101	F	F	F	-	-
I-380	US-101 to Airport Access Road	C	A	A	-	-
Mission St	San Francisco County Line to SR-82	E	A	A	-	-
Geneva Ave	San Francisco County Line to Bayshore Blvd	E	A	A	-	-
Bayshore Blvd	San Francisco County Line to Geneva Ave	E	A	A	-	-

Red shading indicates LOS below standard

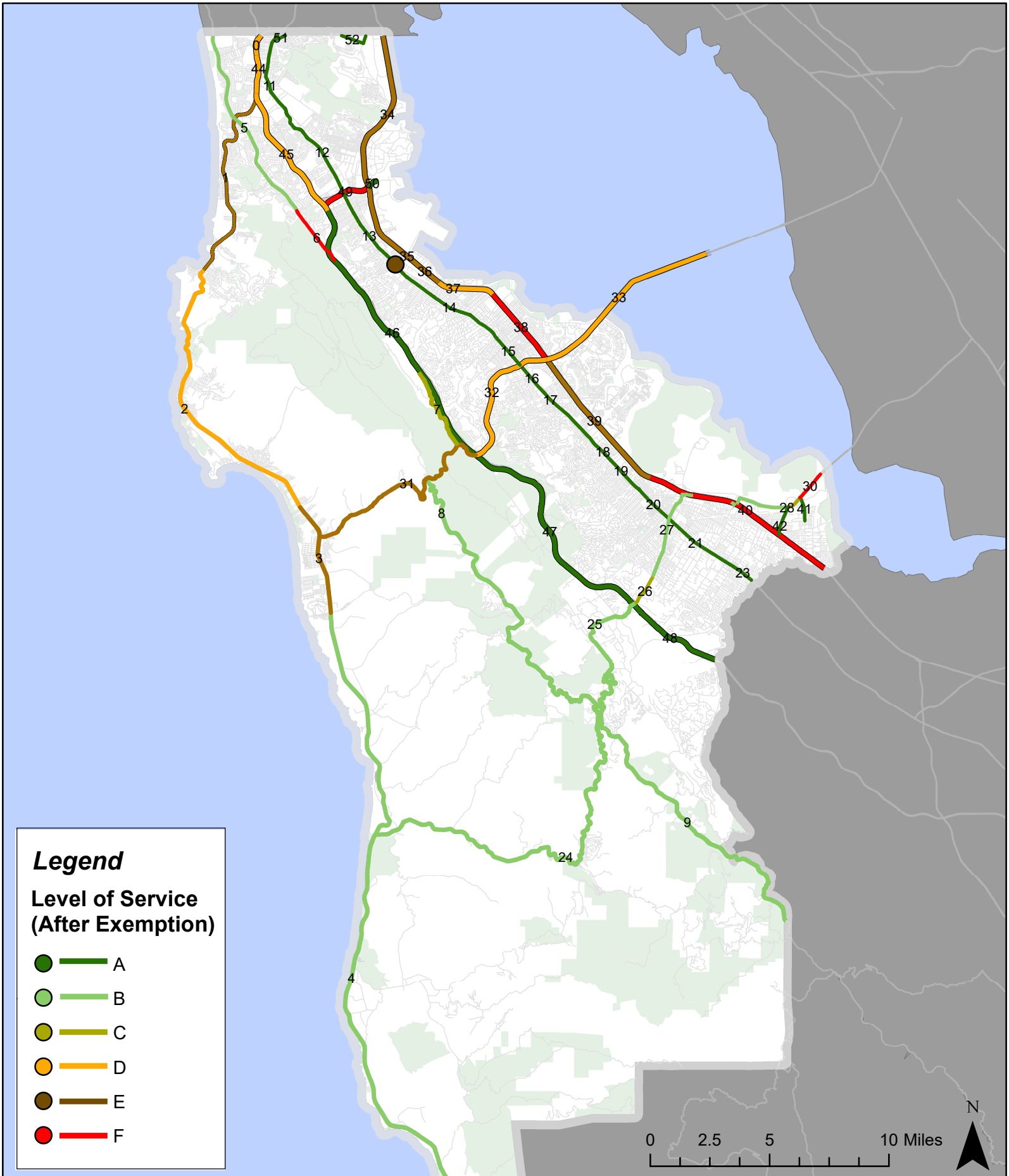

FIGURE 17

DEFICIENT ROADWAY SEGMENTS/INTERSECTIONS
AM PEAK PERIOD (AFTER EXEMPTION) (2023)

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City/County Association of Governments
of San Mateo County

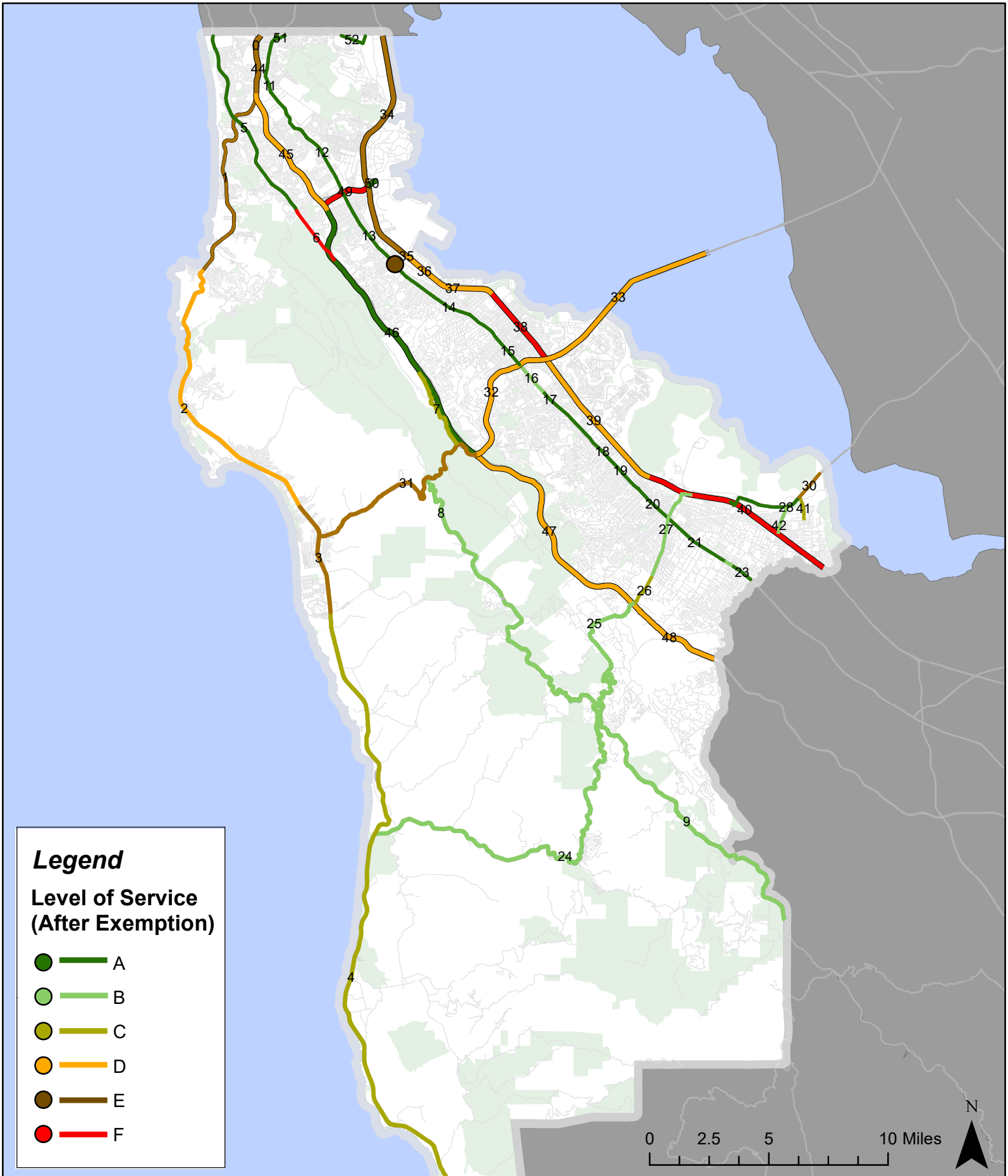


FIGURE 18

DEFICIENT ROADWAY SEGMENTS/INTERSECTIONS
PM PEAK PERIOD (AFTER EXEMPTION) (2023)

TJKM

C/CAG
City/County Association of Governments
of San Mateo County

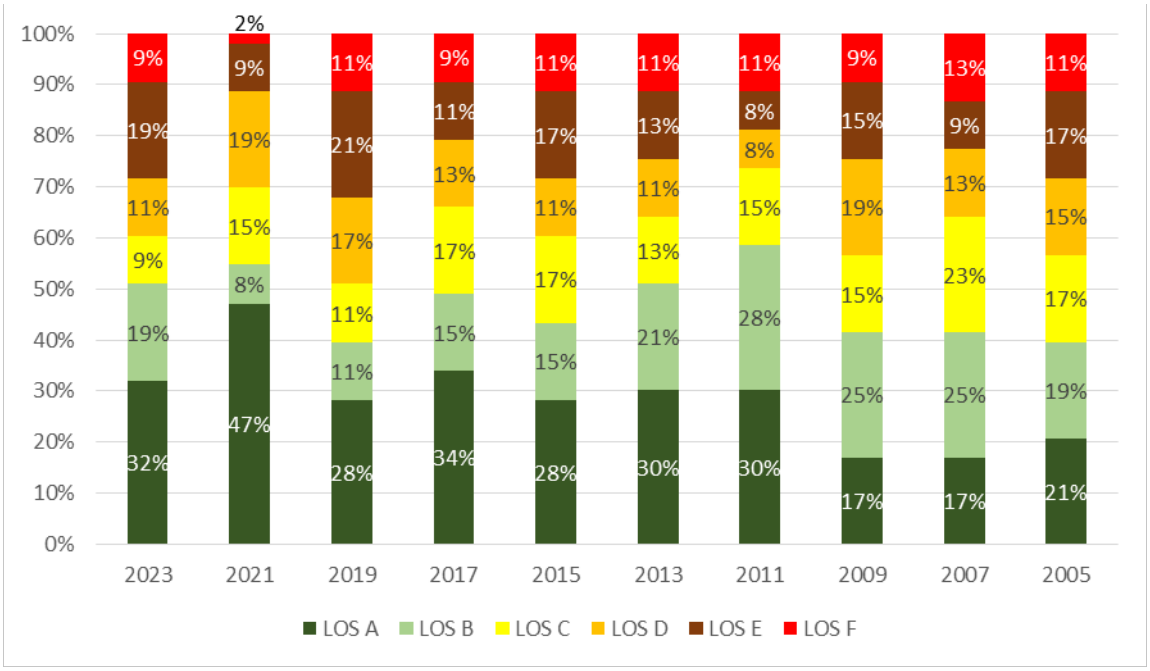
Table 16: 2023 CMP Intersection LOS with Interregional Reductions

ID	Intersection	LOS Standard	2023 LOS		AM LOS with Interregional Trip Reduction	PM LOS with Interregional Trip Reduction
			AM	PM		
1	Bayshore Blvd/Geneva Ave	E	B	C	-	-
2	SR 35/John Daly Blvd	E	C	C	-	-
3	SR 82/Hillside	E	D	D	-	-
4	SR 82/San Bruno Ave	E	D	E	-	-
5	SR 82/Millbrae Ave	E	F	F	E	E
6	SR 82/Broadway	E	B	B	-	-
7	SR 82/Park Rd/Peninsula Ave	E	C	B	-	-
8	SR 82/Ralston Ave	E	E	E	-	-
9	SR 82/Holly St	E	D	D	-	-
10	SR 82/Whipple Ave	E	D	D	-	-
11	University Ave/SR 84	F	C	F	-	-
12	Willow Rd/SR 84	F	D	E	-	-
13	SR 84/Marsh	F	F	F	-	-
14	SR 84/Middlefield Rd	E	D	D	-	-
15	SR 1/SR92	E	D	D	-	-
16	Main St/SR 92	E	D	E	-	-

3.3: Historical Comparisons

C/CAG has continuously conducted monitoring of the CMP network every two years since the CMP was established in 1991. As such, it presents the opportunity to examine the historical trends along each segment and at each intersection. **Figure 19** below illustrates the percentage of each LOS grade for roadway segments across the last ten monitoring cycles. From this, it can be seen that the LOS E & LOS F grade percentages is more than 2021 indicating an increase in traffic volumes post-covid. However, the high percentage of LOS A grades indicates a continued reduction and change in traffic patterns post pandemic.

Figure 19: Historical LOS Comparison for Roadway Segments



In 2023, intersections in the AM peak period saw more LOS F intersections and the same number of LOS E intersections compared to 2021, but the same number of LOS E and F intersections compared to 2019. In the PM peak periods there were more LOS F and significantly more LOS E intersections when compared to 2021, and the same number of LOS F intersections and more LOS E intersections when compared to 2019.

As intersection LOS has traditionally been reported for both the AM and PM peak period, we have the opportunity to examine historical trends for each individually. **Figure 20** shows the historical trends of intersection LOS in the AM peak period, while **Figure 21** illustrates the PM peak period.

Tables showing the historical LOS for all roadway segments and intersections are presented below in **Tables 14 and 15**. All historical LOS is presented after interregional exemptions.

Figure 20: Historical LOS Comparison for Intersections – AM Peak Period

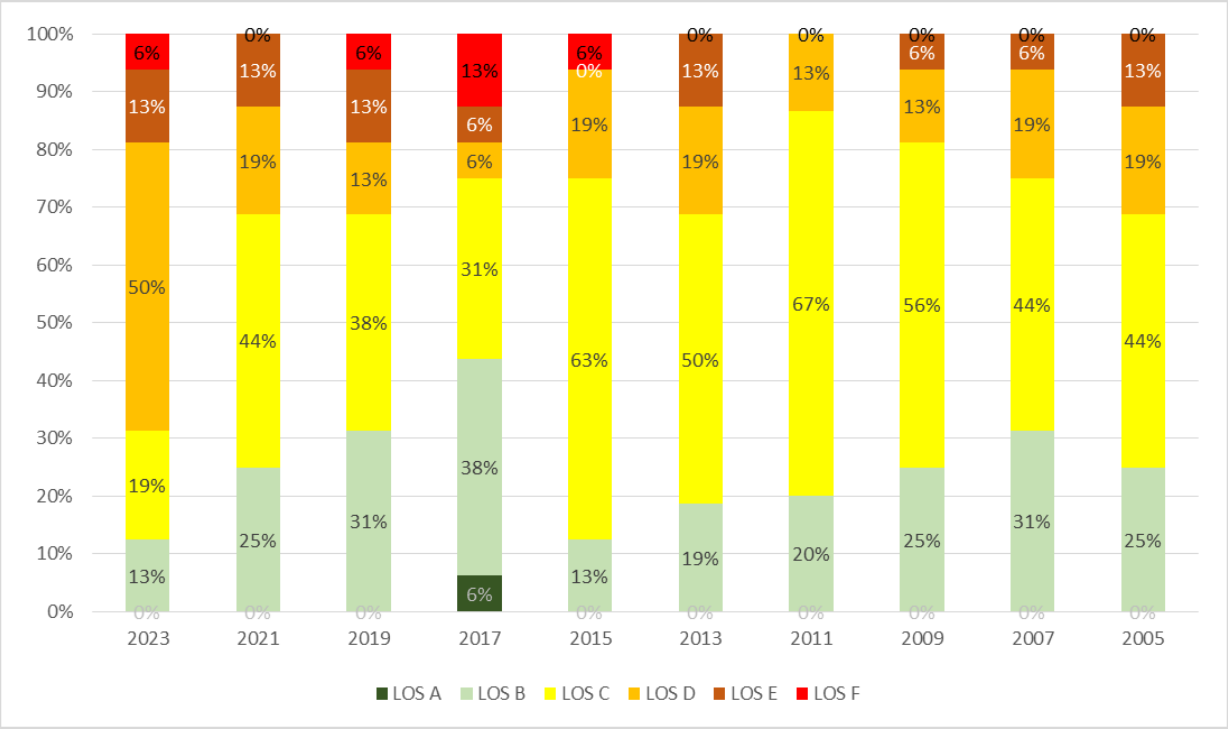


Figure 21: Historical LOS Comparison for Intersections – PM Peak Period

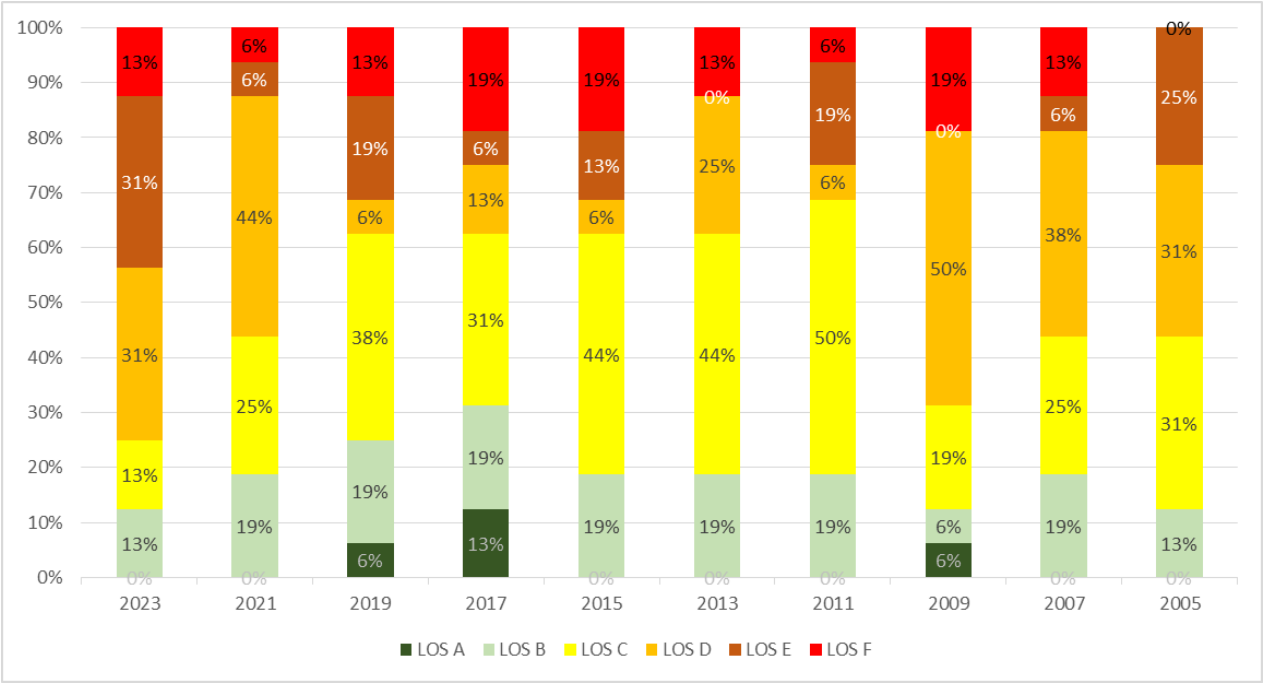


Table 17: Historical LOS for Roadway Segments

Route	Roadway Segment	2023	2021	2019	2017	2015	2013	2011	2009	2007	2005
SR-1	San Francisco County Line to Linda Mar Blvd	E	C	C	A	A	F	B	F	F	F
SR-1	Linda Mar Blvd to Frenchmans Creek Rd	D	D	D	D	D	D	D	D	D	D
SR-1	Frenchmans Creek Road to Miramontes Rd	E	E	E	E	E	E	E	E	E	E
SR-1	Miramontes Rd to Santa Cruz County Line	C	C	C	C	C	B	B	B	B	C
SR-35	San Francisco Co Line to Sneath Ln	B	A	D	C	D	B	A	C	C	C
SR-35	Sneath Ln to I-280	F	C	F	F	F	F	F	E	F	F
SR-35	I-280 to SR-92	C	B	C	B	A	B	B	B	B	C
SR-35	SR-92 to SR-84	B	B	B	B	B	B	B	B	B	B
SR-35	SR-84 to Santa Clara County Line	B	B	B	B	B	B	B	B	B	B
SR-82	San Francisco County Line to John Daly Blvd	A	A	A	A	A	A	A	A	A	A
SR-82	John Daly Blvd to Hickey Blvd	A	A	A	A	A	A	A	A	A	A
SR-82	Hickey Blvd to I-380	A	A	A	A	A	A	A	A	C	A
SR-82	I-380 to Trousdale Dr	A	A	A	A	A	A	A	A	B	A
SR-82	Trousdale Dr to 3rd Ave	A	A	A	A	A	A	B	A	A	A
SR-82	3rd Ave to SR-92	A	A	A	A	A	A	A	A	A	A
SR-82	SR-92 to Hillsdale Ave	B	A	A	A	A	A	A	B	B	B
SR-82	Hillsdale Ave to 42nd Ave	A	A	B	C	C	B	B	B	B	B
SR-82	42nd Ave to Holly St	A	A	A	B	B	A	A	B	B	A
SR-82	Holly St to Whipple Ave	A	A	A	A	B	B	C	C	D	D
SR-82	Whipple Ave to SR-84	A	B	A	A	A	A	B	C	C	C
SR-82	SR-84 to Glenwood Ave	A	A	A	A	B	A	B	B	B	B
SR-82	Glenwood Ave to Santa Cruz Ave	B	A	C	C	C	C	B	B	C	D
SR-82	Santa Cruz Ave to Santa Clara County Line	A	A	D	B	B	B	A	B	B	C
SR-84	SR-1 to Portola Rd	B	C	D	B	B	C	C	C	C	C
SR-84	Portola Rd to I-280	B	C	B	C	C	B	B	B	B	B
SR-84	I-280 to Alameda de las Pulgas	C	C	E	D	D	D	C	C	A	C
SR-84	Alameda de las Pulgas to US-101	B	C	E	D	D	D	E	E	E	E
SR-84	US-101 to Willow Rd	B	A	B	B	C	C	B	E	C	B
SR-84	Willow Rd to University Ave	C	C	E	B	B	B	C	E	F	F

Route	Roadway Segment	2023	2021	2019	2017	2015	2013	2011	2009	2007	2005
SR-84	University Ave to Alameda County Line	F	D	F	F	F	F	F	F	F	F
SR-92	SR-1 to I-280	E	E	E	E	E	E	E	E	E	E
SR-92	I-280 to US-101	D	D	E	E	E	E	F	D	D	E
SR-92	US-101 to Alameda County Line	D	E	F	C	F	E	A	B	B	B
US-101	San Francisco County Line to I-380	E	D	D	E	E	E	A	D	E	D
US-101	I-380 to Millbrae Ave	E	D	E	D	D	C	C	D	C	D
US-101	Millbrae Ave to Broadway	E	D	E	C	E	C	C	C	C	D
US-101	Broadway to Peninsula Ave	D	D	D	D	E	C	C	D	C	D
US-101	Peninsula Ave to SR-92	F	F	F	F	F	F	F	F	F	F
US-101	SR-92 to Whipple Ave	E	D	E	E	E	D	D	E	D	E
US-101	Whipple Ave to Santa Clara County Line	F	D	F	F	F	F	F	F	F	F
SR-109	Kavanaugh Dr to SR-84 (Bayfront Expwy.)	C	A	C	C	D	D	C	D	D	C
SR-114	US-101 to SR-84 (Bayfront Expressway)	B	A	C	C	C	A	B	C	C	B
I-280	San Francisco County Line to SR-1 (north)	E	D	E	E	E	E	E	D	A	E
I-280	SR-1 (north) to SR-1 (south)	E	E	E	D	E	E	B	E	E	E
I-280	SR-1 (south) to San Bruno Ave	D	A	D	D	C	D	D	D	C	E
I-280	San Bruno Ave to SR-92	A	A	D	A	C	B	D	C	B	B
I-280	SR-92 to SR-84	E	A	B	A	C	C	B	D	D	D
I-280	SR-84 to Santa Clara County Line	D	A	D	A	A	A	A	D	D	C
I-380	I-280 to US-101	F	E	F	F	F	F	F	F	F	E
I-380	US-101 to Airport Access Road	A	A	A	A	A	A	A	B	C	A
Mission St	San Francisco County Line to SR-82	A	A	A	A	A	A	A	A	A	A
Geneva Ave.	San Francisco County Line to Bayshore Blvd	A	A	A	A	A	A	A	A	A	A
Bayshore Blvd.	San Francisco County Line to Geneva Ave	A	A	A	A	A	A	A	A	A	A

Table 18: Historical LOS for Intersections

ID	Intersection	Peak Period	2023	2021	2019	2017	2015	2013	2011	2009	2007	2005
1	Bayshore Blvd/Geneva Ave	AM	B	B	E	B	B	B	B	C	B	C
		PM	C	B	B	A	B	B	B	C	C	C
2	SR-35/John Daly Blvd	AM	C	B	B	C	D	C	C	B	B	B
		PM	C	B	B	B	E	C	C	C	B	C
3	SR-82/John Daly Blvd/Hillside Ave	AM	D	C	B	B	C	C	B	C	C	C
		PM	D	C	C	C	C	C	C	D	C	D
4	SR-82/San Bruno Ave	AM	D	C	C	B	C	C	C	C	C	C
		PM	E	C	C	C	C	C	C	D	D	D
5	SR-82/Millbrae Ave	AM	E	C	E	D	D	E	D	E	E	E
		PM	E	D	E	D	E	D	E	D	E	E
6	SR-82/Broadway	AM	B	B	B	A	B	B	B	B	B	B
		PM	B	B	A	A	B	B	B	A	B	B
7	SR-82/Park Rd/Peninsula Ave	AM	C	C	C	B	C	C	C	B	B	B
		PM	B	C	C	B	C	C	C	B	B	B
8	SR-82/Ralston Ave	AM	E	D	C	C	C	C	C	D	D	E
		PM	E	D	C	C	C	D	C	D	D	E
9	SR-82/Holly St	AM	D	C	C	C	C	C	C	C	C	C
		PM	D	C	C	C	C	C	C	D	C	C
10	SR-82/Whipple Ave	AM	D	D	C	C	C	C	C	C	C	D
		PM	D	D	D	D	C	C	C	D	D	D
11	University Ave/SR-84	AM	C	B	C	F	C	E	C	B	B	B
		PM	F	D	F	F	F	F	F	F	F	E
12	Willow Rd/SR-84	AM	D	C	D	C	D	D	C	C	C	C
		PM	E	D	E	F	F	F	E	F	F	E
13	SR-84/Marsh Rd	AM	F	E	F	F	F	D	D	C	C	C
		PM	F	E	F	F	F	D	E	F	D	C
14	SR-84/Middlefield Rd	AM	D	E	D	E	C	D	C	D	D	D
		PM	D	E	E	E	D	D	D	D	D	D
15	SR-1/SR-92	AM	D	C	B	B	C	C	D	C	D	D
		PM	D	D	C	C	C	C	C	D	D	D
16	Main St/SR-92	AM	D	D	B	B	C	B	C	C	C	C
		PM	E	D	B	B	B	B	B	C	C	C

CHAPTER 4: MULTI-MODAL PERFORMANCE MEASURES

Beginning in 1995, the Transit LOS Standard element of the San Mateo County CMP was replaced with the Performance Measure element. Four Performance Measures were selected and incorporated in the 1997 CMP Update and used each update cycle through 2009. The four measures are used to measure the performance of the overall multi-modal transportation system, including non-automotive modes. They are:

BART at South San Francisco station (Source: BART.gov)

- LOS;
- Travel times from single-occupant automobiles, carpools, and transit;
- Pedestrian and bicycle improvements; and
- Ridership/person throughput for transit.

This section presents the 2023 measurements of these performance measures and includes the historic results for context.

4.1: LOS

The levels of service of the CMP corridors and segments are included in the previous sections of this monitoring report. The results show that no roadway segments or intersections exceeded their respective LOS standard following reflection of the interregional trips.

4.2: Travel Times for Single-Occupant Automobiles, Carpools, and Transit

This multi-modal performance measure compares the travel time of the various modes available in the US 101 corridor from the Santa Clara County line to the San Francisco County line. Those include using the general purpose lanes, using the carpool lane for the limits available, or using transit via SamTrans or Caltrain.

The general-purpose travel times previously presented early in this report were the result of a two-month average between April and May 2023. Those included in **Table 19** for the single occupant vehicle represent the calculated

INRIX travel time using the average speed over each TMC segment for each five-minute interval during each respective AM and PM peak period. The HOV travel times are based on five runs in the field for the limits of the HOV between the Santa Clara County line and Whipple Avenue summed with the INRIX results for the balance of the route to the San Francisco County line on the north. Therefore, the HOV portion represents a far smaller sample size than an average for the peak period over two months.

The current limits of the carpool lane in San Mateo County are from the Santa Clara County line to Grand Avenue. For those that are able to use this lane during the peak hours, the remainder of the run will take place in the general purpose lane. Since the 2021 CMP Monitoring Report, the HOV lane was extended an additional 16 miles from Whipple Avenue to Grand Avenue.

Travel times for those using transit include the option to access SamTrans Route 398 along the US-101 corridor or Caltrain. The travel times for the transit options are represented based on the published schedules during the April-May 2023 monitoring period. Actual data collection for these routes was not performed but is shown consistent with methods used in previous LOS monitoring studies.

The travel times for the various mode options are included in **Table 19** below. The table includes the respective travel times, listed by direction and peak periods, for the current reporting period as well as previous years back to 2013.

The results show that travel times are longer in the general purpose lanes along US-101 from 2021 to 2023, in some cases degrading by as much as 12 minutes (AM southbound). This is primarily due to traffic conditions returning to pre-COVID-19 levels since the 2023 travel times are similar to years prior to COVID-19. Travel time savings using the HOV lane are substantial compared to the general purpose lanes, with the HOV lane travel time at least 30 percent less than single occupancy travel time.

Travel time on Caltrain decreased slightly in both directions in both the AM and PM peak periods due to re-implementation of the Baby Bullet express train, which was suspended during the pandemic. The greatest decrease was four minutes in the AM direction.

Established in August 2019, SamTrans Route 398 provides service from the Redwood City Transit City to San Francisco via El Camino Real and US-101 in the AM and PM peak periods, with small detours to the San Bruno

BART Station and San Francisco International Airport. The route runs hourly from 5:07 a.m. to just after midnight on weekdays, and 5:50 a.m. to 11:10 p.m. on weekends. Travel times in the northbound direction either stayed close to the same or increased slightly.

C/CAG has also been exploring the integration of observed travel time data on SamTrans based on automatic vehicle locator (AVL) data. Buses can get stuck in traffic or otherwise be delayed and as such observed travel times may differ from the published schedule. This is not considered for this report.

Table 19: Multi-Modal Travel Times Along US-101 Corridor (in minutes)

Mode of Transportaton	AM - Morning Commute Peak Period												PM - Evening Commute Peak Period											
	Northbound						Southbound						Northbound						Southbound					
	2023	2021	2019	2017	2015	2013	2023	2021	2019	2017	2015	2013	2023	2021	2019	2017	2015	2013	2023	2021	2019	2017	2015	2013
Auto - General Lane	29	23	28	32	32	28	30	22	40	35	36	41	33	24	40	36	39	30	33	26	32	32	32	33
Carpool - HOV Lane	20	24	26	32	36	32	20	22	38	34	35	37	22	24	40	36	42	37	22	26	31	32	35	32
Caltrain (Palo Alto to BayShore Stations)	42	46	40	40	39	23	42	46	43	44	43	27	42	44	40	40	38	24	42	44	39	36	38	23
SamTrans Route 398	58	65	57	80	80	68	70	67	74	-	-	73	66	84	83	-	-	72	61	63	74	91	91	74

4.3: Pedestrian and Bicycle Improvements

The purpose of this performance measure is to maintain a focus on non-vehicular alternatives. This should be reflected in connectivity to transit and other modes to not only make connections convenient, but safe and attractive. During the CMP update process, seven-year Capital Improvement Program (CIP) projects are identified and evaluated. The top-ranked projects are forwarded to MTC to be evaluated in the regional process for State and Federal funding.

C/CAG developed the San Mateo County Comprehensive Bicycle and Pedestrian Plan in 2011 to address the planning, design, funding, and implementation of bicycle and pedestrian projects of countywide significance. The Plan includes a policy framework to guide and evaluate implementation of projects identified by the local implementing cities/towns and the County. To maximize funding available for bikeway projects, the Plan emphasizes projects that improves safety, promote access to jobs, and located within high population as well as employment densities. The Plan also establishes geographical focus areas for countywide investment in pedestrian infrastructure.

The San Mateo County Comprehensive Bicycle and Pedestrian Plan was subsequently updated in 2021 and adopted by the C/CAG Board at their June 2021 meeting. The updated plan proposes 250 miles of bicycle projects and pedestrian projects that address gaps to transit, between jurisdictions, or are within pedestrian priority areas. In addition to the C/CAG plan, approximately 14 cities and towns in San Mateo County have their own bicycle/pedestrian plans.

Bicycle and pedestrian counts were conducted at all 16 CMP intersections and 17 Companion Network intersections during the AM and PM peak period, as well as at eight Coastside intersections during the Saturday AM, Mid-Day, and PM peak periods. **Tables 20 through Table 22** detail the results of these counts.

Table 20: CMP Intersection Bicycle and Pedestrian Counts

ID	Intersection	2hr Peak Period	Total Bike	Total Ped
1	Bayshore Blvd/Geneva Ave	AM	19	41
		PM	10	31
2	SR 35/John Daly Blvd	AM	2	5
		PM	3	14
3	SR 82/John Daly Blvd	AM	8	346
		PM	4	349
4	SR 82/San Bruno Ave	AM	0	59
		PM	2	86
5	SR 82/Millbrae Ave	AM	0	70
		PM	1	140
6	SR 82/Broadway	AM	6	88
		PM	13	134
7	SR 82/Peninsula Ave	AM	1	52
		PM	2	96
8	SR 82/Ralston Ave	AM	6	160
		PM	4	233
9	SR 82/ Holly St	AM	9	45
		PM	7	53
10	SR 82/Whipple Ave	AM	13	72
		PM	16	91
11	University Ave/SR 84	AM	7	16
		PM	1	22
12	Willow Rd/SR 84	AM	3	22
		PM	1	17
13	Marsh Rd/SR 84	AM	8	46
		PM	5	34
14	SR 84/Middlefield Rd	AM	15	121
		PM	17	143
15	SR 1/SR 92	AM	2	28
		PM	1	43
16	Main St/SR 92	AM	1	44
		PM	0	121

Table 21: Companion Network Intersection Bicycle and Pedestrian Counts

ID	Intersection	Peak Period	Total Bike	Total Ped
17	SR 82/3rd Ave	AM	7	124
		PM	16	253
18	Skyline Blvd/SR 92	AM	24	0
		PM	23	1
19	Holly St/Industrial St	AM	4	19
		PM	8	22
20	Whipple Ave/Veterans Blvd	AM	9	52
		PM	1	67
21	Marsh Rd/Middlefield Rd	AM	71	15
		PM	42	16
22	Sand Hill Rd/Santa Cruz Ave	AM	131	27
		PM	141	29
23	University Ave/Bay Rd	AM	7	123
		PM	19	207
24	SR 84/Alamedas de las Pulgas	AM	68	70
		PM	75	39
25	Portola Rd/Alpine Rd	AM	72	26
		PM	68	49
26	SR 35/SR 92	AM	1	0
		PM	1	1
27	El Camino Real/Mission Rd	AM	4	0
		PM	2	0
28	SR 1/Main St	AM	4	47
		PM	0	66
29	El Camino Real/Westborough Rd	AM	4	48
		PM	1	54
30	Capistrano Rd/SR 1	AM	14	36
		PM	3	64
31	S Airport Blvd/San Bruno Ave	AM	15	3
		PM	17	2
32	SR 1/Reina Del Mar Ave	AM	3	50
		PM	2	81
33	SR 1/Cypress Ave	AM	8	3
		PM	5	4

Table 22: Weekend Intersection Bicycle and Pedestrian Counts

ID	Intersection	Peak Period	Total Bike	Total Ped
15	SR 1/SR 92	AM	2	28
		MID	27	26
		PM	9	58
16	Main Street/SR 92	AM	4	34
		MID	21	141
		PM	1	211
18	Skyline Blvd/SR 92	AM	52	0
		MID	141	2
		PM	32	0
26	SR 35/SR 92	AM	3	0
		MID	21	0
		PM	5	0
28	SR 1/Main St	AM	7	24
		MID	28	48
		PM	16	78
30	Capistrano Rd/SR 1	AM	2	7
		MID	13	5
		PM	11	19
31	SR 1/Reina Del Mar Ave	AM	4	64
		MID	13	860
		PM	2	741
33	SR 1/Cypress Ave	AM	8	3
		MID	31	8
		PM	22	2

The results of the counts show that bicycle and pedestrian activity varies across the peak periods and across the county. For the CMP intersections, the intersection with the highest bike activity in the AM peak period was Bayshore Boulevard at Geneva Avenue with 19 bikes, while in the PM peak period it was SR-84/Middlefield Road with 17 bikes. SR-82/John Daly Boulevard had the highest number of pedestrians in both the AM and PM peak periods with 346 and 349 pedestrians respectively.

For the Companion Network intersections, Sand Hill Road/Santa Cruz Avenue had the highest amount of bike activity in the AM and PM peak periods with 131 and 141 bikes respectively. SR-82/3rd Avenue had the highest pedestrian activity in both peak periods with 124 and 253 pedestrians respectively.

On the weekend, Skyline Boulevard/SR-92 had the highest amount of bike activity in all peak periods, with 52 bikes in the AM, 141 bikes in the Mid-Day, and 32 bikes in the PM peak periods. SR-1/Reina del Mar had the highest pedestrian activity in all peak periods, with 41 pedestrians in the AM, 860 pedestrians in the mid-day and 741 in the PM peak period.

Table 23: Historical Comparison Bicycle Counts at CMP Intersections

ID	Intersection	AM Peak Period				PM Peak Period			
		2023	2021	% Change 2021 to 2023	2019	2023	2021	% Change 2021 to 2023	2019
1	Bayshore Blvd/Geneva Ave	15	9	67%	0	6	3	100%	4
2	SR 35/John Daly Blvd	0	5	-100%	4	0	1	-100%	0
3	SR 82/John Daly/Hillside	4	2	100%	2	1	5	-80%	4
4	SR 82/San Bruno Ave	0	0	0%	2	2	3	0%	4
5	SR 82/Millbrae Ave	0	1	-100%	6	0	1	-100%	1
6	SR 82/Broadway	5	9	-44%	6	10	2	400%	8
7	SR 82/Park Rd/Peninsula Ave	1	0	100%	8	1	1	0%	4
8	SR 82/Ralston Ave	0	4	-100%	5	4	3	33%	11
9	SR 82/Holly St	3	5	-40%	6	2	4	-50%	8
10	SR 82/Whipple Ave	8	17	-53%	11	10	10	0%	6
11	University Ave/SR 84	3	4	-25%	20	1	3	-67%	26
12	Willow Rd/SR 84	2	1	100%	29	0	7	-100%	7
13	SR 84/Marsh	2	3	-33%	7	5	10	-50%	23
14	SR 84/Middlefield Rd	10	6	67%	24	8	17	-53%	12
15	SR 1/SR92	1	3	-67%	20	1	4	-75%	5
16	Main St/SR 92	0	2	-100%	7	0	1	-100%	11
	TOTAL BIKES	**54**	**71**	**-24%**	**157**	**51**	**75**	**-32%**	**134**

The project team also compared the number of bikes and pedestrians during the peak hour of each intersection between 2019 and 2021, to better understand pandemic effects on active transportation.

Historical comparisons of the CMP intersections are presented in **Table 23** and **Figures 22** and **23** for bicycles, and **Table 24** and **Figures 24** and **25** for pedestrians.

Table 23 indicates that bicycle counts continue to decrease since 2021 by as much as 32% during the PM peak period. Although vehicular volumes have increased and recovered to close to pre-pandemic levels, bicycle volumes are continuing to decrease. It should be noted, however, that active modes of travel can also be sensitive to moderate changes in weather, temperature, or other field conditions.

Figure 22: Historical Bicycle Counts Comparison – AM Peak Hour

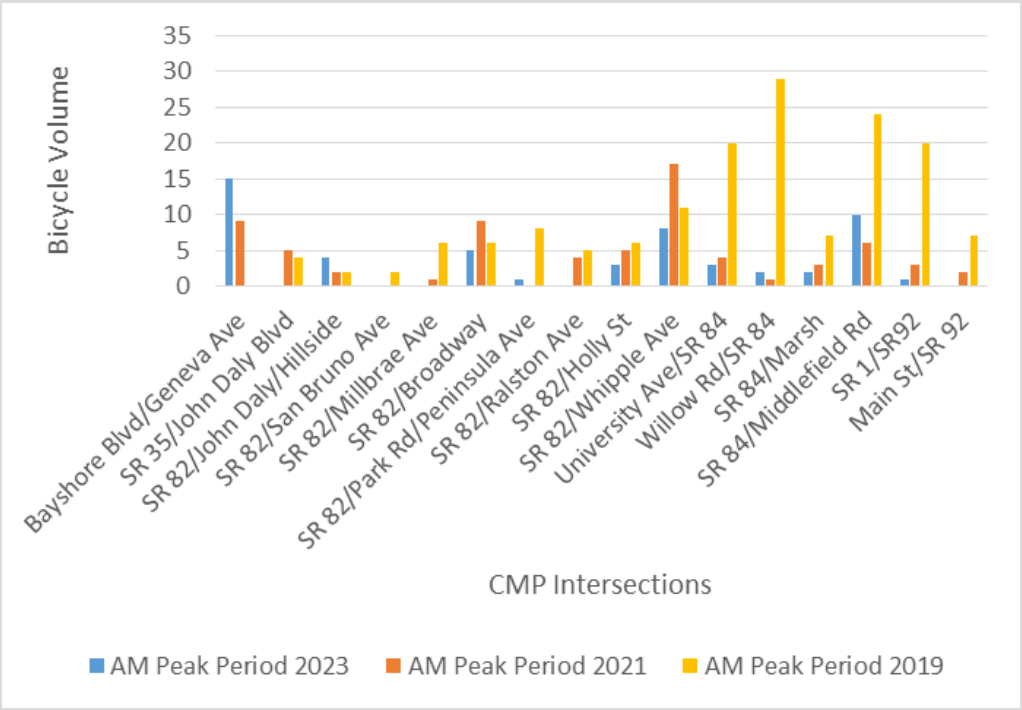


Figure 23: Historical Bicycle Counts Comparison – PM Peak Hour

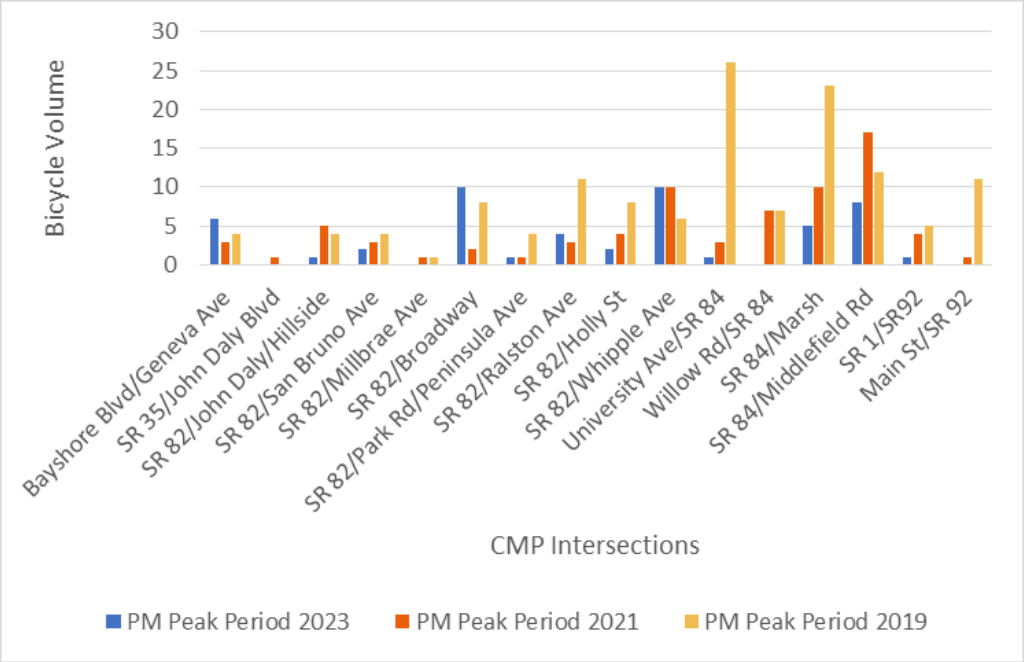


Table 24: Historical Comparison Pedestrian Counts at CMP Intersections

ID	Intersection	AM Peak Period				PM Peak Period			
		2023	2021	% Change 2021 to 2023	2019	2023	2021	% Change 2021 to 2023	2019
1	Bayshore Blvd/Geneva Ave	14	9	56%	20	20	5	300%	15
2	SR 35/John Daly Blvd	4	5	-20%	2	7	2	250%	1
3	SR 82/John Daly/Hillside	199	67	197%	173	196	107	83%	292
4	SR 82/San Bruno Ave	36	18	100%	49	49	41	20%	63
5	SR 82/Millbrae Ave	42	29	45%	244	67	13	415%	224
6	SR 82/Broadway	43	63	-32%	63	65	49	33%	64
7	SR 82/Park Rd/Peninsula Ave	26	17	53%	16	46	12	283%	30
8	SR 82/Ralston Ave	110	29	279%	92	103	42	145%	120
9	SR 82/Holly St	30	28	7%	40	27	29	-7%	49
10	SR 82/Whipple Ave	46	46	0%	32	35	31	13%	57
11	University Ave/SR 84	7	4	75%	12	18	3	500%	9
12	Willow Rd/SR 84	11	4	175%	22	9	7	29%	52
13	SR 84/Marsh	27	8	238%	11	24	19	26%	6
14	SR 84/Middlefield Rd	70	38	84%	22	81	49	65%	23
15	SR 1/SR92	16	14	14%	21	18	25	-28%	23
16	Main St/SR 92	29	18	61%	50	52	47	11%	50
	TOTAL PEDESTRIANS	**710**	**397**	**79%**	**869**	**817**	**481**	**70%**	**1078**

On Table 24, between 2023 and 2021, pedestrian activity increased on average by 79% in the AM peak hour and 70% in the PM peak hour with slight decreases at four intersections. Pedestrian volumes are nearly as high as those in 2019.

Figure 24: Historical Pedestrian Counts Comparison – AM Peak Hour

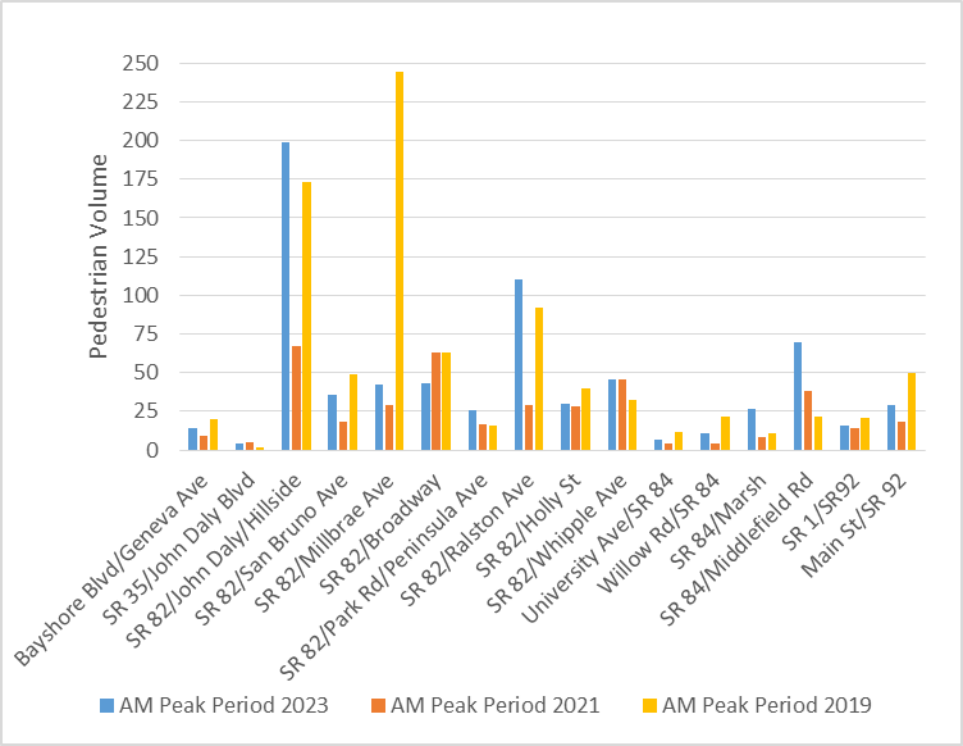
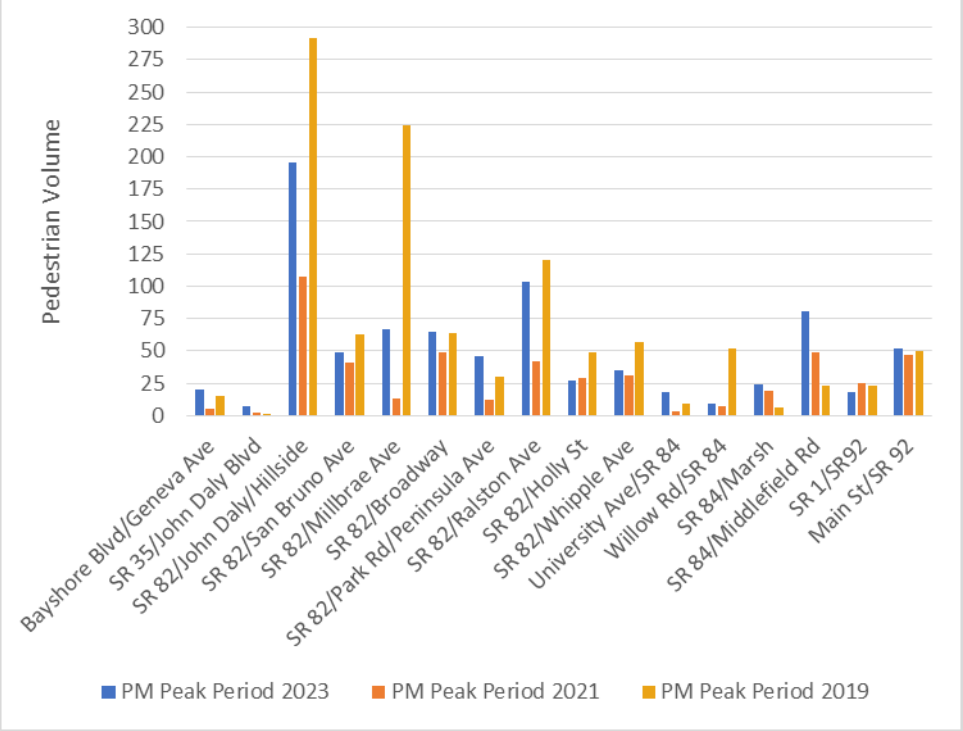


Figure 25: Historical Pedestrian Counts Comparison – PM Peak Hour



4.4: Ridership/Person Throughput for Transit

The purpose of this performance measure is to document the number of patrons using the available transit options. Within San Mateo County, there are three options, including SamTrans, Caltrain, and BART. BART has six stations within San Mateo County: Daly City, Colma, South San Francisco, San Francisco International Airport, San Bruno, and Millbrae.

The COVID-19 pandemic caused a drastic decrease in ridership for transit agencies across San Mateo County in FY 21. However, there is a measurable recovery in transit ridership in FY 23. SamTrans total ridership saw an increase of 73%, Caltrain saw an increase of 290% and BART saw an increase of 217% over FY 21.

Even with these increases in annual ridership, it is still well below pre-pandemic numbers. When comparing FY 23 with pre-pandemic ridership numbers from FY 19, SamTrans total ridership is 27% lower, Caltrain is 71% lower and BART is 58% lower.

This indicates that although transit ridership is continuing to increase in the wake of the pandemic, it is slow to recover as many travel patterns have not shifted to pre-pandemic patterns. For example, many companies have implement work from home policies. Additionally, although vehicle traffic volumes have increased, congestion is not quite back to the pre-pandemic level, so potentially, commuters are choosing to drive rather than take transit.

Annual ridership and average weekday ridership for FY 21 is presented in **Table 25** alongside historical data back to FY 17.

Table 25: Transit Ridership by Agency

Transit Agency	Annual Total					Average Weekday				
	FY 2023	FY 2021	FY 2019	FY2017	FY 2015	FY 2023	FY 2021	FY 2019	FY 2017	FY 2015
SamTrans	7,796,753	4,503,358	10,670,850	11,816,760	13,158,703	30,387	13,620	35,150	38,700	42,981
Caltrain	5,052,371	1,295,656	17,662,773	18,648,850	18,995,161	20,453	4,099	63,597	62,190	58,245
BART (Colma and Daly City)	3,203,688	1,211,716	7,741,549	7,818,023	8,155,340	10,340	3,934	26,483	25,269	28,050
BART (South San Francisco, San Bruno, SFO, and Millbrae)	4,798,306	1,312,774	11,261,768	12,102,872	12,614,731	14,630	4,236	37,687	39,989	40,741
Combined Transit	20,851,118	8,323,504	47,336,940	50,386,505	52,923,935	75,810	25,889	162,917	166,148	170,017

Sources: SamTrans Board Agenda Packet Aug 2, 2023, Caltrain Board Agenda Packet Aug 3, 2023, BART website

CHAPTER 5: OTHER PERFORMANCE METRICS

Ralston Avenue in Belmont, one of the Companion Network segments

In addition to the LOS monitoring and multi-modal performance metrics presented above, two additional metrics are offered to measure the status of the CMP network in San Mateo County: volume comparisons during the COVID-19 pandemic and after, and travel time reliability. Each is described below.

5.1: COVID-19 Pandemic Volume Comparisons

The COVID-19 pandemic recovery has resulted in an increase in traffic across San Mateo County, which can be evidenced in the degraded LOS on more roadway segments countywide (described in Chapter 3) compared to the 2021 CMP Update. During the process to collect traffic counts and analyze INRIX data, TJKM prepared charts comparing 2021 data to current 2023 data to understand the precise change in traffic levels/travel speeds on San Mateo County's CMP network. These are presented below in **Tables 26 through Table 29**.

Travel speeds decreased by an average of 12% in the AM peak period and 16% in the PM peak period between 2021 and 2023.

Volumes from roadway segment 72-hour traffic counts increased by an average of 23% when compared to available data from 2021. However, when comparing 2023 volumes to 2017 volumes, average traffic counts decreased by an average of 12%. Therefore, based on the 72-hour traffic counts, traffic volumes are still slightly below pre-pandemic conditions.

Intersection turning movement count volumes similarly increased by an average of 20% when compared to 2021 data. However, from 2019 to 2021, intersection turning movement count volumes decreased 21% which indicated traffic volumes are similar to pre-pandemic levels.

Note that 10 roadway segments in the CMP network utilize turning movement counts to derive their peak hour volume for V/C calculations and these are presented in a separate table.

Table 26: Freeway Average Speed Comparisons

				AM Peak Period			PM Peak Period		
Segment	Limits	Direction	Free Flow Speed	2023 Avg. Speed	2021 Avg. Speed	% Difference	2023 Avg. Speed	2021 Avg. Speed	% Difference
SR-1	SF County Line to Linda Mar Blvd	NB	55	49	55	-11%	49	54	-9%
		SB	55	53	55	-4%	48	54	-11%
SR-92	I-280 to US-101	EB	60	46	63	-27%	26	59	-56%
		WB	60	48	59	-19%	55	60	-8%
SR-92	US-101 to Alameda County Line	EB	60	65	64	2%	25	56	-55%
		WB	60	37	54	-31%	62	65	-5%
US-101	SF County Line to I-380	NB	65	53	66	-20%	48	66	-27%
		SB	65	57	66	-14%	47	64	-27%
US-101	I-380 to Millbrae Ave	NB	65	66	65	2%	59	63	-6%
		SB	65	59	67	-12%	47	44	7%
US-101	Millbrae Ave to Broadway	NB	65	60	62	-3%	61	61	0%
		SB	65	52	65	-20%	32	52	-38%
US-101	Broadway to Peninsula Ave	NB	65	51	61	-16%	52	64	-19%
		SB	65	52	62	-16%	26	52	-50%
US-101	Peninsula Ave to SR-92	NB	65	35	51	-31%	51	63	-19%
		SB	65	54	65	-17%	42	57	-26%
US-101	SR-92 to Whipple Ave	NB	65	59	63	-6%	27	47	-43%
		SB	65	56	65	-14%	64	62	3%
US-101	Whipple Ave to Santa Clara County Line	NB	65	53	64	-17%	56	65	-14%
		SB	65	40	66	-39%	50	62	-19%
I-280	SF County Line to SR-1 (North)	EB	65	64	69	-7%	59	61	-3%
		WB	65	68	67	1%	66	65	2%
I-280	SR-1 (North) to SR-1 (South)	EB	65	65	68	-4%	53	59	-10%
		WB	65	64	68	-6%	64	67	-4%
I-280	SR-1 (South) to San Bruno Ave	EB	65	66	68	-3%	45	67	-33%
		WB	65	37	67	-45%	65	65	0%
I-280	San Bruno Ave to SR-92	EB	65	69	70	-1%	67	71	-6%
		WB	65	70	70	0%	69	70	-1%
I-280	SR-92 to SR-84	EB	65	70	70	0%	60	71	-15%
		WB	65	67	70	-4%	69	70	-1%
I-280	SR-84 to Santa Clara County Line	EB	65	69	69	0%	41	70	-41%
		WB	65	68	69	-1%	64	69	-7%
I-380	I-280 to US-101	NB	65	51	63	-19%	60	63	-5%
		SB	65	59	60	-2%	42	59	-29%
I-380	US-101 to Airport Access Rd	NB	65	43	46	-7%	42	44	-5%
		SB	65	37	38	-3%	41	39	5%

Table 27: Roadway Segment 72-Hour Volume Comparisons – 2021 to 2023

Route	Roadway Segment	Direction	AM Peak Hour			PM Peak Hour		
			2021 Volume	2023 Volume	% Difference	2021 Volume	2023 Volume	% Difference
SR-1	Linda Mar Blvd to Frenchmans Creek Rd	NB	497	539	8%	534	580	9%
		SB	429	439	2%	611	662	8%
SR-1	Frenchmans Creek Rd to Miramontes Rd	NB	815	870	7%	1239	1322	7%
		SB	1080	1336	24%	1107	1002	-9%
SR-1	Miramontes Rd to Santa Cruz County Line	NB	116	162	40%	230	232	1%
		SB	137	142	4%	262	272	4%
SR-35	San Francisco County Line to Sneath Ln	NB	857	1474	72%	833	1318	58%
		SB	544	950	75%	916	1299	42%
SR-35	Sneath Ln to I-280	NB	463	635	37%	785	1131	44%
		SB	744	1258	69%	451	584	29%
SR-35	I-280 to SR 92	NB	173	236	36%	160	224	40%
		SB	152	186	22%	213	289	36%
SR-35	SR-92 to SR-84	NB	74	135	82%	98	136	39%
		SB	78	113	45%	101	149	48%
SR-35	SR-84 to Santa Clara County Line	NB	100	64	-36%	87	119	37%
		SB	46	139	202%	96	98	2%
SR-82	3rd Ave to SR-92	NB	1323	1401	6%	1317	1375	4%
		SB	993	1290	30%	1418	1362	-4%
SR-82	SR-92 to Hillsdale Ave	NB	1164	1547	33%	1735	2032	17%
		SB	967	1261	30%	1470	1400	-5%
SR-82	Hillsdale Ave to 42nd Ave*	NB	625	780	25%	1052	1117	6%
		SB	646	714	11%	872	981	13%
SR-82	SR-84 to Glenwood Ave	NB	1094	1153	5%	1630	1742	7%
		SB	1546	1904	23%	1712	1686	-2%
SR-82	Glenwood Ave to Santa Cruz Avenue	NB	594	742	25%	1139	1339	18%
		SB	853	940	10%	899	914	2%
SR-82	Santa Cruz Ave to Santa Clara County Line	NB	651	797	22%	1028	1200	17%
		SB	769	1033	34%	855	1123	31%
SR-84	SR-1 to Portola Rd	EB	205	34	-83%	156	35	-78%
		WB	108	34	-69%	210	26	-88%
SR-84	Portola Rd to I-280	EB	319	73	-77%	197	94	-52%
		WB	212	107	-50%	178	71	-60%
SR-84	I-280 to Alameda de las Pulgas	EB	1288	1539	19%	1266	1486	17%
		WB	1948	1710	-12%	1630	1635	0%
SR-84	Alameda de las Pulgas to US-101	EB	1423	1433	1%	1457	1407	-3%
		WB	1407	1244	-12%	1555	1277	-18%
SR-84	US-101 to Willow Rd	EB	712	1434	101%	1530	1697	11%

Route	Roadway Segment	Direction	AM Peak Hour			PM Peak Hour		
			2021 Volume	2023 Volume	% Difference	2021 Volume	2023 Volume	% Difference
		WB	1565	2050	31%	909	1514	67%
SR-84	Willow Rd to University Ave	EB	994	1057	6%	2482	1934	-22%
		WB	2169	3374	56%	936	1154	23%
SR-84	University Ave to Alameda County Line	EB	1021	1291	26%	2790	3175	14%
		WB	2831	3721	31%	1163	1273	9%
SR-92	SR-1 to I-280	EB	921	1139	24%	766	741	-3%
		WB	653	612	-6%	1067	1155	8%
SR-109	Kavanaugh Drive to SR-84 (Bayfront Expwy.)	NB	485	600	24%	978	1710	75%
		SB	739	1273	72%	406	392	-3%
SR-114	US101 to SR-84 (Bayfront Expressway)	NB	485	780	61%	1213	1373	13%
		SB	1040	1133	9%	467	891	91%
Mission St	San Francisco County Line to SR-82	NB	233	248	6%	373	385	3%
		SB	263	205	-22%	357	306	-14%

Table 28: Roadway Segment Turning Movement Count Volume Comparisons – 2021 to 2023

Route	Roadway Segment	Direction	AM Peak Hour			PM Peak Period		
			2021 Volume	2023 Volume	% Difference	2021 Volume	2023 Volume	% Difference
SR-82	San Francisco County Line to John Daly Blvd	NB	517	661	28%	836	871	4%
		SB	512	707	38%	788	842	7%
SR-82	John Daly Blvd to Hickey Blvd	NB	369	541	47%	774	813	5%
		SB	448	620	38%	695	728	5%
SR-82	Hickey Blvd to I-380	NB	890	1104	24%	1257	1371	9%
		SB	767	868	13%	1310	1396	7%
SR-82	I-380 to Trousdale Dr	NB	736	859	17%	1147	1112	-3%
		SB	971	1185	22%	1080	1291	20%
SR-82	Trousdale Dr to 3rd Ave	NB	733	732	0%	828	840	1%
		SB	723	839	16%	751	853	14%
SR-82	42nd Ave to Holly St	NB	525	806	54%	1006	966	-4%
		SB	642	842	31%	961	959	0%
SR-82	Holly St to Whipple Ave	NB	625	926	48%	1061	1248	18%
		SB	751	947	26%	1139	1142	0%
SR-82	Whipple Ave to SR-84	NB	963	1332	38%	1407	1455	3%
		SB	838	1164	39%	1212	1188	-2%
Geneva Ave	San Francisco County Line to Bayshore Blvd	EB	722	818	13%	496	522	5%
		WB	424	515	21%	848	1003	18%
Bayshore Blvd	San Francisco County Line to Geneva Ave	NB	438	448	2%	926	978	6%
		SB	639	823	29%	524	494	-6%

Note: These roadway segments use TMCs to derive their volumes. It includes all volumes approaching or moving away from the side of the intersection indicated in the 2017 Monitoring Report LOS calculation spreadsheets.

Table 29: Intersection Turning Movement Count Volume Comparisons – 2021 to 2023

ID	Roadway Segment	Peak Period	2021 Peak Hour Volume	2023 Peak Hour Volume	% Difference
1	Bayshore Blvd/Geneva Ave	AM	1762	1967	12%
		PM	2178	2225	2%
2	SR-35/John Daly Blvd	AM	1796	2809	56%
		PM	2264	3110	37%
3	SR-82/John Daly Blvd/Hillside Dr	AM	1622	2205	36%
		PM	2535	2662	5%
4	SR-82/San Bruno Ave	AM	2420	3239	34%
		PM	3617	4172	15%
5	SR-82/Millbrae Ave	AM	3456	4062	18%
		PM	4336	4643	7%
6	SR-82/Broadway	AM	1862	2042	10%
		PM	2012	2099	4%
7	SR-82/Peninsula Ave/Park Rd	AM	1693	1784	5%
		PM	2004	2040	2%
8	SR-82/Ralston Ave	AM	2866	3450	20%
		PM	3884	4091	5%
9	SR-82/Holly St	AM	1969	2934	49%
		PM	3037	3359	11%
10	SR-82/Whipple Ave	AM	2958	3503	18%
		PM	3925	4068	4%
11	University Ave/SR-84	AM	4398	5913	34%
		PM	4861	6421	32%
12	Willow Rd/SR-84	AM	3550	5126	44%
		PM	3853	5100	32%
13	Marsh Rd/SR-84	AM	2695	4318	60%
		PM	3110	4033	30%
14	Middlefield Rd/SR-84	AM	4038	4738	17%
		PM	5024	4840	-4%
15	SR-1/SR-92	AM	1921	2764	44%
		PM	2627	2866	9%
16	SR-92/Main St	AM	1794	2011	12%
		PM	2279	2290	0%

5.2: Travel Time Reliability

Travel time reliability is the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day. Travel time reliability is significant to many transportation users. Driver's value reliability as it allows them to make better use of their time. Many transportation planners and decision makers have started to consider travel time reliability as a performance measure throughout the United States. A more extensive discussion of these measures can be found in the Federal Highway Administration (FHWA) publication *Travel Time Reliability*, including guidance on the calculation methodology and application of travel time reliability measures.

Travel time reliability measures are relatively new, but a few have proven effective. Most measures compare high-delay days to those with an average delay. The most effective methods of measuring travel time reliability are 90th or 95th percentile travel times, buffer index, and planning time index, explained in the following sections. Related measurements include average travel time and free flow travel time.

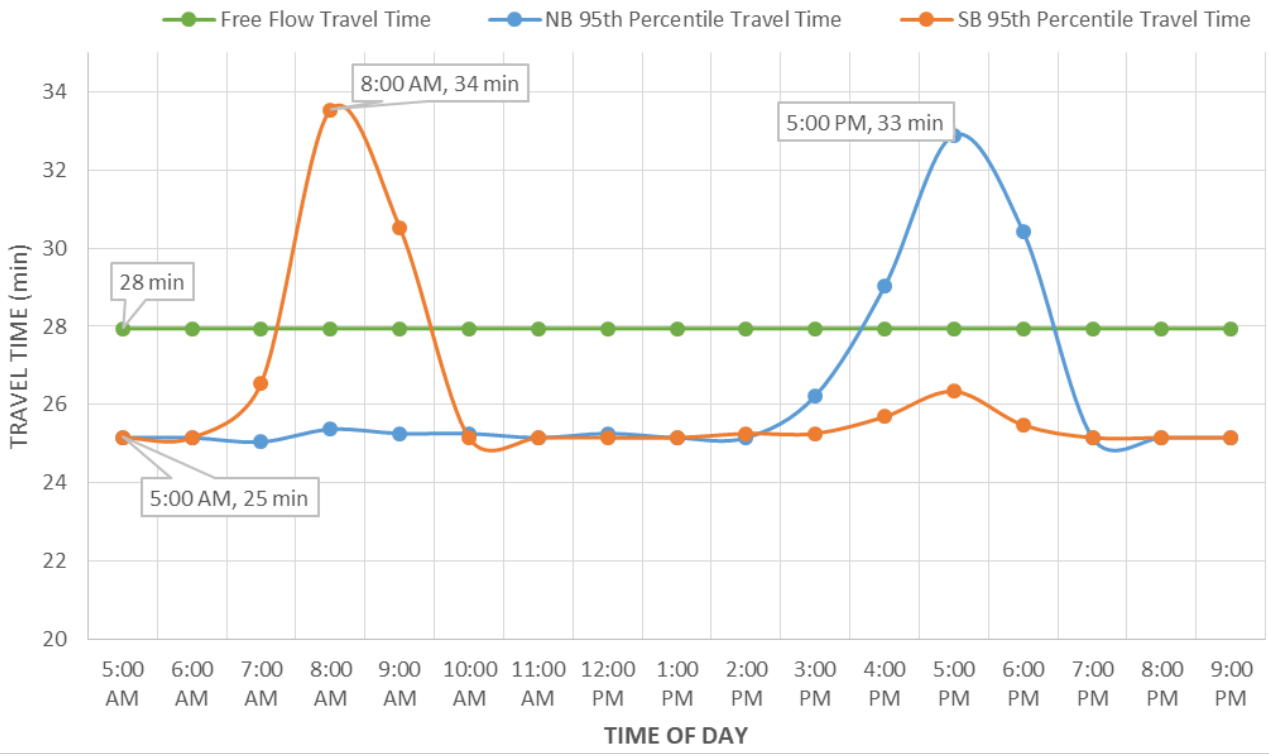
This method, the *90th or 95th percentile travel times*, is perhaps the simplest method to measure travel time reliability. It estimates how bad delay will be on specific routes during the heaviest traffic days. The one or two bad days each month mark the 95th or 90th percentile, respectively. Users familiar with a route (such as commuters) can see how bad traffic is during those few bad days and plan their trips accordingly. This measure is reported in minutes.

The *buffer index* represents the extra time (or time cushion) that travelers must add to their average travel time when planning trips to ensure on-time arrival. For example, a buffer index of 40% means that for a trip that usually takes 20 minutes a traveler should budget an additional eight minutes to ensure on-time arrival. The additional eight minutes is called the buffer time. Therefore, the traveler should allow 28 minutes for the trip in order to ensure on-time arrival 95% of the time.

The *planning time index* represents how much total time a traveler should allow to ensure on-time arrival. While the buffer index shows the *additional* travel time that is necessary, the planning time index shows the *total* travel time that is necessary. The Planning Time Index is the ratio of the 95th percentile travel time to the free-flow travel time. For example, a planning time index of 1.60 means that for a trip that takes 15 minutes in light traffic a traveler should budget a total of 24 minutes to ensure on-time arrival 95% of the time.

As an added value task, TJKM prepared travel time reliability charts for all freeways in San Mateo County where the data was available. This included I-280, SR-92 (I-280 to Alameda County Line), and US-101. Charts were prepared for the entire freeway from one end of the county to the other (with the exception of SR-92 as noted above). Each graph compares the travel time along the corridor under free flow conditions to the northbound/eastbound and southbound/westbound 95th percentile travel times between 5am-9pm. Planning time index data was collected by TJKM from the Caltrans Performance Measurement System (PeMS) for midweek days during April/May 2023, excluding holidays and any days with adverse weather. Caltrans assumes a free flow speed of 60 miles per hour (mph) for calculating free flow travel time. As this speed is below the posted speed limit of 65 mph, speeds increase during off peak times and result in actual 95th percentile travel times below the calculated free flow travel time.

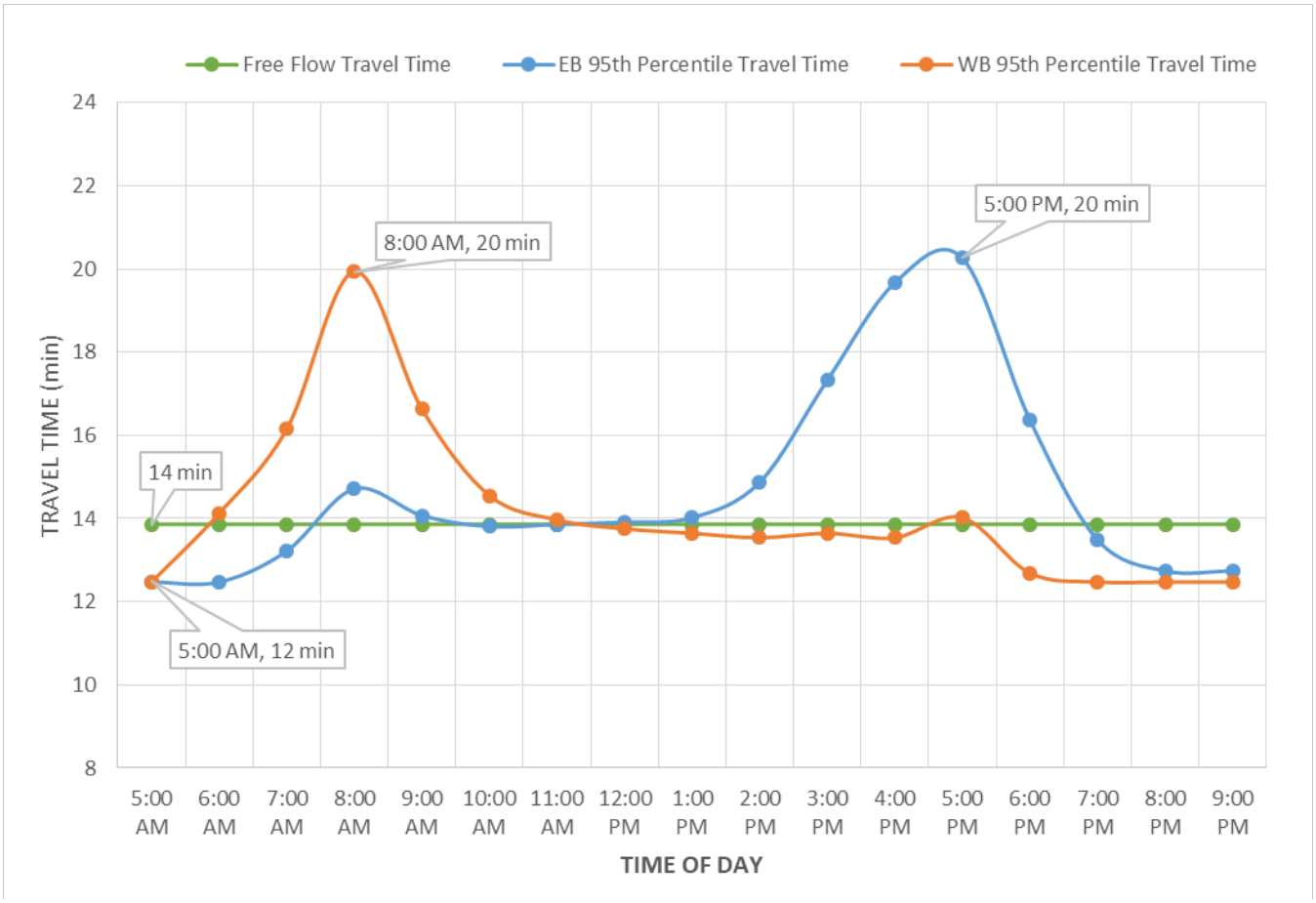
Figure 26: Travel Time Reliability Chart – I-280



On I-280, the southbound direction experienced delays during the AM peak period from approximately 7:00 AM to 10:00 AM and the northbound direction experienced delays during the PM peak period from 3:30 PM to 7:00 PM. The maximum travel time was 34 minutes in the AM peak and 33 minutes in the PM peak, compared to the free flow travel time of 28 minutes assuming a speed of 60 mph. In both directions, travel times reduced below the free flow travel time of 28 minutes, reducing to as low as 25 minutes during non-peak periods. The trends in

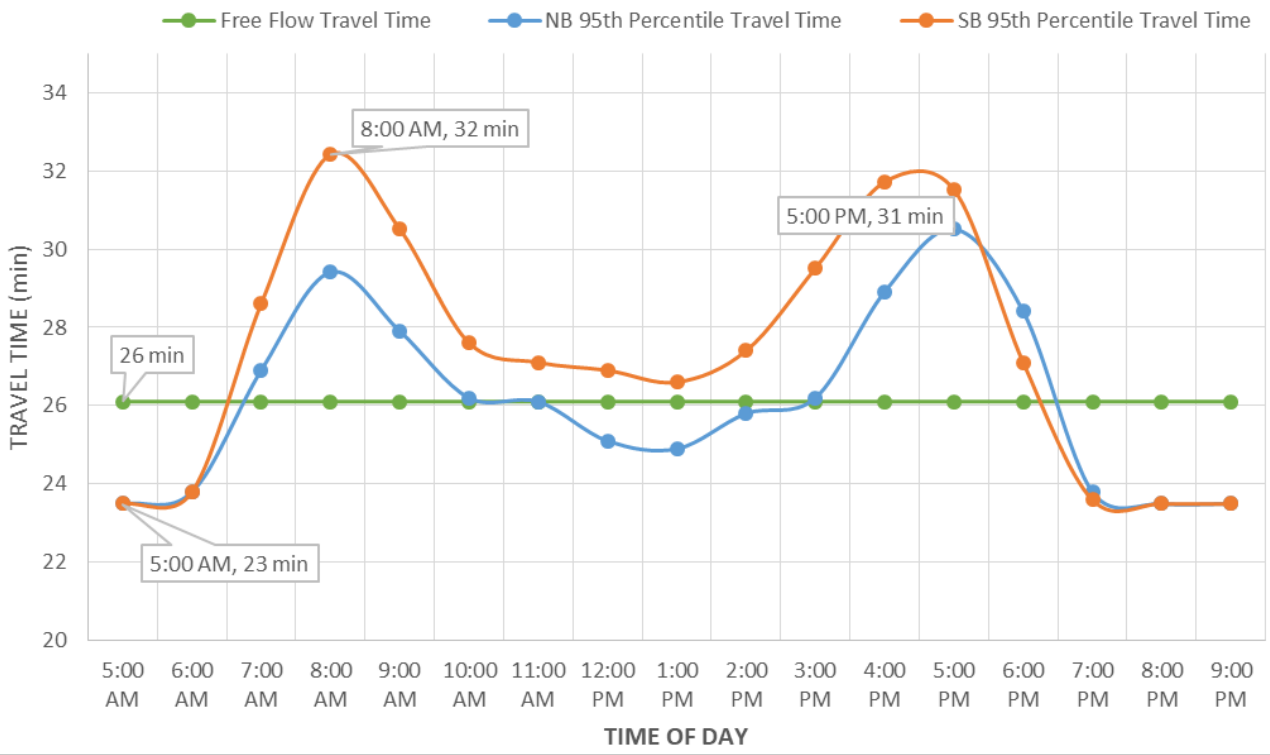
this chart follow the typical commute patterns on I-280, as commuters travel from San Francisco County to Santa Clara County for work in the morning, then the reverse in the afternoon.

Figure 27: Travel Time Reliability Chart – SR-92



On SR-92, westbound travel times are highest in the AM peak period with a maximum travel time of 20 minutes at 8:00 AM. Eastbound travel times are highest in the PM peak period with a maximum travel time of 20 minutes at 5:00 PM. The trends in this chart follow the typical commute patterns on SR-92, as commuters travel from the East Bay to San Mateo County for work in the morning, then the reverse in the afternoon.

Figure 28: Travel Time Reliability Chart – US-101



On US-101, southbound travel times increased in both the AM and PM peak period, reaching as high as 32 minutes near 8:00 AM and 4:30 PM. Northbound travel times also increased both in the AM and the PM peak period, reaching 29 minutes at 8:30 AM and 31 minutes at 5:30 PM. The northbound direction reduced below the free flow travel time of 26 minutes in off-peak hours. The southbound direction gradually reduced to just above the free flow travel time between the AM and PM peak periods, and then reduced below that after 7:00 pm. This trend is typical for commute patters on US-101, as commuters travel in both directions in this vicinity.

CHAPTER 6: NEXT STEPS

6.1: 2023 CMP Conformance

Pedestrian approaching El Camino Real (SR-82) in Colma

As discussed earlier, no roadway segments or intersections were found to be outside the established LOS standards after interregional reductions. The C/CAG Board approved the Countywide Congestion Relief Plan (CRP), which is a countywide deficiency plan to address these and future deficiencies. This Plan will relieve all San Mateo County jurisdictions - 20 cities/towns and the County - from having to develop and implement individual deficiency plans for current LOS changes and any that may be detected in future years. No actions or corrective measures are required and all jurisdictions are considered in conformance.

6.2: CMP Update

The next step in the CMP process is to complete the 2023 CMP Update. TJKM is preparing the document on behalf of C/CAG. This Monitoring Report will be included as an appendix to the CMP Report.