Atherton • Belmont • Brisbane • Burlingame • Colma • Daly City • East Palo Alto • Foster City • Half Moon Bay • Hillsborough • Menlo Park Millbrae • Pacifica • Portola Valley • Redwood City • San Bruno • San Carlos • San Mateo • San Mateo County • South San Francisco • Woodside

AGENDA

Congestion Management & Environmental Quality (CMEQ) Committee

Date: Monday, October 28, 2019
Time: 3:00 p.m.
Place: San Mateo City Hall, Conference Room C
330 West 20th Avenue, San Mateo, California 94403

1.	Public comment on items not on the agenda.	Presentations are limited to 3 mins	
2.	Issues from the October 2019 C/CAG Board meeting: • Approved - 2020 State Transportation Improvement Program (STIP) for San Mateo County • Approved - Filing of application for $7,177,000 from the RTIP for US-101 Managed Lane Project north of I-380 • Approved - Appointment of Maryann Moise Derwin (Portola Valley) to serve on the San Mateo County Express Lanes JPA for a two-year term	Information (Lacap)	No Materials
3.	Approval of minutes of August 26, 2019 meeting	Action (Garbarino)	Page 1 - 3
4.	Receive a presentation on the US 101/SR 92 Interchange Improvement studies	Information (Ocampo)	Page 4 - 6
5.	Review and recommend approval of the Draft 2019 Congestion Management Program (CMP) and Monitoring Report	Action (Lacap)	Page 7 - 52
6.	Executive Director Report	Information (Wong)	No Materials
7.	Member comments and announcements	Information (Garbarino)	
8.	Adjournment and establishment of next meeting date: **November 25, 2019**	Action (Garbarino)	

PUBLIC NOTICING: All notices of C/CAG regular Board meetings, standing committee meetings, and special meetings will be posted at the San Mateo County Transit District Office, 1250 San Carlos Ave., San Carlos, CA, and on C/CAG's website at: http://www.ccag.ca.gov.

PUBLIC RECORDS: Public records that relate to any item on the open session agenda for a regular Board meeting, standing committee meeting, or special meeting are available for public inspection. Those public records that are distributed less than 72 hours prior to a regular Board meeting are available for public inspection at the same time they are distributed to all members, or a majority of the members, of the Board. The Board has designated the City/County Association of Governments of San Mateo County (C/CAG), located at 555 County Center, 5th Floor, Redwood City, CA 94063, for the purpose of making public records available for inspection. Such public records are also available on C/CAG's website at: http://www.ccag.ca.gov.

PUBLIC PARTICIPATION: Public comment is limited to two minutes per speaker. Persons with disabilities who require auxiliary aids or services in attending and participating in this meeting should contact Mima Guilles at (650) 599-1406, five working days prior to the meeting date.

If you have any questions about this agenda, please contact C/CAG staff: Jeff Lacap, 650-599-1455

CITY/COUNTY ASSOCIATION OF GOVERNMENTS COMMITTEE ON CONGESTION MANAGEMENTAND ENVIRONMENTAL QUALITY (CMEQ)

MINUTES
MEETING OF August 26, 2019

The meeting was called to order by Chair Garbarino in Conference Room C at San Mateo City Hall at 3:01 p.m. Attendance sheet is attached. Due to a lack of quorum at the beginning of the meeting, Item 4 was moved up on the agenda.

1. Public comment on items not on the agenda.

None.

2. Issues from the July 2019 C/CAG Board meeting. (Information)

Jeff Lacap, C/CAG Staff, noted the agenda listed the status of items recently addressed by the C/CAG Board, and offered to respond to any questions.

4. Presentation on San Mateo County Energy and Water Strategy 2025. (Information)

John Allan, Sustainability Coordinator from the County of San Mateo Office of Sustainability, presented on the San Mateo County Energy and Water Strategy 2025.The report is an update to the San Mateo County Energy Strategy 2012 jointly developed by C/CAG and the County, which included both energy and water goals, strategies and actions. John also reported on feedback received from stakeholders and next steps.

Committee members had questions on local basin regulations, feedback response rate, different criteria for Sea Level Rise for coastside communities and bayside communities, water sustainability, if trees and landscaping are factored in the strategy, stormwater capture, and saltwater intrusion.

Committee members provided comments only. No formal action needed.

3. Approval of minutes of the June 24, 2019 meeting. (Action)

Motion – Committee member Lee/ 2nd Committee member Bonilla: To approve the minutes of the June 24, 2019 CMEQ meeting. Motion passed (8-0), with member Roberts abstaining.

5. Review and recommend approval of the Draft 2020 State Transportation Improvement Program (STIP) for San Mateo County. (Action)

Jeff Lacap, C/CAG Staff, presented the list of projects proposed for the Draft 2020 State Transportation Improvement Program for San Mateo County, a five-year funding plan updated every two years. For the 2020 STIP, there is approximately $7 million in programming capacity. The projects proposed must meet certain requirements including having a completed Project Study Report (PSR) and project phases applying for STIP funds must have a full funding plan. C/CAG reached out to public works directors for input for STIP candidate projects and worked with Caltrans and San Mateo County Transportation Authority for additional input.

Projects in the 2018 STIP remain committed in the 2020 STIP. The new funding would be directed towards the US-101 Managed Lane Project North of I-380.

Committee members had questions about the status of US-101 Managed Lane Project North of I-380 and the 92/101 Interchange Project.

Motion – Committee member O'Neill/ 2nd Committee member O'Connell: To approve the Draft 2020 State Transportation Improvement Program for San Mateo County. Motion passed unanimously (10-0).

6. Executive Director Report (Information)

Executive Director Wong reported on the following items:

- Multi-Benefit Stormwater Capture Budget Request – Assembly Member Kevin Muller was able to secure $3 million in the State budget to advance designs for multi-benefit stormwater capture projects in San Mateo County.
- US-101 Express Lane Project – At the August California Transportation Committee (CTC) meeting, the CTC approved San Mateo County Express Lane JPA's application to operate a toll facility in the county.
- C/CAG Bicycle and Pedestrian Comprehensive Plan Update – Staff is in the process of finalizing an agreement with a consultant to update the C/CAG Bicycle and Pedestrian Comprehensive Plan Update pending Board approval in September.
- Faster Bay Area – Sandy has participated in a conversation on the proposed transportation measure for the Bay Area sponsored by the Bay Area Council, the San Francisco Bay Area Planning and Urban Research Association (SPUR), and the Silicon Valley Leadership Group. The sponsors are proposing for an event in the County in the September/October timeframe.

7. Member comments and announcements (Information)

Member Lee reported on the upcoming Millbrae Art & Wine and Millbrae Moon Festival happening Labor Day Weekend.

Member Bonilla reported on the upcoming activities in celebration of the 125th anniversary of the City of San Mateo.

8. Adjournment and establishment of next meeting date

The meeting adjourned at 3:54 pm.
The next regular meeting was scheduled for September 30, 2019.

2019 C/CAG Congestion Management & Environmental Quality (CMEQ) Committee Attendance Report													
Agency	**Representative**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Metropolitan Transportation Commission	Gina Papan		N/A	x	x				x				
City of Redwood City	Shelly Masur		x	x	x		x						
Town of Atherton	Elizabeth Lewis		x		x	x			x				
City of San Bruno	Irene O'Connell			x	x	x	x		x				
City of Burlingame	Emily Beach		x	x	x	x	x		x				
Environmental Community	Lennie Roberts		x	x	x	x			x				
City of Pacifica	Mike O'Neill					x	x		x				
City of South San Francisco	Richard Garbarino		x	x			x		x				
Public	Josh Powell		x	x	x								
City of Millbrae	Wayne Lee		x	x	x	x	x		x				
City of San Mateo	Rick Bonilla			x	x		x		x				
Agencies with Transportation Interests	Adina Levin		x	x	x	x	x						
Business Community	Linda Koelling		x	x	x	x	x		x				
San Mateo County Transit District (SamTrans)	Pete Ratto		x	x	x	x	x		x				
City of Belmont	Julia Mates		N/A	x	x								
Peninsula Corridor Joint Powers Board (Caltrain)	*Vacant*		N/A	N/A	N/A		N/A						

Staff and guests in attendance for the August 26, 2019 meeting:
Sandy Wong, Jeff Lacap, Jean Higaki - C/CAG Staff
Public Member
John Allan – San Mateo County Office of Sustainability

C/CAG AGENDA REPORT

Date: May 16, 2019

To: C/CAG Congestion Management and Environmental Quality (CMEQ) Committee

From: Van Dominic Ocampo – Transportation Systems Coordinator

Subject: Receive a presentation on the US 101/SR 92 Interchange Improvement studies

(For further information or questions, contact Van Dominic Ocampo at 650-599-1460)

RECOMMENDATION

Receive a presentation on the US 101/SR 92 Interchange Improvement studies.

FISCAL IMPACT

N/A

SOURCE OF FUNDS

N/A

BACKGROUND

The US 101/SR 92 Interchange (Interchange) is a major facility that serves both regional traffic and local street connections. During AM and PM peak traffic periods, motorists experience substantial delay and congestion at the Interchange (and its vicinity), caused by heavy traffic volume, inadequate capacity, and inefficient weaving and merging at the ramp connectors.

On August 9, 2012, C/CAG Board approved Resolution 12-46 authorizing the acceptance of funds and execution of grant agreements with San Mateo County Transportation Authority (TA), for project feasibility studies and project study documents associated with four highway projects, including the US 101/SR 92 Interchange Improvement Preliminary Planning Study (PPS). In June of 2016, the PPS, which studied the traffic congestion and identified a number of short-term and long-term alternatives to address congestion and safety concerns at the Interchange (and its vicinity) was completed. Short-Term "Area" Improvements focus on non-complex alternatives that improve local access from US 101 and provide operational improvements that reduces weaving conflicts and improve safety, with relatively low implementation costs while Long-term "Direct Connector" Improvements are more complexed, involves construction of new structures, takes longer time and costly.

Since then, C/CAG, TA, together with the Cities of San Mateo and Foster City have been working with Caltrans on completing separate Project Study Report/Project Development Supports (PSR/PDS)

for the Short-Term Area Improvements and the Long-Term Direct Connector Improvements. The PSR/PDS identifies the project scope, schedule, capital outlay and support costs needed to complete the environmental phase and design phases.

Short-Term Area Improvements

The purpose of the Short-Term Area Improvement is to improve local access from US 101 and provide operational improvements that reduces weaving conflicts and improve safety. It addresses deficiencies at four locations at the interchange and its vicinity. The location, deficiency and recommended improvements are as follows:

Location 1: Westbound SR 92 to southbound US 101 loop connector ramp has inadequate capacity resulting in extended queues and no High Occupancy Vehicle (HOV) preferential lane designation to provide incentives for carpool or bus use. The proposed improvement for this location is to widen the loop connector ramp by one lane to allow for the addition of an HOV preferential lane within the ramp.

Location 2: Eastbound SR 92 experiences heavy traffic volume and short merge from northbound and southbound US 101 resulting in extended delays and queues. The proposed improvement would eliminate the inside merge between southbound US 101 connector to eastbound SR 92 to improve safety by providing a standard outside merge between the southbound and northbound US 101 connectors. This improvement will not add a lane but will only shift the location of the existing merge point.

Location 3: Southbound US101 to westbound SR 92 connector ramp experiences high number of vehicles illegally crossing the gore area to access Fashion Island Boulevard off-ramp when obstructed by extended queuing from southbound US101 to eastbound SR 92. The proposed improvement is an exit ramp modification which would move the existing Fashion Island Boulevard off-ramp to exit from the eastbound SR 92 connector to the westbound SR 92 connector. This improvement will not add any through lanes but only shifts the ramp exit location.

Location 4: Northbound US 101 to Hillsdale Boulevard exit ramp has inadequate storage capacity resulting in extended queues and a higher than average ramp accident rate. The proposed improvement would widen and re-stripe the northbound US 101 off-ramp to Hillsdale Blvd. The eastbound through lanes would be extended through the northbound US 101/Hillsdale Blvd intersection. The northbound US 101 loop on-ramp will be realigned and will include a dedicated right turn pocket.

The PSR/PDS for the Short-Term Area Improvement was recently approved by Caltrans and the project is now ready to move to the environmental or PA&ED phase. C/CAG has allocated $2.4 Million of State Transportation Improvement Program (STIP) Funds to pay for the PA&ED phase and another $3.2 Million for the design or Plans, Specifications and Estimate (PS&E) phase. PA&ED phase is expected to be completed by Fall of 2021 with PS&E commencing after its completion. The total cost for the Short-Term Area Improvement Project is estimated at $28 Million, with construction completion tentatively scheduled for Summer of 2024, if funds become available. It also should be noted that construction of the four area improvements can be constructed jointly or independently.

Long-Term Direct Connector Improvement Project

The purpose of US 101/ SR92 Long-Term Direct Connector Improvement Project is to improve the operation efficiency of the interchange, increase person throughput and encourage carpooling and transit use. There is heavy traffic congestion on westbound SR 92 to northbound and southbound US 101 during the AM peak period and the reverse during the PM peak.

The US 101/ SR92 Long-Term Direct Connector Improvement Project considers two build alternatives and these are:

Alternative 1: US 101 / SR 92 Direct Connector from westbound SR 92 to northbound and southbound US 101
Alternative 2: Reversible US 101 / SR 92 Direct Connector

Both Alternatives 1 and 2 provide morning commute benefit for high occupancy vehicle (HOV) users traveling from westbound SR 92 to both directions US 101. However, Alternative 2 also provides a PM peak period commute benefit by reversing the direction of traffic on the direct connector in the afternoon. This alternative also includes improvements along eastbound SR 92 which terminate just west of the San Mateo-Hayward Bridge. Having a direct connector between northbound and southbound US 101 HOV lanes and SR 92 allows high occupancy vehicles to bypass queues at the US 101 / SR 92 interchange.

The PSR/PDS for the US 101/ SR92 Long-Term Direct Connector Improvement Project is currently being reviewed by Caltrans and is expected to be approve by mid-2020. This project is estimated to cost between $160 to $190 Million and has a tentative project completion of Spring 2027.

ATTACHMENTS

None

C/CAG AGENDA REPORT

Date: October 28, 2019

To: Congestion Management and Environmental Quality (CMEQ) Committee

From: Jeff Lacap, Transportation Programs Specialist

Subject: Review and recommend approval of the Draft 2019 Congestion Management Program (CMP) and Monitoring Report

(For further information contact Jeff Lacap at 650-599-1455)

RECOMMENDATION

That the C/CAG CMEQ Committee review and recommend approval of the Draft 2019 Congestion Management Program (CMP) and Monitoring Report

FISCAL IMPACT

$71,833 for consultant services to provide traffic monitoring services for the 2019 CMP; approved by the C/CAG Board at the February 2019 meeting.

BACKGROUND

Overview

Every two years, C/CAG as the Congestion Management Agency for San Mateo County, is required to prepare and adopt a Congestion Management Program (CMP) for San Mateo County. The CMP is prepared in accordance with state statutes, which also establish requirements for local jurisdictions to receive certain gas tax subvention funds. The CMP's conformances with regional goals enable San Mateo County jurisdictions to qualify for state and federal transportation funding.

The Metropolitan Transportation Commission (MTC) also provides guidance for consistency and compatibility with the Regional Transportation Plan (RTP). MTC's review for the consistency of CMPs focuses on five areas:

- Goals and objectives established in the RTP,
- Consistency of the system definition with adjoining counties,
- Consistency with federal and state air quality plans,
- Consistency with the MTC travel demand modeling database and methodologies; and
- RTP financial assumptions.

2019 CMP Update

The Draft 2019 CMP includes updated information and changes from the adopted 2017 CMP. Most of the document is unchanged from the 2017 CMP. Some key updates are highlighted below:

- Updated Chapter 4 – Performance Element
  - Includes discussion regarding SB 743 and future updates to the CMP

- Updated Chapter 5 – Trip Reduction and Travel Demand Element
  - Reflects the current Transportation Demand Element (TDM) and Transportation System Management (TSM) measures

- Updated Chapter 7 – Deficiency Plan Guidelines
  - Reflects the updated 2019 LOS Monitoring results
  - Reflects the re-authorized San Mateo County Congestion Relief Plan (Deficiency Plan) effective as of July 1, 2019 through June 30, 2023

- Updated Chapter 8 – Seven Year Capital Improvement Program
  - Reflects the 2020 State Transportation Improvement Program (STIP) project list to be consistent with the Regional Transportation Improvement Program (RTIP) guidelines (The 2020 STIP is to be adopted by the California Transportation Commission in early 2020)

- Appendices that were updated includes the following:
  - Appendix F - 2019 CMP Monitoring (Draft)
  - Appendix G - Status of Capital Improvement Projects
  - Appendix I - Land Use Guide and Updated List
  - Appendix J - San Mateo County Projects Included in Plan Bay Area 2040
  - Appendix M - Measure M Implementation Plan FY 2017-2021

2019 Traffic Level of Service and Performance Monitoring

C/CAG is required to measure the roadway segments and intersections on the Congestion Management Program roadway network to determine the change in LOS from one period to the next. As part of the 2019 CMP update, C/CAG has retained a consultant to monitor the roadway segments and intersections on the CMP roadway network. This year's study was conducted for the period of March - May of 2019 with travel time data from INRIX, a location-based data and analytics firm, being used and analyzed. The most recent assessment prior to this study was performed in March - May 2017. The primary tasks completed as part of this study include conflation of travel time data to Level of Service monitoring network and Level of Service Analysis. As a result of this monitoring, C/CAG is required to determine what location(s), if any, has (have) exceeded the LOS standard that was established by C/CAG in 1991.

In determining conformance with the LOS standards, C/CAG historically excludes traffic impacts attributable to interregional travel based on the C/CAG Travel Demand Forecasting Model per current CMP guidelines. To address deficiencies on the CMP network, C/CAG developed the San Mateo County Congestion Relief Plan (CRP). Originally adopted in 2002 and reauthorized in 2007, 2011, 2015, and 2019 to be effective through July 2023, the CRP fulfills the requirement of a Countywide Deficiency Plan for all roadway segment and intersection deficiencies identified through the monitoring done for the 1999 through the current Congestion Management Programs. With the CRP in place, no jurisdiction will be required to develop a deficiency plan as a result of

this monitoring report.

The results of the 2019 Monitoring indicate the following roadway segments exceeded its LOS Standard before the reduction of interregional trips:

- SR 35 between I-280 and SR 92 – AM and PM Periods
- SR 84 between SR 1 and Portola – PM Period
- SR 84 between I-280 and Alameda de las Pulgas – AM and PM Periods
- SR 84 between Willow and University – AM Period
- SR 92 between SR 1 and I-280 – AM and PM Periods
- SR 92 between I-280 and US 101 – AM and PM Periods
- SR 92 between US 101 and Alameda County Line – AM and PM Periods
- US 101 between SF County Line and I-380 – AM and PM Periods
- US 101 between I-380 and Millbrae – AM and PM Periods
- US 101 between Millbrae and Broadway – AM and PM Periods
- US 101 between Broadway and Peninsula – AM and PM Periods
- US 101 between SR 92 and Whipple – AM and PM Periods
- SR 109 between Kavanaugh and SR 84 – PM Period
- I-280 between SF County Line and SR 1 (north) – AM Period
- I-280 between SR 1 (north) and SR 1 (south) – AM Period
- I-280 between SR 1 (south) and San Bruno – AM and PM Periods
- I-280 between San Bruno and SR 92 – PM Period
- I-280 between SR 92 and SR 84 – AM and PM Periods
- I-280 between SR 84 and SC County Line – PM Period

It is noted that twelve (12) CMP segments had deficient level of service (without interregional travel exemptions) in both the AM and PM peak periods. Four (4) segments had deficient level of service in the PM peak period only.

C/CAG identifies the deficient locations after deducting for interregional travel (all trips originating outside San Mateo County). Based on the monitoring report and after the exclusions for interregional traffic was applied, five out of the 53 roadway segments exceeded the LOS standard. The segments in violation of the LOS Standard in 2019 are as follows:

- PM – Northbound and Southbound SR 35 between I-280 and SR 92
- PM – Eastbound and Westbound SR 84 between SR 1 and Portola Road
- AM & PM – Westbound SR 84 between I-280 and Alameda de Las Pulgas
- AM – Westbound SR 92 between I-280 and US-101
- PM – Eastbound SR 92 between US-101 and Alameda County Line

For the sixteen (16) intersections monitored, the 2019 traffic volumes, lane configurations, and signal phasing were used as inputs to the intersection level of service calculations. This year's monitoring as well as the 2017 monitoring used the 2000 Highway Capacity Manual method (average control delay) to calculate the LOS results.

All 16 CMP intersections are in compliance with the LOS Standard, similar to the 2017 LOS Monitoring results. In addition to vehicle counts taken at the CMP intersections, bicycle and pedestrian counts were also conducted at each CMP intersection.

A summary of the number of roadway segments (before deducting for interregional travel) and intersections with a LOS F (F designated the worse possible congestion) since the 2001 CMP are as follows:

Year	LOS F*		Year	LOS F*	
	Roadways	Intersections**		Roadways	Intersections**
2001	16	1	2011	14	2
2003	13	0	2013	12	2
2005	12	0	2015	10	0
2007	14	2	2017	12	0
2009	10	3	**2019**	**19**	**0**

* *Without Exemption*

** *Majority of intersections monitored are along Route 82 (El Camino Real)*

Average Travel Times on US-101

Travel times were also measured for the US-101 corridor between the San Francisco and Santa Clara County Lines. The US-101 corridor was selected because, in addition to mixed-flow lanes, it includes High Occupancy Vehicle (HOV) lanes, bus routes, and passenger rail.

The total travel time for carpools was estimated by adding the travel time in the HOV lanes between the Santa Clara County Line and Whipple Avenue to the travel time in the mixed-flow lanes between Whipple Avenue and the San Francisco County Line. Travel times for bus and passenger rail modes were estimated based on current SamTrans and Caltrain published schedules. SamTrans bus route 398 operates in the US-101 corridor. This route provides service through San Mateo County from San Francisco to Redwood City. Travel times were based on the average travel time between County lines during the commute hours. Travel time via Caltrain was calculated in a similar manner. Results for the 2019 travel time surveys are summarized below.

Average Travel Time On US-101 Corridor (in minutes) - Between San Francisco and Santa Clara County Lines																
Mode	**AM - Morning Commute Peak Period**								**PM - Evening Commute Peak Period**							
	NB				**SB**				**NB**				**SB**			
	2019	**2017**	**2015**	**2013**	**2019**	**2017**	**2015**	**2013**	**2019**	**2017**	**2015**	**2013**	**2019**	**2017**	**2015**	**2013**
Auto - Single Occ.[1]	28	32	32	28	40	35	36	41	40	36	39	30	32	32	32	33
Carpool - HOV Lane[2]	26	32	32	32	38	34	35	37	40	36	42	37	31	32	32	32
Caltrain[3]	40	40	39	23	43	44	43	27	40	40	38	24	39	36	38	23
SamTrans Route 398[4]	57	80	80	68	74	-	-	73	83	-	-	72	74	91	91	74

[1]2015, 2017, and 2019 Results based on Inrix Avg speeds over each TMC for the full 3 months (March -May)

[2]2015, 2017, and 2019 HOV results are based on HOV field runs south of Whipple plus Inrix avg speed for TMC north of Whipple to SF County Line

[3] Limited-stop and baby bullet trains from Santa Clara County line to SF County line

[4] Route 398, effective as of August 2019. During AM NB period, does not stop at San Bruno BART Station.

Transit Ridership

As shown in the table below, the 2019 transit ridership data indicates annual total ridership for SamTrans has decreased by 10% and Caltrain ridership decreased by 2% when compared to the CMP update 2017. Annual total ridership for BART decreased by 5% at the stations within San Mateo County. Overall annual total transit ridership decreased about 5% when compared with the previous 2017 CMP Update. Results for the 2019 transit ridership are summarized below.

Transit Agency	Annual Total			Average Weekday		
	FY 2019	FY 2017	FY 2015	FY 2019	FY 2017	FY 2015
SamTrans[1]	10,670,850	11,816,760	13,158,703	35,150	38,700	42,981
Caltrain[2]	18,486,509	18,743,189	18,156,173	63.597	64,114	58,245
BART (Colma, Daly City, South Francisco, San Bruno)[3]	7,741,549	7,818,023	8,155,340	26,483	25,269	28,050
BART (SFO & Millbrae)[3]	11,261,768	12,102,872	12,614,731	37,687	39,989	40,741
Combined Transit	**48,160,676**	**50,480,844**	**52,084,947**	**162,917**	**163,090**	**170,201**

[1] Source: SamTrans End-of-Year Performance Report FY2019
[2] Source: Caltrain Website
[3] Source: BART Staff

The complete draft Monitoring Report is included in Appendix F of the Draft 2019 Congestion Management Program. (A copy is attached to this staff report)

SB 743

Senate Bill 743 was signed into law in 2013 and aimed to replace the metric used to measure the transportation impact assessment in the California Environmental Quality Act (CEQA) process from a delay based metric such as traffic level of service (LOS) to another metric such as vehicle miles traveled (VMT).

The Governor's Office of Planning and Research (OPR) is responsible for identifying the alternative metric and updating the CEQA Guidelines on transportation impact analysis. As a result, VMT was chosen as the new metric for transportation impact assessment under CEQA guidelines in December 2018. Statewide application of the new metric is slated to begin on July 1, 2020. C/CAG is currently working with member agencies by coordinating consistent methods to measure and analyze VMT.

Since current CMP legislation requires the use of LOS metric, the Draft 2019 CMP has been prepared following current CMP guidelines. However, C/CAG, in coordination with the Metropolitan Transportation Commission and other Congestion Management Agencies in the Bay Area, will evaluate and recommend performance metrics for future CMP updates.

Until any legislative efforts to amend the CMP legislation will occur, C/CAG did not do any major updates to the CMP and only made focused changes during this update to report on the work performed and progress made in implementing the CMP elements (Roadway System, Traffic LOS Standards, Performance Element, Trip Reduction and Travel Demand Element, Land Use Impact Analysis Program, and Seven-Year Capital Improvement Program) since the last update in 2017.

2019 CMP Approval Schedule (Tentative)

The C/CAG Congestion Management Program Technical Advisory Committee recommended approval of the 2019 Draft CMP at their October 17, 2019 meeting.

Date	Activity
October 17, 2019	Draft 2019 CMP to TAC
October 28, 2019	Draft 2019 CMP to CMEQ
November 14, 2019	Draft 2019 CMP to Board
December 19, 2019	Final 2019 CMP to TAC
January 27, 2020	Final 2019 CMP to CMEQ
February 13, 2020	Final 2019 CMP to Board

ATTACHMENT

- Draft 2019 San Mateo County CMP – Executive Summary
- Draft Level of Service and Performance Measure Monitoring Report – 2019
- Draft 2019 San Mateo County CMP & Appendix *(Available for download at: http://ccag.ca.gov/committees/congestion-management-program-technical-advisory-committee/)*

Executive Summary

The City/County Association of Governments of San Mateo County (C/CAG), as the Congestion Management Agency for San Mateo County, is required to prepare and adopt a Congestion Management Program (CMP) on a biennial basis. The purpose of the CMP is to identify strategies to respond to future transportation needs, develop procedures to alleviate and control congestion, and promote countywide solutions. The CMP is required to be consistent with the Metropolitan Transportation Commission (MTC) planning process that includes regional goals, policies, and projects for the Regional Transportation Improvement Program (RTIP). The 2019 CMP, which is developed to be consistent with MTC's Plan Bay Area, provides updated program information and performance monitoring results for the CMP roadway system.

The CMP roadway system comprises of 53 roadway segments and 16 intersections. The roadway network includes all the State highways within the County in addition to Mission Street, Geneva Avenue, and Bayshore Boulevard. The intersections are located mostly along El Camino Real (Chapter 2). Baseline Level of Service (LOS) Standards were adopted for each of the roadway segments and intersections on the system wherein five roadway segments and four intersections were designated LOS F (F designated as the worse possible congestion) (Chapter 3). In addition to vehicle counts taken at the CMP intersections, bicycle and pedestrian counts were also conducted at each CMP intersection.

In addition to the roadway system LOS, the CMP also includes other elements to evaluate the performance of the roadway and transit network such as travel time to traverse the length of the County by single-occupant vehicle, carpool, and transit in addition to transit ridership during the peak periods (Chapter 4). Monitoring is completed every two years to determine compliance with the adopted LOS standards and changes to the performance elements are measured.

The results of the 2019 Monitoring indicate the following roadway segments exceeded its LOS Standard before the reduction of interregional trips:

- SR 35 between I-280 and SR 92 – AM and PM Periods
- SR 84 between SR 1 and Portola – PM Period
- SR 84 between I-280 and Alameda de las Pulgas – AM and PM Periods
- SR 84 between Willow and University – AM Period
- SR 92 between SR 1 and I-280 – AM and PM Periods
- SR 92 between I-280 and US 101 – AM and PM Periods
- SR 92 between US 101 and Alameda County Line – AM and PM Periods
- US 101 between SF County Line and I-380 – AM and PM Periods
- US 101 between I-380 and Millbrae – AM and PM Periods
- US 101 between Millbrae and Broadway – AM and PM Periods
- US 101 between Broadway and Peninsula – AM and PM Periods
- US 101 between SR 92 and Whipple – AM and PM Periods
- SR 109 between Kavanaugh and SR 84 – PM Period
- I-280 between SF County Line and SR 1 (north) – AM Period

- I-280 between SR 1 (north) and SR 1 (south) – AM Period
- I-280 between SR 1 (south) and San Bruno – AM and PM Periods
- I-280 between San Bruno and SR 92 – PM Period
- I-280 between SR 92 and SR 84 – AM and PM Periods
- I-280 between SR 84 and SC County Line – PM Periods

It is noted that twelve (12) CMP segments had deficient level of service (without interregional travel exemptions) in both the AM and PM peak periods. Four (4) segments had deficient level of service in the PM peak period only.

The CMP-enabling 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. Based on the monitoring report and after the exclusions for interregional traffic was applied, five out of the 53 roadway segments exceeded the LOS standard. The segments in violation of the LOS Standard in 2019 are as follows:

- PM – Northbound and Southbound SR 35 between I-280 and SR 92
- PM – Eastbound and Westbound SR 84 between SR 1 and Portola Road
- AM & PM – Westbound SR 84 between I-280 and Alameda de Las Pulgas
- AM – Westbound SR 92 between I-280 and US-101
- PM – Eastbound SR 92 between US-101 and Alameda County Line

Regarding intersections, all intersection locations are in compliance with their LOS Standards.

Travel time for single occupancy vehicles and high occupancy vehicles along US-101 identified as part of the 2019 monitoring indicates a minor improvement in the northbound direction during the AM peak hour.

Travel times for bus and passenger rail modes are estimated based on SamTrans and Caltrain published schedules for travel between County lines during peak commute periods (7 a.m. – 9 a.m. and 4 p.m. to 7 p.m.). Caltrain travel times show a 2% decrease in the AM southbound peak period and 8% increase in the PM southbound peak period.

Because a new SamTrans route that traverses San Mateo County to San Francisco was introduced in August 2019, new travel times are presented.

The CMP includes C/CAG's programs and policies regarding transportation systems management (TSM) and transportation demand management (TDM), which address efforts to increase efficiency of the existing system and encourage utilization of alternative modes of transportation. The TSM/TDM programs under Measure A, Commute.org, Transportation Fund for Clean Air (TFCA), local cities, and C/CAG are updated in the 2019 CMP to reflect the current status (Chapter 5). Also included in the CMP is the C/CAG Land Use Impact Analysis Program Policy which address long-range planning, individual large developments generating 100 or more net peak period trips on the CMP network, and cumulative developments.

The Policy provides procedures for local jurisdictions to analyze and mitigate potential impacts to the CMP network resulting from land use decisions (Chapter 6 and Appendix I). The Countywide Congestion Relief Plan (CRP), (reauthorized through June 2023) was developed to address the roadway system deficiencies (or violations of LOS Standards) on a countywide basis. The CRP relieves individual jurisdictions from the need to develop individual deficiency plans to mitigate (or reduce) existing congestion on specific locations. Elements contained in the CRP includes revised provision for Countywide programs such as Employer-based shuttle program and local transportation services, Travel Demand Management, Countywide Intelligent Transportation System (ITS) program and traffic operational improvement strategies, Ramp Metering, and other programs Linking Transportation and Land Use (Chapter 7). The seven-year Capital Improvement Program (CIP) consists of projects programmed in the updated 2020 State Transportation Improvement Program (STIP), OBAG 2, and TDA Article 3 in Chapter 8, Table X.

Other elements included in the 2019 CMP are updates to Measure M, an additional VRF approved by the voters in November 2010, imposes an annual fee of ten dollars ($10) on motor vehicles registered in San Mateo County to help fund transportation-related congestion mitigation and water pollution mitigation programs (Chapter 11). The most current Measure M 5-Year Implementation Plan for Fiscal Year 2017-2021 is included in Appendix M.

The Traffic Impact Analysis (TIA) Policy, which provides uniform procedures to analyze traffic impacts on the CMP network, was added to the 2009 CMP and remains the same. The TIA Policy applies to all General Plan updates, Specific Area Plans, and modifications to the CMP roadway network. (Chapter 12 and Appendix L)

Senate Bill 743 was signed into law in 2013 and aimed to replace the metric used to measure the transportation impact assessment in the California Environmental Quality Act (CEQA) process from a delay-based metric such as traffic level of service (LOS) to another metric such as vehicle miles traveled (VMT).

The Governor's Office of Planning and Research (OPR) is responsible for identifying the alternative metric and updating the CEQA Guidelines on transportation impact analysis. As a result, VMT was chosen as the new metric for transportation impact assessment under CEQA guidelines in December 2018. C/CAG is currently working with member agencies to develop consistent methods to measure and analyze VMT.

Since current CMP legislation requires the use of LOS metric, the Draft 2019 CMP has been prepared following current CMP guidelines. However, C/CAG, in coordination with the Metropolitan Transportation Commission and other Congestion Management Agencies in the Bay Area, will evaluate and recommend performance metrics for future CMP updates.

Until any legislative efforts to amend the CMP legislation will occur, C/CAG did not do any major updates to the CMP and only made focused changes during this update to report on the work performed and progress made in implementing the CMP elements (Roadway System, Traffic LOS Standards, Performance Element, Trip Reduction and Travel Demand Element,

Land Use Impact Analysis Program, and Seven-Year Capital Improvement Program) since the last update in 2017

Submitted to:

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

Level of Service and Performance Measure Monitoring Report - 2019

October 2019

Submitted by:
CoPLAN – *The Planning Collaborative*
5508 Sandalwood
McKinney, TX 75070

October 10, 2019

City/County Association of Governments of San Mateo County
County Office Building
555 County Center
Fifth Floor
Redwood City, California 94063
Attention: Jeffrey Lacap, Transportation Programs Specialist

Re: Level of Service and Performance Measure Monitoring Report - 2019

Dear Mr. Lacap:

CoPLAN, LLC. (CoPLAN) is pleased to submit the report for the 2019 Level of Service (LOS) and Performance Measure Monitoring to support of the 2019 Congestion Management Program for the City/County Association of Governments of San Mateo County (C/CAG).

CoPLAN conducted the 2019 study for C/CAG utilizing the latest technology for performing CMP studies. Our extensive and unique experience provides a cost-effective and cutting edge process to obtain and analyze traffic data. CoPLAN has developed a methodology including GPS and GIS over the past 15 years with exciting results. The addition of GIS linear reference systems has added a component that is unique to CoPLAN for network analyses. Over the last 4 update cycles, CoPLAN staff have developed a comprehensive database for C/CAG that now is integrated in GIS for easy access and historic comparisons.

C/CAG has taken a major step forward in having the ability to take the GIS data, in addition to the historic tables, and integrate the digital data with your travel demand model. The speeds, roadway attributes, etc. can be conflated with the model to produce a very robust and comprehensive system. This was not available in the past because the methodology used with tables and charts did not produce the value-added products of this 2019 study. CoPLAN will continue to support C/CAG to produce the best value that not only meets the intended LOS monitoring requirements to allow historic comparisons of this project, but produces the results in a form that can be used by many other areas within the county and by its members.

Sincerely,
CoPLAN, LLC

Steve Taylor
Project Manager

TABLE OF CONTENTS

A. EXECUTIVE SUMMARY

The City/County Association of Governments of San Mateo County (C/CAG) has an established Congestion Management Program (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.

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 based on system performance, land use factors, multimodal characteristics, and other considerations.

This year's monitoring study was conducted in the spring 2019 with data collection between April and May including INRIX data on approximately 163.3 directional miles of freeways and arterials, 72-hour counts on 21 segments representing 301.4 centerline miles of arterials, and 16 intersection turning movement counts.

This is the third monitoring cycle during which the C/CAG has used commercially available travel speed data from INRIX integrated in a geographic information system (GIS) to monitor Level of Service (LOS) on the CMP network. The primary tasks completed as part of this study include:

- Conflation of travel time data to LOS Monitoring network
- LOS Analysis

With the 2019 monitoring cycle, C/CAG is calculating LOS based on two methodologies—Highway Capacity Manual (HCM) 1994 and HCM 2010. This dual reporting facilitates historical comparisons while also reporting LOS based on the more current methodology. For freeways, only HCM 1994 LOS is reported, as the HCM 2000 methodology requires traffic volume information for all unique freeway segments and ramps. The HCM 2010 criteria was used only for the intersection LOS using the collected peak period turning movement counts analyzed in Synchro. Collection of comprehensive freeway traffic volumes is beyond the scope of the CMP monitoring effort.

B. INTRODUCTION

History of the Congestion Management Program

C/CAG has an established Congestion Management Program (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 Congestion Management Agency (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.

This year's study was conducted in the spring of 2019 with travel time data from INRIX being used between April and May. The most recent assessment prior to this study was performed in April - May 2017. The primary tasks completed as part of this study include:

- Conflation of travel time data to LOS Monitoring network
- Level of Service Analysis

Study Background

This year's monitoring study was conducted in the spring 2019 with data sourced between April and May on approximately 163.3 directional miles of freeways and arterials, 72-hour counts on 21 segments representing 301.4 centerline miles of arterials, and 16 intersection turning movement counts. CMP legislation requires that state highways (including freeways) and principal arterials be included in the CMP network. The network must be useful to track the transportation impacts of land development decisions, as well as to help assess the congestion management implications of proposed transportation projects. C/CAG's network therefore includes numerous local thoroughfares since most urban traffic occurs on city arterials (rather than on the freeways). **Figure 1** shows the routes that were monitored.

All of the study roadways were evaluated during the AM and PM peak period between the hours of 7 AM - 9 AM and 4 PM - 7 PM. As in previous studies, both time periods are considered when determining the LOS to be reported. The directionality of the segment is not reported in many of the summary tables, but the worst LOS found for either direction for either AM or PM peak period is shown as the official result. In most cases, the PM period is the focus of the CMP since consistently, the PM period results in higher volumes, slower speeds, and more congestion. The methodology used included using INRIX travel time data, 72-hour traffic counts, and intersection turning movement counts.

The total directional miles and number of route segments for each roadway type are shown in **Table 1**.

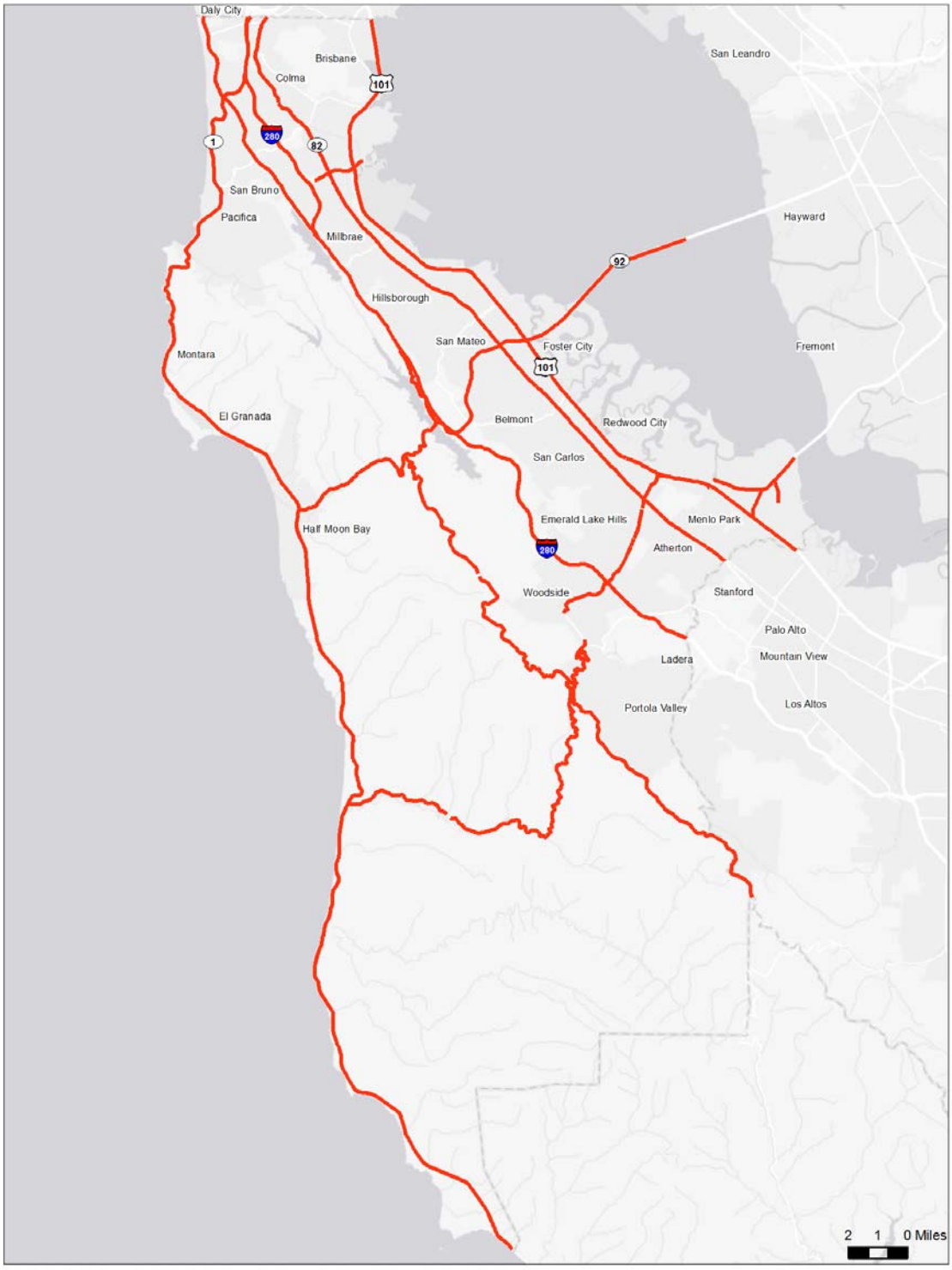

Figure 1 – Spring 2019 CMP Monitored Routes

Table 1 – Total Study Miles Summary

Roadway Type	Total Directional Miles
Arterial / State Routes	301.4
Freeway	163.3
Total	464.7

This monitoring report focused on the five performance measures established in the San Mateo County Congestion Management Program. These performance measures are:

1. Roadway Level of Service
   a: Travel Time – Average Speed
   b. 72-hour traffic counts – V/C for rural arterials
2. Intersection LOS
3. Travel Time for various modes (single occupant, carpools, and transit)
4. Pedestrian and Bicycle Improvements
5. Ridership / Person Throughput for Transit

As noted, the "Roadway Level of Service and Intersection LOS" are the primary CMP performance measures; therefore, a mitigation plan is required if the resulting LOS is below the established minimum standard.

The following sections focus on each of the above performance measures with emphasis on the Roadway and Intersection LOS. The other items are included to provide some alternative views to help explain the changes in performance and the opportunities for improvement.

C. METHODOLOGY

Mapping of CMP Network

Global Positioning System (GPS)

Historically, CMP travel time runs were done manually. CoPLAN staff introduced the use of GPS and GIS to C/CAG in 2011.

All the roadways in the network were mapped using GPS technology in 2011 and 2013. With the introduction of INRIX datasets in 2015, the network attributes were carried over from those past cycles.

As first introduced in 2015, the travel speed data collection process was made more efficient by using data from INRIX in place of a small sample size of GPS travel time runs.

Travel Time Data

Travel time data was assembled from INRIX and conflated to the LOS Monitoring network.

Travel time data was conflated for the morning and afternoon peak periods on all applicable roadway segments; data were only used on Tuesdays, Wednesdays, or Thursdays, and school district spring break periods were avoided.

D. EVALUATION

LOS Analysis – HCM 1994

The tables in the Appendix highlight the 2019 CMP route segments that had LOS lower than the established standard during the AM or PM Peak by HCM 1994 standards directly from the travel time data or 72-hour counts. The CMP legislation allows for the reduction in volume for those interregional trips for those segments that have a LOS lower than the established standard; i.e. those trips that originate from outside the county and either pass through the county or have a destination within San Mateo County.

Other Performance Measures Results

Apart from average speeds aggregated to the CMP route segments level, intersection segment level average speeds were also calculated in 2019 for all routes. These results are available in the GIS tables provided to C/CAG.

With the use of INRIX data once again in this year's freeway travel time analyses, we have the opportunity to include various new performance measures for the region. In prior years, a small sample of travel time runs were made during a small window of time in the AM and PM peak period. One interesting new performance measure that can be evaluated is the **Duration of Congestion**, or amount of time below a certain speed / LOS within a segment. For example, **Figure 2** illustrates the 5-minute average speed for a 24-hour period between April and May of 2017 and 2019. The red line depicts the average speed, while the vertical lines represent the minimum and maximum speeds for each respective time interval (showing the variability of speed for each time slice). Further, on the horizontal axis, the shaded regions depict the corresponding LOS for the average speed for the freeway section. Therefore, one can see that the average speed in the southbound US 101 segment between SR 92 and Whipple falls into the LOS F range in the morning period around 6:30 AM both years, but remains at that LOS in 2019 for a longer period until around 11:00 AM vs. 9:00 in 2017. For the afternoon period, the average speed remains better than LOS F all afternoon, while at times over the 2 months.

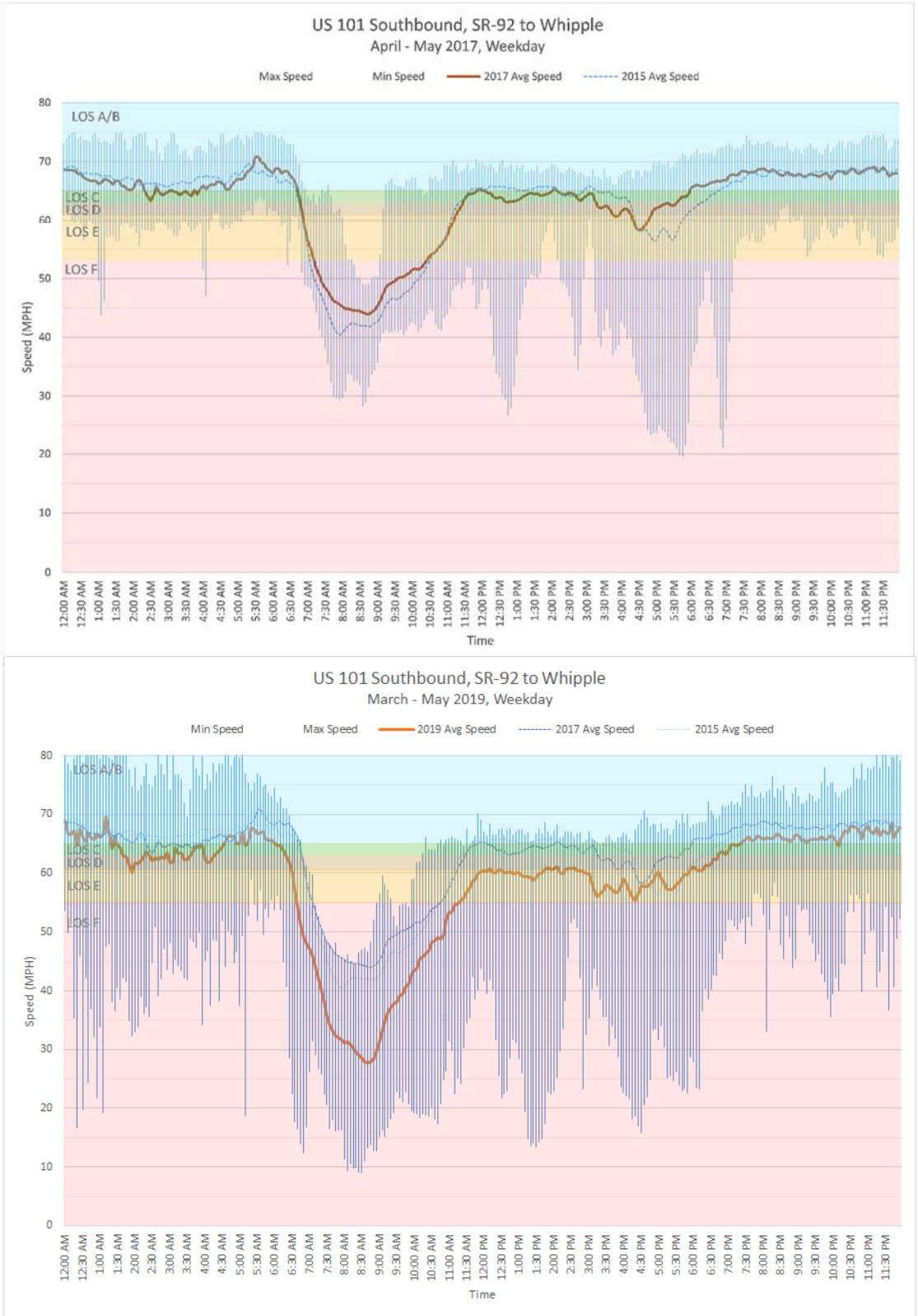

Figure 2 – Spring 2017 vs Spring 2019 Duration of Congestion

E. ROADWAY LEVEL OF SERVICE (LOS)

Traffic Flow

The Highway Capacity Manual (HCM) defines capacity as "…the maximum hourly rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions."

The vehicle capacity and operational characteristics of a roadway are a function of a number of elements including: the number of lanes and lane widths, shoulder widths, roadway alignment, access, traffic signals, grades, and vehicle mix. Generally, roadways with wider travel lanes, fewer traffic control devices, straight alignments, etc. allow faster travel speeds and therefore greater vehicle flow per unit time.

Level of Service

The HCM defines level of service (LOS) as "…a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience."

"Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions."

In accordance with CMP legislation, the county and city governments are required to show that all CMP route segments within their jurisdiction are operating at or above the CMP traffic LOS standard. Section 65089(b)(1)(B) of the California Government Code states that "In no case shall the LOS standards established be below the LOS E or the current level, whichever is farthest from LOS A. When the level of service on a segment or at an intersection fails to attain the established level of service standard, a deficiency plan shall be adopted pursuant to section 65089.4."

All freeway segments in the network, as included in **Figure 3**, 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 2000 HCM methodology to monitor LOS on the CMP network, as this methodology was utilized in the baseline monitoring cycle and is necessary to maintain historical comparisons, identify exempt segments, and monitor potential network deficiencies. The specific methodologies used for monitoring freeway and arterial segments are listed below per HCM definitions:

- **Freeway Segments (HCM 1994 - Chapter 3)** – All freeway segments were evaluated using the "basic freeway sections" methodology of HCM 1994 where the LOS for each freeway segment was determined using its average travel speed.

Freeway LOS was not calculated based on HCM 2000 methodology. In order to evaluate all freeway segments using the HCM 2000 methodology, the volumes on all freeway sections (mainline) with distinct characteristics (e.g., quantity of lanes), as well as on entrances and exits would be required. Changes to the methodology will be considered along with the next update cycle when the HCM 2010 may be incorporated. Until then, the methodology of previous updates was followed to maintain the historical context for comparisons of the results.

The routes that fall into this classification include:

- SR-92 from I-280 to Alameda County Line
- US-101
- I-280
- I-380 from SR-92 to US-101

- **Multilane, 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) dependant on the local free-flow speed, cross-section, number of lanes, % no-passing zones, and functional class.

  Multilane and Two-Lane highways were evaluated primarily based on the current volumes as measured through 72-hour traffic counts at 21 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.

  Many arterial segments used by C/CAG for CMP purposes (called "CMP Segments") span several blocks and include multiple signals and/or stop controlled intersections. If an Intersection Segment is defined as a segment from one controlled intersection to the next, the CMP segments are a collection of consecutive Intersection Segments. INRIX segmentation, known as TMC segments, are many times longer or shorter than the desired limits for the CMP Segments. CoPLAN methodology of travel time estimation can calculate average speeds at the Intersection Segment level and these data can be aggregated to calculate the average speeds at the CMP segment level. The average speed on each CMP segment is computed as the ratio of total length of the segment to the sum of average travel time on each individual intersection segment within the CMP segment. The average travel time on each intersection segment is computed as the arithmetic mean of travel times of accumulated data within the TMC segment. The average speed thus accounts for time in motion and time spent at the signals or stop signs.

  The routes that fall into this classification include:

  - SR-1
  - SR-35
  - SR-82
  - SR-84

- SR-92 from SR-1 to I-280
- SR-109
- SR-114
- I-380 from US-101 to Airport Access Road
- Mission Street
- Geneva Avenue
- Bayshore Boulevard

Table 2 shows the relationship between average travel speed and level of service for basic freeways according to HCM 1994. There are four (4) freeway categories based on the free-flow speed of the facility (ranging from 55-70 mph).

Figure 3 –2019 Routes and LOS Methodologies

Table 2 – Example LOS from Freeway with Free-Flow Speed of 65 mph (HCM 1994)

Roadway Type	Basic Freeway
Free Flow Speed (mph) Range	**65**
A	≥ 65
B	≥ 65
C	≥ 64.5
D	≥ 61
E	≥ 56/53
F	< 56

Roadway Segment LOS Analysis Results

Table 3 summarizes the current year roadway segment LOS. Additionally, **Figures 4, 5, 6, and 7** illustrate the results graphically. As highlighted in **Table 3**, there are 19 segments found to be below the established minimum in each of the AM and PM peak periods. The 19 segments include:

- SR-35 between I-280 and SR 92 – AM and PM Periods
- SR-84 between SR-1 and Portola – PM Period
- SR-84 between I-280 and Alameda de las Pulgas – AM and PM Periods
- SR-84 between Willow and University – AM Period
- SR-92 between SR-1 and I-280 – AM and PM Periods
- SR-92 between I-280 and US 101 – AM and PM Periods
- SR-92 between US 101 and Alameda County Line – AM and PM Periods
- US-101 between SF County Line and I-380 – AM and PM Periods
- US-101 between I-380 and Millbrae – AM and PM Periods
- US-101 between Millbrae and Broadway – AM and PM Periods
- US-101 between Broadway and Peninsula – AM and PM Periods
- US-101 between SR-92 and Whipple – AM and PM Periods
- SR-109 between Kavanaugh and SR-84 – PM Period
- I-280 between SF County Line and SR-1 (north) – AM Period
- I-280 between SR-1 (north) and SR 1 (south) – AM Period
- I-280 between SR-1 (south) and San Bruno – AM and PM Periods
- I-280 between San Bruno and SR-92 – PM Period
- I-280 between SR-92 and SR-84 – AM and PM Periods
- I-280 between SR-84 and SC County Line – PM Periods

Table 3 includes a summary of the historic results since 1999. All results included in this update have consistently used the HCM 1994 for all roadway types and the HCM 2000 for the intersections. Variations in the LOS results may be explained through capital improvements, construction, or use of transit and other modes. The values included in

Table 3 reflects the lowest LOS for either direction; the worst-case LOS for the link in either direction during the respective peak periods.

Table 3 – CMP Roadway Segment Monitoring Results (Lowest LOS)

2019 CMP Roadway Segment Levels of Service

Route	Roadway Segment	LOS Standard	2019 LOS				2019 LOS[2]	2017 LOS[2]	2015 LOS[2]	2013 LOS[2]	2011 LOS[2]	2009 LOS[2]	2007 LOS[2]	2005 LOS[2]
			AM Without Exemption	PM Without Exemption	AM With Exemption	PM With Exemption								
1	San Francisco County Line to Linda Mar Blvd.	E	C	A	C	A	C	A	A	F[3]/ F[4]	F[3]/ B[4]	F[3]/ F[4]	F[3]/ F[4]	F[3]/ F[4]
1	Linda Mar Blvd. to Frenchmans Creek Road	E	D	D	D	D	D	D	D	D	D	D	D	D
1	Frenchmans Creek Road to Miramontes Road	E	E	E	E	E	E	E	E	E	E	E	E	E
1	Miramontes Road to Santa Cruz County Line	D	C	C	C	C	C	C	C	B	B	B	B	C
35	San Francisco county Line to Sneath Lane	E	D	B	D	B	D	C	D	B	A	C	C	C
35	Sneath Lane to I-280	F	F	F	A	F	F	F	F	F	F	E	F	F
35	I-280 to SR 92	B	C	D	A	C	C	B	C[3]/ A[4]	C[3]/ B[4]	C[3]/ B[4]	B	B	C/C
35	SR 92 to SR 84	B	B	B	B	B	B	B	B	B	B	B	B	B
35	SR 84 to Santa Clara County Line	E	B	B	B	B	B	B	B	B	B	B	B	B
82	San Francisco County Line to John Daly Blvd	E	A	A	A	A	A	A	A	A	A	A	A	A
82	John Daly Boulevard to Hickey Boulevard	E	A	A	A	A	A	A	A	A	A	A	A	A
82	Hickey Boulevard to I-380	E	A	A	A	A	A	A	A	A	A	A	C	A
82	I-380 to Trousdale Drive	E	A	A	A	A	A	A	A	A	A	A	B	A
82	Trousdale Drive to 3rd Avenue	E	A	A	A	A	A	A	A	A	B	A	A	A
82	3rd Avenue to SR 92	E	A	A	A	A	A	A	A	A	A	A	A	A
82	SR 92 to Hillside Avenue	E	A	A	A	A	A	A	A	A	A	B	B	B
82	Hillside Avenue to 42nd Avenue	E	A	B	A	B	B	C	C	B	B	B	B	B
82	42nd Avenue to Holly Street	E	A	A	A	A	A	B	B	A	A	B	B	A
82	Holly Street to Whipple Avenue	E	A	A	A	A	A	A	B	B	C	C	D	D
82	Whipple Avenue to SR 84	E	A	A	A	A	A	A	A	A	B	C	C	C
82	SR 84 to Glenwood Avenue	E	B	A	A	A	A	A	B	A	B	B	B	B
82	Glenwood Avenue to Santa Cruz Avenue	E	B	C	A	C	C	C	C	C	B	B	C	D
82	Santa Cruz Avenue to Santa Clara County Line	E	D	D	B	D	D	B	B	B	A	B	B	C
84	SR 1 to Portola Road	C	C	D	C	D	D	B	D[3]/ B[4]	C	C	C	C	C
84	Portola Road to I-280	E	B	B	B	B	B	C	C	B	B	B	B	B
84	I-280 to Alameda de las Pulgas	C	E	E	E	E	E	D	D[3]/ D[4]	D[3]/ D[4]	D[3]/ C[4]	C	D/A	C
84	Alameda de las Pulgas to U.S. 101	E	D	E	D	E	E	D	D	D	E	E	E	E
84	U.S. 101 to Willow Road	D	C	B	C	B	B	B	C	C	B	E/E	C	B
84	Willow Road to University Avenue	E	F	E	A	E	E	B	F[3]/ B[4]	F[3]/ B[4]	F[3]/ C[4]	F/E	F/F	F/F
84	University Avenue to Alameda County Line	F	F	F	F	F	F	F	F	F	F	F	F	F
92	SR 1 to I-280	E	F	F	E	E	E	E	E	E	E	E	E	E
92	I-280 to U.S. 101	D	F	F	E	D	E	E	F[3]/ E[4]	F[3]/ E[4]	F[3]/ F[4]	E[3]/D[4]	F[3]/D[4]	F[3]/ E[4]
92	U.S. 101 to Alameda County Line	E	F	F	A	F	F	C	F[3]/ F[4]	E	F[3]/ A[4]	A/B[3]	A/B[3]	A/B[3]

Notes:

[2] The first value represents LOS without exemptions, and the second value represents LOS with exemptions.

[3] Based on average speed from travel time surveys.

[4] Exemptions applied to volume-to-capacity ratios estimated from average speeds.

"-" = not applicable. LOS standard is not violated. Therefore, exemptions were not applied.

LOS Standard violations (after application of exemptions) are highlighted in red

LOS based on 1994 Highway Capacity Manual Methodology.

Table 3 ('cont) – CMP Roadway Segment Monitoring Results (Lowest LOS)

2019 CMP Roadway Segment Levels of Service

Route	Roadway Segment	LOS Standard	2019 LOS				2019 LOS[2]	2017 LOS[2]	2015 LOS[2]	2013 LOS[2]	2011 LOS[2]	2009 LOS[2]	2007 LOS[2]	2005 LOS[2]
			AM Without Exemption	PM Without Exemption	AM With Exemption	PM With Exemption								
101	San Francisco County Line to I-380	E	F	F	D	D	D	E	F[3]/ E[4]	E	F[3]/ A[4]	D[3]	E[3]	D[3]
101	I-380 to Millbrae Avenue	E	F	F	E	D	E	D	F[3]/ D[4]	F[3]/ C[4]	F[3]/ C[4]	D[3]	F[3]/C[4]	F[3]/ D[4]
101	Millbrae Avenue to Broadway	E	F	F	E	D	E	C	F[3]/ E[4]	F[3]/ C[4]	F[3]/ C[4]	F[3]/C[4]	F[3]/C[4]	F[3]/ D[4]
101	Broadway to Peninsula Avenue	E	F	F	D	D	D	D	F[3]/ E[4]	F[3]/ C[4]	F[3]/ C[4]	F[3]/D[4]	F[3]/C[4]	F[3]/ D[4]
101	Peninsula Avenue to SR 92	F	F	F	F	F	F	F	F	F	F	F[3]	F[3]	F[3]
101	SR 92 to Whipple Avenue	E	F	F	C	E	E	E	F[3]/ E[4]	F[3]/ D[4]	F[3]/ D[4]	F[3]/E[4]	F[3]/D[4]	F[3]/ E[4]
101	Whipple Avenue to Santa Clara County Line	F	F	F	F	F	F	F	F	F	F	F[3]	F[3]	F[3]
109	Kavanaugh Drive to SR 84 (Bayfront Expwy.)	E	C	F	C	A	C	C	D	D	C	D	D	C
114	U.S. 101 to SR 84 (Bayfront Expressway)	E	B	C	B	C	C	C	C	A	B	C	C	B
280	San Francisco County Line to SR 1 (north)	E	F	E	E	E	E	E	E	E	E	F[3]/D[4]	F[3]/A	E[3]
280	SR 1 (north) to SR 1 (south)	E	F	E	E	E	E	D	E	E	A/B	E	E	E[3]
280	SR 1 (south) to San Bruno Avenue	D	F	F	D	C	D	D	F[3]/ C[4]	F[3]/ D[4]	F[3]/ D[4]	E[3]/D[4]	F[3]/C[4]	F[3]/ E[4]
280	San Bruno Avenue to SR 92	D	D	E	D	B	D	A	C	B	D	E[3]/C[4]	A/B[3]	A/B[3]
280	SR 92 to SR 84	D	F	E	B	A	B	A	E/C	C	A/B	D[3]	D[3]	D[3]
280	SR 84 to Santa Clara County Line	D	D	F	D	A	D	A	F[3]/ A[4]	F[3]/ A[4]	E[3]/ A[4]	D[3]	D[3]	E[3]/ C[4]
380	I-280 to U.S. 101	F	F	F	F	F	F	F	F	F	F	F[3]	F[3]	E[3]
380	U.S. 101 to Airport Access Road	C	A	A	A	A	A	A	A	A	A	B[3]	D[3]/C	A[3]
Mission St	San Francisco County Line to SR 82	E	A	A	A	A	A	A	A	A	A	A	A	A
Geneva Ave.	San Francisco County Line to Bayshore Blvd.	E	A	A	A	A	A	A	A	A	A	A	A	A
Bayshore Blvd.	San Francisco County Line to Geneva Avenue	E	A	A	A	A	A	A	A	A	A	A	A	A

Notes:

[2] The first value represents LOS without exemptions, and the second value represents LOS with exemptions.

[3] Based on average speed from travel time surveys.

[4] Exemptions applied to volume-to-capacity ratios estimated from average speeds.

"-" = not applicable. LOS standard is not violated. Therefore, exemptions were not applied.

LOS Standard violations (after application of exemptions) are highlighted in red

LOS based on 1994 Highway Capacity Manual Methodology.

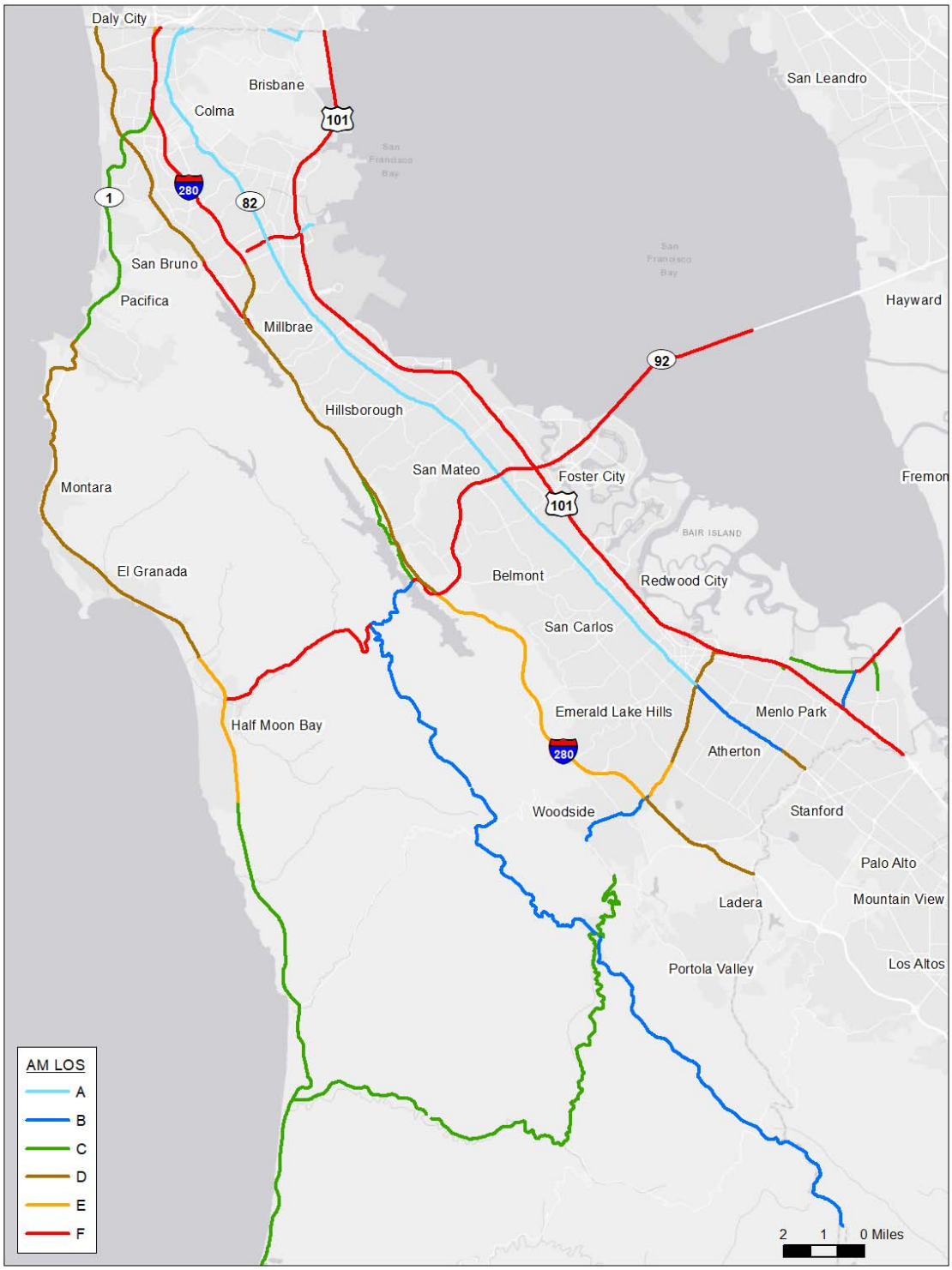

Figure 4 – AM LOS Results (before Exemptions)

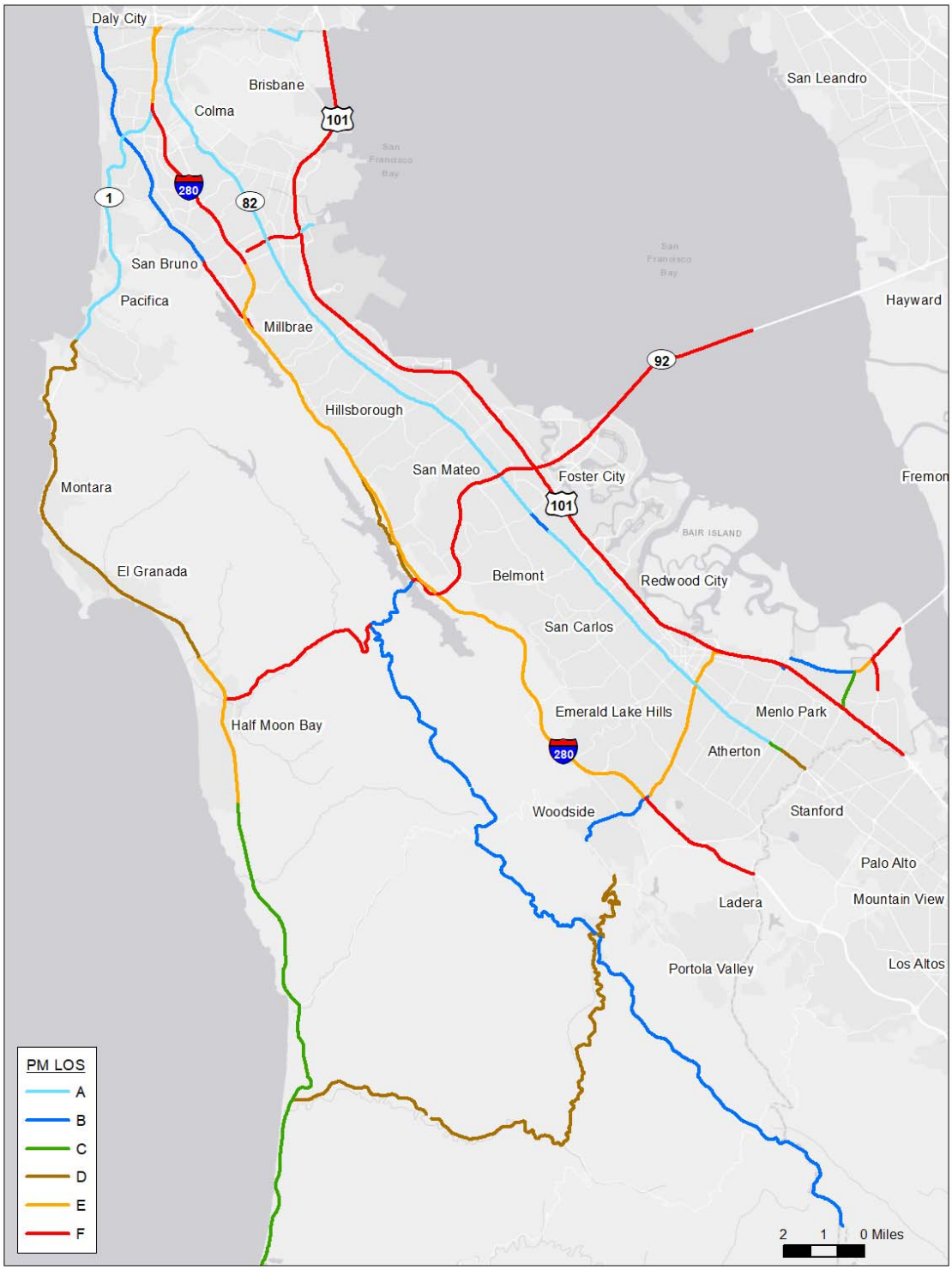

Figure 5 – PM LOS Results (before Exemptions)

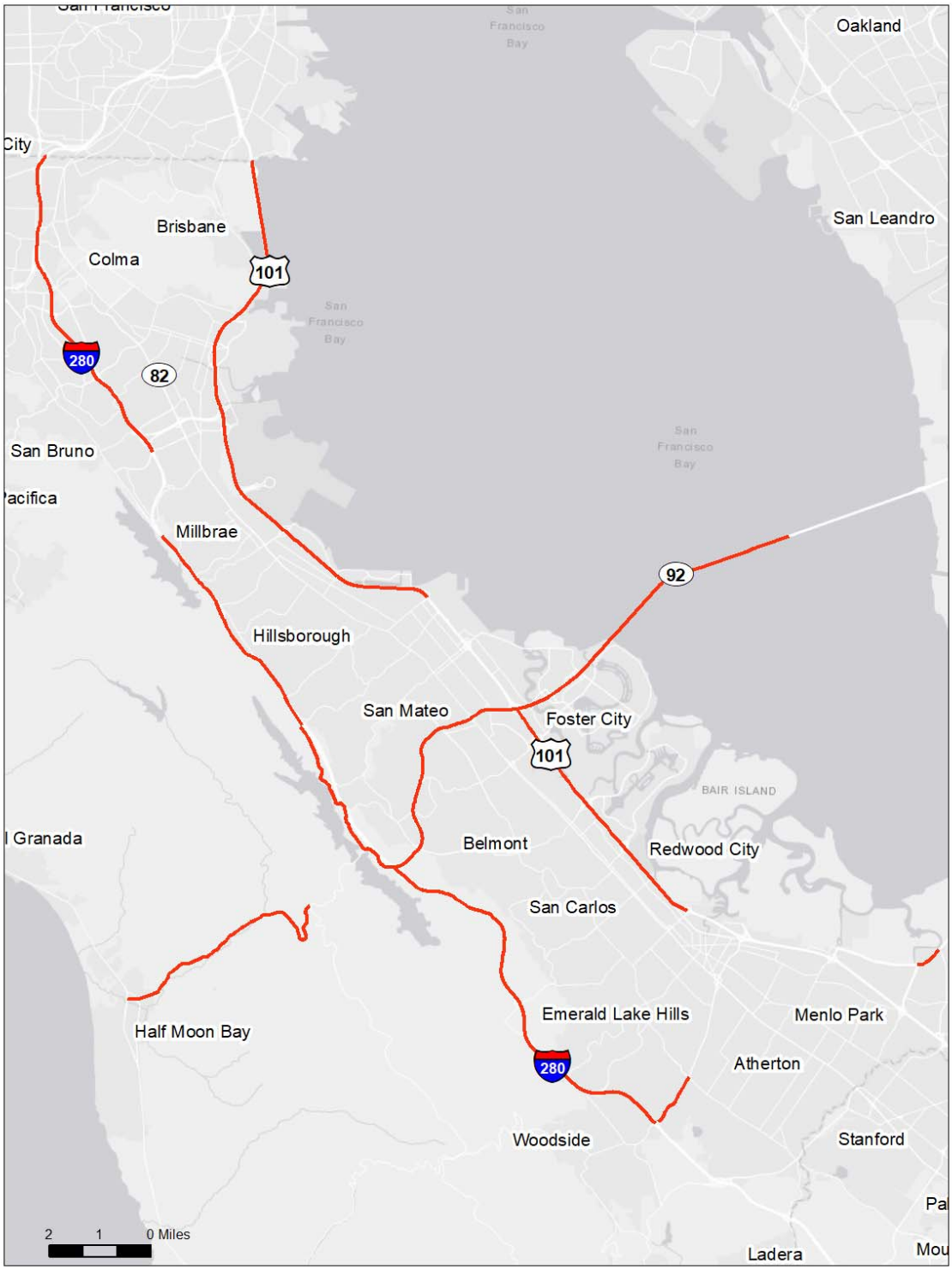

Figure 6 – AM CMP Segments with LOS Lower than Standard (before Exemptions)

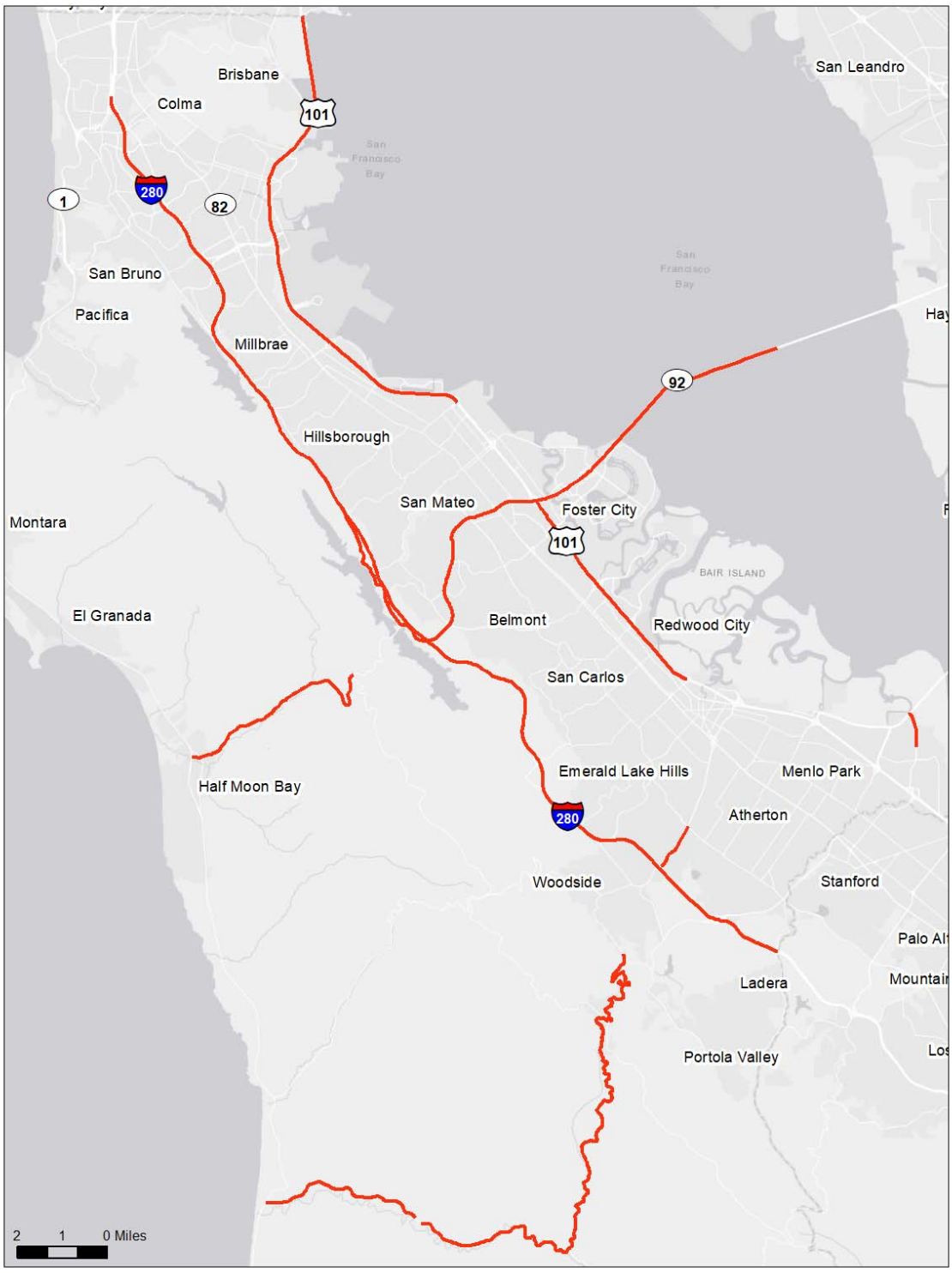

Figure 7 – PM CMP Segments with LOS Lower than Standard (before Exemptions)

F. 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. That is those that either traverse the county or have a destination within the county. For those CMP segments found with a LOS below the standard, the county travel demand model is used to determine the proportion of the volume estimated to be from interregional travel. As shown in **Table 3**, there were 19 segments that had at least one direction in either the AM or PM peak period that had a lower LOS than the established standard. **Table 4** includes the resulting percentage of traffic from the travel demand model that is estimated to be interregional by segment.

Table 4 – Interregional Trips for Segments with LOS Lower than Standard

Link	Segment	Time Period	AM Peak		PM Peak	
		Direction	NB / WB	SB / EB	NB / WB	SB / EB
SR 35	I-280 to SR 92	AM NB/SB, PM NB/SB	6.5%	41.2%	36.5%	17.8%
SR 84	SR 1 to Portola Rd	PM EB/WB			0.0%	0.0%
SR 84	I-280 to Alameda de Las Pulgas	AM WB, PM EB/WB	1.4%		1.2%	62.4%
SR 84	Willow to University Av	AM WB	96.3%			
SR 92	SR 1 to I-280	AM EB/WB, PM EB/WB	25.7%	0.1%	28.1%	0.3%
SR 92	I-280 to US 101	AM EB/WB & PM EB/WB	15.8%	29.0%	14.3%	26.6%
SR 92	US 101 to Alameda Co Line	AM WB, PM EB	75.0%			7.6%
US 101	SF Co Line to I-380	AM NB/SB & PM NB/SB	21.6%	98.3%	18.7%	95.4%
US 101	I-380 to Millbrae Av	AM NB, PM NB/SB	26.4%		28.5%	60.4%
US 101	Millbrae Av to Broadway	AM NB, PM NB/SB	29.8%		31.4%	47.5%
US 101	Broadway to Peninsula Av	AM NB/SB, PM NB/SB	32.5%	54.1%	35.3%	38.5%
US 101	SR 92 to Whipple Av	AM NB/SB, PM NB	50.5%	42.6%	46.4%	
SR 109	Kavanaugh Dr to SR 84	PM NB			78.4%	
I-280	SF Co Line to SR 1 (north)	AM NB	13.7%			
I-280	SR 1 (north) to SR 1 (south)	AM NB	16.1%			
I-280	SR 1 (south) to San Bruno Av	AM SB, PM NB		83.1%	43.6%	
I-280	San Bruno Av to SR 92	PM NB			57.4%	
I-280	SR 92 to SR 84	AM SB, PM NB		59.2%	80.7%	
I-280	SR 84 to SC Co Line	PM NB			94.5%	

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. As mentioned earlier, freeway LOS is primarily determined based on density, but 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.

G. DEFICIENT CMP SEGMENTS

After incorporating the reduction in volume for those segments found to have a LOS lower than the standard, while the AM peak period has 5 segments deficient, the PM peak period was found to have the same 4 segments deficient, as shown in **Figures 8 and 9**. Those include the following:

- PM – Northbound and Southbound SR-35 between I-280 and SR-92
- PM – Eastbound and Westbound SR-84 between SR-1 and Portola
- AM & PM – Westbound SR-84 between I-280 and Alameda de Las Pulgas
- AM – Westbound SR-92 between I-280 and US-101
- PM – Eastbound SR-92 between US-101 and Alameda County Line

While the worst LOS of either peak period has historically been presented in the summary table, the individual peak periods have been separated for improved analysis in the body of the report this year and not just in the appendix as in the past. The segments deficient in the PM period are also highlighted in Table 3.

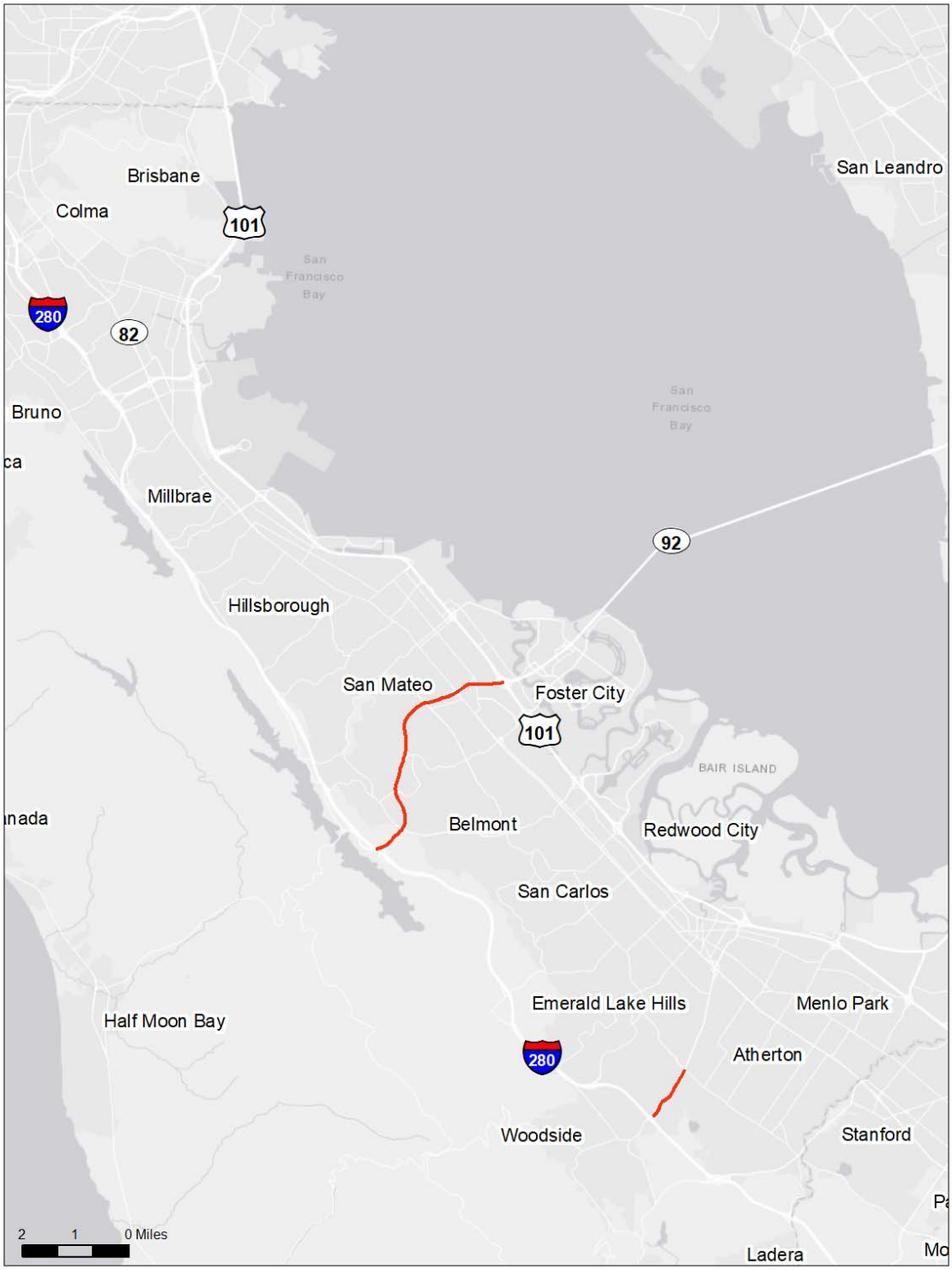

Figure 8 – AM Deficient Segments after Exemption

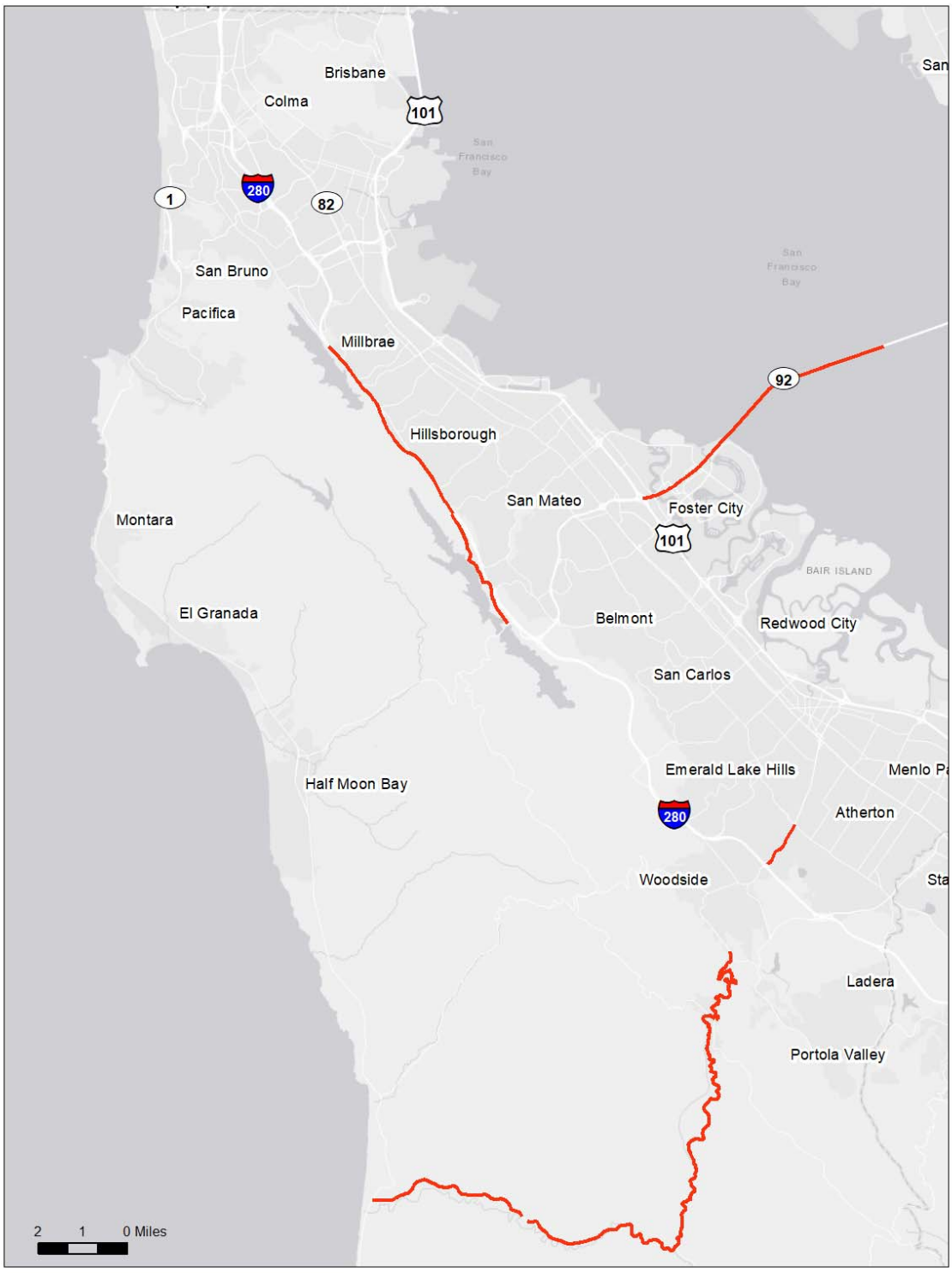

Figure 9 – PM Deficient Segment after Exemption

H. INTERSECTIONS

Sixteen intersections were analyzed as part of the 2019 LOS Monitoring. These intersections have been included in previous studies since 1999 and are included in **Table 5** for reference. The performance measure for intersections is LOS, but different from freeways and highways, the HCM 2000 was used to determine the LOS. Turning movement counts were collected for each intersection during the AM and PM peak periods and modeled in Synchro. In addition to turning movement counts, pedestrian and bike counts were collected for the first time in 2019. 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.

Table 5 includes the results for the 2019 study as well as those back to 2005 using the HCM 2000 methods. As highlighted in the table, all intersections are operating (under optimized signal timing) within established LOS standards. Intersections 1, 5, and 14 are operating at standard and should be monitored to avoid exceeding the established LOS standard. Intersections 11 and 13 are operating at LOS F which is the standard at those locations but should be evaluated for possible improvements.

Table 5 – Intersection LOS

Int #	Intersection	LOS Standard	Peak Hour	2000 HCM Method								2019 Standard Exceeded
				2019 LOS	2017 LOS	2015 LOS	2013 LOS	2011 LOS	2009 LOS	2007 LOS	2005 LOS	
1	Bayshore & Geneva	E	AM	E	B	B	B	B	C	B	C	No
			PM	B	A	B	B	B	C	C	C	No
2	SR 35 & John Daly Blvd	E	AM	B	C	D	C	C	B	B	B	No
			PM	B	B	E	C	C	C	B	C	No
3	SR 82 & Hillside/John Daly	E	AM	B	B	C	C	B	C	C	C	No
			PM	C	C	C	C	C	D	C	D	No
4	SR 82 & San Bruno Ave	E	AM	C	B	C	C	C	C	C	C	No
			PM	C	C	C	C	C	D	D	D	No
5	SR 82 & Milbrae Ave	E	AM	E	D	D	E	F/D	E	E	E	No
			PM	E	D	E	D	E	D	E	E	No
6	SR 82 & Broadway	E	AM	B	A	B	B	B	B	B	B	No
			PM	A	A	B	B	B	A	B	B	No
7	SR 82 & Park-Peninsula	E	AM	C	B	C	C	C	B	B	B	No
			PM	C	B	C	C	C	B	B	B	No
8	SR 82 & Ralston	E	AM	C	C	C	C	C	D	D	E	No
			PM	C	C	C	D	C	D	D	E	No
9	SR 82 & Holly	E	AM	C	C	C	C	C	C	C	C	No
			PM	C	C	C	C	C	D	C	C	No
10	SR 82 & Whipple Ave	E	AM	C	C	C	C	C	C	C	D	No
			PM	D	D	C	C	C	D	D	D	No
11	University & SR 84	F	AM	C	F	C	E	C	B	B	B	No
			PM	F	F	F	F	F	F	F	E	No
12	Willow & SR 84	F	AM	D	C	D	D	C	C	C	C	No
			PM	E	F	F	F	E	F	F	E	No
13	SR 84 & Marsh Rd	F	AM	F	F	F	D	D	C	C	C	No
			PM	F	F	F	D	E	F	D	C	No
14	Middlefield & SR 84	E	AM	D	E	C	D	C	D	D	D	No
			PM	E	E	D	D	D	D	D	D	No
15	SR 1 & SR 92	E	AM	B	B	C	C	D	C	D	D	No
			PM	C	C	C	C	C	D	D	D	No
16	Main St & SR 92	F	AM	B	B	C	B	C	C	C	C	No
			PM	B	B	B	B	B	C	C	C	No

Figures 10 and **11** illustrate the finding for the intersection LOS. Each intersection is represented with two shapes. The larger one is the base and is the LOS Standard. The smaller shape in the middle is the resulting peak period LOS for the respective time period.

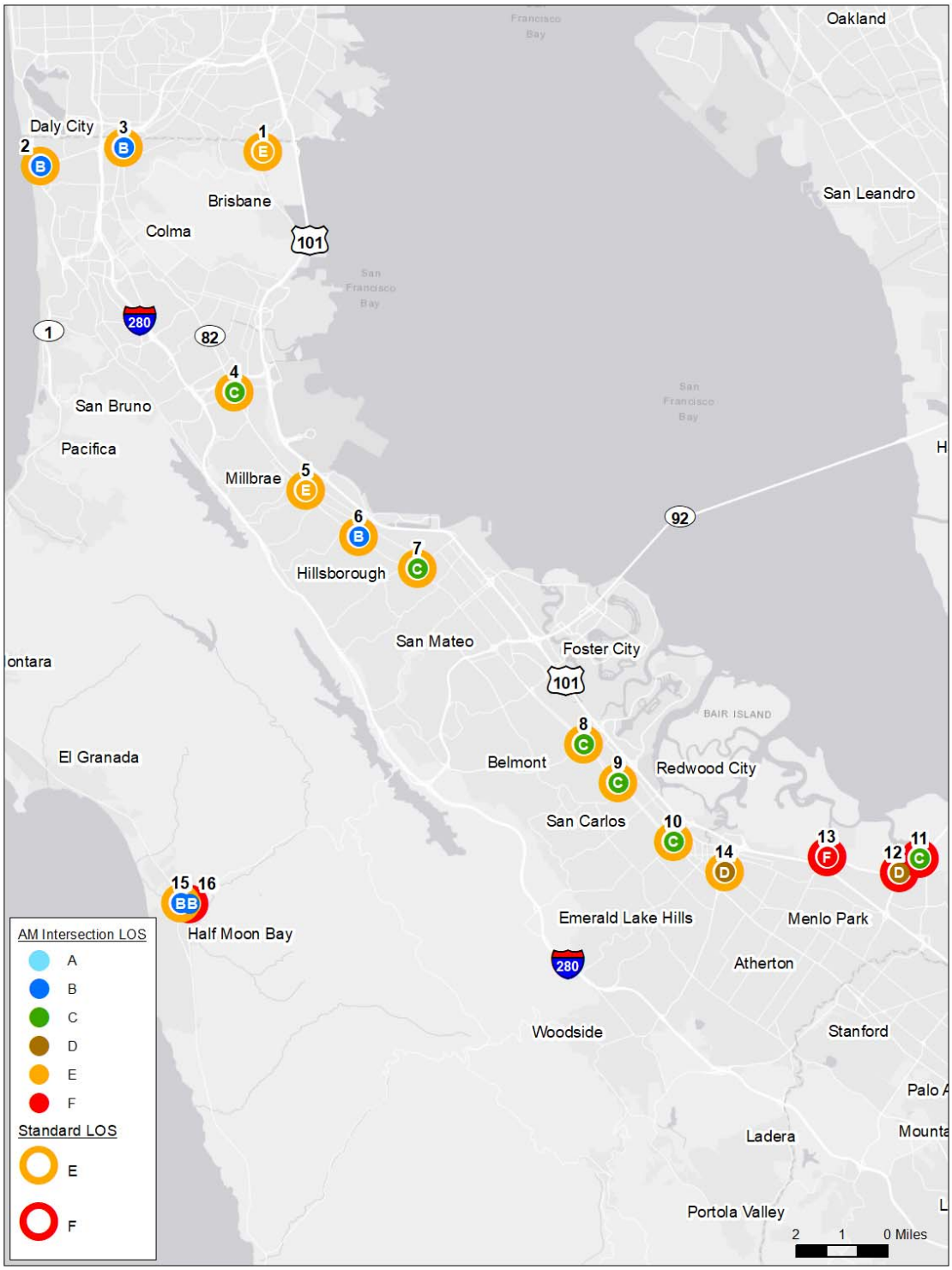

Figure 10 – AM Intersection LOS (Underlying Color is LOS Standard)

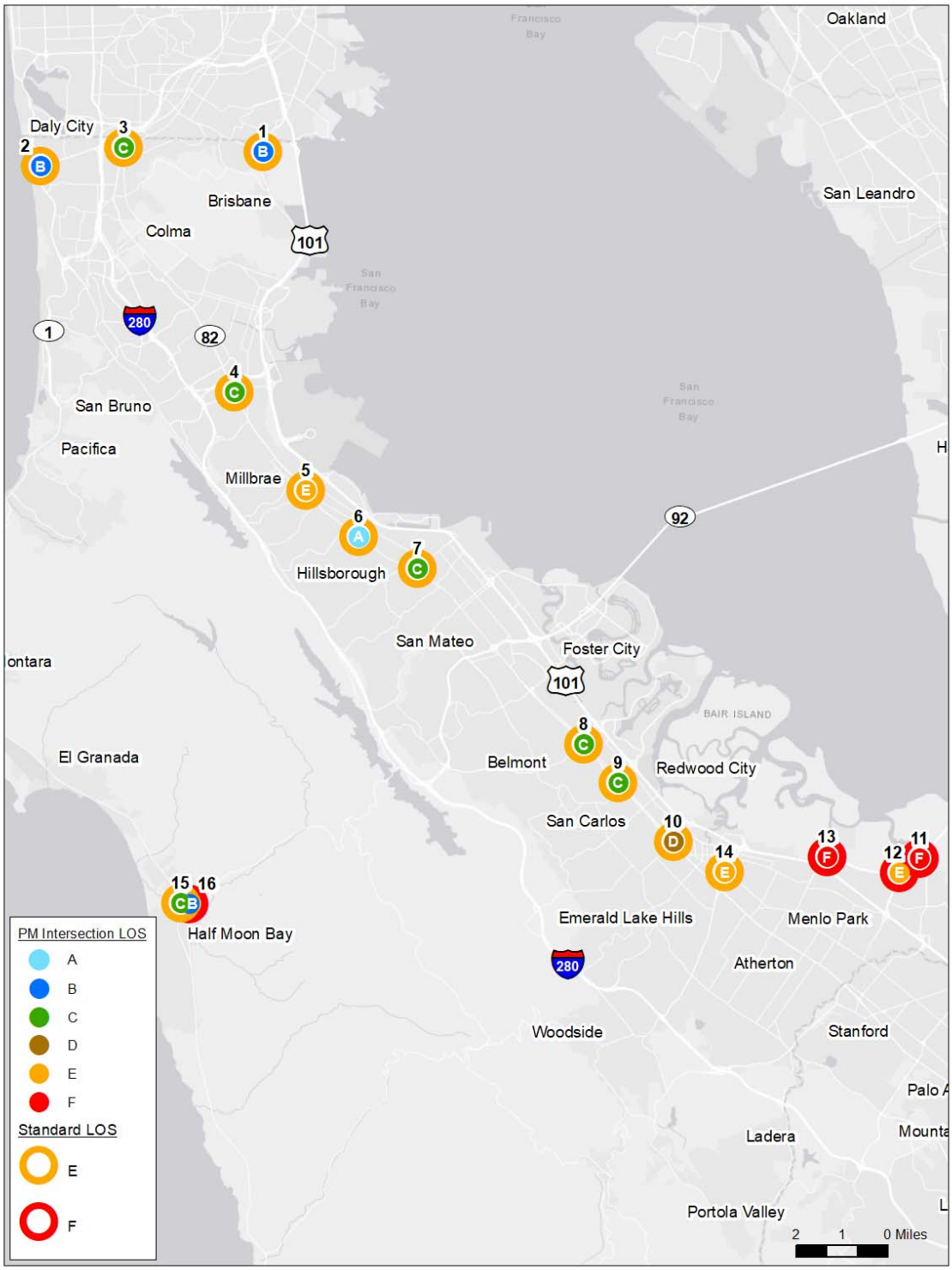

Figure 11 – PM Intersection LOS (Underlying Color is LOS Standard)

I. 2017 MULTI-MODAL PERFORMANCE MEASURE MONITORING PROGRAM

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:

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

This section presents the 2019 measurements of these performance measures and includes the historic results for context.

Level of Service

The levels of service of the CMP corridors and segments are included in the previous sections of this monitoring report. The results show that two roadway segments exceeded the respective LOS standard following reflection of the interregional trips. For the 16 intersections included in the CMP network, all intersections were found to operated at or better than the established standard after incorporating exemptions.

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 2-month average between April and May. Those included in Table 6 for the single occupant vehicle represent the calculated INRIX travel time using the average speed over each TMC segment for each 5-minute interval during each respective AM and PM peak period. The HOV travel times are based on 5 runs in the field for the limits of the HOV between the county line and Whipple 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 2 months.

The current limits of the carpool lane in San Mateo County are from the Santa Clara County line to Whipple 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.

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. 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 6** 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 2009.

Table 6 – Average Travel Time in US 101 Corridor (in minutes)
Between San Francisco and Santa Clara County Lines

Average Travel Time in US 101 Corridor (in minutes) *(Between San Francisco and Santa Clara County Lines)*																								
	AM - Morning Commute Peak Period												PM - Evening Commute Peak Period											
	Northbound						Southbound						Northbound						Southbound					
Mode	2019	2017	2015	2013	2011	2009	2019	2017	2015	2013	2011	2009	2019	2017	2015	2013	2011	2009	2019	2017	2015	2013	2011	2009
Auto - Single Occ. [1]	28	32	32	28	29	30	40	35	36	41	34	28	40	36	39	30	32	33	32	32	32	33	40	29
Carpool - HOV Lane [2]	26	32	32	32	28	30	38	34	35	37	30	26	40	36	42	37	30	32	31	32	32	32	35	27
Caltrain (Baby Bullet b/n Palo Alto and Menlo and Approximate north county line near Bayshore Station - but not stop on Baby Bullet) [3]		40	39	23	35	35		44	43	27	31	31		40	38	24	34	34		36	38	23	35	35
SamTrans Route KX (b/n Palo Alto Station and SFO then transfer to BART at SFO to County Line) [4]		80	80	68	76	79		-	-	73	81	85		-	-	72	81	83		91	91	74	78	89
1 - 2015, 2017, and 2019 Results based on Inrix avg speeds over each TMC for the full 3 month (March-May)																								
2 - 2015, 2017, and 2019 HOV results are based on HOV field runs south of Whipple + Inrix avg speed for TMC north to SF county line																								
3 - Baby Bullet b/n Palo Alto and Menlo and Approximate north county line near Bayshore Station - but not stop on Baby Bullet.																								
4 - Route KX b/n RWC and SF(AM NB Only, PM SB Only) & 398 (b/n Palo Alto and Redwood City).																								

The AM and PM auto travel times in the general-purpose lanes have fluctuated slightly since 2009, while mixed results with some improving while others getting longer for 2019 as compared to 2017.

The carpool travel times also show mixed results as compared to 2017 from Whipple to the county line.

Caltrain has made minor changes to its schedules since 2009 on the Baby Bullet express that was introduced in 2005, thus the travel times have not changed too much since 2013 between the express stops of Palo Alto just south of the county line to the SF stop north of the county line since the last stop in San Mateo County is Millbrae.

Established in 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.

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 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 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. An update to the Plan is currently under development.

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 2019 transit ridership data for SamTrans, Caltrain, and BART (Bay Area Rapid Transit) is included in **Table 7**. As shown in Table 7 below, the 2019 transit ridership data indicates annual total ridership for SamTrans has decreased by 10% and Caltrain ridership decreased by 2% when compared to the CMP update 2017. Annual total ridership for BART decreased by 5% at the stations within San Mateo County. Overall annual total transit ridership decreased about 5% when compared with the previous 2017 CMP Update

Table 7 – Transit Ridership

Transit Agency	Annual Total			Average Weekday		
	FY 2019	FY 2017	FY 2015	FY 2019	FY 2017	FY 2015
SamTrans[1]	10,670,850	11,816,760	13,158,703	35,150	38,700	42,981
Caltrain[2]	18,486,509	18,743,189	18,156,173	63.597	64,114	58,245
BART (Colma, Daly City, South Francisco, San Bruno)[3]	7,741,549	7,818,023	8,155,340	26,483	25,269	28,050
BART (SFO & Millbrae)[3]	11,261,768	12,102,872	12,614,731	37,687	39,989	40,741
Combined Transit	**48,160,676**	**50,480,844**	**52,084,947**	**162,917**	**163,090**	**170,201**

[1] Source: SamTrans End-of-Year Performance Report FY2019
[2] Source: Caltrain Website
[3] Source: BART Staff

J. TRENDS AND NEXT STEPS

Overall between 2017 and 2019 there was just one area that showed improvements while there were a larger number of segments in other areas that worsened especially in the AM Peak Period. A few specifics to highlight that either improved a letter grade in LOS or over 10 mph faster travel time include the following:

- SR 84 between Portola and I-280

Similarly, for those that worsened a letter grade in LOS or slower by more than 10 mph include:

- SR 92 between SR-1 and I-280
- SR-109 between Kavanaugh Drive to SR 84 (Bayfront Expwy.)
- I-280 between SR 1 (north) to SR 1 (south)
- I-280 between San Bruno Avenue to SR 92

The LOS and Performance Measure Monitoring Report for many years has continued to use the 1994 Highway Capacity Manual as the basis for determining LOS for freeways, arterials and intersections. There have been a couple substantial updates to this manual over the years that not only changed the thresholds for determining LOS but also the methodology to be used over the last 15 years. With these changes have come new data sources that allow additional performance measures to be evaluated included travel time reliability and duration of congestion. Nationally, these performance measures are many times of more interest not only to planners and engineers but to drivers. A driver, many times is more concerned with the consistency or reliability with their travel time than they are with the actual conditions. That allows the driver to better plan their trip, departure time, and arrival time with some level of reliability.

It is recommended for the next update cycle, C/CAG transition to the current 2010 HCM.

APPENDIX A

AM and PM Roadway LOS Tabular Results

APPENDIX B

TECHNICAL APPENDIX

- The technical details, database and support documents are included in a separate geographic information system (GIS) deliverable