



DATE: November 13, 2017

TO: Transportation Authority of Marin Board of Commissioners

FROM: Dianne Steinhauser, Executive Director
Derek McGill, Planning Manager

SUBJECT: Accept 2016 System Monitoring Report and the 2017 Congestion Management Program Report (Action), Agenda Item No. 11

RECOMMENDATION

Accept the 2016 System Monitoring Report and the Draft 2017 Congestion Management Program (CMP) Report for Marin County.

A presentation on the 2016 System Monitoring report was made on October 9th, 2017 to the TAM Programming and Projects Executive Committee who recommended the Board accept the System Monitoring Report.

The CMP report concludes that no follow up actions are required on any of the evaluated roadway segments, due to these meeting the established goal or road segments being grandfathered in as part of the original network adoption. Nonetheless, TAM and our local jurisdictions are working towards improvements on many of these road segments.

BACKGROUND

As part of TAM's responsibilities as a Congestion Management Agency, it must update its Congestion Management Program (CMP) every two years for the County to remain eligible for federal and state funds. The next CMP update is due to Metropolitan Transportation Commission (MTC) in December 2017.

Consistent with Requirements from State Law, TAM and its consultants, TJKM Associates, have prepared the 2016 System Monitoring Report and 2017 Congestion Management Program Report. As with previous CMP updates, TAM has collected transportation data to measure system performance in even-numbered years, in this case 2016. That data is utilized for the CMP prepared in odd number years, in this case 2017. Data gathered through this CMP process was expanded in 2016, at the request of our member cities and towns, and this broader collection of information was brought forth to the Programming and Projects Committee in October 2017, where the report was recommended for Board acceptance.

CMP's measure congestion on key highway and arterial segments that were adopted by the CMA, evaluate this congestion against pre-established performance standards, enumerate deficiencies requiring remedial action, address Transportation Demand Management and traffic relief strategies and compile a capital improvement program to improve multi-modal system performance. Transportation system monitoring data collection is necessary to develop the CMP. Note that TAM's predecessor, the Marin County Congestion Management Agency, adopted a CMP designated network in 1991 following the passage of CMP legislation. This same network has been in effect as our CMP reference set of critical roadways ever since.

MTC published updates to its CMP Guidance on July 5, 2013. Our current 2017 CMP Update must be consistent with the latest adopted RTP (Plan Bay Area, adopted July 2017) and with the current MTC travel model. Changes to MTC’s CMP Guidance include references to regional goals and policies established in Plan Bay Area.

The requirements for the CMP were enacted with the passage of Assembly Bill 471 (1989) and became effective upon voter approval of the Prop 111 Blueprint Legislation passed in June 1990. The CMP sets the stage for local land use changes to not adversely impact current transportation service below Level of Service D, without committed transportation mitigation measures. The goal of the original legislation was to tie together land use decisions with transportation investments. Proposition 111 provided for a nine-cent increase in the state gas tax over a five-year period. Note that since 1990, there has been significant additional legislation linking transportation and land use, specifically AB 32 and SB 375.

The CMP legislation makes the following requirements of a conformance determination for local jurisdictions:

- Maintain highway Level of Service (LOS) standards outlined in the CMP (LOS E for highways and LOS D for local arterials), with the exclusion of grandfathered segments;
- Participate in a program to analyze the impact of land-use decisions;
- Participate in the adoption and implementation of a deficiency plan when LOS standards are not maintained, with the exclusion of grandfathered segments.

Cities and counties have a vested interest in complying with the CMP requirements because their receipt of Proposition 111 gas tax subventions, along with other state and federal transportation funds, is conditioned on the development of and compliance with a CMP.

California Government Code Section 65089 requires that every county that includes an urbanized area adopt a CMP. The CMP shall include every city and the county. California Government Code Section 65088.1 defines urbanized areas as being over 50,000 in population. Marin County meets this definition.

DISCUSSION/ANALYSIS

Data gathered through this CMP process typically includes:

- Peak hour travel counts on our Arterials and Highways,
- Peak hour travel counts and occupancy information on key portions of our HOV system (where appropriate).
- Weekend hourly travel counts on portions of State Route 1 and Sir Francis Drake
- Travel Times along arterial and highways using Inrix data (where available)
- Bike and Pedestrian Counts at approximately 23 locations over a 14 hour period on weekdays and 2 hour weekend counts.

The CMP network of monitored roadways was adopted in 1994 by the CMA in response to state statutory requirements associated with the Congestion Management Program legislation of 1990. The locations of the CMP roadways are identified in the table below:

Street	From	To	Roadway Type
SR 1	US 101	Tennessee Valley Rd	Arterial
SR 1	Northern Ave	Almonte Blvd	Arterial
SR 1	Sir Francis Drake Blvd	Pt. Reyes Station	Arterial

SR 37	US 101	Atherton Ave	Freeway
US 101	Golden Gate Bridge	Spencer Ave	Freeway
US 101 (SOV and HOV)	SR 131 (Tiburon Blvd)	Tamalpais Dr	Freeway
US 101 (SOV and HOV)	Sir Francis Drake Blvd	I-580	Freeway
US 101 (SOV and HOV)	I-580	Mission Ave	Freeway
US 101 (SOV and HOV)	Mission Ave	N. San Pedro Rd	Freeway
US 101 (SOV and HOV)	Freitas Pkwy	Lucas Valley Rd	Freeway
US 101	North of Atherton	Sonoma Co. Line	Freeway
SR 131 (Tiburon Blvd)	Redwood Hwy Front.Rd	E. Strawberry Dr	Arterial
I-580	Sir Francis Drake Blvd	Marin Co. Line	Freeway
I-580	Bellam Blvd	Sir Francis Drake Blvd	Freeway
Novato Blvd	San Marin Dr	Eucalyptus Ave	Arterial
Novato Blvd	Wilson Ave	Diablo Ave	Arterial
S. Novato Blvd	Sunset Pkwy	US 101	Arterial
Bel Marin Keys	US 101	Commercial Blvd	Arterial
Sir Francis Drake Blvd	Butterfield Rd	Willow Rd	Arterial
Sir Francis Drake Blvd	San Anselmo Ave	Red Hill Ave	Arterial
Sir Francis Drake Blvd	College Ave	Toussin Ave	Arterial
Sir Francis Drake Blvd	College Ave	Wolfe Grade	Arterial
Sir Francis Drake Blvd	US 101	Larkspur Landing Circle	Arterial
Red Hill Ave	Sir Francis Drake Blvd	Second St	Arterial
Second St	US 101	Marquard St	Arterial
Third St	US 101	Marquard St	Arterial
Bridgeway	Gate 5 Rd	Gate 6 Rd	Arterial

In 2016, in response to local jurisdictional needs for better data and TAM’s countywide constituents requesting same, the TAM Board authorized an expansion of the data collection process to collect additional travel data beyond previous congestion management program efforts. This data collection effort has been shaped by our member agencies, specifically Public Works staff and City/ Town Manager input into the effort, with increased funding from a temporary expansion of city/county fees to TAM. The TAM Board authorized an expanded set of data collection effort to include:

- Expanding the hours of the data collection to gather average daily traffic (ADT) and determine peak hour counts.
- Expanding the weekend data collection process to better compare weekend ADT to weekday ADT.
- Expanding data collection outside the CMP roadway network including the following locations:

Street	From	To	Roadway Type
Alexander Avenue	US 101	South Street	Arterial
Almonte Blvd	SR 1	Miller Avenue	Arterial
Camino Alto	Blithedale	Tamalpais	Arterial
Paradise Drive	San Clemente	Westward Drive	Arterial
Tamalpais Drive	Madera Blvd	Sausalito Street	Arterial
College Ave	Magnolia	SFD	Arterial

Bon Air Road	Magnolia	SFD	Arterial
Wolfe Grade	SFD	D Street	Arterial
SFD	Butterfield	Red Hill	Arterial
Lincoln Ave	Mission	US 101	Arterial
Manual T Freitas	Las Gallinas	Northgate	Arterial
Las Gallinas	Manual T Freitas	Lucas Valley	Arterial
Main Gate Road	Nave Drive	C Street	Arterial
Ignacio Boulevard	Alameda Del Prado	Entrada Drive	Arterial

- Expanding Bike and Pedestrian counts to include 5 new locations. The bike and pedestrian count locations now include:

ID	Count Location
1	LOS RANCHITOS RD AND PUERTO SUELLO SUMMIT
2	CAL PARK HILL PATHWAY AND ANDERSON
3	MILL VALLEY-SAUSALITO PATH AND BLITHEDALE AVENUE
4	MILL VALLEY-SAUSALITO PATH AND TENNESSEE VALLEY PATH
5	BRIDGEWAY BLVD AND PRINCESS ST
6	TIBURON BIKE PATH AND TIBURON BIKE PATH
7	MAIN ST AND TIBURON BLVD/PARADISE DR
8	S KNOLL RD AND TIBURON BLVD
9	TOWER DR AND E BLITHEDALE AVE
10	SIR FRANCIS DRAKE FLYOVER
11A	SAN ANSELMO AVE AND TURNSTEAD AVE
11B	SAN ANSELMO AVE AND TURNSTEAD AVE
12	BOLINAS RD AND BROADWAY BLVD
13	MAGNOLIA AVE & WARD ST
14	LARKSPUR-CORTE MADERA PATH
15	CORTE MADERA CREEK PATH
16	CAMINO ALTO & E BLITHEDALE AVE
17	ALAMEDA DEL PRADO AND PACHECO HILL PATH
18	LARKSPUR PLAZA DR / ROSE LN AND DOHERTY DR
19	ROSE LN AND DOHERTY DR
20	S NOVATO BLVD AND ROWLAND BLVD
21	ANDERSEN DR AND BELLAM BLVD
22	NICASIO VALLEY RD & DRIVEWAY
23	ENFRENTE BIKE PATH AND NOVATO BLVD
24	ALMONTE BLVD / SHORELINE HWY AND SHORELINE HWY
25	E. FRANCISCO BLVD AND BAY ST
26	ANDERSEN DR AND DU BOIS ST
27	MERRYDALE DR & NONE-SCREENLINE
28	US 101 NB OFF RAMP AND BIKE PATH AT SFD BLVD

The resultant 2016 System Monitoring Report provides system performance information on a wide range of quantitative travel information from roadway speeds and volumes, transit performance, and bike and pedestrian volumes. In October through December 2016 tube counts were conducted at the identified roadway locations and video technology was used at the identified bike and pedestrian count locations. Data was collected on a seven day period to capture Tuesdays through Thursdays when schools were in session, and days with any holidays, special events or weather conditions were avoided.

Local Roadway Volumes

Roadway volumes collected during this process are included in **Attachment A**, and summarized on a 3-day (Tuesday-Thursday) average, with approximated peak hours of 6-10 AM and 3-7 PM. East Sir Francis Drake west of US 101 reflected the highest volume local road in the county, with 2nd and 3rd Streets in San Rafael in 2nd and 3rd place respectively.

Also included in **Attachment A** are time of day charts comparing Saturday and Sunday travel information with average weekday traffic for each of our local roadway segments.

Local Roadway Service Level

In the 2016 Monitoring Cycle, four of the 17 CMP roadways segments received the minimal established LOS goal or fell below that goal for the AM peak. Three of the four segments are arterial segments on Sir Francis Drake, and one on South Novato Boulevard west of US 101. These charts are shown as table 6 in the report on page 13.

In the PM 4 segments four received the minimal established LOS goal or fell below that goal, two on Sir Francis Drake, one on 2nd Street in San Rafael, and one on SR 1 west of US 101. These charts are shown as table 7 in the report on page 14.

No follow up actions are required on any of these segments, due to these meeting the established goal or roadways segments being grandfathered in as part of the original network adoption. Nonetheless, TAM and our local jurisdictions are working towards improvements on many of these road segments.

Highway Service Level

In the 2016 monitoring cycle, 3 highway segments met the minimal established LOS goal of “E” for mixed flow conditions in the AM period, and all other segments performed above this goal. All of these segments are southbound or westbound facilities, as shown on table 9 on page 20. All northbound facilities received a LOS standard of an “A” with the exception of US 101 north of the Golden Gate Bridge which has a LOS “C”.

In the PM period, 4 highway segments fell below established LOS goals for mixed flow conditions with LOS “F”. All of these segments are northbound/eastbound directions, as shown in table 10 on page 22 of the report. These roadways are grandfathered segments or currently under improvement so no action is required. All southbound facilities received an LOS standard of a “C” or higher with the exception of US 101 north of the Golden Gate Bridge which has LOS “E”.

Note TAM and its member jurisdictions are working towards improvements in the Highway 101 Corridor.

HOV Lane Service Levels

In the 2016 monitoring cycle, two segments of HOV lanes met or fell below established LOS goals for HOV lane performance, one in the AM on southbound US 101 from Lucas Valley Road to Freitas Parkway at LOS

“E” and at SR 131 to Tamalpais in the PM, a grandfathered segment that has historically not met established LOS standards at LOS “F”. The full performance of HOV lanes are shown in Table 12 and 13 on page 27 of the report. Again, while no follow up actions are required on any of these segments per CMP statutes, TAM and its member agencies are working on efforts to improve operations in these segments including ramp metering and bus-on-shoulder options.

Countywide Travel time comparisons

Based on the data collected as part of this effort average travel times were gathered for US 101 to compare free-flowing conditions to the peak travel periods. The average free-flow US 101 travel time (from county line to county line) is 26 minutes, with an average travel time of 36 minutes at the AM peak and 39 minutes in the PM peak.

Pedestrians and Bicycles

TAM conducts bicycle and pedestrian counts at 28 locations most of which have been counted previously by TAM for Marin County as part of the Nonmotorized Transportation Pilot Program. Bridgeway at Princess Street in Sausalito remains the highest volume on weekdays of both bike and pedestrian counts with 4,865 pedestrians and 1,929 bicyclists counted over a 14-hour period. Other high volume locations include San Anselmo Avenue at Tunstead Avenue in San Anselmo with 2,666 Bike and Pedestrian counts and Broadway at Bolinas road in Fairfax with 2,469 bike and pedestrian counts. The Central Marin Ferry Connector Bridge opened in 2016 has 530 bike and pedestrian users over a 14-hour period.

Travel Demand Modeling and Land Use Analysis

The CMP is required to identify consistency with MTC’s Regional Travel Demand Model Methodology and databases used in the Regional Travel Demand Model. MTC published updates to its CMP Guidance on July 5, 2013. As done in previous CMP cycles, the 2017 CMP Update must be consistent with the adopted RTP (Plan Bay Area, adopted July 2017) and with the current MTC travel model. There have been no changes to the regional guidance since TAM’s adoption of the 2013 CMP. MTC and County staff around the region staff are in discussions about future CMP guidance and modeling requirements.

The intent of the Land Use Analysis Program is to improve the linkage between local land use decisions and regional transportation facility decisions; to better assess the impacts of development in one community on another; and to promote information sharing between local governments when the decisions made by one jurisdiction have an impact on another. TAM acts as a resource to local governments in performing transportation analyses of land use changes on the CMP designated transportation network.

Capital Improvement Program

TAM’s CMP Capital Improvement Program is the basis for determining which projects are included in the Regional Transportation Improvement Program, RTIP. The CMP Capital Improvement Program must also show consistency with regional air quality attainment plans.

Both Measure A’s transportation sales tax and Measure B’s vehicle registration fee provide projects and programs addressing long range needs identified through the Regional Transportation Plan are included in this chapter.

Monitoring, Conformance and Deficiency Planning

Local jurisdictions must meet the CMP conformance requirements to receive funding in several state programs. The process of conformity has not substantively changed in the 2017 CMP. LOS monitoring did not report any new deficiencies and local jurisdictions that conform to the land use analysis program requirements are expected to remain in conformance.

Recommendation

Move to accept the Draft 2017 Congestion Management Program (CMP) with its supporting documentation- the 2016 Transportation Systems Monitoring Report.

FISCAL CONSIDERATION

There are no fiscal considerations.

NEXT STEPS

The CMP is a required document and must be submitted to MTC by December 2017 for review and acceptance.

TAM staff will post the information shared in this report on the Data & Statistics page of the TAM website here: <https://www.tam.ca.gov/resources-news/data-statistics/>

Ramp volumes that are being gathered on highway ramps in Marin County are being delayed due to the North Bay Fires; however these will be presented to the TAM Board in early 2018. They are not required in the CMP submittal to MTC.

ATTACHMENTS

Exhibit A – Travel Data Summaries

Exhibit B – Draft 2016 Transportation System Monitoring Report

Exhibit C – Draft 2017 CMP Report

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Average Daily Traffic Information (Tuesday – Thursday ADT)

		Average Daily Traffic (T-TH)		AM Peak (6-10)		PM Peak (3-7)		Notes:
		EB	WB	EB	WB	EB	WB	
<i>CMP Segments</i>								
1A	SR1 West of 101	14,985	15,135	4,503	2,783	3,780	5,107	
1B	SR1 Between Northern & Almonte	5,123	2,759	1,682	580	1,201	744	
1C	SR 1 Between Sir Francis Drake & Pt. Reyes Station	1,195	1,178	202	201	381	148	NB/SB
4A	SR131 Between Redwood & Strawberry	15,373	16,583	3,629	4,282	4,201	4,482	
6A	Novato Blvd Between San Marin & Eucalyptus	3,405	3,707	883	825	1,006	1,294	
6b	Novato Blvd Between Wilson & Diablo	9,633	9,235	2,688	1,500	2,569	3,321	
6C	Novato Blvd Between Sunset & US 101	5,108	3,828	1,895	688	1,250	1,393	
7A	Bel Marin Keys Between US 101 & Commercial	10,443	10,215	3,550	1,556	2,087	3,808	
8A	SFD Blvd Between Butterfield & Willow	10,382	11,511	3,132	1,850	2,570	3,801	
8B	SFD Blvd Between San Anselmo & Red Hill	14,896	15,587	4,344	2,613	3,858	5,077	
8C	SFD Blvd Between College & Toussin	10,616	11,815	2,996	1,945	2,794	3,925	
8D	SFD Blvd Between College & Wolfe	14,369	15,035	3,254	3,305	3,902	4,442	
8E	SFD West of Larkspur Landing	22,320	23,551	6,410	5,666	5,114	6,535	
9A	Red Hill Ave Between SFD & Second	19,793	18,611	5,130	5,080	3,599	5,521	
9B	Second St Between US 101 & Marquard St	22,285		5,358		5,845		
9C	Third St Between US 101 & Marquard St		20,630		3,935		5,915	
10A	Bridgeway Between Gate 5 & Gate 6	12,927	13,324	2,108	3,675	4,152	3,328	
<i>New Locations</i>								
1	Alexander Ave Between US101 & South	3,195	4,006	463	1,161	931	1,147	NB/SB
2	Almonte Between SR1 & Miller	8,872	8,627	1,682	1,991	3,333	2,690	NB/SB
3	Camino Alto Between Blithedale & Tamalpais	3,225	1,636	414	386	1,855	534	NB/SB
4	Blithedale Ave East of Camino Alto	16,926	14,867	3,697	3,714	4,753	3,914	
5	Paradise Dr Between San Clemente & Westward	7,154	12,888	1,718	3,406	2,218	4,230	
6	Tamalpais Dr Between Madera & Sausalito	9,613	9,125	2,393	1,870	2,903	2,892	
7	College Ave Between Magnolia & SFD	7,478	7,162	1,205	1,988	2,290	2,049	
8	Bon Air Rd Between Magnolia & SFD	7,460	6,817	1,304	1,813	2,559	1,649	
9	Wolfe Grade Between SFD & D St	6,684	4,872	903	1,507	3,060	1,376	NB/SB
10	SFD Blvd Between Butterfield Rd & Red Hill Ave	13,733	17,798	4,070	2,930	3,185	5,853	
11	3rd St Between US 101 & Point San Pedro Rd		13,754		2,250		3,946	
12	2nd St Between US 101 & Point San Pedro Rd	21,747		4,002		6,851		
13	Lincoln Ave Between Mission Ave & US 101	5,280	6,988	994	1,914	2,057	2,183	NB/SB
14	Manual T Frietas Between Las Gallinas & Northgate	10,636	11,538	2,844	2,495	3,072	3,528	
15	Las Gallinas Between Manual T Frietas & Lucas Valley	3,580	3,556	694	1,533	1,300	861	NB/SB
16	Main Gate Rd Between Nave Dr & C St	3,684	3,330	973	811	1,140	1,097	
17	Ignacio Blvd Between Alameda Del Prado & Entrada D	8,803	7,257	3,364	1,192	1,914	2,459	
18	SR131/Tiburon Blvd Between Strawberry & Trestle	14,058	14,021	3,163	3,525	4,141	3,900	
19	Miller Ave Between Reed St & Camino Alto	10,296	10,343	1,866	2,409	3,482	3,088	

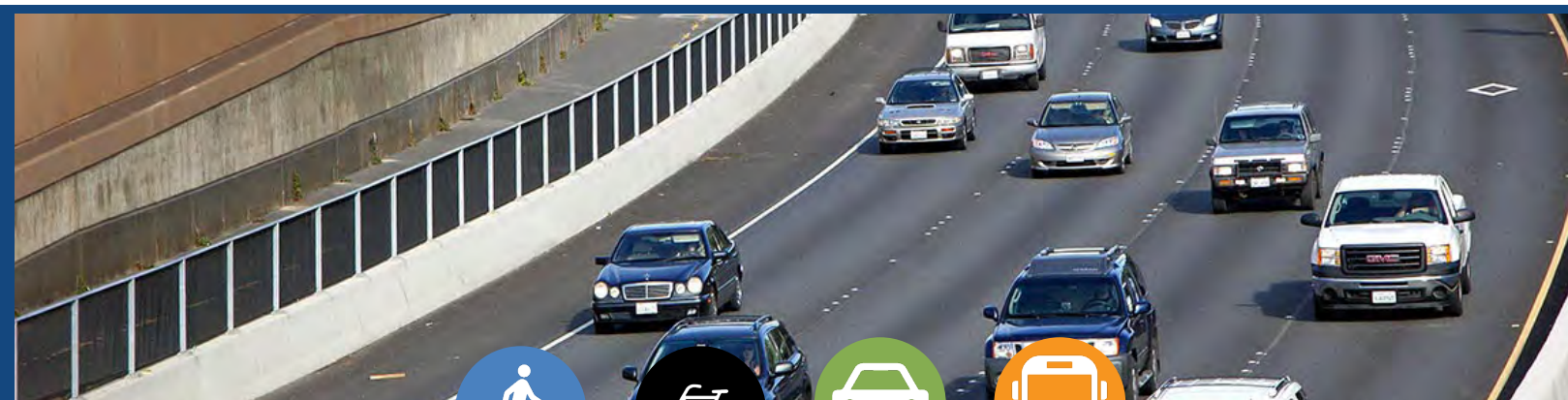
Average Daily Traffic to Weekend Comparison

CMP Segments	Average Daily Traffic (T-TH)		Saturday Volumes			Sunday Volumes			Notes:
	EB	WB	EB	WB	% of ADT	EB	WB	% of ADT	
1A SR1 West of 101	14,985	15,135	11,888	15,600	-10%	11,154	14,129	-19%	
1B SR1 Between Northern & Almonte	5,123	2,759	6,315	4,181	25%	5,271	3,658	12%	
1C SR 1 Between Sir Francis Drake & Pt. Reyes Station	1,195	1,178	2,051	2,308	46%	1,311	1,422	13%	NB/SB
4A SR131 Between Redwood & Strawberry	15,373	16,583	14,117	14,750	-11%	13,649	15,691	-9%	
6A Novato Blvd Between San Marin & Eucalyptus	3,405	3,707	3,222	3,361	-8%	3,065	3,483	-9%	
6b Novato Blvd Between Wilson & Diablo	9,633	9,235	8,408	7,998	-15%	7,432	6,869	-32%	
6C Novato Blvd Between Sunset & US 101	5,108	3,828	3,767	3,247	-27%	4,336	3,582	-13%	
7A Bel Marin Keys Between US 101 & Commercial	10,443	10,215	5,057	5,076	-104%	4,075	3,994	-156%	
8A SFD Blvd Between Butterfield & Willow	10,382	11,511	10,569	11,825	2%	9,672	9,770	-13%	
8B SFD Blvd Between San Anselmo & Red Hill	14,896	15,587	15,565	14,956	0%	12,799	13,203	-17%	
8C SFD Blvd Between College & Toussin	10,616	11,815	8,877	10,463	-16%	7,534	5,611	-71%	
8D SFD Blvd Between College & Wolfe	14,369	15,035	10,786	11,292	-33%	9,133	9,628	-57%	
8E SFD West of Larkspur Landing	22,320	23,551	17,639	18,698	-26%	14,895	15,579	-51%	
9A Red Hill Ave Between SFD & Second	19,793	18,611	17,996	16,617	-11%	15,266	14,443	-29%	
9B Second St Between US 101 & Marquard St	22,285		19,111		-17%	21,661		-3%	
9C Third St Between US 101 & Marquard St		20,630		17,959	-15%		17,721	-16%	
10A Bridgeway Between Gate 5 & Gate 6	12,927	13,324	13,697	13,053	2%	9,923	9,870	-33%	
<i>New Locations</i>									
1 Alexander Ave Between US101 & South	3,195	4,006	4,014	4,977	20%	3,386	3,756	-1%	NB/SB
2 Almonte Between SR1 & Miller	8,872	8,627	7,139	8,135	-15%	5,896	6,120	-46%	NB/SB
3 Camino Alto Between Blithedale & Tamalpais	3,225	1,636	2,228	1,726	-23%	1,458	1,180	-84%	NB/SB
4 Blithedale Ave East of Camino Alto	16,926	14,867	14,011	11,649	-24%	11,645	9,828	-48%	
5 Paradise Dr Between San Clemente & Westward	7,154	12,888	5,482	8,645	-42%	4,581	6,388	-83%	
6 Tamalpais Dr Between Madera & Sausalito	9,613	9,125	7,053	6,799	-35%	6,018	5,857	-58%	
7 College Ave Between Magnolia & SFD	7,478	7,162	4,734	4,896	-52%	4,039	4,500	-71%	
8 Bon Air Rd Between Magnolia & SFD	7,460	6,817	4,579	4,090	-65%	3,623	3,344	-105%	
9 Wolfe Grade Between SFD & D St	6,684	4,872	3,564	3,052	-75%	2,913	2,275	-123%	NB/SB
10 SFD Blvd Between Butterfield Rd & Red Hill Ave	13,733	17,798	12,072	15,160	-16%	11,415	13,776	-25%	
11 3rd St Between US 101 & Point San Pedro Rd		13,754		16,913	19%		17,774	23%	
12 2nd St Between US 101 & Point San Pedro Rd	21,747		17,996		-21%	15,594		-39%	
13 Lincoln Ave Between Mission Ave & US 101	5,280	6,988	3,485	5,515	-36%	3,173	4,385	-62%	NB/SB
14 Manual T Frietas Between Las Gallinas & Northgate	10,636	11,538	8,631	8,791	-27%	7,403	7,820	-46%	
15 Las Gallinas Between Manual T Frietas & Lucas Valley	3,580	3,556	2,603	2,818	-32%	2,272	1,884	-72%	NB/SB
16 Main Gate Rd Between Nave Dr & C St	3,684	3,330	2,332	2,158	-56%	2,090	1,868	-77%	
17 Ignacio Blvd Between Alameda Del Prado & Entrada Dr	8,803	7,257	6,653	5,925	-28%	5,064	5,135	-57%	
18 SR131/Tiburon Blvd Between Strawberry & Trestle	14,058	14,021	12,590	12,959	-10%	11,097	11,391	-25%	
19 Miller Ave Between Reed St & Camino Alto	10,296	10,343	9,376	9,615	-9%	7,469	7,338	-39%	



2016 Transportation System Monitoring Report

Final Report
August 2017



VISION THAT MOVES YOUR COMMUNITY

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EXECUTIVE SUMMARY

The County of Marin maintains a Congestion Management Plan (CMP) through the Transportation Authority of Marin (TAM), the designated Congestion Management Agency (CMA), as required by the California Government Code 65089. TAM 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 2016 Transportation System Monitoring Report provides an insight into the performance of various arterial and freeway segments, throughout the County, and assists with key decisions on future investment of transportation dollars.

Included in this report is extensive bicycle and pedestrian monitoring data. Though not required for the CMP process, TAM chooses to include this data to understand the multi-modal aspects on the CMP network due to the unique nature of Marin County.

CMP Network

The County established the CMP Network in 1991 that included all state highways and principal arterials in the County. In total, the 123-mile CMP network contains 91 miles of state highways and 32 miles of principal arterials. *The CMP adopted Level of Service (LOS) standard for Arterials is LOS D, and for Freeways, it is LOS E. In order for the arterial segments to meet this standard, they should be performing at a speed of 10 mph or more, and for freeway segments, it is 30 mph or more.* Additional details on the network and their recent performance are discussed in Chapter 3 of this 2016 Transportation Monitoring Report.

Data Collection and Congestion Analysis

The biennial monitoring task requires extensive data collection for all established arterials and freeway segments included in the network. With changing needs and technological advancements, the data collection methodology has evolved over the last two 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 only on normal commute travel days (i.e. Tuesdays, Wednesday, and Thursdays), and non-school days and days with any special events or incidents were eliminated. Available commercial speed data and floating car surveys were utilized for the analysis. The data was analyzed separately for commercial speed data and floating car surveys to obtain average speeds for each segment and convert to LOS using Highway Capacity Manual (HCM) methodologies. Further discussion on data collection efforts is included in Chapter 2.

CMP Network



Monitoring Results

The 1991 CMP established LOS standards for major arterials and freeway segments using travel time and average speed. For arterials, the established standard is LOS D, while for the freeways it is LOS E. Many sections with a LOS designation worse than the adopted standards in 1991 are grandfathered into the first adopted CMP. CMP legislation exempts congested CMP roadway segments that did not meet the minimum LOS standards when the CMP network was formed (in 1991 and 1992) from deficiency identification and preparing a deficiency plan. These segments are referred as Grandfathered Segments.

A total of 17 arterial segments and 10 freeway segments were monitored in this report during the AM and PM peak periods. A summary of these monitoring results are provided in **Table 1**.

Table 1: 2014 CMP Network Monitoring Results

Roadway Type	# of CMP Segments	AM Peak Hour		PM Peak Hour		LOS Standard
		LOS Standard Met	LOS Standard Not Met*	LOS Standard Met	LOS Standard Not Met*	
Arterials	17	16	1	16	1	D
Freeways	10	10	0	6	4	E
TOTAL	27	26	1	22	5	

Notes: *Includes Grandfathered segments.

In the 2016 Monitoring Cycle, six of the 27 segments did not meet the established LOS standards. Two of the seven segments are arterials, and since all of these segments have been grandfathered, no follow up actions are required. The remaining four are freeway segments, of which three have been grandfathered and of which the 4th segment has a mainline improvement scheduled for construction completion in Fall 2017¹. On-going work along the eastbound shoulder on the Richmond-San Rafael Bridge has also likely had an upstream impact on travel times, as recorded in this monitoring report for Segments 5A and 5B. These freeway segments do not require any follow up actions or corrective measures at this time. Additional details for all arterial and freeway segments are provided in Chapter 3.

¹ The Bay Area Toll Authority (BATA) is spearheading the Richmond-San Rafael Bridge Access Improvements to improve mobility along the Interstate 580 corridor between Richmond and San Rafael. This project will convert the right shoulder to a third freeway lane from the Sir Francis Drake Boulevard on-ramp in Marin County to the Marine Street (Richmond Parkway/Point Richmond) exit in Contra Costa County.

1.0 BACKGROUND

1.1 Purpose of the CMP and Biennial Monitoring

The legislative changes of 1990 required all urbanized counties within the State to establish a CMA, and develop and maintain a CMP. As required by the State regulations, TAM, the County-designated CMA, established the CMP roadway network in 1991 that included all state highways and principal arterial roadways within the County. California Government Code Section 65089(b)(1)(A) states that once a highway or roadway has been designated as part of the CMP system, it cannot be removed. Furthermore, Section 60589(b)(4) requires that the regional transportation system is part of the required land use program defined by State statute.

Biennial monitoring provides an opportunity to monitor established LOS standards for the arterial 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 Marin 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 Marin CMP roadway system is consistent with the RTP, as well as the CMPs of adjoining Contra Costa, San Francisco, and Sonoma counties.

1.2 CMP Designated Network

The following State Highways and arterials are included in the Marin County CMP roadway network:

1. State Route 1 (SR 1) – from Sonoma County Line to United States Highway 101 (US 101)
2. State Route 37 (SR 37) – from US 101 to Sonoma County Line
3. US 101 – from Sonoma County Line to San Francisco County Line
4. State Route 131 (SR 131) – from US 101 to Main Street in Tiburon
5. Interstate 580 (I-580) – from US 101 to Contra Costa County Line
6. Novato Boulevard / South Novato Boulevard in Novato – from Sutro Avenue / San Marin Drive to US 101
7. Bel Marin Keys Boulevard – from US 101 Southbound Ramps to Commercial Boulevard
8. Sir Francis Drake Boulevard in unincorporated Marin County, Fairfax, San Anselmo, Ross, Kentfield, Larkspur – from SR 1 to I-580
9. Red Hill Avenue / 2nd Street / 3rd Street in San Anselmo and San Rafael – from Sir Francis Drake Boulevard to US 101
10. Bridgeway / 2nd Street / Alexander Avenue in Sausalito – from US 101 to US 101

Table 2 provides details of the Marin CMP Roadway Network segments. In total, the 123-mile CMP designated roadway network contains 91 miles of state highways and 32 miles of principal arterial roadways. The CMP Network is illustrated in **Figure 1**.

The HOV lanes in the Marin CMP network are illustrated in **Figure 2**.

Table 2: Arterial and Freeway Segments in CMP Network

ID #	Street	From	To	CMP Facility Type	Grand-fathered Status
1A	SR 1	US 101	Tennessee Valley Rd	Arterial	No
1B	SR 1	Northern Ave	Almonte Blvd	Arterial	Yes
1C	SR 1	Sir Francis Drake Blvd	Pt. Reyes Station	Arterial	No
2A	SR 37	US 101	Atherton Ave	Freeway	No
3A	US 101 (MF and HOV)	Golden Gate Bridge	Spencer Ave	Freeway	No
3B	US 101 (MF and HOV)	SR 131 (Tiburon Blvd)	Tamalpais Dr	Freeway	Yes
3C	US 101 (MF and HOV)	Sir Francis Drake Blvd	I-580	Freeway	Yes
3D	US 101 (MF and HOV)	I-580	Mission Ave	Freeway	Yes
3E	US 101 (MF and HOV)	Mission Ave	N. San Pedro Rd	Freeway	Yes
3F	US 101 (MF and HOV)	Freitas Pkwy	Lucas Valley Rd	Freeway	Yes
3G	US 101	North of Atherton	Sonoma Co. Line	Freeway	Yes
4A	SR 131 (Tiburon Blvd)	Redwood Hwy Frontage Rd	E. Strawberry Dr	Arterial	No
5A	I-580	Sir Francis Drake Blvd	Marin Co. Line	Freeway	No
5B	I-580	Bellam Blvd	Sir Francis Drake Blvd	Freeway	Yes
6A	Novato Blvd	San Marin Dr	Eucalyptus Ave	Arterial	No
6B	Novato Blvd	Wilson Ave	Diablo Ave	Arterial	No
6C	S. Novato Blvd	Sunset Pkwy	US 101	Arterial	No
7A	Bel Marin Keys	US 101	Commercial Blvd	Arterial	Yes
8A	Sir Francis Drake Blvd	Butterfield Rd	Willow Rd	Arterial	Yes
8B	Sir Francis Drake Blvd	San Anselmo Ave	Red Hill Ave	Arterial	Yes
8C	Sir Francis Drake Blvd	College Ave	Toussin Ave	Arterial	Yes
8D	Sir Francis Drake Blvd	College Ave	Wolfe Grade	Arterial	Yes
8E	Sir Francis Drake Blvd	US 101	Larkspur Landing Cir	Arterial	Yes
9A	Red Hill Ave	Sir Francis Drake Blvd	Second St	Arterial	No
9B	Second St	US 101	Marquard St	Arterial	No
9C	Third St	US 101	Marquard St	Arterial	No
10A	Bridgeway	Gate 5 Rd	Gate 6 Rd	Arterial	No

Notes: MF = Mixed Flow lanes; HOV = High Occupancy Vehicle

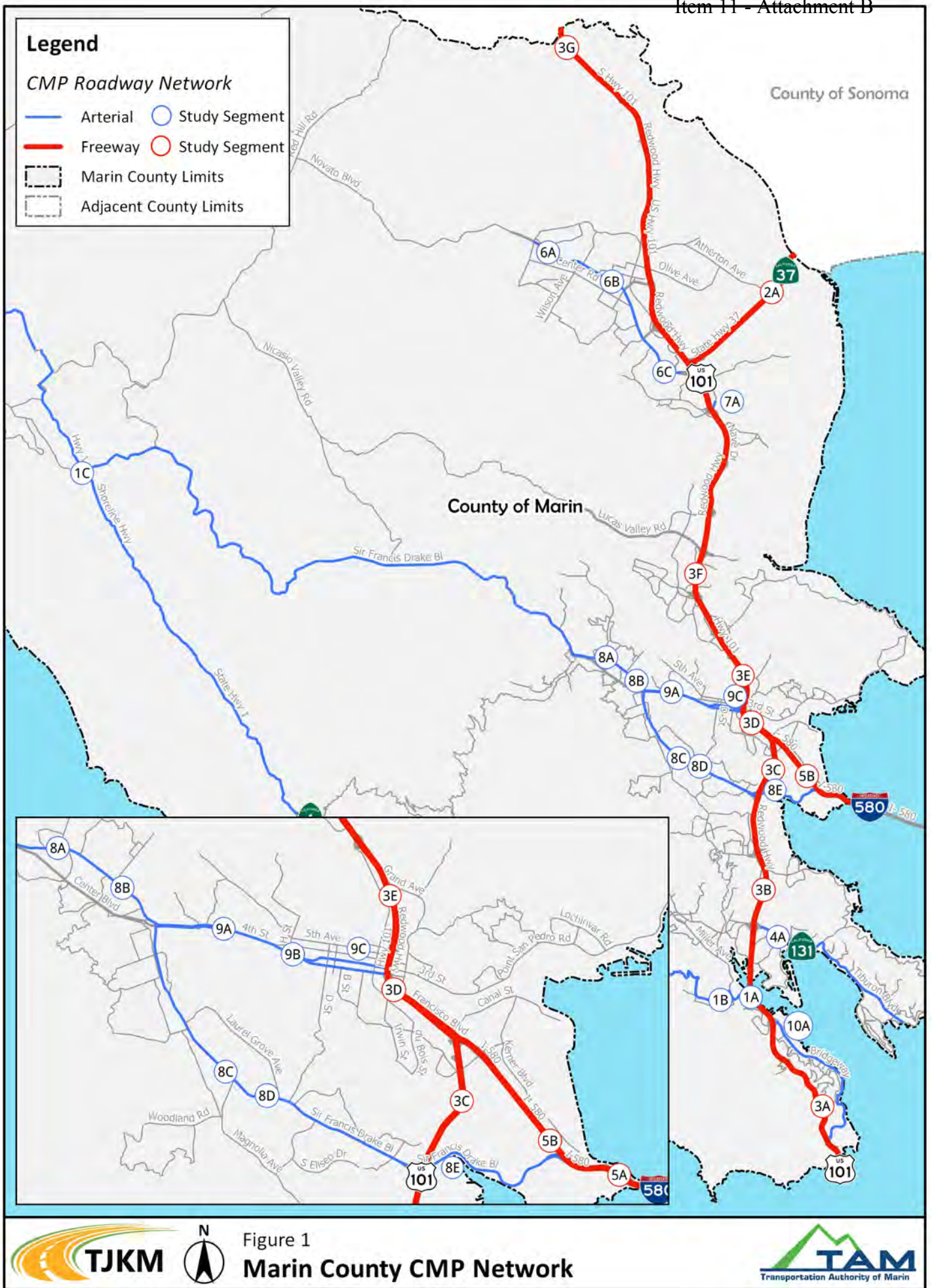


Figure 1
Marin County CMP Network



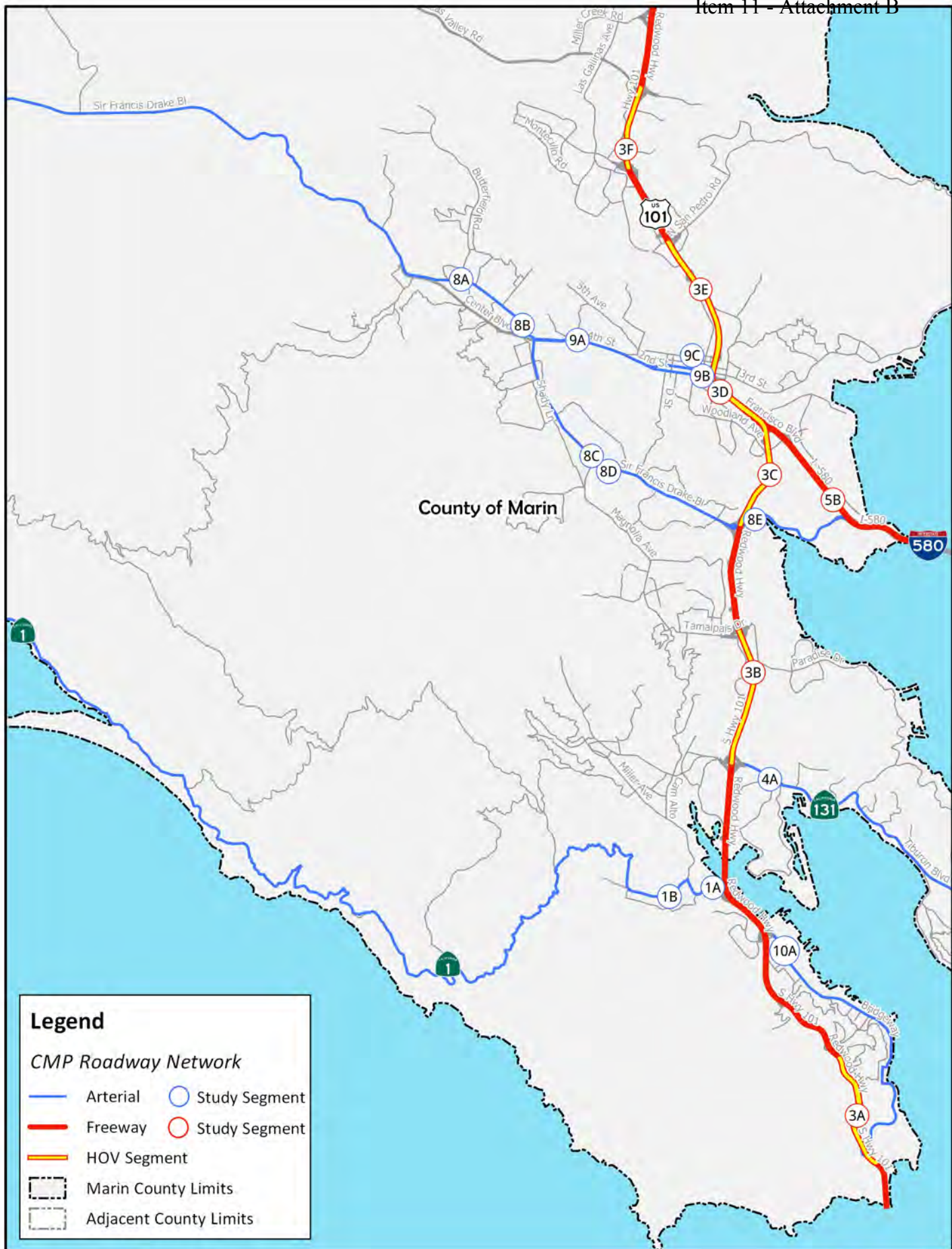


Figure 2
HOV Lanes in CMP Network



1.3 Roadway System Level of Service

The 1991 CMP established the LOS standards for the arterials and freeway segments using travel times and average speeds. For the arterial segments, LOS D is the established standard while for the freeway segments, LOS E is the accepted standard. Certain segments were operating at lower levels of service when these standards were established. These segments have been “grandfathered” in, allowing them to operate at levels lower than the established standards without requiring corrective measures.

Local jurisdictions often measure LOS based on delay at intersections. However, TAM as a CMA is concerned with system performance as a whole, not the performance of individual intersections. Therefore, LOS for the CMP is based on travel speeds, and not delay at intersections.

The following **Table 3** shows frequency of monitoring based upon the results of the most recent data collection and analysis efforts:

Table 3: Frequency of CMP Monitoring

Roadway Type	LOS in Most Recent Monitoring Report	Frequency of Monitoring
Arterial Segments	LOS C or better (> 13 MPH)	4 years
	LOS D or worse (< 13 MPH)	2 years
Freeway Segments	LOS C or better (> 54 MPH)	4 years
	LOS D or worse (< 54 MPH)	2 years
Grandfathered Segments	N/A	2 years

Source: 2012 Transportation Monitoring Report

The 2016 monitoring included all arterial and freeway segments within the network, irrespective of their 2014 LOS designation. These efforts are in conformance with the established monitoring requirements.

2.0 METHODOLOGY

This section discusses the methodology utilized for measuring LOS on major arterials and freeways. 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 later removal.

Using a combination of commercial speed data and floating car surveys, travel time data was collected for 27 segments within Marin County, including 17 arterial segments and 10 freeway segments, six with HOV lanes. The raw commercial speed data and floating car survey data were subsequently post-processed in order to calculate average speeds along study segments and analyzed. Consistent with prior Marin County CMP monitoring, average speed was then used to assign LOS using HCM methodologies.

2.1 Screening for Data Collection Periods

To ensure that data collection efforts appropriately reflect normal traffic conditions, the data collection schedule was carefully reviewed in an effort to eliminate collection of abnormal travel conditions associated with national holidays, school holidays across the county, construction events, and any other events associated with abnormal traffic conditions, such as seasonal shopping events. These factors have potential to affect the data quality for the current monitoring and removing them ensures the LOS results are representative of normal traffic conditions experienced by a daily commuter.

Travel time data was collected using a combination of commercial speed data and in-field floating car surveys, and therefore appropriate monitoring days for both sources were reviewed and identified. Additionally, commercial speed data was also obtained for some arterial segments that were also selected for in-field floating car surveys, with the intention of providing an additional level of data validation between sources.

Notwithstanding the preliminary screening process, the data collected in the field was processed and reviewed to identify any significant inconsistencies relative to prior year analyses, adjacent segment travel times and travel patterns, commercial speed data, and TJKM's understanding of area circulation patterns. A second round of floating car surveys were performed on segments where irregularities were found in this secondary screening process, in order to increase the number of data points used in the average speed calculations, further improving our confidence in the data validity.

2.1.1 Base Monitoring Times

In-field floating car surveys for LOS monitoring were conducted in October, November, and December 2016, when schools were in session. A second round of in-field floating car surveys were conducted in March and April 2017, when schools were in session, after secondary data screening revealed some segments would benefit from additional data points to ensure data confidence. Commercial speed data was obtained in September 2016.

Weekday data was collected on Tuesdays, Wednesdays, and Thursdays for the nominated morning and evening peak periods. The morning peak period was from 7:00 AM to 9:00 AM and the evening peak period was from 4:30 PM to 6:30 PM.

2.1.2 Public Holidays, Special Events, and Weather Conditions

During the data collection days and times, no public holidays, special events or weather conditions were observed that could have impacted the usefulness of the collected data. The data was collected on days and hours representative of normal traffic conditions.

2.1.3 Construction/Maintenance and Traffic Incidents

Significant construction impacts were not present during the monitoring period, resulting in no data being disqualified from the process. However, some on-going construction, maintenance, and rehabilitation work on the eastbound Richmond-San Rafael Bridge shoulders may have caused increased congestion upstream on I-580 eastbound analysis segments. This work was on-going during a significant portion of 2016 and will continue until Fall 2017. The reason for this work is in part to prepare for addition of a third eastbound lane, in response to existing PM peak hour eastbound congestion. Therefore, despite potentially affecting travel times, this work was not considered disqualifying for the purposes of this study, since poor travel times were reported previously in 2014. The next monitoring in 2018 should reveal the benefit of this project for eastbound travel times on these analysis segments.

Major incidents have potential to impact normal daily traffic conditions so data for incidents was reviewed. Using Freeway Performance Monitoring System (PeMS) operated by Caltrans, incident data during the monitoring period was collected. Upon review, no data was excluded from the monitoring period due to incidents on the CMP segments.

2.2 Data Collection

Travel time, traffic volumes, bicycle, and pedestrian volumes were collected during the monitoring period on Tuesdays, Wednesdays, and Thursdays. This section describes the types of data and their collection methods.

2.2.1 Travel Time Data

Both commercial speed data and in-field floating car surveys were obtained to measure average speed, and quantify LOS, in the Monitoring Report. In some cases, commercial speed data and in-field floating car surveys were obtained for overlapping study locations, on different dates, in order to gauge consistency between methods and as a secondary screening for unusual travel conditions.

Commercial Speed Data (INRIX)

MTC has contracted with INRIX to obtain region-wide commercial speed data, and has made the data available for planning and monitoring purposes. This LOS Monitoring Study used the commercial speed data from INRIX through MTC's contract. INRIX "aggregates traffic data from GPS-enabled vehicles and mobile devices, traditional road sensors and hundreds of other sources."

Traffic data is reported by INRIX using discrete roadway links termed as Traffic Message Channels (TMCs). Each TMC link is associated with a unique ID represented by a nine-digit code, where each individual number in the TMC code describes a portion of the geography including country, direction of travel, and roadway segment. INRIX data contains speeds aggregated at multiple time intervals for each TMC code in the network. For the current monitoring period, data at individual minute granularity was accessed for the selected monitoring times across all identified CMP segments in Marin County. Data from INRIX was then compared with floating car survey data to verify quality and help justify use.

Floating Car Surveys

Floating car surveys were conducted for the 17 arterial roadway segments identified for study, and the six high-occupancy vehicle (HOV) freeway segments. The surveys were completed using GPS technology to determine the travel time between the start and end of each CMP segment. A minimum of three surveys were completed for peak period and in each direction of travel on arterial and HOV freeway segments. Where INRIX data was deemed appropriate for use, floating car data was not used in travel time reporting or LOS calculations.

2.2.2 Bicycle and Pedestrian Counts

Bicycle and pedestrian counts were collected at 29 locations, six of which are new compared to 2014. At majority of the locations, the data was collected for 14 hours during the weekdays and two hours during the weekends. Additional details on this effort are included in Chapter 5.

2.2.3 Vehicle Screen Line Counts

Vehicle counts were collected for the 17 arterial monitoring locations over a period of seven days, during a typical week the AM and PM peak periods on typical weeks in October and November 2016 when schools were in session, during clear weather. For the 10 freeway segments, data was pulled from PeMS, as available, and where not available, from recently published traffic studies that included relevant and recent count information. Further discussion of this data is included in Chapter 6.

2.3 Data Analysis

The methodology for determining LOS from raw commercial speed and floating car survey data includes two steps. The first step requires converting the raw speed data into average peak period speeds on every CMP segment. The methodology differs between the two data sources for the conversion process. The second step consists of converting the average speeds to LOS using a specific method dependent on the type of roadway facility.

2.3.1 Average Speed – Commercial Speed Data (INRIX)

Once collected from the INRIX database, the commercial speed data points were associated with the appropriate CMP segment based on the date and time of the floating car surveys. Once reduced, the data was averaged on each segment to determine the average speed for all selected data points. *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 compared with floating car survey data to verify quality and help justify use. Only grade 30 INRIX data was used in analysis over floating car survey data where manual collection results misrepresented normal traffic conditions.

2.3.2 Average Speed – Floating Car Survey Data

Once floating car survey data was collected using GPS units, it was processed to present average speed and travel time on each segment. It was then tabulated into spreadsheets to calculate the average speed using the travel time and length for each CMP segment.

2.3.3 Level of Service Standards

Determination of average speed allowed for LOS assignment on each CMP segment based on the methodology documented in Highway Capacity Manual 2010 (HCM 2010), published by Transportation Research Board. This study uses LOS speed standards as shown in **Tables 4** and **Table 5**.

Arterials

LOS for arterial facilities is dependent on the average speed of traffic on the segment. **Table 4** shows LOS designation assigned to various ranges of vehicle speeds on arterials. Based on the average speed of the freeway in the morning and evening peaks and using the HCM standards as shown in the table below, LOS was estimated for each CMP segment, in each travel direction, and during each weekday peak period.

Table 4: Arterial Level of Service Thresholds

Speed	Level of Service (LOS)
25 mph	A
20 mph	B
13 mph	C
10 mph	D
7 mph	E
< 7 mph	F

Source: Highway Capacity Manual, 2010 Edition

Freeways

The LOS assignments for freeway segments are different from arterials primarily due to higher capacity and higher speeds. **Table 5** shows LOS designations for freeway segments based on average vehicle travel speeds. Based on the average speed of the freeway in the morning and evening peaks and using the HCM standards as shown in the table below, LOS was estimated for each CMP segment, in each travel direction, and during each weekday peak period.

Table 5: Freeway Level of Service Thresholds

Speed	Level of Service (LOS)
60 mph	A
57 mph	B
54 mph	C
46 mph	D
30 mph	E
< 30 mph	F

Source: Highway Capacity Manual, 2010 Edition

3.0 LEVEL OF SERVICE RESULTS

This chapter discusses the 2016 monitoring LOS results for arterial and freeway segments on the CMP roadway network based on the data collected for the project during 2016/17. **Figures 3** and **4** illustrate the LOS results for each of the CMP Arterial and Freeway segments in Marin County for 2016.

3.1 Arterial Level of Service

There are 17 major arterial segments identified in the Marin County CMP network.

3.1.1 Existing Arterial Level of Service

In the AM peak period, all arterial segments except one are performing at LOS D or better. The Segment #8E, Sir Francis Drake Boulevard from Larkspur Landing Circle to US 101 in the westbound direction resulted in LOS E. This result is consistent with the results of the 2014 monitoring study. The LOS results for arterial segments in the AM peak period are shown in the **Table 6**.

In the PM peak period, all arterial segments except one are performing at LOS D or higher. The Segment #8E, Sir Francis Drake Boulevard from Larkspur Landing Circle to US 101 in the eastbound direction resulted in LOS F. This finding mirrors the AM peak hour result, which finds LOS E conditions in the opposite, westbound, direction, indicating the influence of commute traffic. This result shows a marked improvement over the 2014 monitoring study, which found an additional two segments operating at LOS E or worse. The LOS results for arterial segments in the PM peak period are shown in the **Table 7**.

Comparison charts of LOS results, for both directions of travel during the AM and PM peak periods, from 2014 and 2016 monitoring cycles are shown after the tables. **Figures 3** and **4** illustrate the LOS results for each of the CMP Arterial segments in Marin County for 2016.

3.1.2 CMP Arterial Level of Service Performance Standard

The LOS standard to meet CMP requirements is LOS D for major arterials in the PM peak period. There is no LOS standard for AM peak period.

As discussed in the section above, Segment #8E, Sir Francis Drake Boulevard from Larkspur Landing Circle to US 101 in the eastbound direction is performing at LOS F in the PM peak period. However, this segment is grandfathered, and therefore, no action is required.

3.1.3 Historical Arterial Level of Service

The **Table 8** and chart in the following pages show the historical LOS results from 2008–2016 for arterials in the Marin CMP network in the peak direction of travel during the PM peak period. Historical data for the peak direction of travel of both peak hours is presented in the charts for 2014 and 2016 Arterial LOS comparison.



Table 6: 2016 Arterial LOS Summary – AM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS GOAL	ACTION
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
1A	SR 1	US 101 to Tennessee Valley Rd	0.40	01:05	25	B	02:19	16	C	D	None
1B	SR 1	Northern Ave to Almonte Blvd	0.80	03:31	15	C	01:49	27	A	D	None
1C	SR 1 ¹	Sir Francis Drake Blvd to Pt. Reyes Station	2.20	04:18	31	A	04:30	29	A	D	None
4A	SR 131 (Tiburon Blvd)	Redwood Hwy Frontage Rd to E. Strawberry Dr	0.50	00:49	35	A	01:09	26	A	D	None
6A	Novato Blvd	San Marin Dr to Eucalyptus Ave	0.42	00:53	28	A	01:23	21	B	D	None
6B	Novato Blvd	Wilson Ave to Diablo Ave	1.14	02:59	23	B	02:48	24	B	D	None
6C	S. Novato Blvd	Sunset Pkwy to US 101	1.07	06:23	12	D	02:11	27	A	D	None
7A	Bel Marin Keys	US 101 to Commercial Blvd	0.20	18:26	23	B	01:16	19	C	D	None
8A	Sir Francis Drake Blvd	Butterfield Rd to Willow Rd	0.26	01:14	12	D	00:51	17	C	D	None
8B	Sir Francis Drake Blvd	San Anselmo Ave to Red Hill Ave	1.12	06:32	13	D	02:44	24	B	D	None
8C	Sir Francis Drake Blvd	College Ave to Toussin Ave	0.28	01:08	15	C	00:36	26	A	D	None
8D	Sir Francis Drake Blvd	College Ave to Wolfe Grade	0.61	01:29	26	A	01:12	29	A	D	None
8E	Sir Francis Drake Blvd	US 101 to Larkspur Landing Cir	0.46	01:04	24	B	03:57	10	E	D	None ²
9A	Red Hill Ave	Sir Francis Drake Blvd to Second St	1.13	02:41	26	A	03:56	19	C	D	None
9B	Second St	US 101 to Marquard St	1.13	02:52	23	B	One Way Only			D	None
9C	Third St	US 101 to Marquard St	1.11	One Way Only			03:29	19	C	D	None
10A	Bridgeway ¹	Gate 5 Rd to Gate 6 Rd	0.17	00:28	22	B	00:29	21	B	D	None

- Notes: 1. Data obtained from commercial sources.
2. Grandfathered Segment (No actions required).

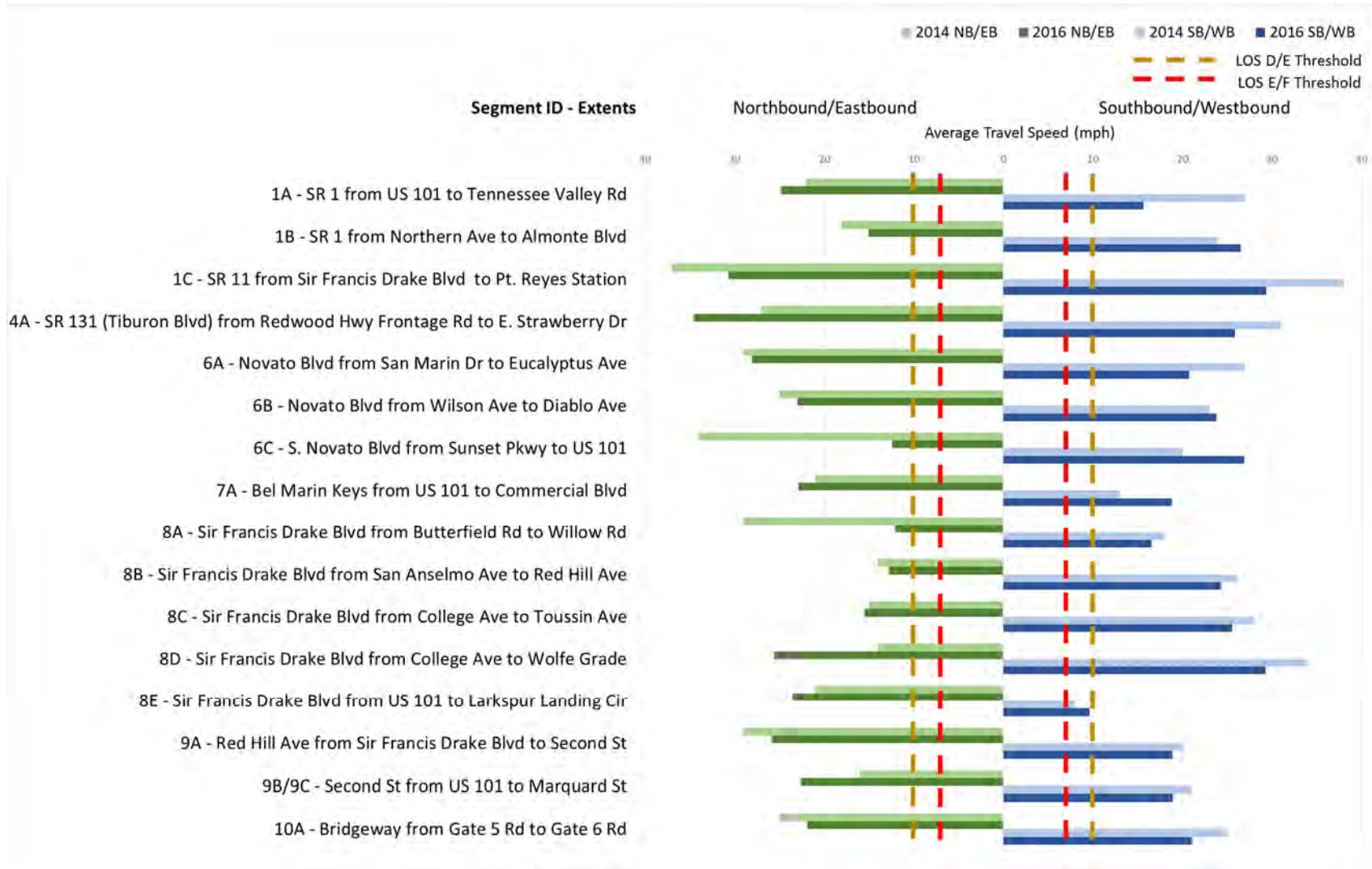


Table 7: 2016 Arterial LOS Summary – PM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goal	Action
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
1A	SR 1	US 101 to Tennessee Valley Rd	0.40	01:16	21	B	03:03	11	D	D	None
1B	SR 1	Northern Ave to Almonte Blvd	0.80	02:04	24	B	01:39	29	A	D	None
1C	SR 1 ¹	Sir Francis Drake Blvd to Pt. Reyes Station	2.20	04:35	29	A	04:19	31	A	D	None
4A	SR 131 (Tiburon Blvd)	Redwood Hwy Frontage Rd to E. Strawberry Dr	0.50	01:16	25	B	01:02	28	A	D	None
6A	Novato Blvd	San Marin Dr to Eucalyptus Ave	0.42	00:49	30	A	00:53	28	A	D	None
6B	Novato Blvd	Wilson Ave to Diablo Ave	1.14	03:58	17	C	03:41	18	C	D	None
6C	S. Novato Blvd	Sunset Pkwy to US 101	1.07	02:05	27	A	08:25	21	B	D	None
7A	Bel Marin Keys	US 101 to Commercial Blvd	0.20	00:50	19	C	01:38	15	C	D	None
8A	Sir Francis Drake Blvd	Butterfield Rd to Willow Rd	0.26	00:46	19	C	01:08	12	D	D	None
8B	Sir Francis Drake Blvd	San Anselmo Ave to Red Hill Ave	1.12	05:32	14	C	03:17	21	B	D	None
8C	Sir Francis Drake Blvd	College Ave to Toussin Ave	0.28	01:13	14	C	01:05	15	C	D	None
8D	Sir Francis Drake Blvd	College Ave to Wolfe Grade	0.61	01:35	23	B	01:40	24	B	D	None
8E	Sir Francis Drake Blvd	US 101 to Larkspur Landing Cir	0.46	10:28	3	F	01:26	19	C	D	None ²
9A	Red Hill Ave	Sir Francis Drake Blvd to Second St	1.13	02:55	24	B	04:12	17	C	D	None
9B	Second St	US 101 to Marquard St	1.13	02:52	11	D	One Way Only			D	None
9C	Third St	US 101 to Marquard St	1.11	One Way Only			03:29	17	C	D	None
10A	Bridgeway ¹	Gate 5 Rd to Gate 6 Rd	0.17	00:28	20	B	00:29	21	B	D	None

- Notes:
1. Data obtained from commercial sources.
 2. Grandfathered Segment (No actions required).

AM Peak Period – 2014 and 2016 LOS Results Comparison



PM Peak Period – 2014 and 2016 LOS Results Comparison

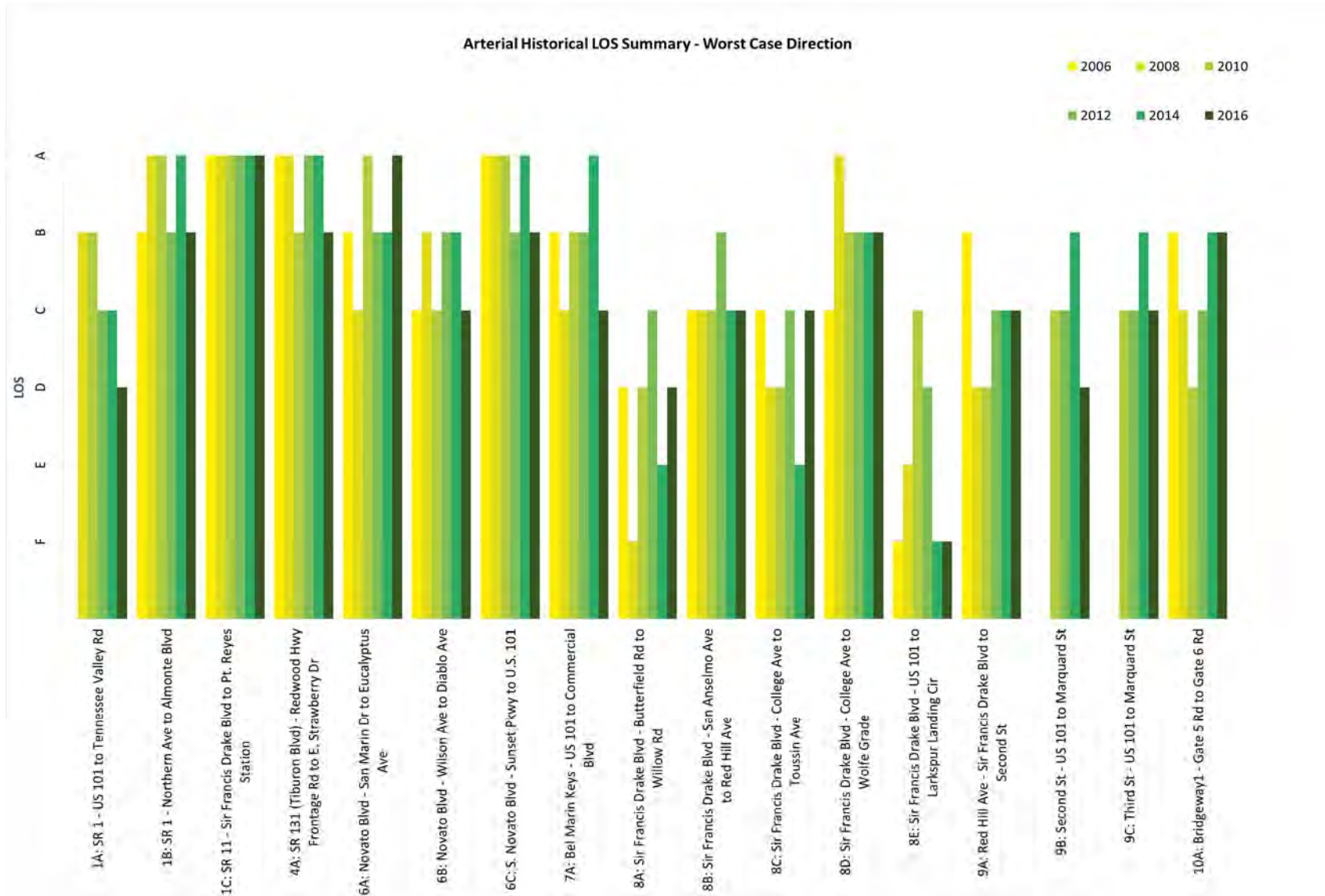




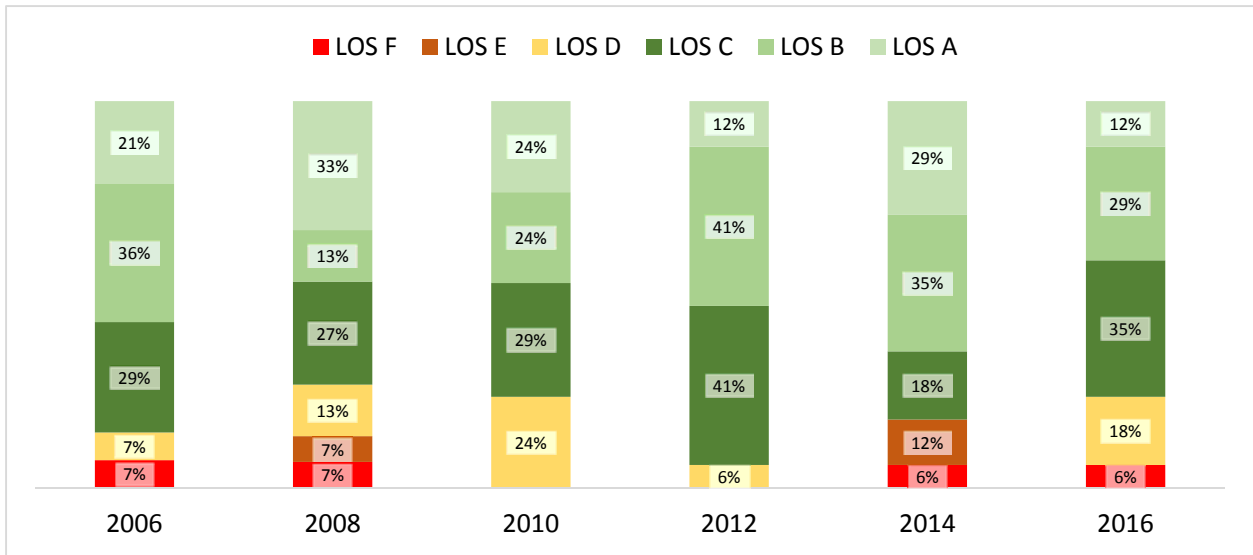
Table 8: Arterial Historical LOS Summary – PM Peak Period (Worst Case Direction)

ID	LOS Goal	Roadway	Segment	2006	2008	2010	2012	2014	2016
1A	D	SR 1	US 101 to Tennessee Valley Rd	-	B	B	C	C	D
1B	D	SR 1	Northern Ave to Almonte Blvd	B	A	A	B	A	B
1C	D	SR 1 ¹	Sir Francis Drake Blvd to Pt. Reyes Station	A	A	A	A	A	A
4A	D	SR 131 (Tiburon Blvd)	Redwood Hwy Frontage Rd to E. Strawberry Dr	A	A	B	A	A	B
6A	D	Novato Blvd	San Marin Dr to Eucalyptus Ave	B	C	A	B	B	A
6B	D	Novato Blvd	Wilson Ave to Diablo Ave	C	B	C	B	B	C
6C	D	S. Novato Blvd	Sunset Pkwy to US 101	A	A	A	B	A	B
7A	D	Bel Marin Keys	US 101 to Commercial Blvd	B	C	B	B	A	C
8A	D	Sir Francis Drake Blvd	Butterfield Rd to Willow Rd	D	F	D	C	E	D
8B	D	Sir Francis Drake Blvd	San Anselmo Ave to Red Hill Ave	C	C	C	B	C	C
8C	D	Sir Francis Drake Blvd	College Ave to Toussin Ave	C	D	D	C	E	C
8D	D	Sir Francis Drake Blvd	College Ave to Wolfe Grade	C	A	B	B	B	B
8E	D	Sir Francis Drake Blvd	US 101 to Larkspur Landing Cir	F	E	C	D	F	F
9A	D	Red Hill Ave	Sir Francis Drake Blvd to Second St	B	D	D	C	C	C
9B	D	Second St	US 101 to Marquard St	-	-	C	C	B	D
9C	D	Third St	US 101 to Marquard St	-	-	C	C	B	C
10A	D	Bridgeway	Gate 5 Rd to Gate 6 Rd	B	C	D	C	B	B

Arterial Historical LOS Summary for PM Peak Period - Worst Case Direction



PM Peak Period - Historical Comparison of System Wide Arterial Performance



3.2 Freeway Level of Service

There are 10 freeway segments identified in the Marin County CMP network. Mixed flow lanes and HOV lanes are monitored separately.

3.2.1 Existing Freeway Level of Service (Mixed Flow)

In the AM peak period, all mixed flow freeway segments are performing at LOS E or better. The LOS results for the AM peak are shown in **Table 9**.

In the PM peak period, all mixed flow freeway segments except four are performing at LOS E or higher. Two US 101 NB segments and two I-580 EB segments are operating at LOS F. These are segments 3B, 3G, 5A, and 5B respectively. By comparison, only one I-580 EB segment performed at LOS F during the PM peak hour in 2014. On-going shoulder closures on the Richmond-San Rafael Bridge may have impacted the travel times recorded on Segments 5A and 5B. The LOS results for the PM peak are shown in **Table 10**.

Figures 3 and 4 illustrate the LOS results for each of the CMP Freeway segments in Marin County for 2016.

The comparison of LOS results, in the AM and PM peak hour in the peak direction, from 2012 and 2014 monitoring cycles is shown below.

3.2.2 CMP Freeway (Mixed Flow) Level of Service Performance Standard

The LOS standard to meet the CMP requirements is LOS E for Freeways and Expressways in the PM peak period. There is no LOS standard for AM peak period.

Segments 3B, 3G, and 5B are grandfathered, and therefore, no action is required. Segment 5A is not grandfathered. However, a mainline improvement to add a third eastbound lane is scheduled for completion in Fall 2017², which is anticipated to significantly ease eastbound congestion during the PM peak hour. Therefore, no action is currently required.

² The Bay Area Toll Authority (BATA) is spearheading the Richmond-San Rafael Bridge Access Improvements to improve mobility along the Interstate 580 corridor between Richmond and San Rafael. This project will convert the right shoulder to a third freeway lane from the Sir Francis Drake Boulevard on-ramp in Marin County to the Marine Street (Richmond Parkway/Point Richmond) exit in Contra Costa County.



Table 9: Freeway Mixed-Flow Lanes LOS Summary – AM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goal	Action
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
2A	SR 37	US 101 to Atherton Ave	2.60	02:29	63	A	03:24	46	E	E	None
3A	US 101	Golden Gate Bridge to Spencer Ave	1.50	01:40	54	C	01:39	54	C	E	None
3B	US 101	SR 131 (Tiburon Blvd) to Tamalpais Dr	1.70	01:38	62	A	01:37	63	A	E	None
3C	US 101	Sir Francis Drake Blvd to I-580	1.32	01:17	62	A	01:28	54	D	E	None
3D	US 101	I-580 to Mission Ave	1.22	01:11	61	A	01:18	56	C	E	None
3E	US 101	Mission Ave to N. San Pedro Rd	1.59	01:30	63	A	02:00	48	D	E	None
3F	US 101	Freitas Pkwy to Lucas Valley Rd	1.01	00:55	67	A	01:42	35	E	E	None
3G	US 101	North of Atherton to Sonoma Co. Line	5.96	05:35	64	A	07:32	47	D	E	None
5A	I-580	Sir Francis Drake Blvd to Marin Co. Line	0.70	00:41	61	A	00:57	44	E	E	None
5B	I-580	Bellam Blvd to Sir Francis Drake Blvd	1.23	01:12	61	A	01:18	57	C	E	None

AM Peak Period – 2014 and 2016 LOS Results Comparison





Table 10: Freeway Mixed-Flow Lanes LOS Summary – PM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goal	Action
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
2A	SR 37	US 101 to Atherton Ave	2.60	02:20	67	A	02:27	64	A	E	None
3A	US 101	Golden Gate Bridge to Spencer Ave	1.50	01:39	54	C	02:11	41	E	E	None
3B	US 101	SR 131 (Tiburon Blvd) to Tamalpais Dr	1.70	03:59	26	F	01:36	64	A	E	None ¹
3C	US 101	Sir Francis Drake Blvd to I-580	1.32	01:51	43	E	01:20	60	B	E	None
3D	US 101	I-580 to Mission Ave	1.22	01:33	47	D	01:16	58	B	E	None
3E	US 101	Mission Ave to N. San Pedro Rd	1.59	01:44	55	C	01:41	57	C	E	None
3F	US 101	Freitas Pkwy to Lucas Valley Rd	1.01	01:02	59	B	00:59	61	A	E	None
3G	US 101	North of Atherton to Sonoma Co. Line	5.96	12:31	29	F	05:39	63	A	E	None ¹
5A	I-580	Sir Francis Drake Blvd to Marin Co. Line	0.70	01:52	22	F	00:43	59	B	E	None ²
5B	I-580	Bellam Blvd to Sir Francis Drake Blvd	1.23	04:20	17	F	01:13	61	A	E	None ¹

Notes: 1. Grandfathered Segment (No actions required).

2. Improvements to this segment are currently scheduled for construction in Fall 2017 (No action required, pending verification of performance after improvement construction).

PM Peak Period – 2014 and 2016 LOS Comparison



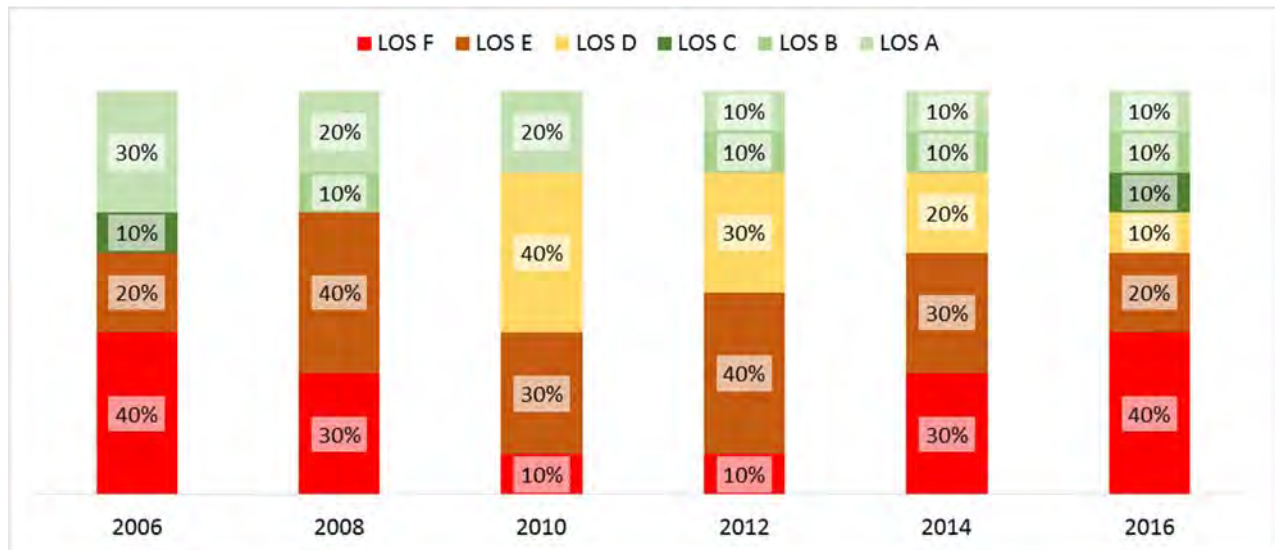
3.2.3 Historical Level of Service – Freeways Mixed-Flow

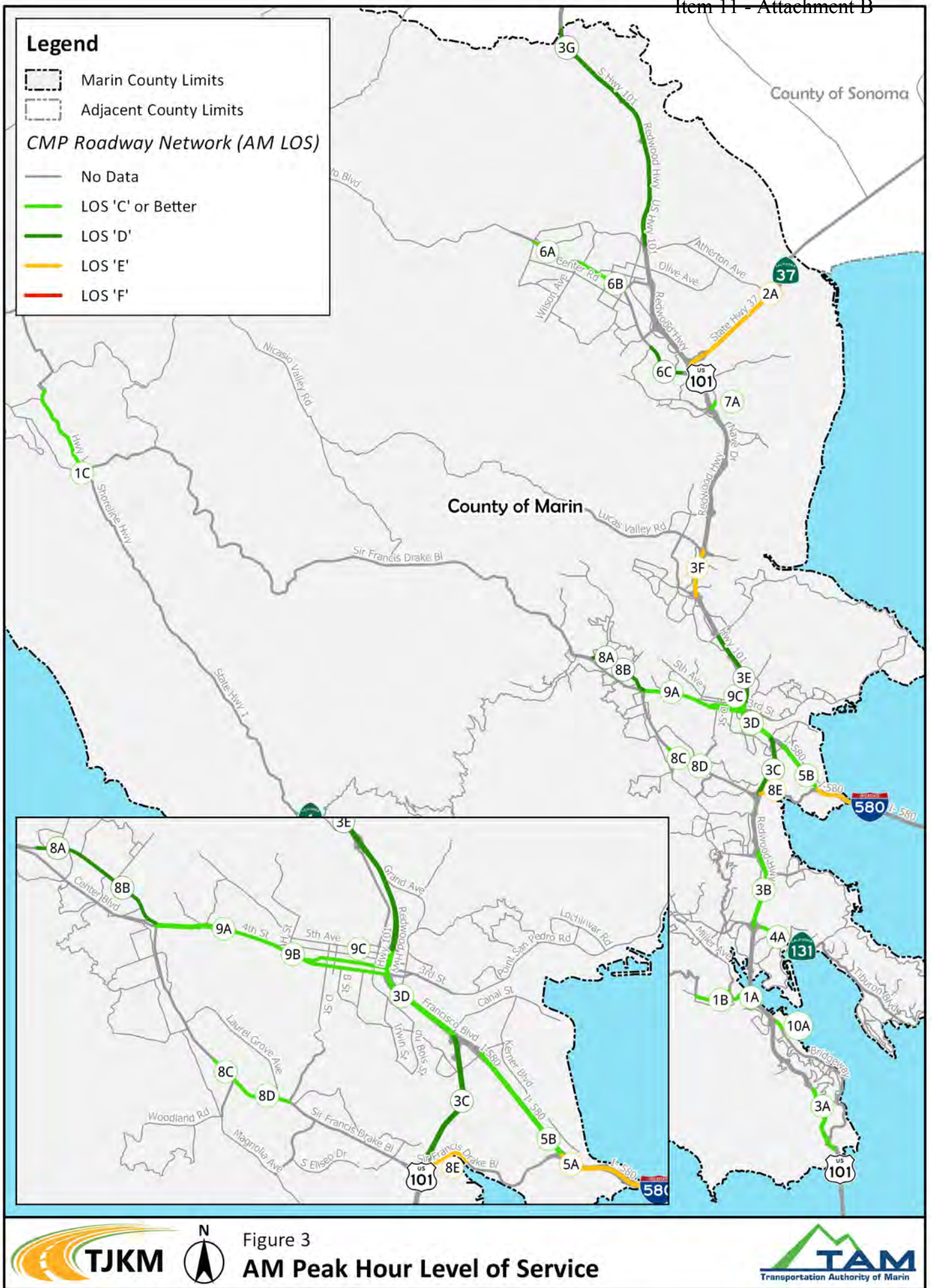
The chart and **Table 11** below present the historical LOS results for the PM peak period for mixed-flow lanes on freeways. Historical data is not presented for the AM peak period for this time-period, but is instead presented in the above charts for 2014. Across the years, many segments experience fluctuations in level of service. The fluctuations in the trends can be attributed to several factors, such as changes in traffic patterns, traffic volumes, unemployment, economy, etc.

Table 11: Freeway Historical LOS Summary – PM Peak Period

ID	LOS Goal	Roadway	Segment	2006	2008	2010	2012	2014	2016
2A	E	SR 37	US 101 to Atherton Ave	A	B	A	A	A	A
3A	E	US 101	Golden Gate Bridge to Spencer Ave	A	A	D	E	D	E
3B	E	US 101	SR 131 (Tiburon Blvd) to Tamalpais Dr	F	F	F	F	F	F
3C	E	US 101	Sir Francis Drake Blvd to I-580	F	E	D	D	D	E
3D	E	US 101	I-580 to Mission Ave	F	E	E	D	E	D
3E	E	US 101	Mission Ave to N. San Pedro Rd	C	F	E	D	B	C
3F	E	US 101	Freitas Pkwy to Lucas Valley Rd	A	A	D	B	E	B
3G	E	US 101	North of Atherton to Sonoma Co. Line	E	F	E	E	F	F
5A	E	I-580	Sir Francis Drake Blvd to Marin Co. Line	F	E	A	E	E	F
5B	E	I-580	Bellam Blvd to Sir Francis Drake Blvd	E	E	D	E	F	F

PM Peak Period - Historical Comparison of System Wide Freeway Performance





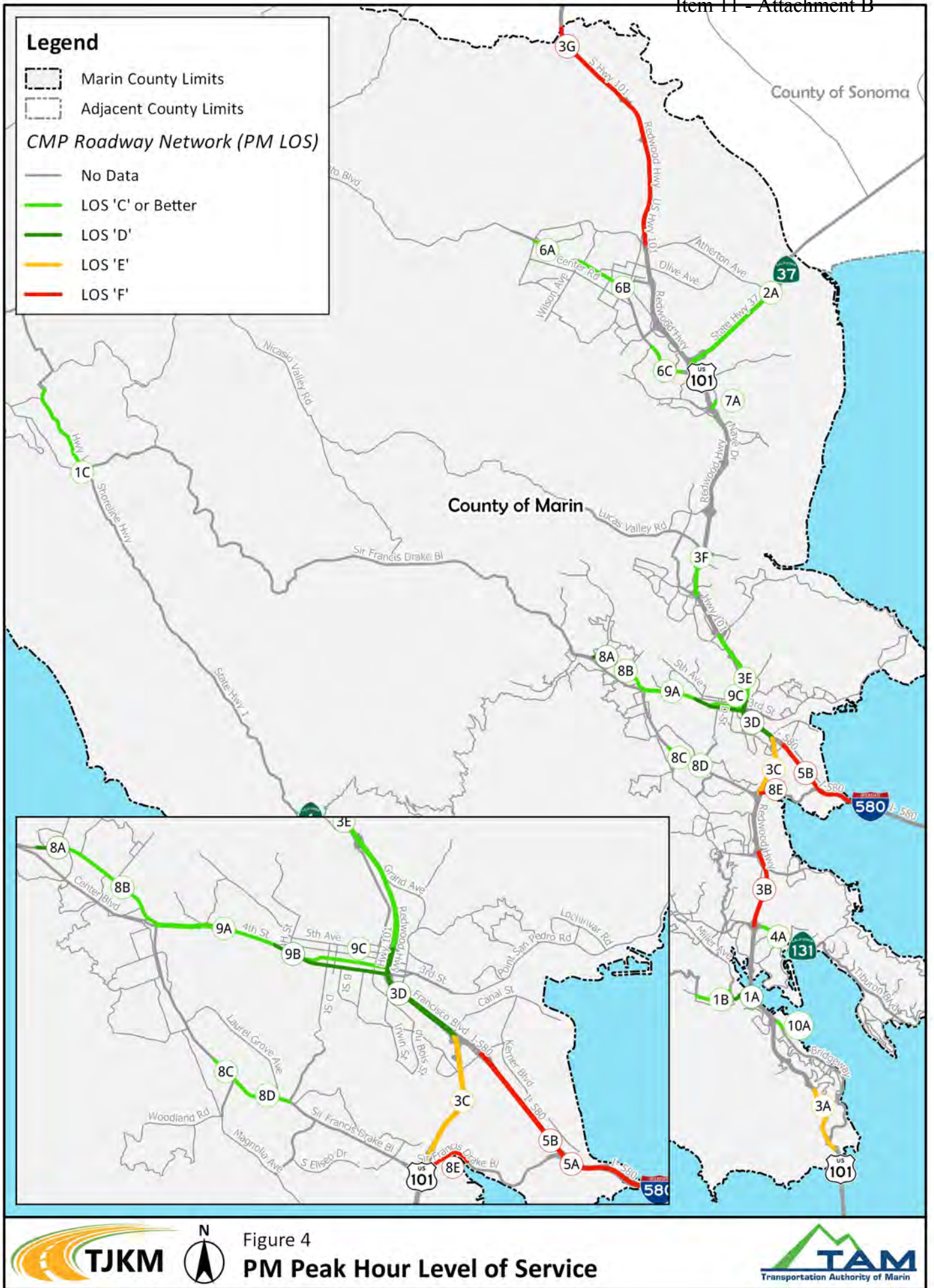


Figure 4
PM Peak Hour Level of Service



3.2.4 Freeway HOV Lane Level of Service

Six freeway segments in the CMP network have HOV lanes and all are located on US 101. The LOS standard to meet the CMP requirements is LOS E for Freeways and Expressways in the PM peak hour. There is no LOS standard for AM peak period.

The LOS results for the Freeway HOV segments are within the CMP LOS standards, except for Segment #3B. This segment is grandfathered, and does not need any action.

The LOS results for the AM and PM peaks are shown in **Table 12** and **Table 13** respectively. All but one segment performed at LOS D or better in the AM and PM peak periods. The US 101 HOV lane enforcement in the northbound direction is between the hours of 4:30-7:00 PM, Monday through Friday; and in the southbound direction is between the hours of 6:30-8:30 AM, Monday through Friday. **Figures 5** and **6** illustrate the LOS results for each of the CMP Freeway HOV segments in Marin County for 2016.

Table 12: US 101 Freeway HOV Lanes LOS Summary – AM Peak Period (SB Peak Direction)

ID	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goals	Action
			Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
3A HOV	Golden Gate Bridge to Spencer Ave	1.50	02:03	58	B	02:16	53	D	E	None
3B HOV	SR 131 (Tiburon Blvd) to Tamalpais	1.70	01:24	69	A	01:29	65	A	E	None
3C HOV	Sir Francis Drake Blvd to I-580	1.32	01:06	68	A	01:18	58	B	E	None
3D HOV	I-580 to Mission Ave	1.22	01:01	67	A	01:09	59	B	E	None
3E HOV	Mission Ave to N. San Pedro Rd	1.59	01:22	68	A	01:40	56	C	E	None
3F HOV	Freitas Pkwy to Lucas Valley Rd	1.01	00:47	73	A	01:26	43	E	E	None

Table 13: US 101 Freeway HOV Lanes LOS Summary – PM Peak Period (NB Peak Direction)

ID	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goals	Action
			Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
3A HOV	Golden Gate Bridge to Spencer Ave	1.50	02:17	52	D	02:45	46	D	E	None
3B HOV	SR 131 (Tiburon Blvd) to Tamalpais	1.70	03:52	28	F	01:29	65	A	E	None ¹
3C HOV	Sir Francis Drake Blvd to I-580	1.32	01:35	48	D	01:15	61	A	E	None
3D HOV	I-580 to Mission Ave	1.22	01:16	54	C	01:04	64	A	E	None
3E HOV	Mission Ave to N. San Pedro Rd	1.59	01:37	57	B	01:27	64	A	E	None
3F HOV	Freitas Pkwy to Lucas Valley Rd	1.01	00:57	61	A	00:55	64	A	E	None

Notes: 1. Grandfathered Segment (No actions required)

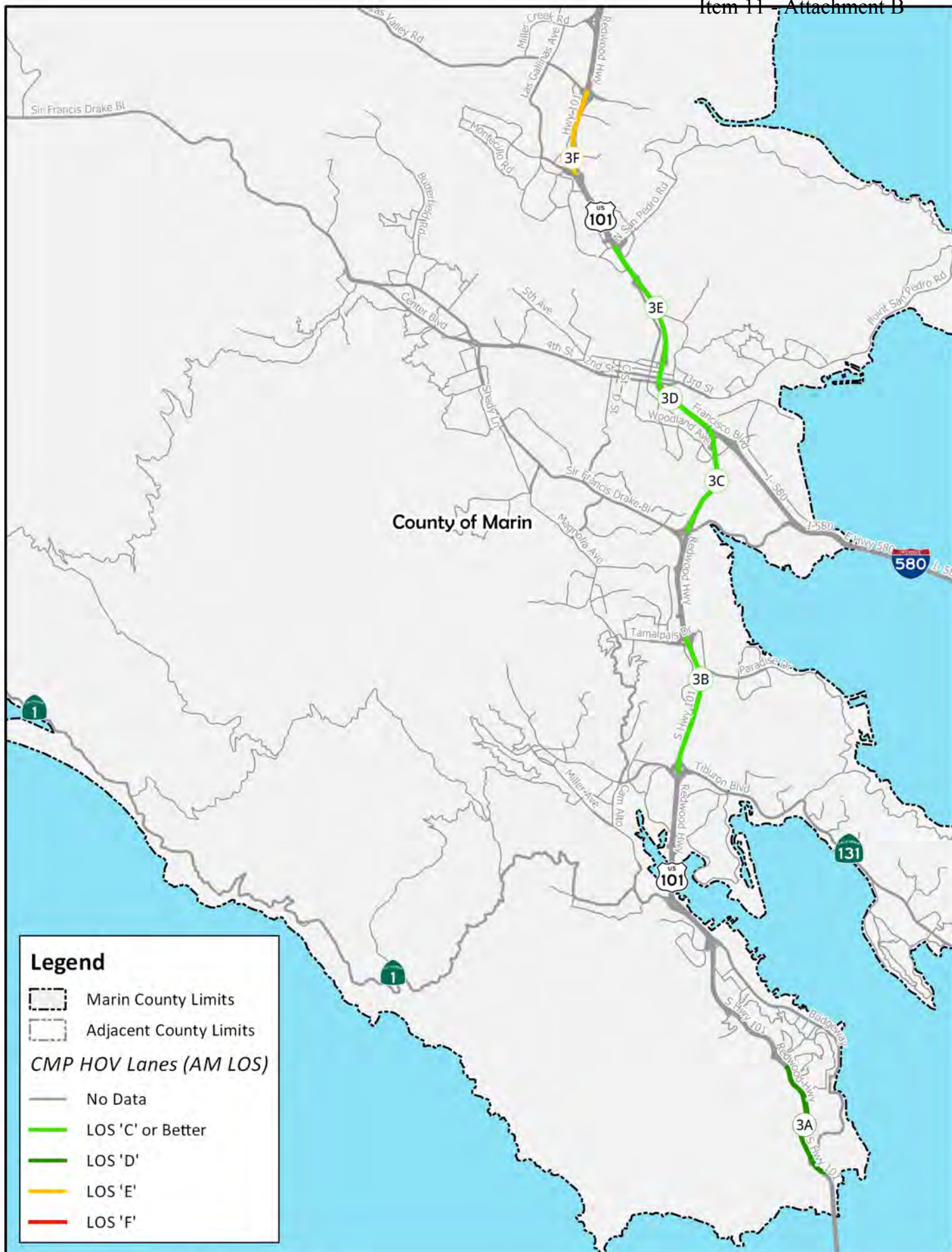
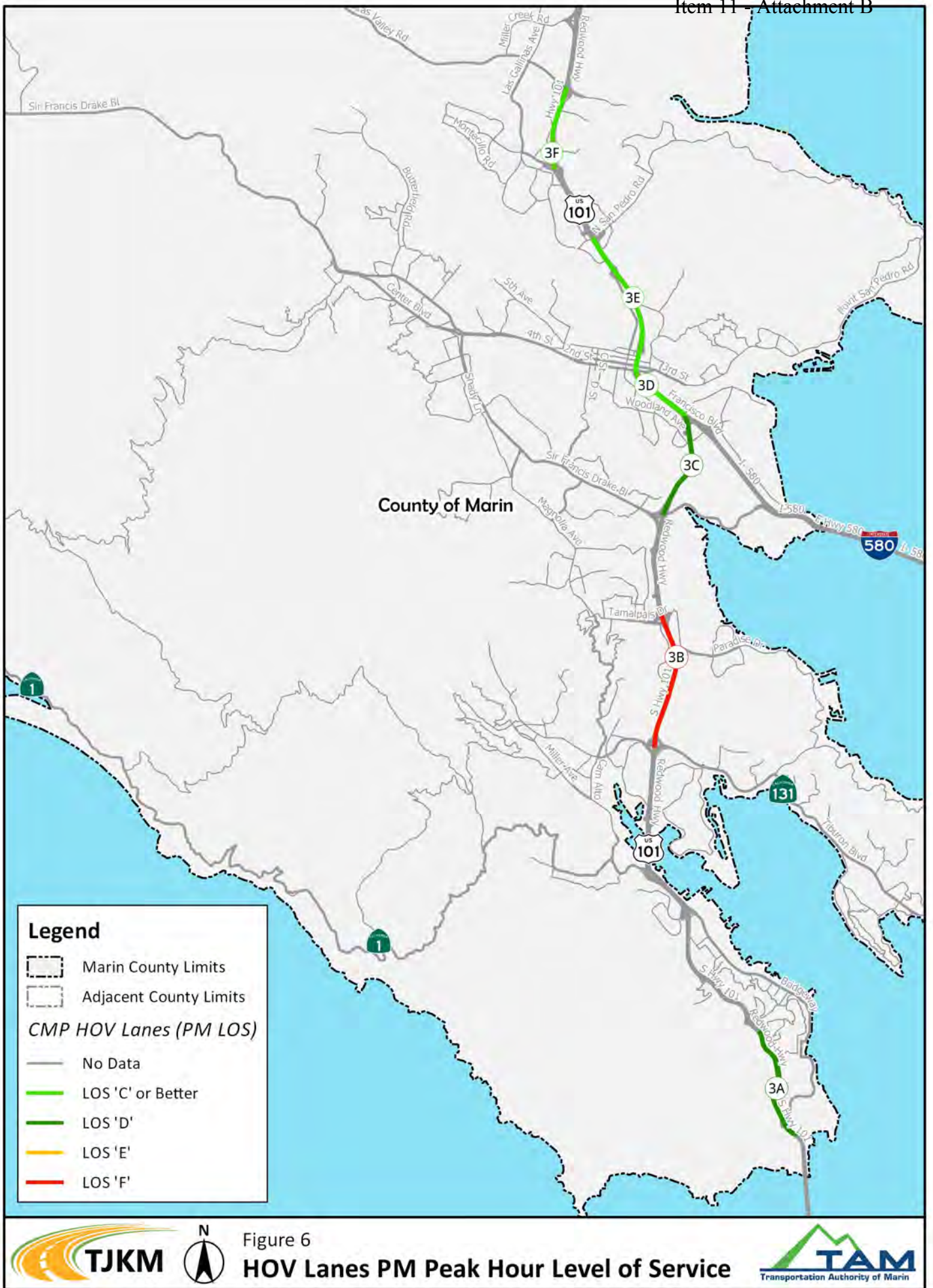


Figure 5
HOV Lanes AM Peak Hour Level of Service





3.3 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 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.

3.3.1 90th or 95th Percentile Travel Times

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.

3.3.2 Buffer Index

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 percent 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 percent of the time.

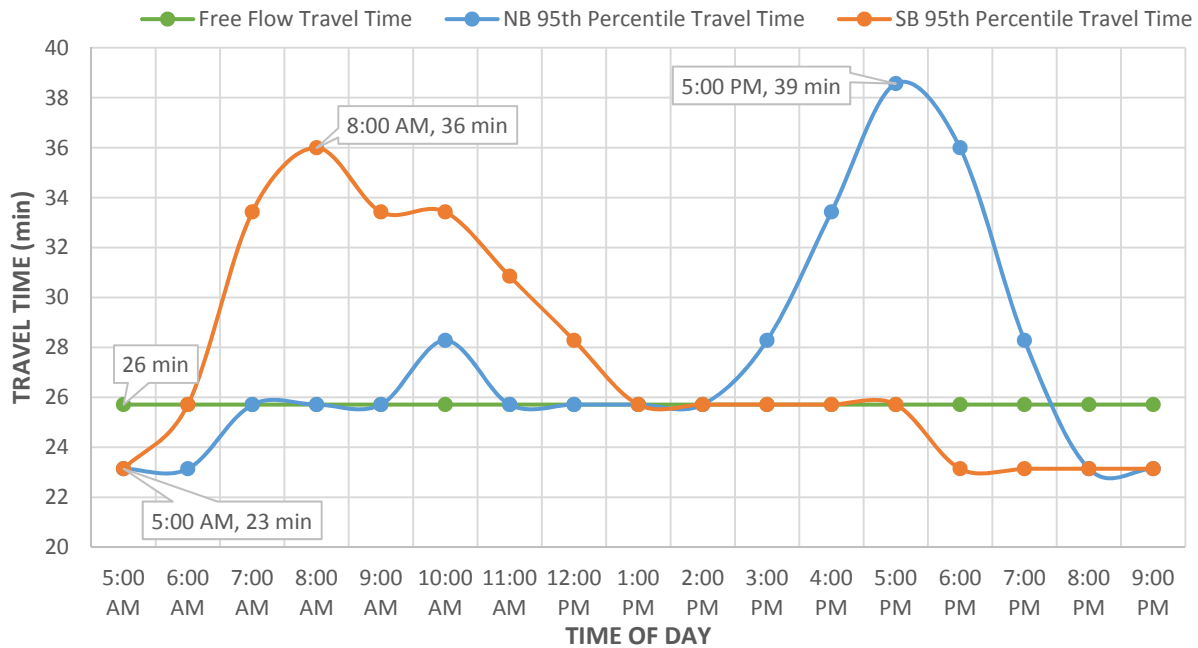
3.3.3 Planning Time Index

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 percent of the time.

The graph below compares the travel time along US 101 in Marin County under free flow conditions to the northbound and southbound 95th percentile travel times between 5:00 AM and 9:00 PM. Planning time index data was collected by TJKM from the Caltrans Performance Measurement System (PeMS) for midweek days during October 2016, 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. Travel times were calculated using the total corridor length of 25.7 miles.

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.

US 101 – Marin County Travel Time Comparison



As this graph shows, 95th percentile travel times vary over the course of a day from approximately 23 minutes to 39 minutes in the northbound direction and from 23 minutes to 36 minutes in the southbound direction.

The free flow travel time along the same corridor is approximately 26 minutes, assuming a speed of 60 mph. Northbound traffic experienced more delays during the afternoon commute period, with a maximum planning time index of 1.5 at 5:00 PM. Southbound traffic experienced more delays during the morning commute period, with a maximum planning time index of 1.4 at 8:00 AM. It should be noted that the free flow speed of 60 mph is lower than the posted speed limit of 65 mph. In the evening and very early morning, 95th percentile travel times dropped below free flow travel times, indicating that traffic tended to speed up and approach the speed limit.

In addition to the above, TAM can also include factors such as seasonal variation, weather, and incidents to calculate the travel time along US 101 and I-580 within Marin County. Based on studies conducted within the United States, weather generally increases travel time by approximately 10 percent.

4.0 CURRENT TRANSIT OPERATIONS IN MARIN COUNTY

The transit network within Marin County is comprised of a variety of services. These include:

- ▶ General public transit bus service for both inter- and intra-county trips
- ▶ General public ferry service, serving trips between Marin County and San Francisco
- ▶ Specialized transit services aimed at serving the needs of the senior and disabled population in the County, including dial-a-ride, paratransit, and wheelchair accessible taxis
- ▶ Privately operated services, providing targeting service between specific locations, such as the service between Marin County and San Francisco International Airport

The Sonoma-Marín Area Rail Transit (SMART) service will likely be added next year as a CMP transit service. As of March 2017, construction of the first initial segment has been completed and testing is underway on the tracks for a projected opening in late Spring/early Fall of 2017.

The following sections provide a brief description of the transit services provided for inter- and intra-county transit travel. In addition, bus route information, headways, and overall transit ridership are summarized in each section.

4.1 Marin Transit

Marin Transit is the agency responsible for local transit service within Marin County. Marin Transit has responsibility for local transit services and contracts with other operators for three types of fixed route services within the county: large bus fixed route, shuttle, and rural service. Contracted providers include Golden Gate Transit, MV Transportation, and Marin Airporter. Marin Transit also contracts with Whistlestop Wheels to provide paratransit and dial-a-ride services within Marin County. Marin Transit added 19 percent service increases in Summer 2016.

Table 14 summarizes the regularly scheduled Marin Transit services. Marin Transit also operates the Marin Access Mobility Management Center, which is a one-call, transportation information and referral service, focused on meeting the mobility needs of Marin’s older adults, disabled persons, and low-income residents. **Tables 15** and **16** summarize the CMP arterial and freeway segments utilized by the Marin Transit Bus Routes.

Transit service provided within Marin County by Marin Transit via contractors includes:

- ▶ *Local Service.* Nine routes operate entirely within Marin County on weekdays, with limited weekend service, contracted through Golden Gate Transit. Additional 10 routes operate as school-focused service on school days only, as detailed below. Since the 2015 CMP, Marin Transit has ceased operations on Route 45.
- ▶ *School Service.* Ten routes provide limited service on school days in Marin County, as well as select trips on Routes 17 and 23. All routes have operated continuously since the 2015 CMP, with the addition of Route 122 serving the College of Marin. Marin transit also provides contract support for yellow school bus service in the Mill Valley, Ross Valley and the Tiburon Peninsula.
- ▶ *Recreational Services.* A seasonal shuttle service, Route 66, operates between Muir Woods and Mill Valley. A supplemental route (66F) provides intermediate service via Marin City. Shuttle schedules are adapted to weekend and seasonal recreational travel demands. Marin Transit contracts with Golden Gate Transit to operate Route 66 in partnership with the National Park Service between May and October.

- ▶ **West Marin Stagecoach.** Marin Transit contracts with MV Transportation to operate the West Marin Stagecoach with one service route (Route 68) in West Marin. The Stagecoach provides weekday and weekend service to area residents. Route 65 has been removed.
- ▶ **Community Shuttle Service.** Marin Transit contracts with Marin Airporter to operate six shuttle bus routes providing limited service: Strawberry / Tiburon (Route 219); San Rafael / Fairfax (Route 228); Santa Venetia / San Rafael (Route 233); San Rafael / Contempo (Route 245); Hamilton Theater / San Marin Drive in Novato (Route 251); Indian Valley Campus / San Rafael (Route 257). Since the previous CMP update, Route 259 (San Rafael / Novato) ceased operation. Marin Airporter also provides airport shuttle service between Marin County and San Francisco Airport as its primary business, separate from Marin Transit operations.
- ▶ **Marin Access.** Marin Access provides transit services and information for the community's older adults, persons with disabilities, and low-income residents. This Marin Transit program contracts with Whistlestop Wheels to provide the following services: Paratransit, Catch-A-Ride, and Volunteer Driver.
- ▶ **Novato Dial-a-Ride.** Marin Transit contracts with Whistlestop Wheels to provide a dial-a-ride shuttle bus service that provides curb-to-curb pick-up and drop-off service available to all residents in the Novato service area.

Table 14: Marin Transit Routes - Peak Headways for Fixed-Route Service

As of March 2017			As of March 2015		
Route #	Route Type: Description	Approx. Headways (minutes)	Route #	Route Type: Description	Approx. Headways (minutes)
17	Local: San Rafael to Sausalito	30-60	17	Local: San Rafael to Sausalito	30-60
22	Local: San Rafael to Marin City	30-60	22	Local: San Rafael to Marin City	20-60
23	Local: Shoreline Pkwy to White Hill Middle School (Fairfax)	60	23	Local: San Rafael to White Hill MS	60
29	Local: San Rafael to Manor (Fairfax)	60	29	Local: San Rafael to Manor (Fairfax)	30-60
35	Local: San Rafael to Canal Area	30	35	Local: San Rafael to Canal Area	4-30
36	Local: San Rafael to Marin City	30	36	Local: San Rafael to Marin City	26-30
-	-	-	45	Local: San Rafael Kaiser Hospital North Gate	28-60
49	Local: San Rafael to Novato (Redwood Blvd & Olive Ave)	30-60	49	Local: San Rafael to Novato (Redwood Blvd & Olive Ave)	60
61	West Marin Stagecoach: Donahue & Terners (Marin City) to Bolinas Downtown	170	61	West Marin Stagecoach: Donahue & Terners (Marin City) to Bolinas Downtown	170
-	-	-	65	West Marin Stagecoach: Dillon Beach to Eastside Transit Center	WED 2 runs EB 1 run WB
66	Muir Woods Shuttle: Pohono Street Park & Ride Lot (Mill Valley) to Muir Woods	20-30 (Weekends)	66	Muir Woods Shuttle: Pohono Street Park & Ride Lot (Mill Valley) to Muir Woods	20-30 (Weekends)
68	West Marin Stagecoach: Inverness to San Rafael	60-120	68	West Marin Stagecoach: Inverness to San Rafael	60-120
71x	Local: Novato to Sausalito Ferry	30	71	Local: Novato to Marin City	30
113	School: Paradise Cay to Redwood HS	1 run (AM) 1 run (PM)	113	School: Paradise Cay to Redwood HS	1 run (AM) 2 runs (PM)

As of March 2017			As of March 2015		
Route #	Route Type: Description	Approx. Headways (minutes)	Route #	Route Type: Description	Approx. Headways (minutes)
115	School: Sausalito Ferry to St. Hilary School	2 runs (AM) 2 runs (PM)	115	School: Sausalito Ferry to St. Hilary School	2 runs (AM) 2 runs (PM)
117	School: East Corte Madera to Hall MS	2 runs (AM) 4 runs (PM)	117	School: East Corte Madera to Hall MS	2 runs (AM) 4 runs (PM)
119	School: Tiburon to Redwood HS	2 runs (AM) 1 run (PM)	119	School: Tiburon to Redwood HS	2 runs (AM) 2 runs (PM)
122	School: College of Marin to San Rafael Transit Center	10 runs (AM) 10 runs (PM)	-	-	-
125	School: San Rafael to Lagunitas	2 run (AM) 2 runs (PM)	125	School: San Rafael to Lagunitas	2 run (AM) 2 runs (PM)
139	School: Terra Linda HS to Lucas Valley	1 run (AM) 1 run (PM)	139	School: Terra Linda HS to Lucas Valley	1 run (AM) 1-2 runs (PM)
145	School: Terra Linda HS to San Rafael	1 run (AM) 1-2 runs (PM)	145	School: Terra Linda HS to San Rafael	1-2 runs (PM)
151	School: Hamilton (Novato) to San Marin HS	2 runs (AM) 2 runs (PM)	151	School: Hamilton (Novato) to San Marin HS	2 runs (AM) 2-3 runs (PM)
154	School: Olive Ave & Olive Ct to San Marin HS / Sinaloa MS	2 runs (AM) 2 runs (PM)	154	School: Olive Ave & Olive Ct to San Marin HS / Sinaloa MS	1 run (AM) 2 runs (PM)
219	Shuttle: Strawberry to Tiburon	30	219	Shuttle: Strawberry to Tiburon	30
228	Shuttle: San Rafael to Manor (Fairfax)	60	228	Shuttle: San Rafael to Manor (Fairfax)	60
233	Shuttle: San Rafael to Santa Venetia	60	233	Local: San Rafael to Santa Venetia	60
245	Shuttle: San Rafael to Contempo	60	-	-	-
251	Shuttle: Hamilton Theater to San Carlos & San Marin (Novato)	60	251	Shuttle: Hamilton Theater to San Carlos & San Marin (Novato)	60
257	Shuttle: Indian Valley Campus to San Rafael	60	257	Shuttle: Indian Valley Campus to San Rafael	60

Sources: Marin Transit website (2017); Marin CMP Update (2015).

Table 15: CMP Arterial Segments Utilized by Marin Transit Services

Arterial Segments			Transit Routes	PM Peak LOS
ID	Roadway	Segment		
1A	SR 1	US 101 to Tennessee Valley Rd	66, 66F	D
1B	SR 1	Northern Ave to Almonte Blvd	66, 66F	B
1C	SR 1 ¹	Sir Francis Drake Blvd to Pt. Reyes Station	-	A
4A	SR 131 (Tiburon Blvd)	Redwood Hwy Frontage Rd to E. Strawberry Dr	219	B
6A	Novato Blvd	San Marin Dr to Eucalyptus Ave	251	A
6B	Novato Blvd	Wilson Ave to Diablo Ave	251	C
6C	S. Novato Blvd	Sunset Pkwy to US 101	-	B
7A	Bel Marin Keys	US 101 to Commercial Blvd	257	C
8A	Sir Francis Drake Blvd	Butterfield Rd to Willow Rd	23, 122, 68, 228	D
8B	Sir Francis Drake Blvd	San Anselmo Ave to Red Hill Ave	23, 68, 228	C
8C	Sir Francis Drake Blvd	College Ave to Toussin Ave	122, 68, 228	C
8D	Sir Francis Drake Blvd	College Ave to Wolfe Grade	68, 228	B
8E	Sir Francis Drake Blvd	US 101 to Larkspur Landing Cir	17, 68, 228	F
9A	Red Hill Ave	Sir Francis Drake Blvd to Second St	23	C
9B	Second St	US 101 to Marquard St	23	D
9C	Third St	US 101 to Marquard St	-	C
10A	Bridgeway ¹	Gate 5 Rd to Gate 6 Rd	66F	B

Table 16: CMP Freeway Segments Utilized by Marin Transit Services

Freeway Segments			Transit Routes	PM Peak LOS
ID	Roadway	Segment		
2A	SR 37	US 101 to Atherton Ave	-	A
3A	US 101	Golden Gate Bridge to Spencer Ave	-	E
3B	US 101	SR 131 (Tiburon Blvd) to Tamalpais Dr	17	F
3C	US 101	Sir Francis Drake Blvd to I-580	17, 228	E
3D	US 101	I-580 to Mission Ave	17	D
3E	US 101	Mission Ave to N. San Pedro Rd	245	C
3F	US 101	Freitas Pkwy to Lucas Valley Rd	-	B
3G	US 101	North of Atherton to Sonoma Co. Line	-	F
5A	I-580	Sir Francis Drake Blvd to Marin Co. Line	-	F
5B	I-580	Bellam Blvd to Sir Francis Drake Blvd	-	F

4.2 Golden Gate Transit

Golden Gate Transit operates transit services between Marin County and the Sonoma, San Francisco, and Contra Costa Counties. Golden Gate Transit is one of three operating divisions of the Golden Gate Bridge, Highway and Transportation District. **Table 17** lists the service routes with a comparison to the most recent CMP update in March 2015.

Additional bus service provided directly by Golden Gate Transit connects Marin County to other parts of the region. Inter-county bus routes that operate partly inside Marin County include the following services:

- ▶ *Transbay Basic Service.* Basic service routes operate all day, seven days a week, providing wheelchair accessible trunk-line service between the Transbay Terminal and Civic Center in San Francisco or Richmond BART, and various suburban centers within Marin and Sonoma Counties. They provide the “backbone” service within Marin County and between Marin and neighboring counties. The routes are 40/40x, 70/71, and 101/101X. Since the previous CMP update, Route 10 ceased operation.
- ▶ *Transbay Commute Service.* This service provides 17 routes that operate on non-holiday weekdays. Most services connect residential neighborhoods within Marin County to the San Francisco Financial District and Civic Center employment centers during the AM and PM commute periods. Other service connects Sonoma County with Marin County and San Francisco. Commute service is generally operated in the peak direction during commute hours only, and is not run at all during the midday and off-peak periods.

Table 17: Regional Golden Gate Bus Transit Routes and Peak Headways

As of March 2017			As of March 2015		
Route #	Route Type: Description	Approx. Headways (minutes)	Route #	Route Type: Description	Approx. Headways (minutes)
2	Commute: SF to Marin Headlands	30	2	Commute: SF to Marin Headlands	30
4	Commute: Mill Valley to SF	5-15	4	Commute: Mill Valley to SF	5-15
8	Commute: Tiburon to SF	2 runs (AM) 1 run (PM)	8	Commute: Tiburon to SF	2 runs (AM) 1 run (PM)
-	-	-	10	Basic: Strawberry to SF	30-60
18	Commute: College of Marin to SF	22-30	18	Commute: College of Marin to SF	22-30
24	Commute: Manor (Fairfax) to SF	8-30	24	Commute: Manor (Fairfax) to SF	8-30
25	Shuttle: Larkspur Ferry to Manor (Fairfax)	30	25	Shuttle: Larkspur Ferry to Manor (Fairfax)	30
27	Commute: San Anselmo to SF	15-60	27	Commute: San Anselmo to SF	15-60
30	Commute: San Rafael to SF	2 runs (AM) 1 run (PM)	-	-	-
37*	Shuttle-Larkspur Ferry to Smith Ranch Road	30	37*	Shuttle-Larkspur Ferry to Smith Ranch Road	30
38	Commute: Terra Linda to SF	2 runs (AM) 1 run (PM)	38	Commute: Terra Linda to SF	30
40/40x	Basic: San Rafael to Del Norte BART	30-60	40/42	Basic: San Rafael to Del Norte BART weekday	30-60
44	Commute: Marinwood to SF	2 runs (AM) 2 runs (PM)	44	Commute: Marinwood to SF	2 runs (AM) 2 runs (PM)
54	Commute: San Marin to SF	9-30	54	Commute: San Marin to SF	9-30
56	Commute: Novato to SF	30	56	Commute: Novato to SF	30
58	Commute: SF to Novato	30	58	Commute: SF to Novato	30
70/70x	Basic: Novato to SF	4-30	70/71	Basic: Novato to SF	4-30
72/72x	Commute: Santa Rosa to SF	10-30	72	Commute: Santa Rosa to SF	10-30
74	Commute: Santa Rosa to SF	30	74	Commute: Santa Rosa to SF	30
76	Commute: East Petaluma to SF	25-30	76	Commute: East Petaluma to SF	25-30
92	Commute: Marin City to SF	30-60	92	Commute: Marin City to SF	30-60
93	Commute: GG Toll Plaza to SF Civic Center	10-30	93	Commute: GG Toll Plaza to SF Civic Center	10-30
97	Commute: Larkspur Ferry to SF	1 run (AM)	97	Commute: Larkspur Ferry to SF	1 run (AM)
101/101x	Basic: Santa Rosa to SF	60	101/101x	Basic: Santa Rosa to SF	60

Sources: Golden Gate Transit Website (2017); Marin CMP Update (2015).

4.3 Ferry Services

Three organizations provide Ferry service in Marin County:

- ▶ *Golden Gate Ferry Service.* The Golden Gate Bridge, Highway and Transportation District operates ferry services from Larkspur and Sausalito to San Francisco via conventional and high-speed ferries. The Larkspur Ferry provides more service to San Francisco, with headways between 30 and 55 minutes during the weekday commute periods. The Sausalito Ferry provides less frequent service to San Francisco and longer headways between 50 and 90 minutes during the weekday commute periods. Both ferries transport people to the San Francisco Ferry Building. The San Francisco Giants Game Ferry (National League Baseball) is an additional ferry service that operates on game days. This ferry runs until 30 minutes after the final out of the ballgame and runs about 60 minutes from Larkspur to AT&T Park.
- ▶ *Blue and Gold Fleet.* The Blue and Gold Fleet operates both commuter and recreational ferry service from Sausalito to Fisherman’s Wharf in San Francisco. Blue and Gold also provides recreational service between Angel Island and San Francisco, Oakland, and Vallejo.
- ▶ *Angel Island Tiburon Ferry.* The Angel Island Tiburon Ferry operates recreational service between Angel Island and Downtown Tiburon. Service varies throughout the year; headways are one-two hours on weekdays and one-three hours on weekends; on weekends from April through October, headways are one hour and from November through March, are one-two hours. No weekday service is offered from November through February except by reservation, and Wednesday-Friday service is offered in the month of March.

4.4 Summary of Fixed Route Services and Boardings

The transit routes managed by Marin Transit are routinely monitored for performance. The recent dedication of additional resources has led to an expansion of local transit service, which in turn has increased local boardings. These trends are illustrated in **Table 18** and Transit Ridership Trends Chart, which show ridership trends for Marin Transit Fixed Route Service, Golden Gate Transit Bus, and Ferry Operations.

- ▶ As the table shows, demand for the Golden Gate Transit basic and commuter bus services to and from San Francisco have decreased slightly in the last year by approximately 2 percent.
- ▶ Golden Gate Ferry Service has experienced decreased in ridership during the last two fiscal years, approximately 5 percent increase from 2013-2014 to 2015-2016.
- ▶ Marin Transit Fixed Route Service showed a decrease of 5 percent in ridership from 2013-2014 to 2015-2016 with an increase of 3 percent in revenue hours.
- ▶ Marin Access Services have a slight increase in ridership of approximately 2 percent with a 1 percent reduction in revenue hours in fiscal year 2015-2016. There was much larger bump in both ridership and revenue hours in the fiscal year previous 2014-2015.

Tables 15 and **16** provided in Section 4.1. Marin Transit summarize the CMP segments utilized by the Marin Transit Bus Services and the LOS for each segment during the PM peak hour showing the impact on transit services using them.

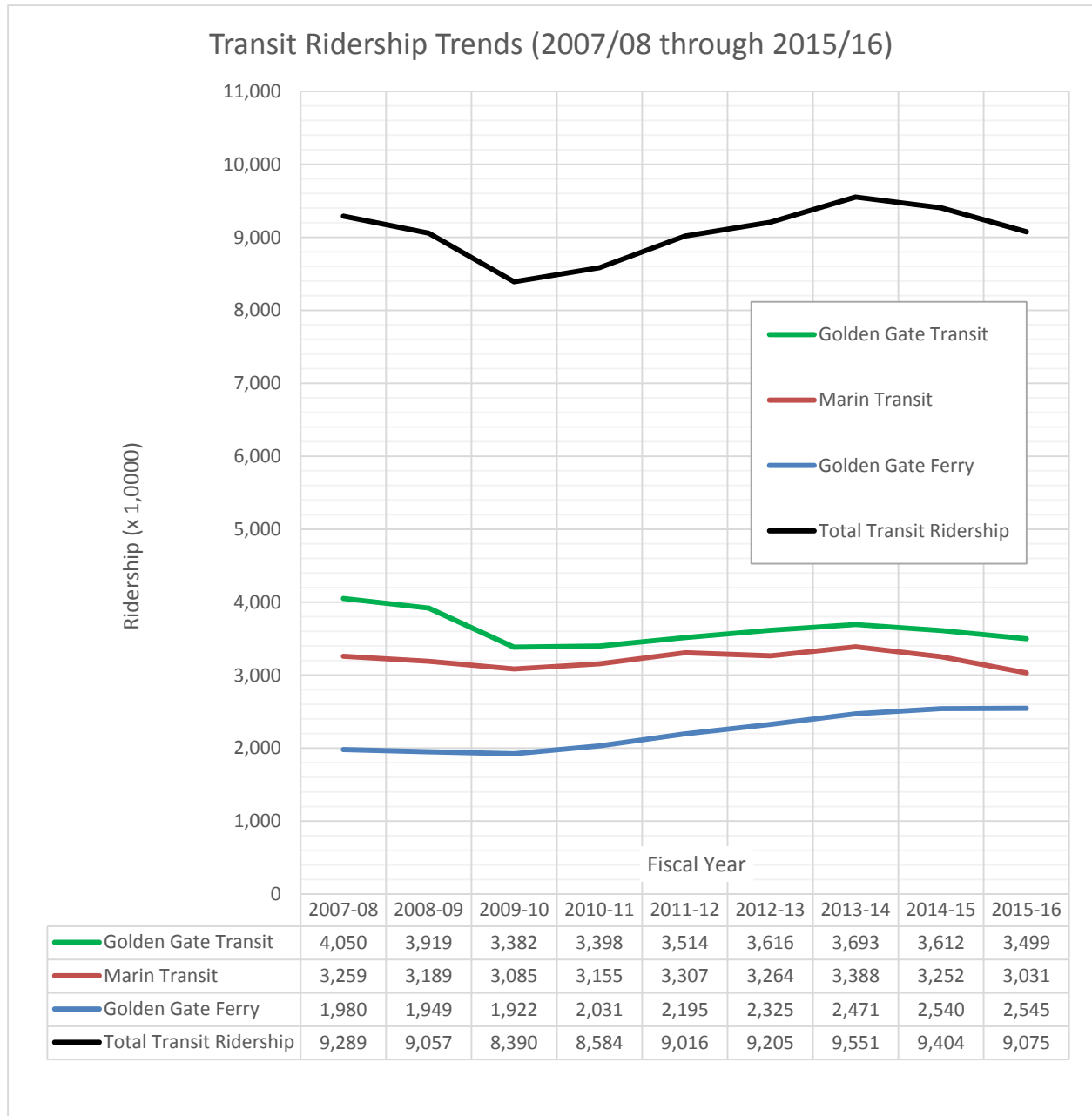
Table 18: Transit Ridership Trends in Marin County

Fiscal Year	Annual Revenue Hours	Annual Boardings
Golden Gate Basic and Commuter Service¹:		
2010-2011	333,000	3,398,098
2011-2012	325,000	3,513,639
2012-2013	341,000	3,615,851
2013-2014	321,000	3,692,851
2014-2015	337,000	3,612,000
2015-2016	N/A	3,499,000
Golden Gate Ferry Service¹:		
2010-2011	14,000	2,031,219
2011-2012	13,000	2,195,414
2012-2013	13,000	2,324,874
2013-2014	14,000	2,470,583
2014-2015	14,000	2,540,000
2015-2016	14,000	2,545,000
Marin Transit Fixed Route Service²:		
2010-2011	117,011	3,154,571
2011-2012	136,951	3,307,179
2012-2013	136,227	3,263,903
2013-2014	147,111	3,387,925
2014-2015	152,801	3,252,116
2015-2016	156,803	3,031,450

Sources: 1. Comprehensive Annual Financial Report FY 2015-2016. Golden Gate Bridge Highway and Transportation District. (http://goldengate.org/organization/annual_reports.php)

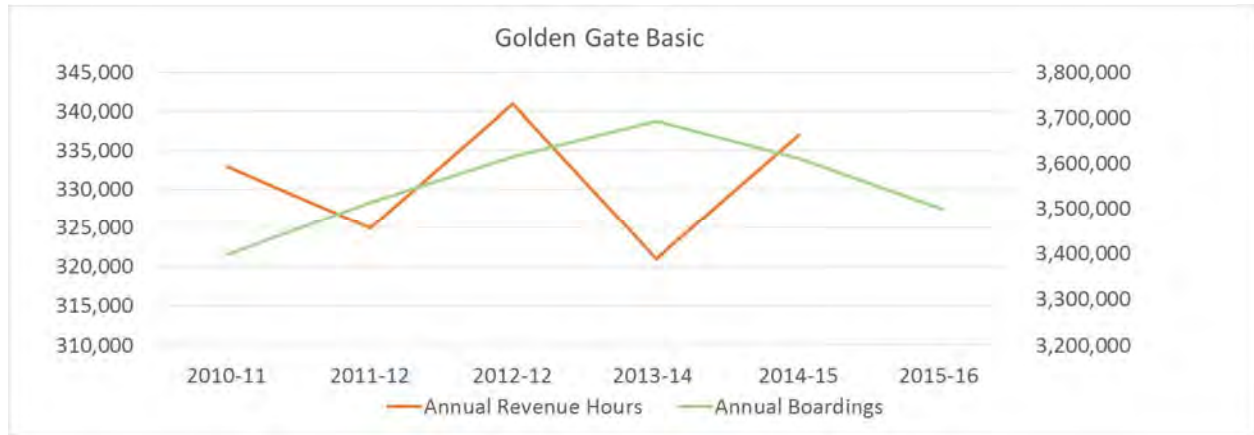
2. System Performance Summary for FY 2010-2011, FY 2011-2012, FY 2012-2013, FY 2013-2014, 2014-2015, 2015-2016, Marin Transit. (<http://www.marintransit.org/monitoringreports.html>)

Transit Ridership Trends (2007 / 2008 through 2015 / 2016)

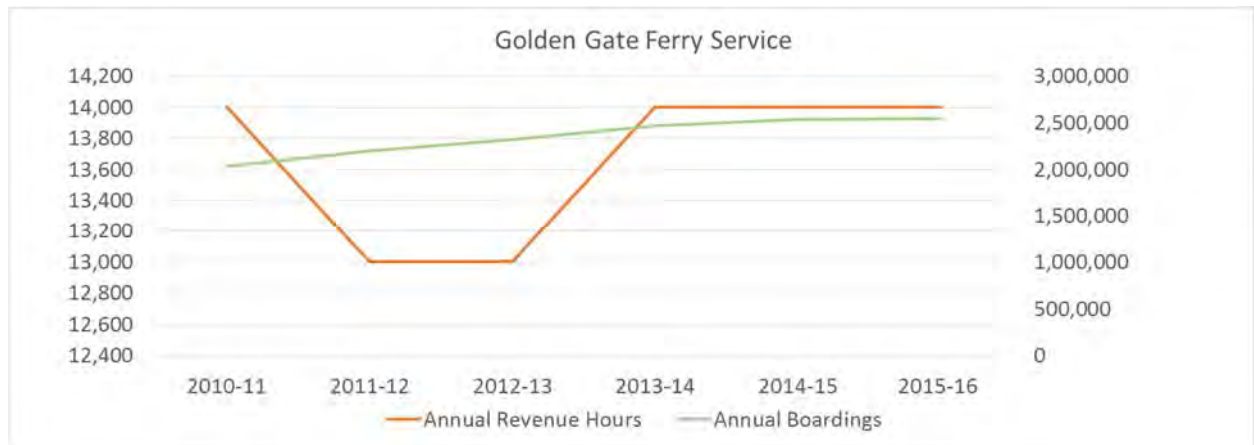


The trends for annual revenue hours and boardings for each of the Golden Gate Transit Basic and Commuter Services, Golden Gate Ferry Service, and Marin Transit Fixed Route Service between 2010-2011 and 2015-2016 were compared and illustrated in the Annual Revenue Hours and Boardings Trends Charts provided below.

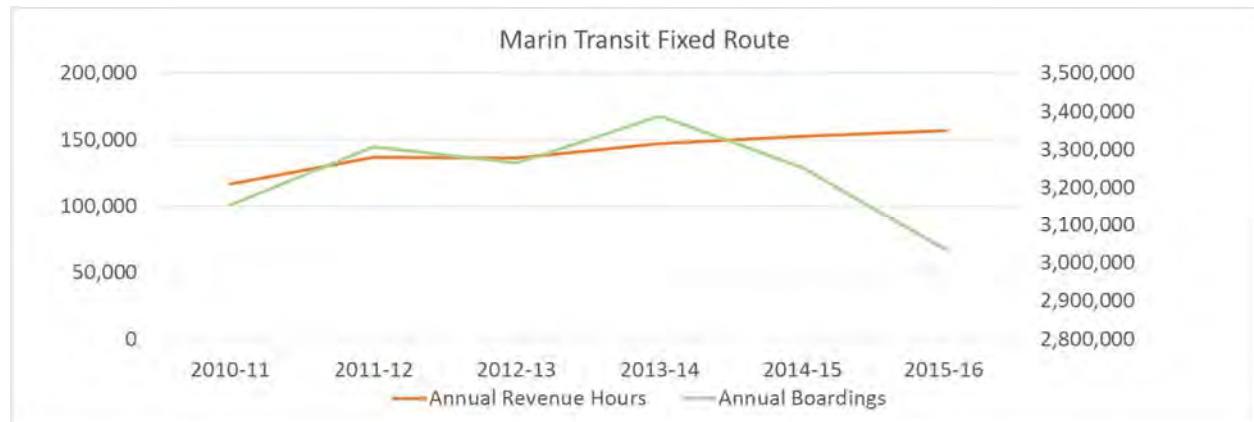
**Annual Revenue Hours and Boardings Trends for Golden Gate Transit Basic and Commuter Services
(2010 / 2011 through 2015 / 2016)**



**Annual Revenue Hours and Boardings Trends for Golden Gate Ferry Service
(2010 / 2011 through 2015 / 2016)**



**Annual Revenue Hours and Boardings Trends for Marin Transit Fixed Route Service
(2010 / 2011 through 2015 / 2016)**



4.5 Specialized Transit Services

- ▶ **Marin Access.** Marin Transit contracts with Whistlestop Wheels to provide local paratransit services that are available during the same hours and days of the week as comparable local and inter-county fixed-route, non-commute bus services. The service is a door-to-door ridesharing program that has approximately 40 lift-equipped vehicles available for use. Approximately 162,511 annual passenger trips are provided on Marin Access Paratransit service.

Inter-county paratransit service is provided seven days a week, under an agreement between Golden Gate Transit and Marin Transit. The inter-county service area includes Sonoma, San Francisco, and Contra Costa County in addition to Marin County. Statistics for this service are included in **Table 19**. The demand for paratransit service has grown in recent years as more Marin County residents have become eligible for the service and medical providers and residents become more aware of paratransit service.

Table 19: Marin Access Performance Statistics, FY 2011 to FY 2016

Fiscal Year	Annual Revenue Hours	Annual Passenger Trips
2010-2011	53,127	116,970
2011-2012 ¹	49,012	119,666
2012-2013 ²	59,589	143,417
2013-2014	57,389	158,187
2014-2015	60,417	172,512
2015-2016	58,756	162,511

Notes: 1 Volunteer Driver Program added in FY 2011-2012.

2 Catch-A-Ride Program added in FY 2012-2013.

Source: System Performance Summary for FY 2010-2011, FY 2011-2012, FY 2012-2013, FY 2013-2014, 2014-2015, 2015-2016, Marin Transit. (<http://www.marintransit.org/monitoringreports.html>)

- ▶ **Volunteer Driver.** Marin Transit manages two Volunteer Driver programs for seniors who have difficulty using fixed route or paratransit services: 1) the Safe Transport and Reimbursement (STAR) Program operated by Whistlestop Wheels in Eastern Marin, and 2) the TripTrans West Marin Volunteer Driver Program operated by West Marin Senior Services in Western Marin. Both programs provide drivers with mileage reimbursements for their services. During the 2015-2016 fiscal year, the volunteer driver program served 16,570 unlinked passengers during weekday service.
- ▶ **Catch-a-Ride.** Marin Transit manages the Catch-A-Ride program, which allows eligible Marin County residents to receive a discounted ride in taxis and other licensed vehicles throughout Marin County. To be considered eligible for the program, participants must be a resident of Marin County and at least 80 years of age, at least 60 years of age and unable to drive, or be eligible for paratransit under the Americans with Disabilities Act. The program pays a discounted rate of the fare based on the mileage of the trip, rather than the meter rate. Fiscal year 2015-2016, the program had 16,520 trips. Marin Catch-A-Ride is funded by Marin's voter approved vehicle registration fee, Measure B.
- ▶ **School Transportation.** Marin Transit provides school transportation services including supplemental school bus service and contracted yellow school bus service.

5.0 BICYCLE AND PEDESTRIAN ACTIVITY

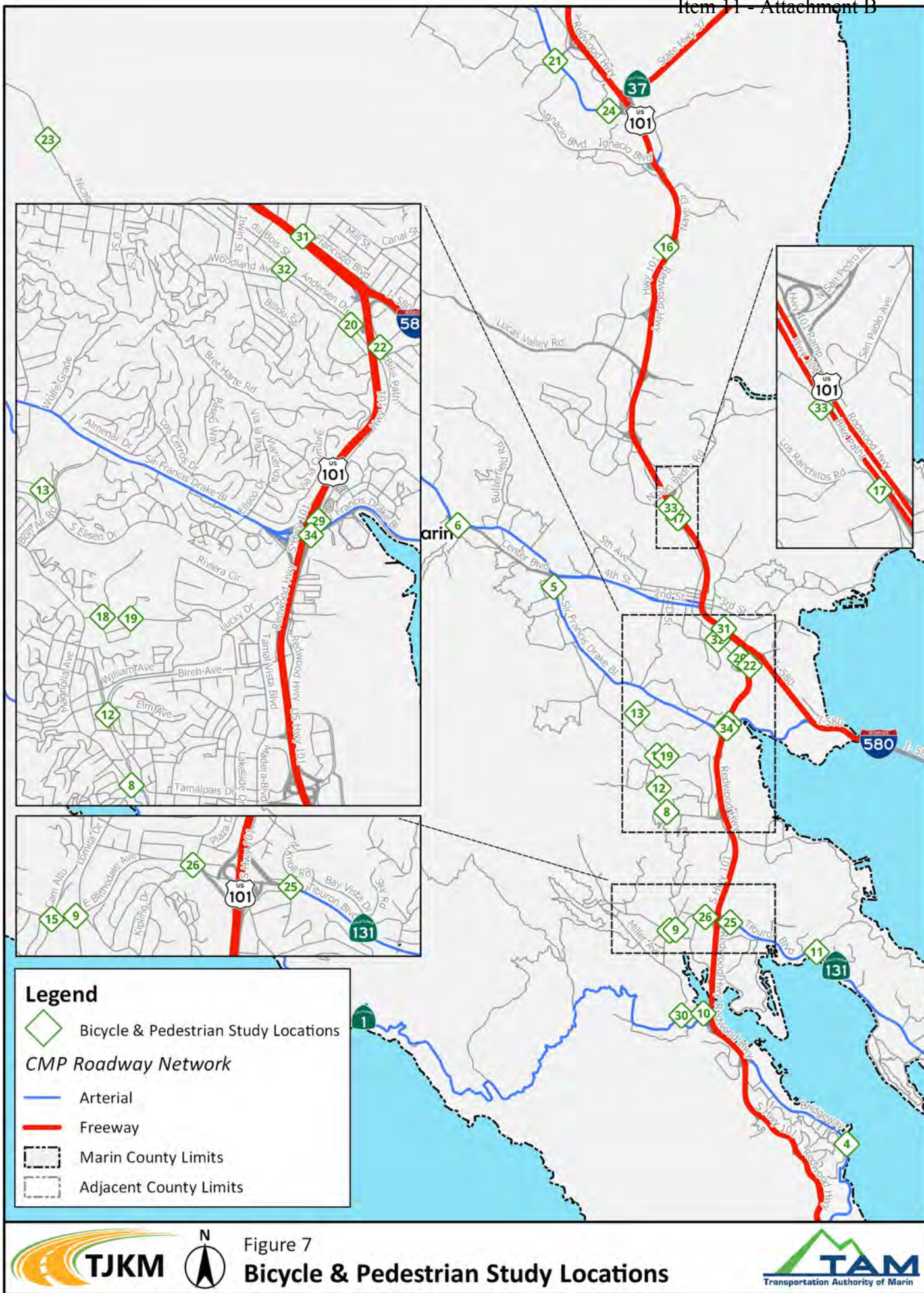
Bicycle and pedestrian activity was monitored at various locations in Marin County that were previously studied in the 2014 Transportation System Monitoring Report. **Table 20** lists the bicycle and pedestrian count locations, consistent with the 2014 study. **Figure 7** presents a map of the bicycle and pedestrian count locations. The bicycle and pedestrian monitoring report is not required for the CMP and is therefore presented for informational purposes only. Bicycle and pedestrian volumes were collected at 28 locations. This includes seven new locations, noted in **Table 18**, relative to the 2014 report. Locations 27 and 28 from the 2014 report, pedestrian paths at the US 101 northbound and southbound ramps in Tiburon, were not included in 2016.

Bicycle and pedestrian counts we collected on weekdays for a 14-hour period from 6:00 AM to 8:00 PM and for a four-hour weekend midday period between 10:00 AM and 2:00 PM. The surveys also included adult and youth demographic attributes. The total bicycle and pedestrian volumes were then compared to the historical data from previous years.

Table 20: Bicycle and Pedestrian Count Locations

ID1	Count Location Description and City
1	Tiburon Boulevard @ Main Street, Tiburon
4	Bridgeway @ Princess Street, Sausalito
5	San Anselmo Avenue @ Tunstead Avenue (Southern Intersection), San Anselmo
6	Broadway @ Bolinas Road, Fairfax
8	Magnolia Avenue @ Ward Street, Larkspur
9	Mill Valley-Sausalito Path @ E. Blithedale Avenue, Mill Valley
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction, Tam Junction
11	Tiburon Bike Path @ Blackie's Pasture/McKegney Green, Tiburon
12	Larkspur-Corte Madera Path @ Baltimore Avenue, Larkspur
13	Corte Madera Creek Path @ Bon Air Road, Greenbrae
15	Camino Alto @ E. Blithedale Avenue, Mill Valley
16	Pacheco Hill Path @ Alameda del Prado, Novato
17	Los Ranchitos Road @ Lincoln Hill Multi-Use Pathway, San Rafael
18	Doherty Drive @ Larkspur Plaza Drive/Rose Lane West, Larkspur
19 ²	Doherty Drive @ Rose Lane East, Larkspur
20	Andersen Drive @ Cal Park Tunnel Path, San Rafael
21	S. Novato Boulevard @ Rowland Way, Novato
22	Bellam Boulevard @ Andersen Drive, San Rafael
23	Nicasio Valley Road @ Nicasio School, Nicasio
24	Enfrente Bike Path @ S. Novato Boulevard, Novato
25	Tiburon Boulevard @ S. Knoll Road, Mill Valley
26	E. Blithedale Avenue @ Tower Drive, Mill Valley
29 ²	Central Marin Ferry Connector Bridge @ Sir Francis Drake Boulevard, Larkspur
30 ²	Almonte Boulevard @ Shoreline Highway, Mill Valley
31 ²	Francisco Boulevard E. @ Bay Street, San Rafael
32 ²	Andersen Drive @ Du Bois Street, San Rafael
33 ²	Merrydale Road @ Lincoln Hill Multi-Use Pathway, San Rafael
34 ²	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Boulevard, Larkspur

Notes: 1. ID Numbers are non-sequential to retain consistency with 2014 Monitoring Report and previous reports.
2. New count location for 2016



5.1 Bicycle and Pedestrian Volumes

Raw bicycle and pedestrian counts were processed into two-hour peak periods, shown in **Table 21**. Volumes are reported for the two-hour periods specified in the 2014 Monitoring Report (weekday 7:00-9:00 AM, weekday 4:00-6:00 PM, and weekend 12:00-2:00 PM) to retain consistency between monitoring years. As was the case in 2014, it should be noted that conducting 14-hour counts showed an offset in the peak periods for bicycle and pedestrian users relative to vehicular traffic peaks. This shift in peak activity by mode is discussed later in this section. It should also be noted that comparisons between years for single day data collection efforts are less reliable for pedestrian and bicycle volumes, as opposed to vehicular volumes, as slight to moderate changes in weather patterns are much more likely to cause shifts in travel behavior in these modes than for motorists.

During the weekday monitoring, overall pedestrian activity was highest during the two-hour PM peak period, while overall bicycle activity was similar in both peak periods, but slightly higher during the two-hour AM peak period. This system-wide observation varied considerably from location to location, however. During the weekend two-hour midday peak period, overall bicycle and pedestrian activity nearly doubled from what was observed during the weekdays, most notably for bicycles.

The Bridgeway and Princess Street location in Sausalito, CA (ID# 4) experienced the highest volumes of pedestrians and bicyclists of all 28 locations monitored. This location experienced 270 bicyclists in the AM peak period (up from 181 in 2014) and 349 bicyclists in the PM peak period (up from 234 in 2014). During the weekend midday peak period, this location recorded 1,577 bicyclists.

During the AM peak period, 134 pedestrians were observed at the Bridgeway and Princess Street location, up from 101 in 2014. During the PM peak period, 866 pedestrian were observed, up from 586 in 2014. During the weekend midday peak period, 2,883 pedestrians were observed, an increase from 2,513 in 2014.

For bicycles, the South Novato Boulevard and Roland Way (ID# 21) and Bellam Boulevard and Andersen Drive (ID# 22) locations had the lowest observations in the AM peak period with only 8 bicyclists each. During the PM peak period, the Enfrente Bike Path at South Novato Boulevard (ID# 24) had the lowest bicycle observations, with a count of 12. During the weekend peak hour, Bellam Boulevard and Andersen Drive had the lowest observation with 13 bicyclists.

For pedestrians, the lowest observed activity occurred at Nicasio Valley Road at Nicasio School (ID# 23) with no recorded pedestrian counts at any weekday or weekend data collection periods on this rural facility.

Table 21: 2-Hour Bicycle and Pedestrian Count Volumes for Weekdays and Weekends

ID	Count Location Description	Weekday AM Peak (7-9 AM)			Weekday PM Peak (4-6 PM)			Weekend Midday Peak (12-2 PM)			Weekday 14-Hour Total (6 AM–8 PM)		
		Peds	Bikes	Total	Peds	Bikes	Total	Peds	Bikes	Total	Peds	Bikes	Total
1	Tiburon Blvd @ Main St	258	47	305	293	87	380	315	253	568	1,377	373	1,750
4	Bridgeway @ Princess St	134	270	404	866	349	1,215	2,883	1,577	4,460	4,865	1,929	6,794
5	San Anselmo Ave @ Tunstead Ave	154	77	231	440	114	554	154	263	417	2,151	515	2,666
6	Broadway @ Bolinas Rd	237	75	312	381	135	516	550	293	843	1,892	577	2,469
8	Magnolia Ave @ Ward St	120	50	170	306	55	361	391	163	554	1,530	326	1,856
9	Mill Valley-Sausalito Path @ E. Blithedale Ave	83	192	275	59	89	148	55	411	466	287	600	887
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction	105	278	383	135	209	344	64	756	820	654	1,276	1,930
11	Tiburon Bike Path @ Blackie's Pasture / McKegney Green	7	23	30	16	16	32	16	35	51	76	87	163
12	Larkspur-Corte Madera Path @ Baltimore Ave	112	116	228	127	78	205	84	141	225	601	429	1,030
13	Corte Madera Creek Path @ Bon Air Rd	118	71	189	74	96	170	61	67	128	473	368	841
15	Camino Alto @ E. Blithedale Ave	30	64	94	31	36	67	43	208	251	148	291	439
16	Pacheco Hill Path @ Alameda del Prado	3	24	27	1	24	25	3	28	31	23	126	149
17	Los Ranchitos Rd @ Lincoln Hill Multi-Use Pathway	4	33	37	10	35	45	3	53	56	52	184	236
18	Doherty Dr @ Larkspur Plaza Dr / Rose Ln West	128	141	269	0	69	69	225	61	286	413	422	835
19	Doherty Dr @ Rose Ln East	92	108	200	57	54	111	386	56	442	926	329	1,255
20	Andersen Dr @ Cal Park Tunnel Path	18	80	98	20	96	116	31	89	120	124	414	538
21	S. Novato Blvd @ Rowland Wy	53	8	61	39	29	68	30	25	55	379	128	507
22	Bellam Blvd @ Andersen Dr	45	8	53	38	28	66	31	13	44	208	58	266
23	Nicasio Valley Rd @ Nicasio School	0	10	10	0	22	22	0	165	165	0	96	96

ID	Count Location Description	Weekday AM Peak (7-9 AM)			Weekday PM Peak (4-6 PM)			Weekend Midday Peak (12-2 PM)			Weekday 14-Hour Total (6 AM–8 PM)		
		Peds	Bikes	Total	Peds	Bikes	Total	Peds	Bikes	Total	Peds	Bikes	Total
24	Enfrente Bike Path @ S. Novato Blvd	6	17	23	10	12	22	3	27	30	54	84	138
25	Tiburon Blvd @ S. Knoll Rd	5	36	41	8	31	39	3	111	114	62	176	238
26	E. Blithedale Ave @ Tower Dr	27	46	73	20	44	64	14	115	129	158	231	389
29	Central Marin Ferry Connector Bridge @ Sir Francis Drake Blvd	12	70	82	23	91	114	11	95	106	158	372	530
30	Almonte Blvd @ Shoreline Hwy	45	100	145	72	36	108	48	134	182	269	279	548
31	Francisco Blvd E. @ Bay St	109	37	146	76	80	156	31	36	67	614	260	874
32	Andersen Dr @ Du Bois St	29	81	110	27	85	112	25	90	115	174	356	530
33	Merrydale Rd @ Lincoln Hill Multi-Use Pathway	4	12	16	7	14	21	3	25	28	46	93	139
34	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Blvd	14	44	58	10	67	77	12	61	73	91	280	371
TOTAL		1,952	2,118	4,070	3,146	2,081	5,227	5,475	5,351	10,826	17,805	10,659	28,464

Bicycle and pedestrian volumes are presented in the above table for the AM and PM peak periods generally associated with vehicle commuter traffic. *Peak periods for non-auto modes do not necessarily mirror those for vehicles due to the increased travel time associated with the slower progression.* For this monitoring cycle, 14-hour counts were conducted and the data shows that bicycle and pedestrian peak periods tend to be outside the standard 7:00-9:00 AM and 4:00-6:00 PM weekday peak periods.

Table 22 summarizes the highest volume observed two-hour peak periods at each location for weekdays and **Table 23** summarizes the highest volume observed two-hour peak period for weekends (between 10:00 AM and 2:00 PM). The following charts display the differences between bicycle and pedestrian volumes during standard vehicular peaks and observed peak periods.

Table 22: Maximum Observed Peak Period Bicycle and Pedestrian Count Volumes for Weekdays

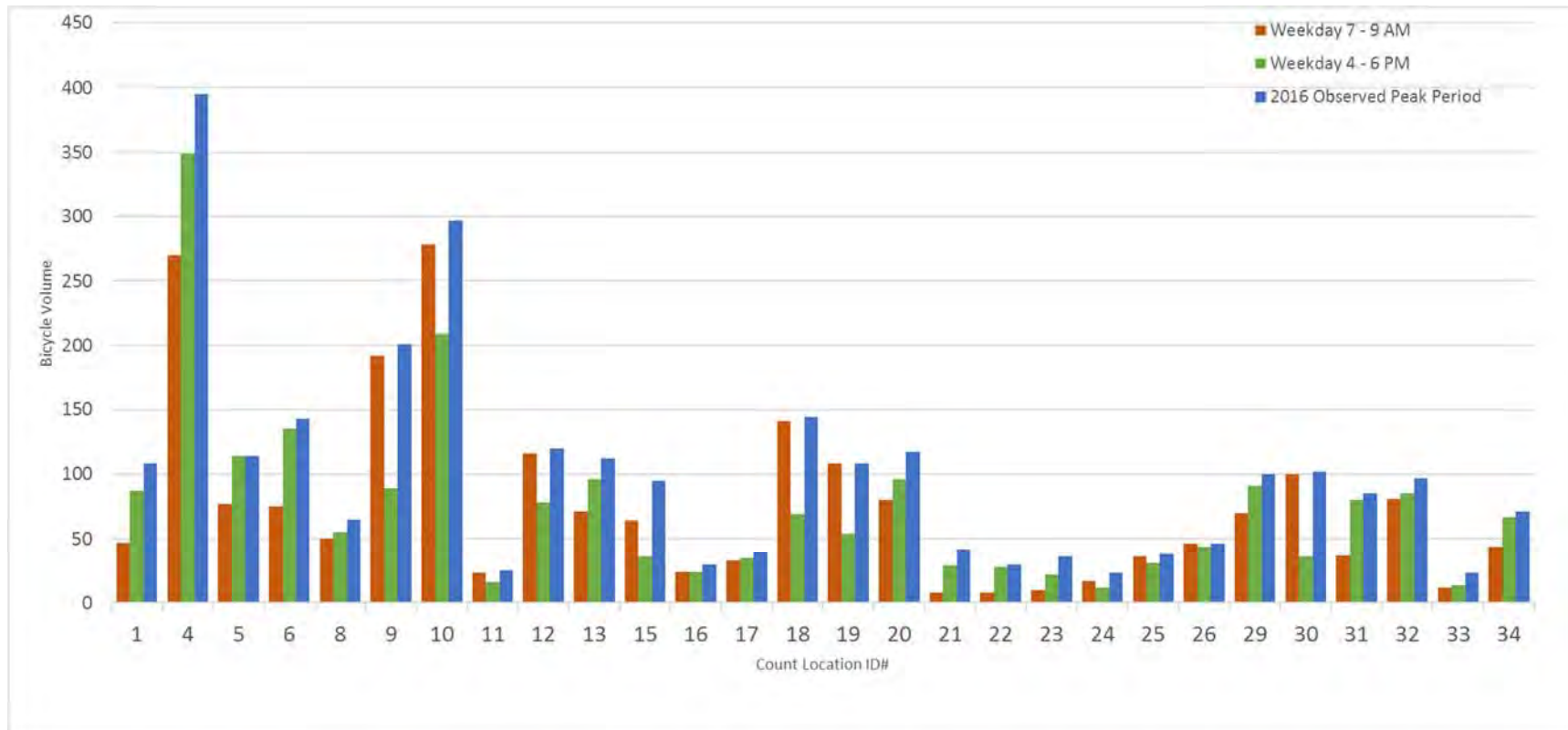
ID	Count Location Description	Pedestrian		Bicycle	
		Peak Period	Count	Peak Period	Count
1	Tiburon Blvd @ Main St	4:45 PM - 6:45 PM	396	2:45 PM - 4:45 PM	108
4	Bridgeway @ Princess St	12:30 PM - 2:30 PM	1,453	12:15 PM - 2:15 PM	395
5	San Anselmo Ave @ Tunstead Ave	12:30 PM - 2:30 PM	471	4:00 PM - 6:00 PM	114
6	Broadway @ Bolinas Rd	5:00 PM - 7:00 PM	438	3:15 PM - 5:15 PM	143
8	Magnolia Ave @ Ward St	5:00 PM - 7:00 PM	357	12:30 PM - 2:30 PM	65
9	Mill Valley-Sausalito Path @ E. Blithedale Ave	7:45 AM - 9:45 AM	96	7:15 AM - 9:15 AM	201
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction	4:15 PM - 6:15 PM	153	6:30 AM - 8:30 AM	297
11	Tiburon Bike Path @ Blackie's Pasture / McKegney Green	8:30 AM - 10:30 AM	23	2:45 PM - 4:45 PM	25
12	Larkspur-Corte Madera Path @ Baltimore Ave	8:00 AM - 10:00 AM	137	7:30 AM - 9:30 AM	120
13	Corte Madera Creek Path @ Bon Air Rd	7:00 AM - 9:00 AM	118	3:30 PM - 5:30 PM	112
15	Camino Alto @ E. Blithedale Ave	7:30 AM - 9:30 AM	36	6:45 AM - 8:45 AM	95
16	Pacheco Hill Path @ Alameda del Prado	6:00 AM - 8:00 AM	10	4:30 PM - 6:30 PM	30
17	Los Ranchitos Rd @ Lincoln Hill Multi-Use Pathway	9:00 AM - 11:00 AM	12	4:45 PM - 6:45 PM	39
18	Doherty Dr @ Larkspur Plaza Dr / Rose Ln West	11:15 AM - 1:15 PM	207	7:30 AM - 9:30 AM	144
19	Doherty Dr @ Rose Ln East	11:45 AM - 1:45 PM	385	7:00 AM - 9:00 AM	108
20	Andersen Dr @ Cal Park Tunnel Path	11:30 AM - 1:30 PM	25	4:30 PM - 6:30 PM	117
21	S. Novato Blvd @ Rowland Wy	2:00 PM - 4:00 PM	150	3:00 PM - 5:00 PM	42
22	Bellam Blvd @ Andersen Dr	6:45 AM - 8:45 AM	54	3:45 PM - 5:45 PM	30
23	Nicasio Valley Rd @ Nicasio School	6:00 AM - 8:00 AM	0	10:00 AM - 12:00 PM	36
24	Enfrente Bike Path @ S. Novato Blvd	10:00 AM - 12:00 PM	15	11:15 AM - 1:15 PM	23
25	Tiburon Blvd @ S. Knoll Rd	1:15 PM - 3:15 PM	21	6:45 AM - 8:45 AM	38
26	E. Blithedale Ave @ Tower Dr	10:30 AM - 12:30 PM	43	6:45 AM - 8:45 AM	46
29	Central Marin Ferry Connector Bridge @ Sir Francis Drake Blvd	5:00 PM - 7:00 PM	41	4:45 PM - 6:45 PM	100
30	Almonte Blvd @ Shoreline Hwy	4:45 PM - 6:45 PM	98	7:30 AM - 9:30 AM	102
31	Francisco Blvd E. @ Bay St	5:00 PM - 7:00 PM	185	3:45 PM - 5:45 PM	85
32	Andersen Dr @ Du Bois St	12:45 PM - 2:45 PM	53	4:30 PM - 6:30 PM	97
33	Merrydale Rd @ Lincoln Hill Multi-Use Pathway	4:45 PM - 6:45 PM	14	2:30 PM - 4:30 PM	23
34	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Blvd	5:00 PM - 7:00 PM	28	4:45 PM - 6:45 PM	71

Table 23: Maximum Observed Peak Period Bicycle and Pedestrian Count Volumes for Weekends

ID	Count Location Description	Pedestrian		Bicycle	
		Peak Period	Count	Peak Period	Count
1	Tiburon Blvd @ Main St	10:00 AM - 12:00 PM	383	10:30 AM - 12:30 PM	306
4	Bridgeway @ Princess St	12:00 PM - 2:00 PM	2,883	12:00 PM - 2:00 PM	1,577
5	San Anselmo Ave @ Tunstead Ave	10:00 AM - 12:00 PM	239	10:30 AM - 12:30 PM	311
6	Broadway @ Bolinas Rd	11:15 AM - 1:15 PM	562	11:15 AM - 1:15 PM	359
8	Magnolia Ave @ Ward St	12:00 PM - 2:00 PM	391	10:30 AM - 12:30 PM	200
9	Mill Valley-Sausalito Path @ E. Blithedale Ave	10:30 AM - 12:30 PM	77	10:15 AM - 12:15 PM	486
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction	10:00 AM - 12:00 PM	184	11:45 AM - 1:45 PM	758
11	Tiburon Bike Path @ Blackie's Pasture / McKegney Green	10:00 AM - 12:00 PM	36	10:45 AM - 12:45 PM	46
12	Larkspur-Corte Madera Path @ Baltimore Ave	10:00 AM - 12:00 PM	191	10:45 AM - 12:45 PM	145
13	Corte Madera Creek Path @ Bon Air Rd	10:00 AM - 12:00 PM	128	10:45 AM - 12:45 PM	67
15	Camino Alto @ E. Blithedale Ave	10:15 AM - 12:15 PM	53	10:30 AM - 12:30 PM	225
16	Pacheco Hill Path @ Alameda del Prado	11:15 AM - 1:15 PM	3	10:15 AM - 12:15 PM	49
17	Los Ranchitos Rd @ Lincoln Hill Multi-Use Pathway	10:00 AM - 12:00 PM	13	10:45 AM - 12:45 PM	58
18	Doherty Dr @ Larkspur Plaza Dr / Rose Ln West	12:00 PM - 2:00 PM	225	11:00 AM - 1:00 PM	65
19	Doherty Dr @ Rose Ln East	12:00 PM - 2:00 PM	386	10:15 AM - 12:15 PM	65
20	Andersen Dr @ Cal Park Tunnel Path	10:45 AM - 12:45 PM	38	10:30 AM - 12:30 PM	98
21	S. Novato Blvd @ Rowland Wy	11:00 AM - 1:00 PM	39	10:00 AM - 12:00 PM	33
22	Bellam Blvd @ Andersen Dr	10:15 AM - 12:15 PM	38	10:00 AM - 12:00 PM	14
23	Nicasio Valley Rd @ Nicasio School	6:00 AM - 8:00 AM	0	10:00 AM - 12:00 PM	231
24	Enfrente Bike Path @ S. Novato Blvd	10:00 AM - 12:00 PM	8	10:00 AM - 12:00 PM	34
25	Tiburon Blvd @ S. Knoll Rd	10:30 AM - 12:30 PM	11	10:00 AM - 12:00 PM	164
26	E. Blithedale Ave @ Tower Dr	12:00 PM - 2:00 PM	14	10:15 AM - 12:15 PM	185
29	Central Marin Ferry Connector Bridge @ Sir Francis Drake Blvd	10:00 AM - 12:00 PM	19	11:00 AM - 1:00 PM	110
30	Almonte Blvd @ Shoreline Hwy	10:00 AM - 12:00 PM	59	10:00 AM - 12:00 PM	176
31	Francisco Blvd E. @ Bay St	10:00 AM - 12:00 PM	61	12:00 PM - 2:00 PM	36
32	Andersen Dr @ Du Bois St	11:30 AM - 1:30 PM	40	11:00 AM - 1:00 PM	96
33	Merrydale Rd @ Lincoln Hill Multi-Use Pathway	9:30 AM - 11:30 AM	8	11:00 AM - 1:00 PM	33
34	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Blvd	10:00 AM - 12:00 PM	24	10:00 AM - 12:00 PM	77



Weekday Bicycle Volume Comparison



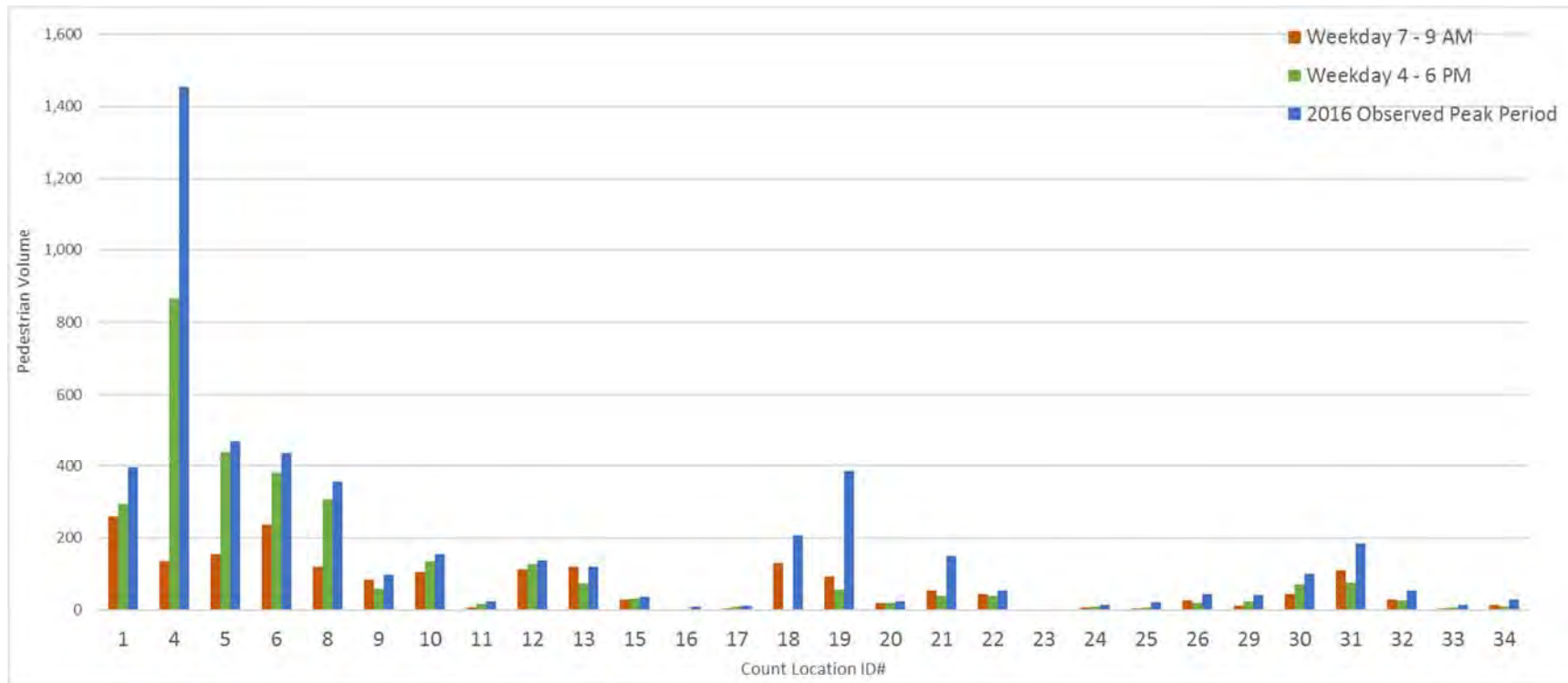
¹Locations 2 and 3 not counted in 2014 or 2016

²Locations 27 and 28 not counted in 2016

³Locations 29 through 34 are new for 2016



Weekday Pedestrian Volume Comparison



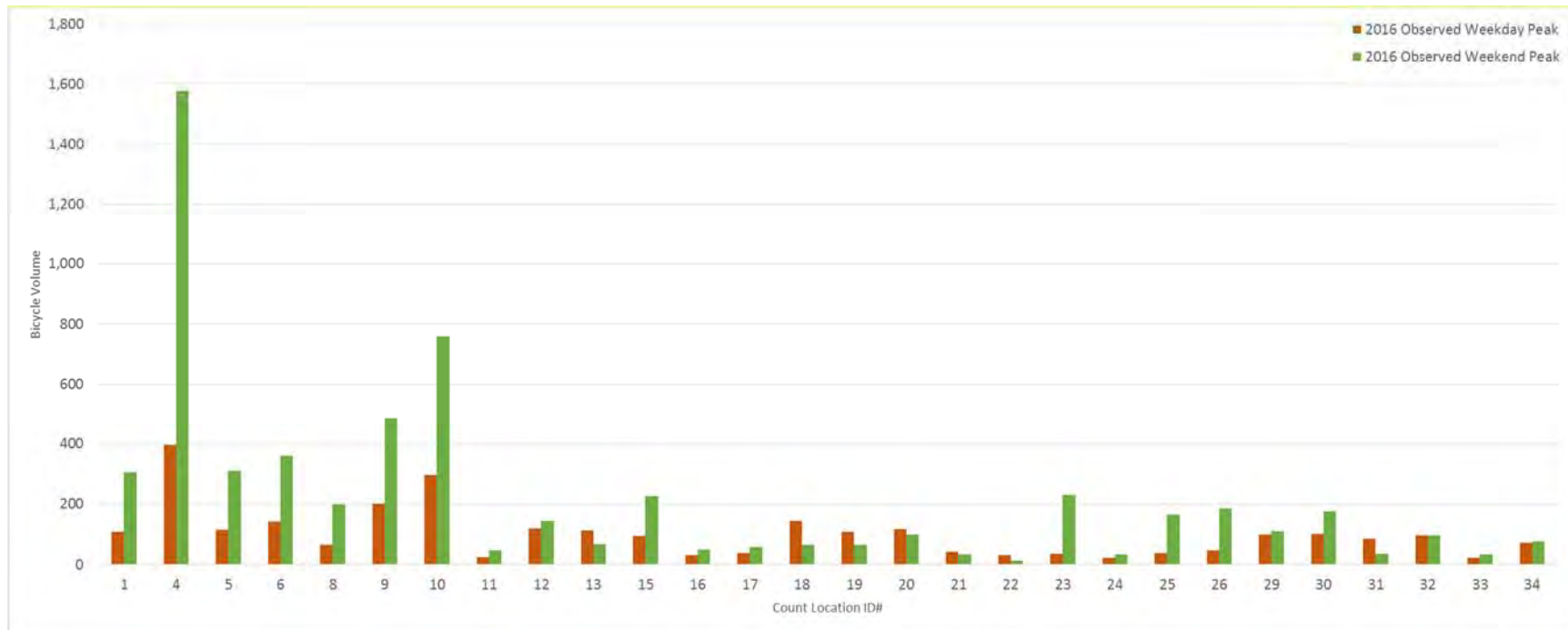
¹Locations 2 and 3 not counted in 2014 or 2016

²Locations 27 and 28 not counted in 2016

³Locations 29 through 34 are new for 2016



Weekday vs Weekend Peak Bicycle Volume Comparison

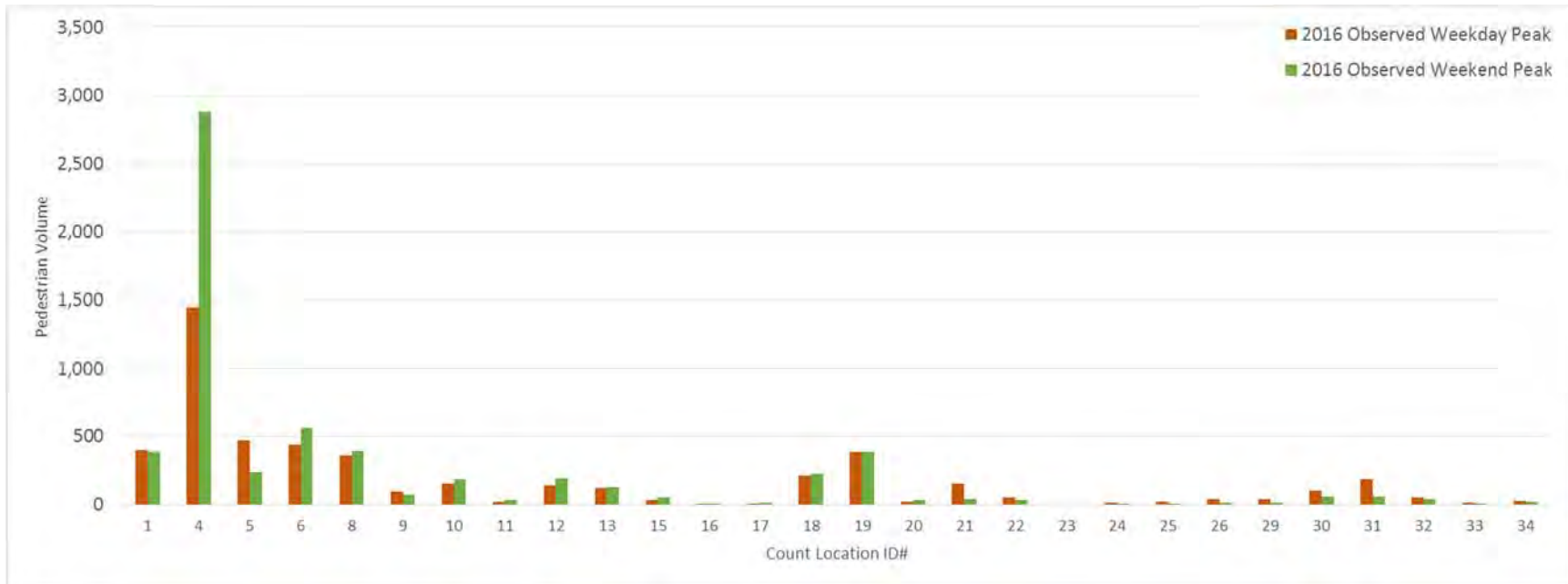


¹Locations 2 and 3 not counted in 2014 or 2016

²Locations 27 and 28 not counted in 2016

³Locations 29 through 34 are new for 2016

Weekday vs Weekend Peak Pedestrian Volume Comparison



¹Locations 2 and 3 not counted in 2014 or 2016

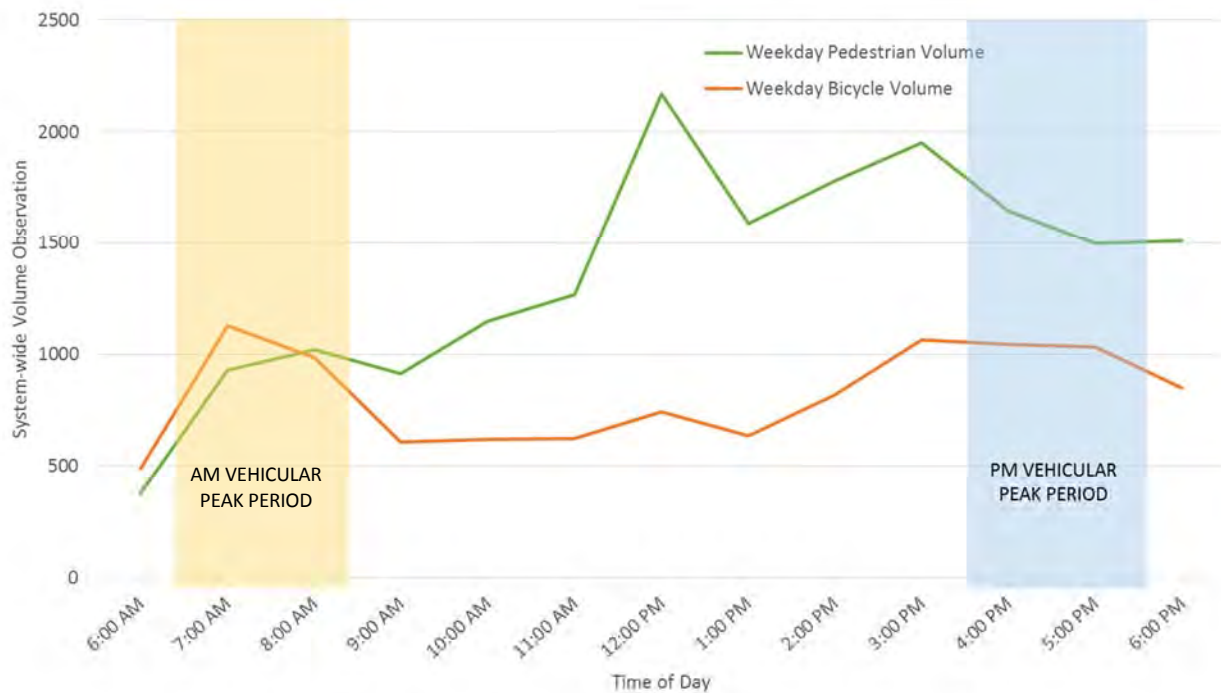
²Locations 27 and 28 not counted in 2016

³Locations 29 through 34 are new for 2016

As shown in the first two comparison charts above, peak observation periods for bicycle and pedestrian activity do generally follow the patterns of traditional AM and PM peak periods for vehicular volumes, notwithstanding a handful of exceptions, where peak activity falls outside those vehicular peaks. However, system-wide, there are not strong patterns that emerge when looking for an overall peak period.

The second set of comparison charts display differences between the maximum observed two-hour peak periods on weekdays versus weekends for bicycles and pedestrians. Weekend counts generally show much higher volumes than those found during weekdays. This trend shows that many users on the weekend are recreational users and do not necessarily commute during the weekdays via bicycling or walking.

The following chart shows the total sum of all system-wide bicycle and pedestrian observations, respectively, over the course of the 14-hour monitoring period.



Additional bicycle and pedestrian volume attribute trends at each count location are displayed in **Table 24**. The adult to youth ratio for bicyclists and pedestrians was 7:93 for both modes, system-wide at all locations combined. Locations closer to schools show much higher youth to adult ratios, in some cases showing youth volumes exceeding adult volumes.

Overall, in terms of system-wide comparisons, these data show a relatively significant shift from the 2014 data, which showed overall 15:85 and 20:80 splits between youths and adults for cyclists and pedestrians respectively.

As noted in the beginning of this chapter, comparisons between years based on a single data collection data should be made cautiously, since shifts in non-essential travel behavior, and shifts to other travel modes, are far more sensitive to slight shifts in weather, temperature, and other field conditions for non-motorized modes than for motorists. Conclusions based on these data should also, therefore, be made cautiously, and based on field observations over several days.

Table 24: Peak Period Bicycle and Pedestrian Volumes and Attributes: Youth vs Adult

ID	Count Location Description	Pedestrians				Bicyclists			
		Youth	Adult	Total	Ratio	Youth	Adult	Total	Ratio
1	Tiburon Blvd @ Main St	27	843	870	3 : 97	0	387	387	0 : 100
4	Bridgeway @ Princess St	108	3,827	3,935	3 : 97	8	2,190	2,198	0 : 100
5	San Anselmo Ave @ Tunstead Ave	62	677	739	8 : 92	3	454	457	1 : 99
6	Broadway @ Bolinas Rd	22	1,143	1,165	2 : 98	1	501	502	0 : 100
8	Magnolia Ave @ Ward St	69	777	846	8 : 92	8	257	265	3 : 97
9	Mill Valley-Sausalito Path @ E. Blithedale Ave	8	190	198	4 : 96	1	691	692	0 : 100
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction	7	299	306	2 : 98	8	1,240	1,248	1 : 99
11	Tiburon Bike Path @ Blackie's Pasture / McKegney Green	3	36	39	8 : 92	2	74	76	3 : 97
12	Larkspur-Corte Madera Path @ Baltimore Ave	26	298	324	8 : 92	120	230	350	34 : 66
13	Corte Madera Creek Path @ Bon Air Rd	26	231	257	10 : 90	42	194	236	18 : 82
15	Camino Alto @ E. Blithedale Ave	19	84	103	18 : 82	4	306	310	1 : 99
16	Pacheco Hill Path @ Alameda del Prado	0	6	6	0 : 100	0	76	76	0 : 100
17	Los Ranchitos Rd @ Lincoln Hill Multi-Use Pathway	0	17	17	0 : 100	0	121	121	0 : 100
18	Doherty Dr @ Larkspur Plaza Drive / Rose Ln West	104	82	186	56 : 44	150	118	268	56 : 44
19	Doherty Dr @ Rose Ln East	106	72	178	60 : 40	120	87	207	58 : 42
20	Andersen Dr @ Cal Park Tunnel Path	8	64	72	11 : 89	10	262	272	4 : 96
21	S. Novato Blvd @ Rowland Wy	25	90	115	22 : 78	1	60	61	2 : 98
22	Bellam Blvd @ Andersen Dr	27	88	115	23 : 77	19	30	49	39 : 61
23	Nicasio Valley Rd @ Nicasio School	0	0	0	-	0	197	197	0 : 100
24	Enfrente Bike Path @ S. Novato Blvd	0	19	19	0 : 100	1	56	57	2 : 98
25	Tiburon Blvd @ S. Knoll Rd	2	16	18	11 : 89	1	176	177	1 : 99
26	E. Blithedale Ave @ Tower Dr	4	58	62	6 : 94	0	205	205	0 : 100
29	Central Marin Ferry Connector Bridge @ Sir Francis Drake Blvd	4	44	48	8 : 92	11	256	267	4 : 96
30	Almonte Blvd @ Shoreline Hwy	77	103	180	43 : 57	91	178	269	34 : 66
31	Francisco Blvd E. @ Bay St	15	200	215	7 : 93	11	148	159	7 : 93
32	Andersen Dr @ Du Bois St	1	79	80	1 : 99	0	256	256	0 : 100
33	Merrydale Rd @ Lincoln Hill Multi-Use Pathway	3	8	11	27 : 73	10	37	47	21 : 79
34	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Blvd	3	36	39	8 : 92	2	172	174	1 : 99
TOTAL		756	9,387	10,143	7 : 93	624	8,959	9,583	7 : 93

5.2 Historical Trends

5.2.1 Historical Bicycle Volume Trends

The bicycle data collected for this monitoring period was compared with the previous cycles' data to determine historical trends. It should be noted that these counts are for the peak hour, the one hour experiencing the highest volume of bicyclists throughout the day, and not the two-hour peak period. As shown in the **Table 25**, the average weekday bicycle volume is 76 bicyclists per location in 2016, an 85% increase over the 41 in 2014, and 31% increase over the five-year average (2007 to 2014) of 58. More modest increases relative to 2015 and the five-year average were recorded for weekend bicycle travel. Decreases in observed bicycle volumes were recorded at several locations, most significantly at the Tiburon Bike Path at Blackie's Pasture (ID# 11) during both weekday and weekend periods.

5.2.2 Historical Pedestrian Volume Trends

Weekday and weekend pedestrian peak hour count data is shown in **Table 26**. The pedestrian data collected for this monitoring period was compared with the previous cycles' data to determine historical trends. It should be noted that these counts are for the peak hour, the one hour experiencing the highest volume of pedestrians throughout the day, and not the two-hour peak period. In 2016, the average weekday pedestrian volume is 136 per location, a twofold increase over the 64 in 2014, and 40 percent increase over the five-year average (2007 to 2014) of 97. A less pronounced increase in pedestrian volume was noted on weekends. The increases, decreases, and shifts in pedestrian volume, when examined at the count location level, however, show far more variance than the bicycle counts. This reinforces the notion that pedestrian travel may involve more non-essential and recreational trips than bicyclists and motorists.

5.2.3 Caution Concerning Use of Historical Trend Information

In 2014, the data showed a noticeable downward trends in bicycle and pedestrian activity. This pattern appears to have reversed, showing an overall increase in bicycle ridership in 2016 relative to the five-year average, and a moderate increase in overall pedestrian activity. While it is encouraging to see an overall shift towards increased non-motorized travel, it is improbable that the changes in cycling and pedestrian activity are entirely attributable to overall commute and modal shifts changes over just two years.

As previously mentioned, shifts to other modes of travel are particularly sensitive to moderate changes in weather, temperature, and other field conditions for cyclists and pedestrians. Perhaps more importantly, shifts in weather, temperature, and other field conditions play a significant role in reducing pedestrian and cycling activity for non-essential trips and recreational use. These factors limit the utility of historical comparisons and year-to-year comparisons between these travel modes when only using a single data collection point. Conclusions drawn from this analysis should therefore be made cautiously.



Table 25: Weekday and Weekend Peak Hour Historical Bicycle Counts, 2007-2016

ID ¹	Bicycle Counts - Weekday Peak Hour											Bicycle Counts - Weekend Peak Hour										
	07	08	09	10	11	12	13	14	2007 - 2014 Average	2016	% Change	07	08	09	10	11	12	13	14	2007 - 2014 Average	2016	% Change
1	64	54	84	40	76	53	67	45	60	61	2%	154	147	64	213	185	127	103	150	143	161	13%
4	129	184	121	127	40	207	314	132	157	218	39%	91	467	502	460	476	283	573	746	450	812	80%
5	41	40	69	62	100	46	60	36	57	66	16%	102	34	128	119	166	233	124	134	130	171	32%
6	61	67	80	58	303	55	61	50	92	80	-13%	167	82	239	128	238	302	164	233	194	196	1%
8	25	33	45	25	26	16	31	28	29	42	45%	76	102	104	113	125	188	239	87	129	111	-14%
9	84	98	93	81	99	122	64	69	89	113	27%	111	302	300	243	279	355	241	252	260	262	1%
10	101	156	116	166	114	153	112	93	126	178	41%	266	339	397	344	386	308	367	360	346	397	15%
11	77	58	93	93	86	36	41	58	68	19	-72%	80	139	153	251	255	114	106	190	161	27	-83%
12	28	44	41	36	68	31	43	35	41	102	149%	57	57	69	66	77	47	79	69	65	85	31%
13	27	38	35	61	N/A	24	32	35	36	63	75%	35	26	49	66	N/A	40	45	35	42	37	-12%
15	36	33	18	93	20	12	8	14	29	69	138%	38	131	42	20	21	82	43	50	53	115	117%
16	6	11	4	28	27	3	17	21	15	18	20%	5	13	30	22	32	32	24	22	23	27	17%
17	22	11	15	65	101	29	17	23	35	20	-43%	67	4	11	11	38	59	17	47	32	40	25%
18	28	26	40	78	86	N/A	115	15	55	128	133%	19	31	12	9	37	N/A	21	18	21	39	86%
20	37	39	35	30	76	33	40	20	39	57	46%	23	23	14	95	77	47	57	29	46	60	30%
21	18	N/A	12	76	12	5	15	10	21	22	5%	13	N/A	10	11	15	20	16	21	15	18	20%
22	21	N/A	25	26	29	66	24	17	30	24	-20%	8	N/A	16	22	49	30	10	11	21	10	-52%
Average	47	59	54	67	79	56	62	41	58	76	31%	77	126	126	129	154	142	131	144	129	152	18%

Note: Locations where data was absent in 2014 report are not included in comparison table



Table 26: Weekday and Weekend Peak Hour Pedestrian Historical Counts, 2007-2016

ID ¹	Pedestrian Counts - Weekday Peak Hour											Pedestrian Counts - Weekend Peak Hour										
	07	08	09	10	11	12	13	14	2007 - 2014 Average	2016	% Change	07	08	09	10	11	12	13	14	2007 - 2014 Average	2016	% Change
1	269	134	226	226	82	234	228	130	191	193	1%	564	187	238	200	394	332	159	427	313	249	-20%
4	348	514	394	394	506	696	638	376	483	732	52%	303	1388	1782	1676	1055	890	1316	1381	1224	1,699	39%
5	122	66	140	140	181	228	186	107	146	260	78%	222	60	194	258	394	307	202	234	234	127	-46%
6	74	178	121	121	252	187	131	69	142	259	82%	125	276	124	121	205	204	209	197	183	321	75%
8	84	105	123	123	125	97	159	81	112	174	55%	102	114	133	48	195	170	128	165	132	199	51%
9	38	41	26	26	86	78	44	35	47	64	36%	19	39	28	29	33	31	63	34	35	42	20%
10	20	54	40	40	33	106	46	44	48	73	52%	48	40	55	52	53	75	65	43	54	109	102%
11	84	164	78	78	117	92	72	79	96	17	-82%	75	97	145	166	267	148	212	153	158	24	-85%
12	64	42	51	51	51	31	56	55	50	77	54%	33	44	59	33	52	29	41	64	44	104	136%
13	35	48	35	35	N/A	44	37	36	39	73	87%	26	37	47	25	N/A	42	23	28	33	71	115%
15	35	13	15	15	112	10	20	11	29	22	-24%	15	12	6	9	8	22	10	15	12	34	183%
16	7	15	7	7	29	22	2	18	13	9	-31%	11	8	11	14	12	16	7	5	11	3	-73%
17	14	1	4	4	78	8	6	9	16	8	-50%	20	1	4	5	11	0	13	6	8	9	13%
18	38	46	161	161	387	N/A	118	15	132	193	46%	30	26	13	8	30	N/A	22	21	21	199	848%
20	11	19	31	31	23	0	10	1	16	15	-6%	21	24	10	71	32	3	5	2	21	24	14%
21	39	N/A	9	9	29	16	41	16	23	104	352%	13	N/A	6	7	8	25	9	11	11	22	100%
22	39	N/A	9	9	30	154	11	11	38	36	-5%	20	N/A	34	31	31	30	5	11	23	24	4%
Average	78	96	86	86	133	125	106	64	97	136	40%	97	157	170	162	174	145	146	165	152	192	26%

Note: Locations where data was absent in 2014 report are not included in comparison table

6.0 ADDITIONAL ROADWAY CHARACTERISTICS

The following chapter discusses the distributions of ridership on CMP roadways and Marin County transit providers. As mentioned earlier, vehicle occupancy counts were conducted at the following seven locations within the CMP network:

1. Segment #1A – SR 1 from US 101 to Tennessee Valley Road
2. Segment #1B – SR 1 from Northern Avenue to Almonte Boulevard
3. Segment #3A – US 101 from Golden Gate Bridge to Spencer Avenue
4. Segment #3B – US 101 from SR 131 (Tiburon Boulevard) to Tamalpais Drive
5. Segment #3F – US 101 from Freitas Parkway to Lucas Valley Road
6. Segment #3G – US 101 from Atherton Avenue to Sonoma County Line
7. Segment #5A – I-580 from Sir Francis Drake Boulevard to Marin County Line

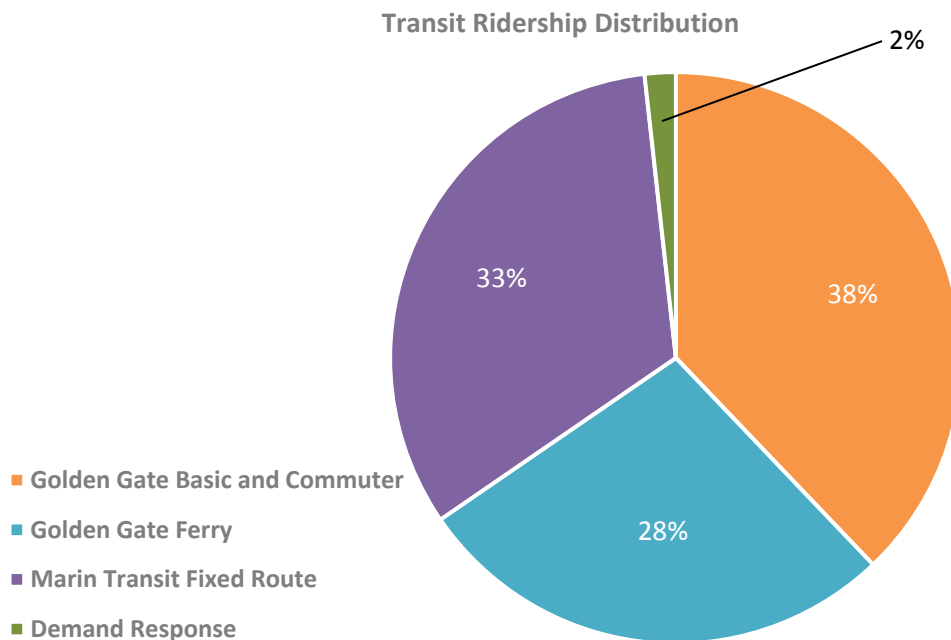
6.1 Passenger Vehicle Rider Distribution

During the summer of 2017, multiple vehicle occupancy counts were collected by MTC, TAM, and Caltrans along the CMP arterial and freeway segments within Marin County. The vehicle occupancy study will be made available separately once the collected data is compiled and analyzed.

6.2 Transit Rider Distribution

This section discusses the ridership distribution amongst all transit operations within Marin County and the following chart displays the use percentage of each transit mode. The following lists the services included in the analysis for Fiscal Year 2015-2016:

1. Golden Gate Basic and Commuter Service
2. Golden Gate Ferry Service
3. Marin Transit Sponsored Local Service
4. Marin Transit Shuttles and West Marin Routes (including Novato Dial-a-Ride)
5. Marin Access Paratransit Service



The above chart shows that there is a large (68 percent total) ridership using Golden Gate Transit Services. Of this, 38 percent use the Basic and Commuter Services and the remaining 25 percent take the Ferry. This distribution helps display that when looking at improving transit services within Marin County, Golden Gate Transit Services would benefit most. The distribution also illustrates that 33 percent of transit users are on the Marin Transit Fixed Route Services. This knowledge allows TAM to determine where to allocate their limited funding for transit improvements in the near future.

The remaining two percent of ridership is comprised of the Marin Access Services. Though these services do not provide a majority of rides within the system, they provide essential movement of Marin residents and should not be ignored when considering improvements.

7.0 NEXT STEPS

7.1 2014 CMP Conformance

As discussed earlier, two arterial segments and four freeway segments were found to be in non-compliance of the adopted LOS standards. Since the arterial segments, and three of the freeway segments have been grandfathered in, no actions or corrective measures are required. Additionally, as previously mentioned in this report, the fourth freeway segment that did not meet the adopted LOS standard has a scheduled improvement slated for construction completion by Fall 2017 that will add a third travel lane in the direction of travel that experienced PM peak hour congestion. Therefore, no actions or corrective measures are required beyond monitoring the performance of that segment after construction of the improvement has been completed.

7.2 Travel Time Reliability

The FAST Act, the successor federal transportation bill to MAP 21, continued to place increased emphasis on travel time reliability. Since travel time reliability is extremely important to the users, and since it plays a key role in a user's mode choice, TJKM recommends that TAM continue including travel time reliability data for future CMP monitoring efforts.

7.3 CMP Update

The next step in the CMP process is to complete the 2017 CMP Update. TJKM will work with TAM staff on a work plan and schedule to complete the 2017 Update as per CMP guidelines.



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2017 CMP Update



Final Report
November 2017



VISION THAT MOVES YOUR COMMUNITY

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COMMON ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill	PeMS	Performance Measurement System
ABAG	Association of Bay Area Governments	RTIP	Regional Transportation Improvement Program
ADA	Americans with Disabilities Act	RTP	Regional Transportation Plan
ADT	Average Daily Traffic	SB	Southbound
BAAQMD	Bay Area Air Quality Management District	SCS	Sustainable Communities Strategy
Caltrans	California Department of Transportation	SCTA	Sonoma County Transportation Authority
CEQA	California Environmental Quality Act	SHOPP	State Highway Operations and Protection Program
CIP	Capital Improvement Program	SMART	Sonoma-Marín Area Rapid Transit
CMA	Congestion Management Agency	SOV	Single Occupancy Vehicle
CMIA	Corridor Mobility Improvement Account	SR	State Route
CMP	Congestion Management Program	SR2S	Safe Routes to School
CTC	California Transportation Commission	STAR	Safe Transport and Reimbursement
EB	Eastbound	STIP	State Transportation Improvement Program
FY	Fiscal Year	TAM	Transportation Authority of Marin
GHG	Greenhouse Gasses	TAZ	Traffic Analysis Zones
HCM	Highway Capacity Manual	TCIF	Trade Corridors Improvement Fund
HOT	High Occupancy Toll	TCM	Transportation Control Measures
HOV	High Occupancy Vehicle	TDM	Transportation Demand Management
IOS	Initial Operating Segment	TFCA	Transportation Fund for Clean Air
LOS	Level of Service	TIP	Transportation Improvement Program
MSN	Marin-Sonoma Narrows	V/C	Volume to Capacity
MTC	Metropolitan Transportation Commission	VMT	Vehicle Miles Travelled
MTM	Marin Travel Model	VRF	Vehicle Registration Fee
MUTCD	Manual of Uniform Traffic Control Devices	WB	Westbound
NB	Northbound		
NTPP	Nonmotorized Transportation Pilot Program		

EXECUTIVE SUMMARY

The 2017 Congestion Management Program (CMP) Update is a document of the Transportation Authority of Marin (TAM), the designated Congestion Management Agency (CMA) for Marin County. The 2016 biennial update is required by State statute. Following are highlights of this document.

Chapter 1: Designated Roadway System

The designated CMP roadway system in Marin County has not changed, as required by law. The CMP network numbering system is defined in corridor segments, allowing readers to easily reference roadway performance tables.

Chapter 2: Roadway System Level of Service

The monitoring results of roadway segments have varied little since the 2015 CMP Update, although some segments show improved levels of service (LOS). Five monitored CMP roadway segments (all grandfathered with the exception of one) out of 27 fell below LOS standards based on the 2016 Monitoring results.

Grandfathered roadway segments are those that operated at a lower (deficient) LOS than the standard established in 1991. Such segments are allowed to continue operating at a lower LOS without requiring remedial action. The segment that is not grandfathered has scheduled construction for improvements in Fall 2017 and will not require a follow-up action until verification of performance after construction. Given that no segments require action, no jurisdiction is considered out of conformance at this time.

Chapter 3: System Performance

The transit system in Marin County continues to serve many residents and commuters. The recent dedication of additional resources has led to an expansion of local transit service. Overall demand for Golden Gate Ferry has increased slightly during Fiscal Year (FY) 2015/16 from FY 2014/15. However, Golden Gate Transit and Marin Transit services have shown a slight decrease in ridership in FY 2015/16 from FY 2014/15.

Bicycle and pedestrian system performance is important to the County and is detailed in Chapter 3. The data collected to measure bicycle and pedestrian activity indicated that during the weekday monitoring, overall pedestrian activity was highest during the two-hour PM peak period, while overall bicycle activity was similar in both peak periods, but slightly higher during the two-hour AM peak period. This system-wide observation varied considerably from location to location. During the weekend two-hour midday peak period, overall bicycle and pedestrian activity nearly doubled from what was observed during the weekdays, most notably for bicycles. This trend shows that many users on the weekend are recreational users and do not necessarily commute during the weekdays via bicycling or walking.

The average weekday bicycle volume per location in 2016 shows an 85% increase over 2014, and 31% increase over a five-year average (2007 to 2014). In 2016, the average weekday pedestrian volume per location shows a twofold increase over 2014, and 40% increase over a five-year average (2007 to 2014).

The performance measures presented in this chapter show that multimodal demand is not showing significant change in the last two years. The current economy is good and though many efforts on different fronts are proceeding well, the challenges of increased travel demand remain significant. Overall traffic flow on eight arterial segments and two US 101 segments was better in 2016 than it was in 2014.

Travel times along US 101 in the northbound (NB) and southbound (SB) directions between the County lines vary between 23 - 39 minutes and 23 - 36 minutes respectively depending on the time of day. Planning travel time, the total time a traveler should allow to ensure on-time arrival, in the NB direction during the PM peak hour can be as high as approximately 39 minutes, and approximately 36 minutes in the SB direction during the AM peak hour. Transit ridership shows approximately 66% using Golden Gate Transit Services, 33% using Marin Transit Fixed Route Services, and the remainder using Marin Access Services.

Chapter 4: Transportation Demand Management

Transportation Demand Management (TDM) strategies are utilized to improve efficiency of the existing transportation systems without significant expansion of the infrastructure. These strategies focus on ways to reduce solo driving and/or to eliminate need for driving all together. Some of the commonly used strategies that aim at cutting down solo driving include carpool, vanpool, bicycles, transit, and park & ride lots. Strategies to reduce vehicle miles traveled (VMT) include alternatives such as telecommuting, flexible work schedules, and parking cash-out programs. Improving a balance between available jobs and housing also help encourage non-auto modes of transportation. Use of TDM strategies help cities and counties in their attempt to balance the growing need for transportation and availability of limited transportation dollars.

Chapter 5: Land Use Analysis

The CMP presents two important elements of the Land Use Analysis Program: Part A for major development projects and general plan updates, and Part B for biennial development tracking, both of which require local government participation and cooperation. The first program was adopted in 1991. As of August 2015, 20 major development proposals in the near-term horizon are to be considered in Part A. Compliance to CMP requirements allows jurisdictions to retain gas tax funding and have projects programmed in the Regional Transportation Improvement Program (RTIP).

Chapter 6: Travel Demand Model

CMP requirements include maintaining and utilizing a travel demand model that is consistent with the regional model and available for use in corridor and development studies. The Marin Travel Model (MTM) was updated in 2013 with 2040 land use projections to be consistent with Plan Bay Area forecasts.

Chapter 7: Capital Improvements Program

A majority of Measure A, the County's 1/2-cent transportation sales tax, funding is allocated to operating existing programs. Also, many Marin County projects have received major funding from other sources in the past several years, so that there are not many improvements that can be identified. The most significant investment to Marin's roadway system, the Marin-Sonoma Narrows (MSN) Project, is detailed

in this chapter. Several MSN Phase 1 projects have been completed and are underway. This report also describes other projects whose funding is provided and tracked by regional and state agencies.

This CMP identifies programs and funding relative to County Measure B, the \$10 vehicle registration fee (VRF) approved by Marin County voters in 2010. Measure B includes three elements: maintain local streets and pathways; improve transit for seniors and persons with disabilities; and, reduce congestion and pollution with programs relating to school safety and congestion, commute alternatives, and alternative fuels.

Chapter 8: Deficiency Plan Procedures

Local jurisdictions must meet the CMP conformance requirements to receive funding from several State programs. The conformity process has not substantially changed in the 2015 CMP. LOS monitoring in this CMP found one new deficiency. The segment, I-580 from Sir Francis Drake Boulevard to Marin County Line, that is not grandfathered has scheduled construction for improvements in Fall 2017 and will not require a follow-up action until verification of performance after construction. Given that no segments require action, no jurisdiction is considered out of conformance at this time and local jurisdictions that conform to the land use analysis program requirements are expected to remain in conformance.

1. DESIGNATED ROADWAY SYSTEM

1.1 Purpose and Intent of Legislation

The CMP roadway system is a network that allows performance monitoring in terms of established LOS standards. The network must be created at a level such that impacts can be identified, and a connection can be made between proposed projects and their specific impacts on the network. The network can neither be too small, as impacts would be unidentifiable, nor too large, as there would be logistical issues in monitoring network performance. The CMP was established as part of the legislated Transportation Blueprint of 1990 and became a requirement for CMAs across California to fulfill.

The Marin County CMA established the CMP roadway network in 1991. The designated CMP roadway system includes all state highways and principal arterial roadways in Marin County. California Government Code Section 65089(b)(1)(A) states that once a highway or roadway has been designated as part of the CMP system, it cannot be removed. Furthermore, Section 60589(b)(4) requires that the regional transportation system is part of the required land use program defined by State statute.

1.2 Relationship to Regional Plans

The CMP is a short-range document containing elements that are required for consistency with long term regional transportation plans. The CMP is required to be consistent with long range regional transportation plans in the following 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.

Plan Bay Area 2040 is the Regional Transportation Plan (RTP) developed by the Metropolitan Transportation Commission (MTC), the San Francisco Bay Area's regional transportation planning agency. The Marin CMP roadway system is consistent with the RTP, which was adopted in July 2017.

1.3 Designated CMP System

Prior Marin County CMPs have defined State Highways and other principal arterial roadways for the County CMP roadway network. MTC has provided a framework that allows for flexibility in defining the principal arterial system. The following criteria were used to establish the designated CMP roadway network:

- *State Highways*: All State Highways must be included in the CMP roadway network according to the CMP legislation. If a route is to be removed from the State Highway System, it is to be evaluated according to principal arterial criteria to determine whether it should remain in the CMP network.
- *Principal Arterial Roadways*: Marin's first CMP, created in 1991, designated principal arterial roadways as part of the CMP roadway network. Non-State CMP roadways were included based upon the following criteria:

- Purpose and function of the roadway
- Land use adjacent to the roadway and proximity to activity centers
- Average Daily Traffic (ADT) volume (generally greater than 25,000 daily vehicles)
- Connectivity to other facilities

1.4 County CMP Designated Network

Figure 1 illustrates all designated CMP roadway facilities within Marin County. The following roadways are designated as the State Highway corridors of the Marin CMP roadway network:

1. State Route (SR) 1 – from Sonoma County Line to US 101
2. SR 37 – from US 101 to Sonoma County line
3. US 101 – from Sonoma County Line to San Francisco County Line
4. SR 131 – from US 101 to Main St in Tiburon
5. Interstate I-580 – from US 101 to Contra Costa County Line

As noted above, additional roadways were designated in Marin’s CMP in 1991. The following routes (also shown in **Figure 1**) are the Principal Arterials of the Marin CMP roadway network:

1. Novato Boulevard/South Novato Boulevard in Novato – from Sutro Avenue/San Marin Drive to US 101
2. Bel Marin Keys Boulevard – from US 101 SB Ramps to Commercial Boulevard
3. Sir Francis Drake Boulevard in unincorporated Marin County, Fairfax, San Anselmo, Ross, Kentfield, Larkspur – from SR 1 to I-580
4. Red Hill Avenue/2nd Street/3rd Street in San Anselmo and San Rafael – from Sir Francis Drake Boulevard to US 101
5. Bridgeway/2nd Street/Alexander Avenue in Sausalito – from US 101 to US 101

Table 1 provides details of the Marin CMP roadway network. In total, the 123-mile CMP designated roadway network contains 91 miles of state highways and 32 miles of principal arterial roadways.

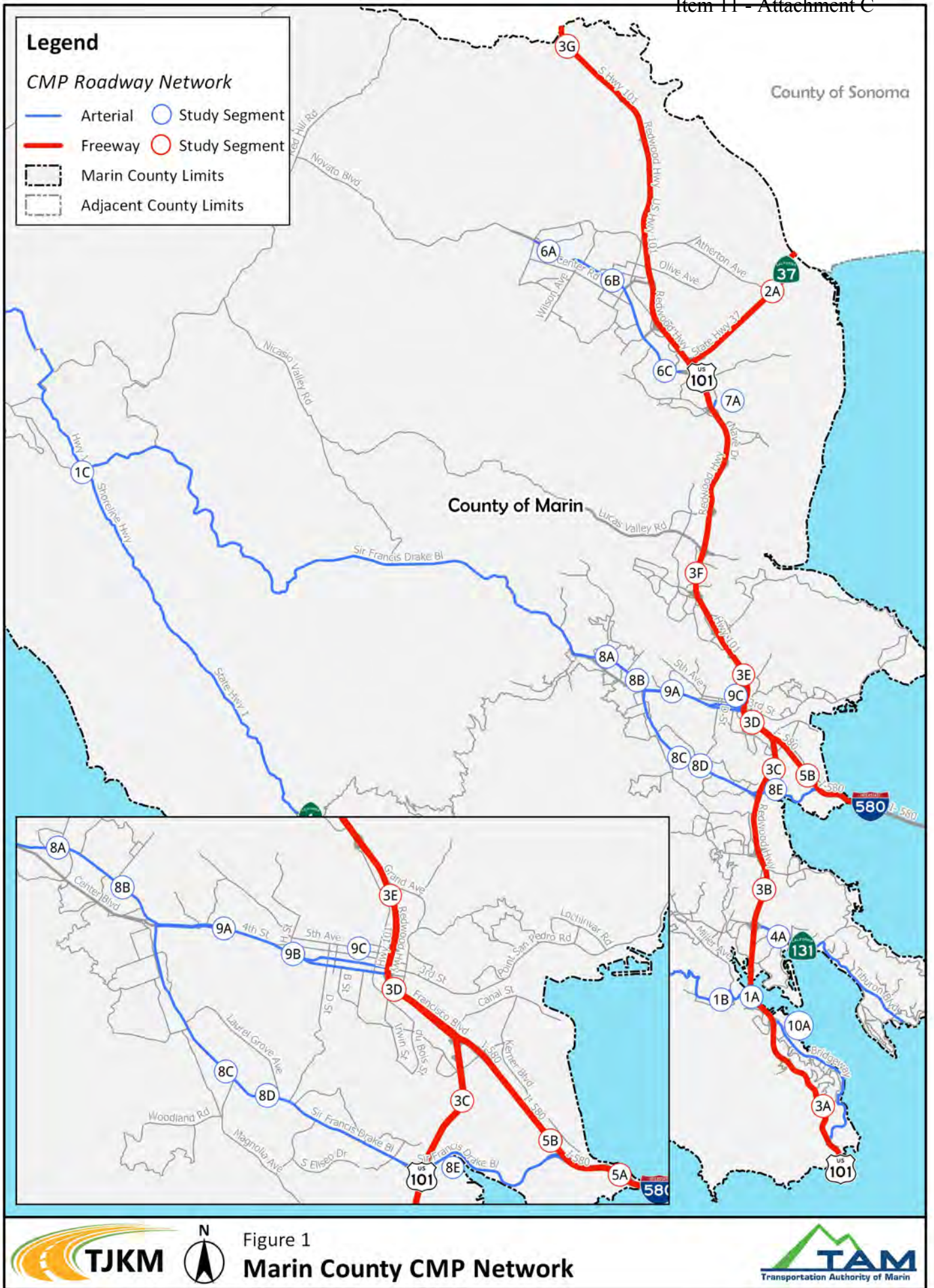


Table 1: Arterial and Freeway Segments in CMP Network

<i>ID</i>	<i>Street</i>	<i>From</i>	<i>To</i>	<i>Roadway Type</i>	<i>Grand-fathered Status</i>
1A	SR 1	US 101	Tennessee Valley Rd	Arterial	No
1B	SR 1	Northern Ave.	Almonte Blvd	Arterial	Yes
1C	SR 1	Sir Francis Drake Blvd.	Pt. Reyes Station	Arterial	No
2A	SR 37	US 101	Atherton Ave.	Freeway	No
3A	US 101	Golden Gate Bridge	Spencer Ave.	Freeway	No
3B	US 101 (SOV & HOV)	SR 131 (Tiburon Blvd.)	Tamalpais Dr.	Freeway	Yes
3C	US 101 (SOV & HOV)	Sir Francis Drake Blvd.	I-580	Freeway	Yes
3D	US 101 (SOV & HOV)	I-580	Mission Ave.	Freeway	Yes
3E	US 101 (SOV & HOV)	Mission Ave.	N. San Pedro Rd.	Freeway	Yes
3F	US 101 (SOV & HOV)	Freitas Pkwy.	Lucas Valley Rd.	Freeway	Yes
3G	US 101	North of Atherton	Sonoma Co. Line	Freeway	Yes
4A	SR 131 (Tiburon Blvd.)	Redwood Hwy Frontage Rd.	E. Strawberry Dr.	Arterial	No
5A	I-580	Sir Francis Drake Blvd.	Marin Co. Line	Freeway	No
5B	I-580	Bellam Blvd.	Sir Francis Drake Blvd.	Freeway	Yes
6A	Novato Blvd.	San Marin Dr.	Eucalyptus Ave.	Arterial	No
6B	Novato Blvd.	Wilson Ave.	Diablo Ave.	Arterial	No
6C	S. Novato Blvd.	Sunset Pkwy.	US 101	Arterial	No
7A	Bel Marin Keys	US 101	Commercial Blvd.	Arterial	Yes
8A	Sir Francis Drake Blvd.	Butterfield Rd.	Willow Rd.	Arterial	Yes
8B	Sir Francis Drake Blvd.	San Anselmo Ave.	Red Hill Ave.	Arterial	Yes
8C	Sir Francis Drake Blvd.	College Ave.	Toussin Ave.	Arterial	Yes
8D	Sir Francis Drake Blvd.	College Ave.	Wolfe Grade	Arterial	Yes
8E	Sir Francis Drake Blvd.	US 101	Larkspur Landing Cir.	Arterial	Yes
9A	Red Hill Ave.	Sir Francis Drake Blvd.	Second St.	Arterial	No
9B	Second St.	US 101	Marquard St.	Arterial	No
9C	Third St.	US 101	Marquard St.	Arterial	No
10A	Bridgeway	Gate 5 Rd.	Gate 6 Rd.	Arterial	No

Notes: SOV = Single Occupancy Vehicle; HOV = High Occupancy Vehicle

2. ROADWAY SYSTEM LEVEL OF SERVICE

2.1 Purpose and Intent of Legislation

California Government Code 65089(b)(1)(A) requires that LOS standards be established as part of a CMP using the Transportation Research Board’s Highway Capacity Manual (HCM) or an accepted alternative.

Traffic LOS definitions describe roadway operational conditions in terms of speed and travel time, volume, capacity, ease of maneuverability, traffic interruptions, comfort, convenience, and safety. **Tables 2 and 3** show the LOS criteria used in monitoring the Marin County CMP roadway network for arterial and freeway segments. There are six gradations of LOS from A to F. LOS A reflects free-flow conditions, with vehicles traveling at free-flow speed. LOS F reflects forced-flow, or “stop-and-go” congested conditions.

Table 2: Arterial Level of Service Thresholds

<i>Speed</i>	<i>Level of Service (LOS)</i>
25 mph	A
20 mph	B
13 mph	C
10 mph	D
7 mph	E
< 7 mph	F

Source: Highway Capacity Manual

Table 3: Freeway Level of Service Thresholds

<i>Speed</i>	<i>Level of Service (LOS)</i>
60 mph	A
57 mph	B
54 mph	C
46 mph	D
30 mph	E
< 30 mph	F

Source: Highway Capacity Manual

The LOS designation as related to facility speeds and volume-to-capacity ratios provides a quantitative tool that can be used to analyze the impacts of land use changes on the CMP network. Traffic LOS is also used as a measure of system performance (e.g., congestion). Every two years, TAM (as Marin’s CMA) is required to determine whether local governments have been conforming to the CMP, including attainment of LOS standards. This is achieved through a self-certification process in which TAM monitors and reports LOS conditions. The CMA can also consider local jurisdiction monitoring reports to aid in determining whether the local city is in conformance with the CMP. Additional detail on monitoring requirements is included in Chapter 8.

Local cities and towns must consider the impacts that land use decisions have on LOS within the designated CMP network. TAM works with local government entities to determine whether a change in

land use affects LOS negatively, and how to mitigate any anticipated deficiencies. A systems approach may have to be examined when considering LOS of the entire system. Cities and counties may be responsible for improvements and funding of programs that affect the system as a whole.

It should be noted that prior to the 2007 CMP, the methodology for monitoring LOS was conducted by using the volume to capacity (V/C) ratio. Since then, the methodology has shifted from using traffic volumes to measuring the amount of time traveled through a segment, reflecting newer LOS calculation methods now recommended and performed by the Highway Capacity Manual printed in 2003. The 2016 Monitoring Cycle uses historical data no earlier than 2008 so all LOS methodologies are the same.

2.2 Highway Level of Service Standards

Goals and Objectives

The LOS methodology should allow for measurement of traffic growth trends through changes in volumes, capacity, and delay. CMP legislative guidance identifies several issues that affect the determination of LOS and the application of a standard. The Marin County CMP has developed an approach that is consistent, easy to use, non-duplicative, and compatible with local government data and travel demand models. **Table 4** below summarizes the approach used to address each issue identified in the guidance.

Table 4: Approaches to Marin CMP Issues

<i>Issue</i>	<i>Approach</i>
Inter-County Trips	In accordance with California statutory requirements, trips with no end in Marin County (through trips) are not to be included for deficiency plan determination. These trips are included for performance reporting.
LOS Standards	D for Urban and Suburban Arterial Roadways. E for Freeways and Rural Expressways (US 101, I-580, and SR 37).
Method of Analysis: Freeway and Rural Expressway Segments	The analysis technique for freeway segments, based on segment weekday PM peak-hour volume to capacity ratios is from chapter 23 and 24 of the Highway Capacity Manual. (The PM peak hour is the highest consecutive 60 minutes of traffic in the afternoon, typically between 5 PM and 6 PM).
Method of Analysis: Urban and Suburban Arterial Segments	Volume-to-Capacity ratios are the analysis technique for arterial sequences, utilizing capacities provided in Chapter 15 and 16 of the <i>Highway Capacity Manual</i> , and based on weekday PM peak-hour traffic volumes. (The PM peak hour is the highest consecutive 60 minutes of traffic in the afternoon, typically between 5 PM and 6 PM).
Method of Analysis: Rural Arterial Roadways	Chapter 20 of the <i>Highway Capacity Manual</i> is the analysis technique to be applied for rural roadways, based on weekday PM peak hour traffic volumes. (The PM peak hour is the highest consecutive 60 minutes of traffic in the afternoon, typically between 5 PM and 6 PM).
Monitoring	The local agency (e.g., city and county) or TAM performs the LOS monitoring. Monitoring frequency is to be biennial (with certain exceptions outlined in Chapter 8 of the Highway Capacity Manual), recognizing that more frequent counting could be done as part of development impact study requirements.
Deficiency Analysis	More refined analyses may be required when determining if a roadway segment is deficient. If appropriate, the operational analysis methodology described in the <i>Highway Capacity Manual</i> may be used to determine LOS.

The CMP legislation allows trips not originating in a county, trips passing through a county, or trips generated by low- and very low-income housing to be excluded from the determination of conformance with LOS standards following consultation with MTC, Caltrans, and the Bay Area Air Quality Management District. TAM, however, decided to include these trips when determining conformance with LOS standards for local planning purposes, as exclusion of these trips would present a misleading picture of the traffic conditions in the county and could artificially skew the inclusion and/or ranking of projects in the seven-year Capital Improvement Program (CIP).

Facility Classifications

The HCM provides methods for determining LOS on several types of facilities. These facilities are grouped into interrupted- and uninterrupted-flow facilities. Interrupted-flow facilities include city streets and non-grade separated highways (like SR 1) that are part of the State Highway System. For purposes of LOS analysis, the CMP network is classified into two functional types of facilities:

- *Basic Freeway and Rural Expressway Segments*: These are designed as uninterrupted-flow facilities with multiple lanes available in each direction and traffic only stopping when traffic is heavy enough to create slow speeds or when breakdowns occur.
- *Suburban and Rural Arterial Roadways*: Suburban arterial roadways consist of more than one lane in each direction, with traffic signals less than two miles apart on average. Rural arterial roadways are typically a single lane in each direction but designed at lower speeds than rural expressways and have occasional interrupted flow from traffic signals, stop signs or turning vehicles.

Definition of Roadway Segments

Chapter 1 lists the segments of the Marin County CMP network analyzed as part of this CMP (see **Figure 1** and **Table 1**). Each segment is assigned a “responsible jurisdiction” where the jurisdiction named is the one with the greatest segment mileage. This jurisdiction is responsible for preparing any required deficiency plans, as well as complying with all other CMP legislative requirements related to that segment. Other jurisdictions through which a CMP segment travels are expected to work in a cooperative fashion with the responsible jurisdiction, and bear a pro rata share of the cost of any improvement to the facility based on the approximate cost of improvements in their jurisdiction. In the event that funding is needed for a program, each jurisdiction would contribute its fair share of the cost based on segment mileage within the jurisdiction.

Identification of “Grandfathered” Roadway Segments

“Grandfathered” roadway segments are those that operated at a lower (deficient) LOS than the standard established in 1991. Freeway segments that operated at LOS F or arterial segments that operated at LOS E or F in the 1991 CMP qualify as “grandfathered” segments and do not require action if they operated at these levels during the 2016 Monitoring. The monitoring locations for each CMP facility in Marin County and their grandfathered status are summarized in **Table 1**.

At the time when the Marin County CMP was created, there was an agreement that some segments would operate at deficient LOS and should be excluded from local government requirements to maintain the adopted level of service standard as part of any new development approval process. These segments were “grandfathered” and thus not required to meet the LOS standard.

In the future, TAM may wish to develop an improvement plan to address congestion as appropriate for these remaining grandfathered facilities. An improvement plan would consist of a description of the actions required to improve the LOS on the facility, either by increasing capacity or managing the demand for travel in a manner that effectively improves LOS.

2.3 2016 Monitoring Results

The monitoring for the 2017 CMP was conducted for TAM by TJKM. The 2016 Monitoring Cycle, documented in the *2016 Transportation System Monitoring Report*, provides detailed results summarized in **Tables 5** and **6**. **Table 5** documents average travel time, speed survey results, and LOS for the PM peak period on arterial segments. **Table 6** contains this information for freeways. The charts that follow are a historical comparison for arterial and freeway LOS during the PM peak period in the peak direction.

Table 5: 2016 Arterial LOS Summary – PM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goal	Action
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
1A	SR 1	US 101 to Tennessee Valley Rd.	0.40	01:16	21	B	03:03	11	D	D	None
1B	SR 1	Northern Ave. to Almonte Blvd.	0.80	02:04	24	B	01:39	29	A	D	None
1C	SR 1 ¹	Sir Francis Drake Blvd. to Pt. Reyes Station	2.20	04:35	29	A	04:19	31	A	D	None
4A	SR 131 (Tiburon Blvd)	Redwood Hwy. Frontage Rd. to E. Strawberry Dr.	0.50	01:16	25	B	01:02	28	A	D	None
6A	Novato Blvd	San Marin Dr to Eucalyptus Ave	0.42	00:49	30	A	00:53	28	A	D	None
6B	Novato Blvd	Wilson Ave. to Diablo Ave.	1.14	03:58	17	C	03:41	18	C	D	None
6C	S. Novato Blvd	Sunset Pkwy. to US 101	1.07	02:05	27	A	08:25	21	B	D	None
7A	Bel Marin Keys	US 101 to Commercial Blvd.	0.20	00:50	19	C	01:38	15	C	D	None
8A	Sir Francis Drake Blvd	Butterfield Rd. to Willow Rd.	0.26	00:46	19	C	01:08	12	D	D	None
8B	Sir Francis Drake Blvd	San Anselmo Ave. to Red Hill Ave.	1.12	05:32	14	C	03:17	21	B	D	None
8C	Sir Francis Drake Blvd.	College Ave. to Toussin Ave.	0.28	01:13	14	C	01:05	15	C	D	None
8D	Sir Francis Drake Blvd.	College Ave. to Wolfe Grade	0.61	01:35	23	B	01:40	24	B	D	None
8E	Sir Francis Drake Blvd.	US 101 to Larkspur Landing Cir.	0.46	10:28	3	F	01:26	19	C	D	None ²
9A	Red Hill Ave.	Sir Francis Drake Blvd. to Second St.	1.13	02:55	24	B	04:12	17	C	D	None
9B	Second St.	US 101 to Marquard St.	1.13	02:52	11	D	One Way Only			D	None
9C	Third St.	US 101 to Marquard St.	1.11	One Way Only			03:29	17	C	D	None
10A	Bridgeway ¹	Gate 5 Rd. to Gate 6 Rd.	0.17	00:28	20	B	00:29	21	B	D	None

Notes: 1. Data obtained from commercial sources.
2. Grandfathered Segment (No actions required)

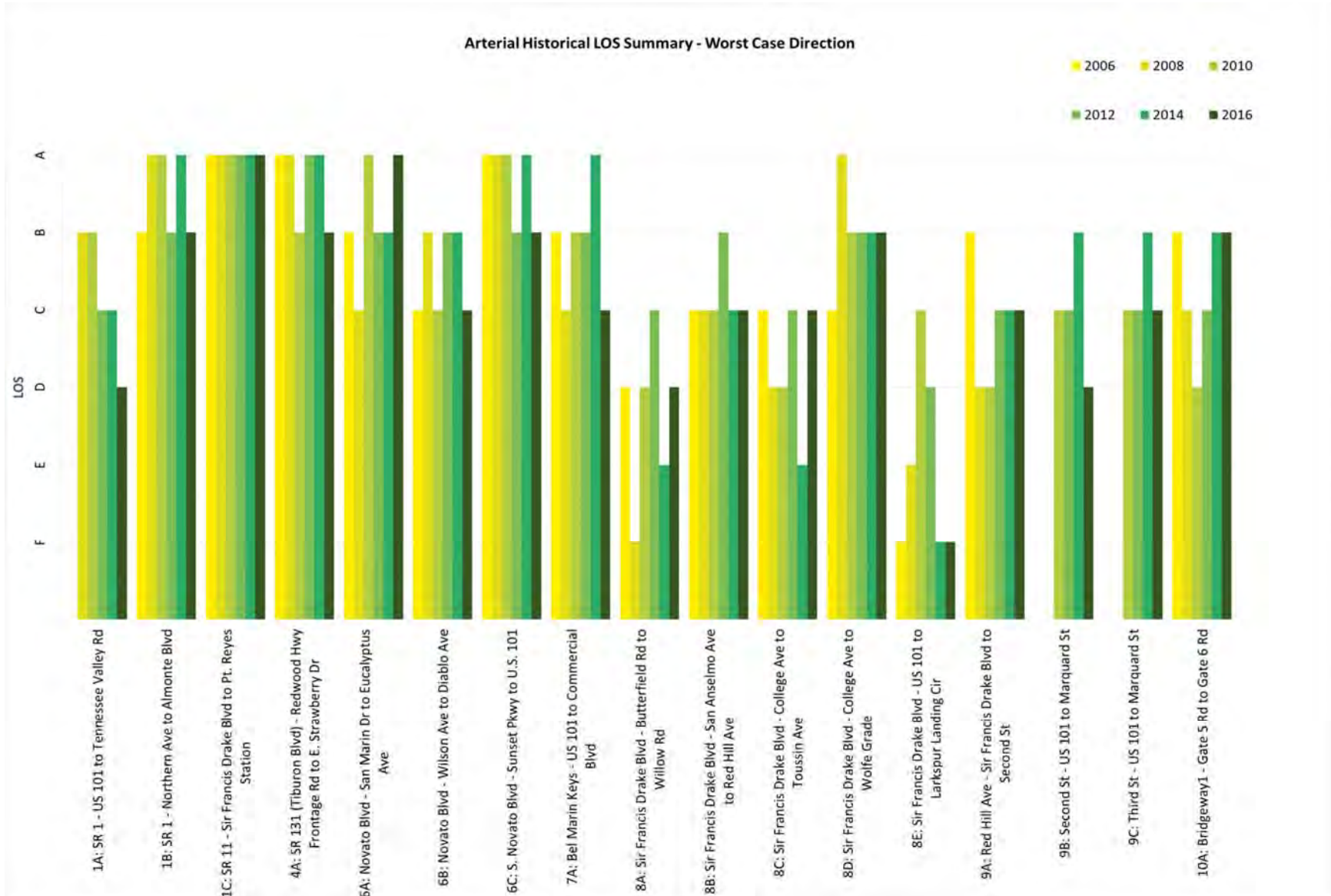
Table 6: Freeway Mixed-Flow Lanes LOS Summary – PM Peak Period

ID	Roadway	Segment	Length (mi)	Northbound / Eastbound			Southbound / Westbound			LOS Goal	Action
				Avg. Time (mm:ss)	Avg. Speed (mph)	LOS	Avg. Time (mm:ss)	Avg. Speed (mph)	LOS		
2A	SR 37	US 101 to Atherton Ave.	2.60	02:20	67	A	02:27	64	A	E	None
3A	US 101	Golden Gate Bridge to Spencer Ave.	1.50	01:39	54	C	02:11	41	E	E	None
3B	US 101	SR 131 (Tiburon Blvd.) to Tamalpais Dr.	1.70	03:59	26	F	01:36	64	A	E	None ¹
3C	US 101	Sir Francis Drake Blvd. to I-580	1.32	01:51	43	E	01:20	60	B	E	None
3D	US 101	I-580 to Mission Ave.	1.22	01:33	47	D	01:16	58	B	E	None
3E	US 101	Mission Ave. to N. San Pedro Rd.	1.59	01:44	55	C	01:41	57	C	E	None
3F	US 101	Freitas Pkwy. to Lucas Valley Rd.	1.01	01:02	59	B	00:59	61	A	E	None
3G	US 101	North of Atherton to Sonoma Co. Line	5.96	12:31	29	F	05:39	63	A	E	None ¹
5A	I-580	Sir Francis Drake Blvd. to Marin Co. Line	0.70	01:52	22	F	00:43	59	B	E	None ²
5B	I-580	Bellam Blvd. to Sir Francis Drake Blvd.	1.23	04:20	17	F	01:13	61	A	E	None ¹

- Notes:
1. Grandfathered Segment (No actions required).
 2. Improvements to this segment are currently scheduled for construction in Fall 2017 (No action required, pending verification of performance after improvement construction).

The results of the 2016 Monitoring Cycle show that no actions are required on any segment in the CMP network except for one segment, 5A – I-580 from Sir Francis Drake Boulevard to Marin County Line, which is not grandfathered experiences deterioration of LOS from E to F. However, improvements to this segment are currently scheduled for construction in Fall 2017. No action is required at this segment, pending verification of performance after improvement construction. Five of the 27 segments did not meet the established LOS standards: one arterials (one during the AM and PM peak hour) and four freeways (all during the PM peak hour). All of the segments with the exception of one are grandfathered. The grandfathered segments will require no follow-up actions. The segment that is not grandfathered has scheduled construction for improvements in Fall 2017 as aforementioned and will not require a follow-up action until verification of performance after construction. Given that no segments require action, no jurisdiction is considered out of conformance at this time.

Arterial Historical LOS Summary for PM Peak Period – Worst Case Direction



PM Peak Period – 2014 and 2016 LOS Comparison



3. SYSTEM PERFORMANCE

3.1 Purpose and Intent of Legislation

The California Government Code Section 65089(b)(2) requires each CMA to establish performance measures to evaluate current and future multimodal system performance (in addition to LOS presented in Chapter 2) for the movement of people and goods. Consistent with past CMPs, performance measures are included in this CMP and described in this chapter. The measures should not be confused with “standards,” as no level of performance is required. Rather, measures simply indicate the levels of performance at a given time.

The first part of this section highlights the current transit system in Marin County. The next section highlights bicycle and pedestrian programs. Lastly, one additional performance measure is provided:

- Travel Time Reliability

The above performance measures help determine whether the goals of the CMP are being met: supporting mobility, air quality, land-use, and economic objectives. These measures are also used in the development of any necessary CIP, deficiency plans, and the land-use analysis program. The *2016 Transportation System Monitoring Report* prepared by TJKM for TAM in August 2017 contains detailed information on the transportation system, and is a key source in describing these measures.

3.2 Current Transit Operations in Marin County

The transit network within Marin County comprises a variety of services. These include:

- General public transit bus service for both inter- and intra-county trips
- General public ferry service, serving trips between Marin County and San Francisco
- Specialized transit services aimed at serving the needs of the senior and disabled population in the County, including dial-a-ride, paratransit, and wheelchair accessible taxis
- Privately operated services, providing targeting service between specific locations, such as the service between Marin County and San Francisco International Airport

The Sonoma-Marín Area Rail Transit (SMART) service will likely be added as a CMP transit service. As of September 2017, revenue service of the SMART train is underway.

The following sections provide a brief description of the transit services provided for inter-county and intra-county transit travel. In addition, bus route information, headways, and overall transit ridership are summarized in each section.

Marin Transit

Marin Transit is the agency responsible for local transit service within Marin County. Marin Transit has responsibility for local transit services and contracts with other operators for three types of fixed route services within the county: large bus fixed route, shuttle, and rural service. Contracted providers include Golden Gate Transit, MV Transportation, and Marin Airporter. Marin Transit also contracts with Whistlestop to provide paratransit and dial-a-ride service within Marin County. Marin Transit added 19% service increases in Summer 2016.

Table 8 summarizes the regularly scheduled Marin Transit services. Marin Transit also operates the Marin Access Mobility Management Center, which is a one-call, transportation information and referral service, focused on meeting the mobility needs of Marin's older adults, disabled persons, and low-income residents.

Transit service provided within Marin County by Marin Transit via contractors includes:

- *Local Service:* Nine routes operate entirely within Marin County on weekdays, with limited weekend service, contracted through Golden Gate Transit. Additional 10 routes operate as school-focused service on school days only, as detailed below. Since the 2015 CMP, Marin Transit has ceased operations on Route 45.
- *School Service:* 10 routes provide limited service on school days in Marin County, as well as select trips on Routes 17 and 23. All routes have operated continuously since the 2015 CMP, with the addition of Route 122 serving the College of Marin. Marin transit also provides contract support for yellow school bus service in the Mill Valley, Ross Valley and the Tiburon Peninsula.
- *Recreational Services:* A seasonal shuttle service, Route 66, operates between Muir Woods and Mill Valley. A supplemental route (66F) provides intermediate service via Marin City. Shuttle schedules are adapted to weekend and seasonal recreational travel demands. Marin Transit contracts with Golden Gate Transit to operate Route 66 in partnership with the National Park Service between May and October.
- *West Marin Stagecoach:* Marin Transit contracts with MV Transportation to operate the West Marin Stagecoach with one service route (Route 68) in West Marin. The Stagecoach provides weekday and weekend service to area residents. Route 65 has been removed.
- *Community Shuttle Service:* Marin Transit contracts with Marin Airporter to operate six shuttle bus routes providing limited service: Strawberry / Tiburon (Route 219); San Rafael / Fairfax (Route 228); Santa Venetia / San Rafael (Route 233); San Rafael / Contempo (Route 245); Hamilton Theater / San Marin Drive in Novato (Route 251); Indian Valley Campus / San Rafael (Route 257). Since the previous CMP update, Route 259 (San Rafael / Novato) ceased operation. Marin Airporter also provides airport shuttle service between Marin County and San Francisco Airport as its primary business, separate from Marin Transit operations.
- *Marin Access:* Marin Access provides transit services and information for the community's older adults, persons with disabilities, and low-income residents. This Marin Transit program contracts with Whistlestop to provide the following services: Paratransit, Catch-A-Ride, and Volunteer Driver.
- *Novato Dial-A-Ride:* Marin Transit contracts with Whistlestop to provide a dial-a-ride shuttle bus service that provides curb-to-curb pick-up and drop-off service available to all residents in the Novato service area.

Golden Gate Transit

Golden Gate Transit operates transit services between Marin County and Sonoma, San Francisco, and Contra Costa Counties. Golden Gate Transit is one of three operating divisions of the Golden Gate Bridge, Highway and Transportation District.

Additional bus service provided directly by Golden Gate Transit connects Marin County to other parts of the region. Inter-county bus routes that operate partly inside Marin County include the following services:

- *Transbay Basic Service:* Basic service routes operate all day, seven days a week, providing wheelchair accessible trunk-line service between the Transbay Terminal and Civic Center in San Francisco or Richmond BART, and various suburban centers within Marin and Sonoma Counties. They provide the “backbone” service within Marin County and between Marin and neighboring counties. The routes are 40/40x, 70/71, and 101/101X. Since the previous CMP update, Route 10 ceased operation.
- *Transbay Commute Service:* This service provides 17 routes that operate on non-holiday weekdays. Most services connect residential neighborhoods within Marin County to the San Francisco Financial District and Civic Center employment centers during the AM and PM commute periods. Other service connects Sonoma County with Marin County and San Francisco. Commute service is generally operated in the peak direction during commute hours only, and is not run at all during the midday and off-peak periods.

Ferry Services

Three organizations provide ferry service in Marin County:

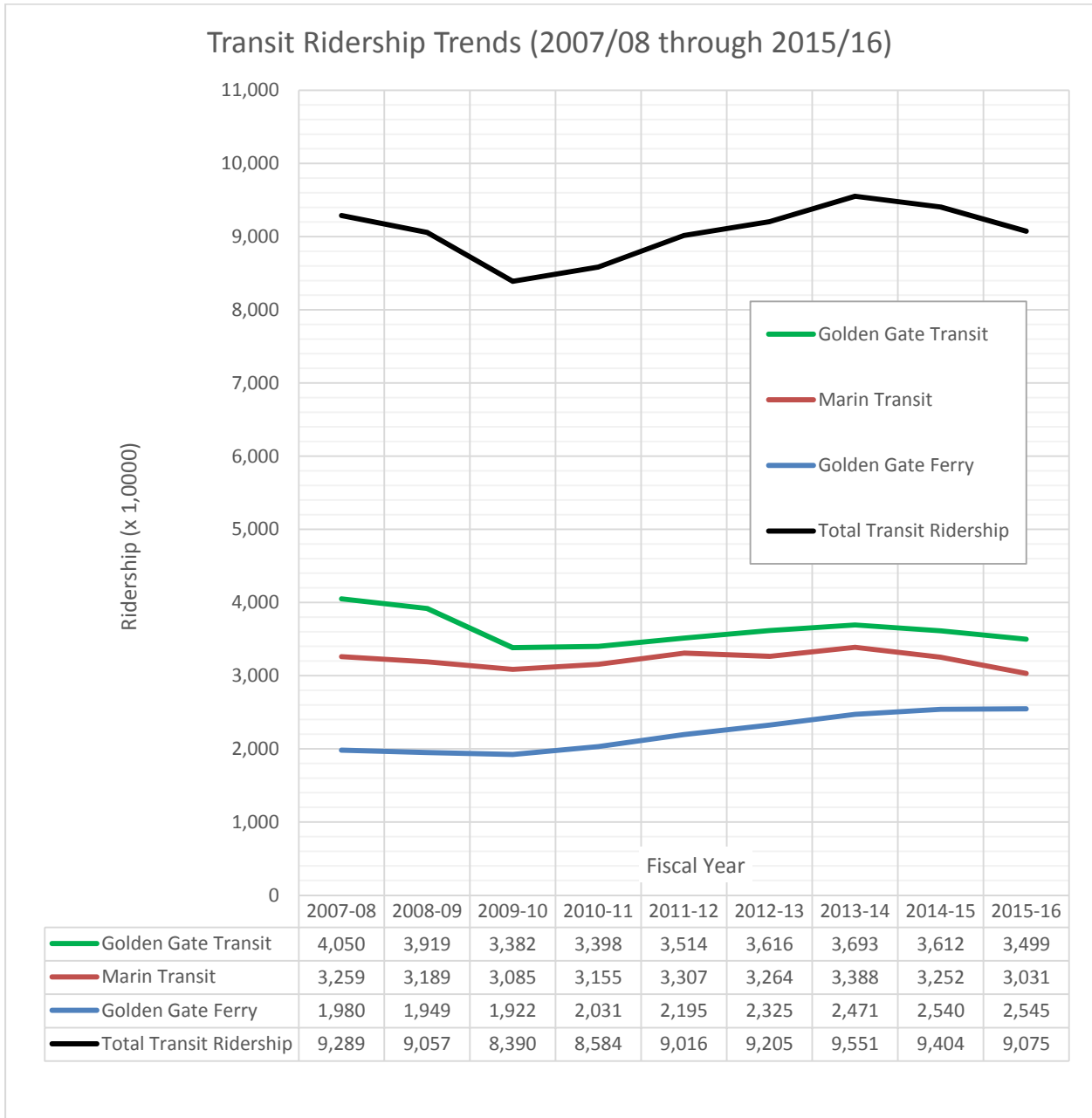
- *Golden Gate Ferry Service (Public Entity):* The Golden Gate Bridge, Highway, and Transportation District operates ferry services from Larkspur and Sausalito to San Francisco via conventional and high-speed ferries. The Larkspur Ferry provides more service to San Francisco, with headways between 30 and 55 minutes during the weekday commute periods. The Sausalito Ferry provides less frequent service to San Francisco and longer headways between 50 and 90 minutes during the weekday commute periods. Both ferries transport people to the San Francisco Ferry Building. The San Francisco Giants Game Ferry (National League Baseball) is an additional ferry service that operates on game days. This ferry runs until 30 minutes after the final out of the ballgame and runs about 60 minutes from Larkspur to AT&T Park. Golden Gate Ferry Service is now running Tiburon Ferry Service as well.
- *Blue and Gold Fleet (Private Entity):* The Blue and Gold Fleet operates both commuter and recreational ferry service from Sausalito to Fisherman’s Wharf in San Francisco. Blue and Gold also provides recreational service between Angel Island and San Francisco, Oakland, and Vallejo.
- *Angel Island Tiburon Ferry (Private Entity):* The Angel Island Tiburon Ferry operates recreational service between Angel Island and Downtown Tiburon. Service varies throughout the year; headways are one-two hours on weekdays and one-three hours on weekends; on weekends from April through October, headways are one hour and from November through March, are one-two hours. No weekday service is offered from November through February except by reservation, and Wednesday-Friday service is offered in the month of March.

Summary of Fixed Route Services and Boardings

The transit routes managed by Marin Transit are routinely monitored for performance. The recent dedication of additional resources has led to an expansion of local transit service, which in turn has increased local boardings. These trends are summarized in the chart below, which also shows ridership trends in Marin Transit Fixed Route Service, Golden Gate Transit Bus, and Ferry Operations. The following summarizes the changes in ridership in recent years:

- Demand for the Golden Gate Transit basic and commuter bus services to and from San Francisco have decreased slightly in the last year by approximately 2%.
- Golden Gate Ferry Service has experienced decreased in ridership during the last two fiscal years, approximately 5% increase from 2013-2014 to 2015-2016.
- Marin Transit Fixed Route Service showed a decrease of 5% in ridership from 2013-2014 to 2015-2016 with an increase of 3% in revenue hours.
- Marin Access Services have a slight increase in ridership of approximately 2% with a 1% reduction in revenue hours in FY 2015-2016. There was much larger bump in both ridership and revenue hours in the fiscal year previous 2014-2015.

Transit Ridership Trends (2007 / 2008 through 2015 / 2016)

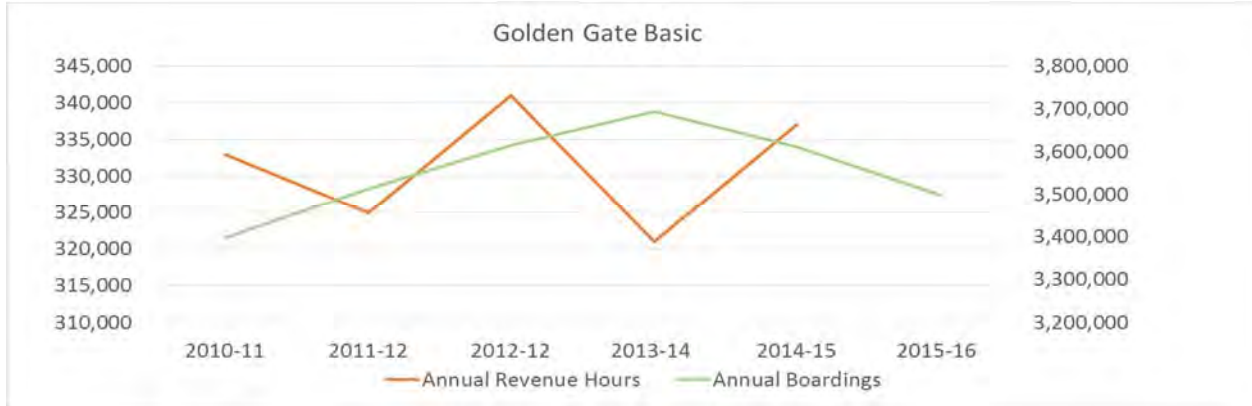


As the chart shows, the total ridership across Golden Gate Transit, Marin Transit, and Golden Gate Ferry has decreased slightly since 2013/14. Golden Gate Transit and Marin Transit have shown a steady decline in ridership from 2013/14 to 2015/16, however, Golden Gate Ferry has shown a steady albeit slight increase in ridership for the same duration.

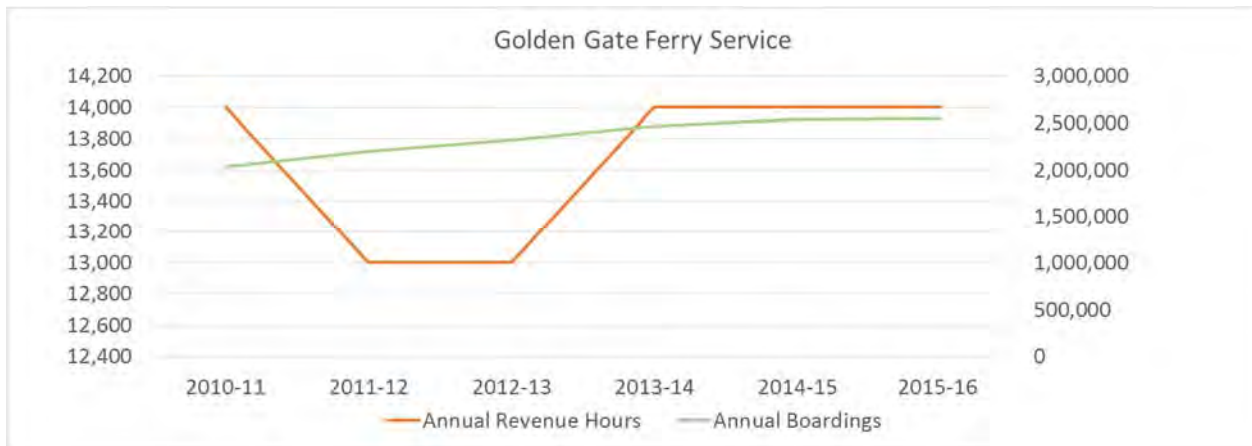
The trends for annual revenue hours and boardings for each of the Golden Gate Transit Basic and Commuter Services, Golden Gate Ferry Service, and Marin Transit Fixed Route Service between 2010-2011

and 2015-2016 were compared and illustrated in the Annual Revenue Hours and Boardings Trends Charts provided below.

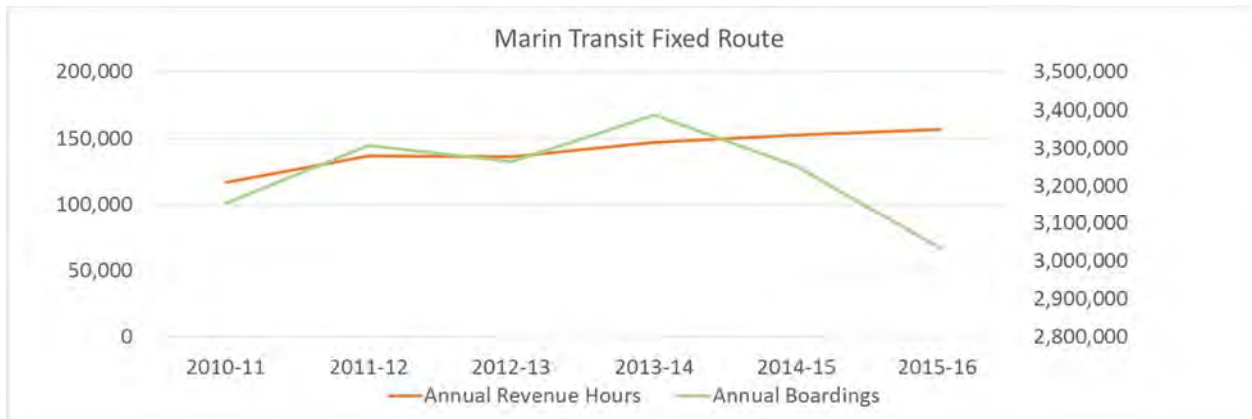
**Annual Revenue Hours and Boardings Trends for Golden Gate Transit Basic and Commuter Services
 (2010 / 2011 through 2015 / 2016)**



**Annual Revenue Hours and Boardings Trends for Golden Gate Ferry Service
 (2010 / 2011 through 2015 / 2016)**



**Annual Revenue Hours and Boardings Trends for Marin Transit Fixed Route Service
 (2010 / 2011 through 2015 / 2016)**

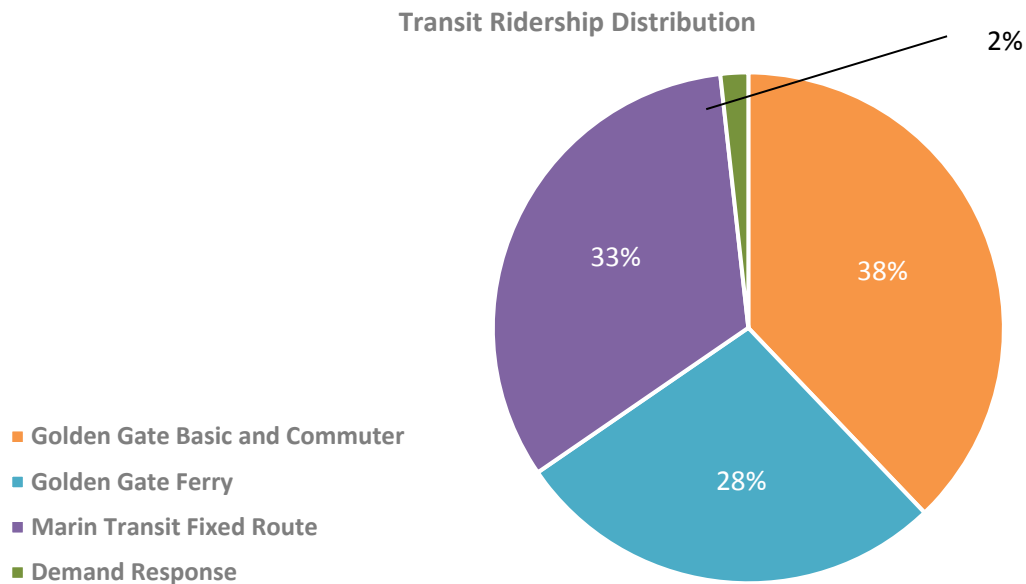


As the charts show, the annual boardings have decreased for Golden Gate Transit Commuter and Basic Services and Marin Transit Fixed Route Service even with the increase in annual revenue hours each year since 2012/13. There has been a steady increase in Golden Gate Ferry Service from 2010/11 through 2015/16 irrespective of the increase in annual revenue hours.

Transit Rider Distribution

This section discusses the ridership distribution amongst all transit operations within Marin County and the following chart displays the use percentage of each transit mode. The following lists the services included in the analysis for FY 2015-2016:

1. Golden Gate Basic and Commuter Service
2. Golden Gate Ferry Service
3. Marin Transit Sponsored Local Service
4. Marin Transit Shuttles and West Marin Routes (including Novato Dial-A-Ride)
5. Marin Access Paratransit Service



The above chart shows that there is a large (68% total) ridership using Golden Gate Transit Services. Of this, 38% use the Basic and Commuter Services and the remaining 25% take the Ferry. This distribution helps display that when looking at improving transit services within Marin County, Golden Gate Transit Services would benefit most. The distribution also illustrates that 33% of transit users are on the Marin Transit Fixed Route Services. This knowledge allows TAM to determine where to allocate their limited funding for transit improvements in the near future.

The remaining 2% of ridership is comprised of the Marin Access Services. Though these services do not provide a majority of rides within the system, they provide essential movement of Marin residents and should not be ignored when considering improvements.

Specialized Transit Services

Marin Access

Marin Transit contracts with Whistlestop to provide local paratransit services that are available during the same hours and days of the week as comparable local and inter-county fixed-route, non-commute bus services. The service is a door-to-door ridesharing program that has approximately 40 lift-equipped vehicles available for use. Approximately 162,511 annual passenger trips are provided on Marin Access Paratransit service.

Inter-county paratransit service is provided seven days a week, under an agreement between Golden Gate Transit and Marin Transit. The inter-county service area includes Sonoma, San Francisco, and Contra Costa County in addition to Marin County. Statistics for this service are included in **Table 7**. The demand for paratransit service has grown in recent years as more Marin County residents have become eligible for the service and medical providers and residents become more aware of paratransit service.

Table 7: Marin Access Performance Statistics FY 2011 to FY 2016

<i>Fiscal Year</i>	<i>Annual Revenue Hours</i>	<i>Annual Passenger Trips</i>
2010-2011	53,127	116,970
2011-2012 ¹	49,012	119,666
2012-2013 ²	59,589	143,417
2013-2014	57,389	158,187
2014-2015	60,417	172,512
2015-2016	58,756	162,511

Notes: ¹ Volunteer Driver Program added in FY 2011-2012.

² Catch-A-Ride Program added in FY 2012-2013.

Source: System Performance Summary for FY 2010-2011, FY 2011-2012, FY 2012-2013, FY 2013-2014, 2014-2015, 2015-2016, Marin Transit. (<http://www.marintransit.org/monitoringreports.html>)

Volunteer Driver

Marin Transit manages two Volunteer Driver programs for seniors who have difficulty using fixed route or paratransit services: 1) the Safe Transport and Reimbursement (STAR) Program operated by Whistlestop in Eastern Marin, and 2) the TripTrans West Marin Volunteer Driver Program operated by West Marin Senior Services in Western Marin. Both programs provide drivers with mileage reimbursements for their services. During the 2015-2016 fiscal year, the volunteer driver program served 16,570 unlinked passengers during weekday service.

Catch-a-Ride

Marin Transit manages the Catch-A-Ride program, which allows eligible Marin County residents to receive a discounted ride in taxis and other licensed vehicles throughout Marin County. To be considered eligible for the program, participants must be a resident of Marin County and at least 80 years of age, at least 60 years of age and unable to drive, or be eligible for paratransit under the Americans with Disabilities Act. The program pays a discounted rate of the fare based on the mileage of the trip, rather than the meter

rate. Fiscal year 2015-2016, the program had 16,520 trips. Marin Catch-A-Ride is funded by Marin's voter approved VRF, Measure B.

School Transportation

Marin Transit provides school transportation services including supplemental school bus service and contracted yellow school bus service.

3.3 Bicycle and Pedestrian Programs

TAM and other jurisdictions have a commitment to non-motorized transportation programs. This commitment extends to all levels of planning and funding, including a portion of TAM-administered Measure A funds. The Measure A – Transportation Sales Tax Strategic Plan is comprised of four strategies in order to establish exactly where Measure A expenditures are allocated:

- Strategy 1: Local Bus Transit
- Strategy 2: US 101 HOV Gap Closure
- Strategy 3: Local Streets and Roads
- Strategy 4: School Related Congestion and Safer Access to School

Strategies 2, 3, and 4 include bicycle and pedestrian improvements. Strategy 2 included the completion of two bicycle/pedestrian projects: Puerto Suello Hill and Lincoln Hill multi-use pathways. Strategy 3 is divided into two sub strategies: Major Roads and Related Infrastructure and Local Roads for all modes. Both sub strategies make bicycle and pedestrian eligible for funding. Per the Measure A Strategic Plan, Strategy 4 is identified as a significant component of traffic congestion in Marin, with over 21% of all trips in the morning peak period. Three sub-strategies – Safe Routes to Schools, Crossing Guards, and Safe Pathways to School Fund – complement each other to provide safer access to Marin schools.

Safe Routes to Schools Program

Strategy 4 of the Measure A Strategic Plan continues to make significant impact across the county. A brief overview of the three sub-strategies follows:

- *Safe Routes to School:* TAM's program is one of the most successful in the county, as well as a model for the nation. Since the program began, there has been an 8% mode shift countywide from single-student car trip to walking, bicycling, transit, and carpooling to/from school. The program will continue to strengthen and focus on long-term impacts.
- *Crossing Guards:* This program provides trained crossing guards at key intersections throughout Marin County. Use of the crossing guards can reduce the reluctance parents may have in allowing their children to walk to school.
- *Safe Pathways:* The capital improvement element of this strategy provides funding for the engineering, environmental clearance and construction of pathway, street crossing and sidewalk improvements for better and safer access to schools.

Additional funding of bicycle and pedestrian improvements in Marin County are provided through targeted funding sources, including

- Transportation Funds for Clean Air (TFCA)

- Transportation Development ACT (TDA) Article 3
- Regional Bicycle Program Funds
- Regional Measure 2 funds

Local Jurisdiction Bicycle and Pedestrian Plans

Countywide, TAM is coordinating the update of the County of Marin, and eight cities’ and town’s bicycle and pedestrian plans during 2014, 2015, and 2016. The plan updates completed by summer of 2016, are funded with TDA Article 3 funds and managed by each local agency for public outreach and local adoption. The schedule of the plan updates will take place over two years.

Local jurisdictions also maintain local funds and programs for bicycle and pedestrian projects as part of local jurisdiction capital improvement plans.

Bicycle and Pedestrian System Performance

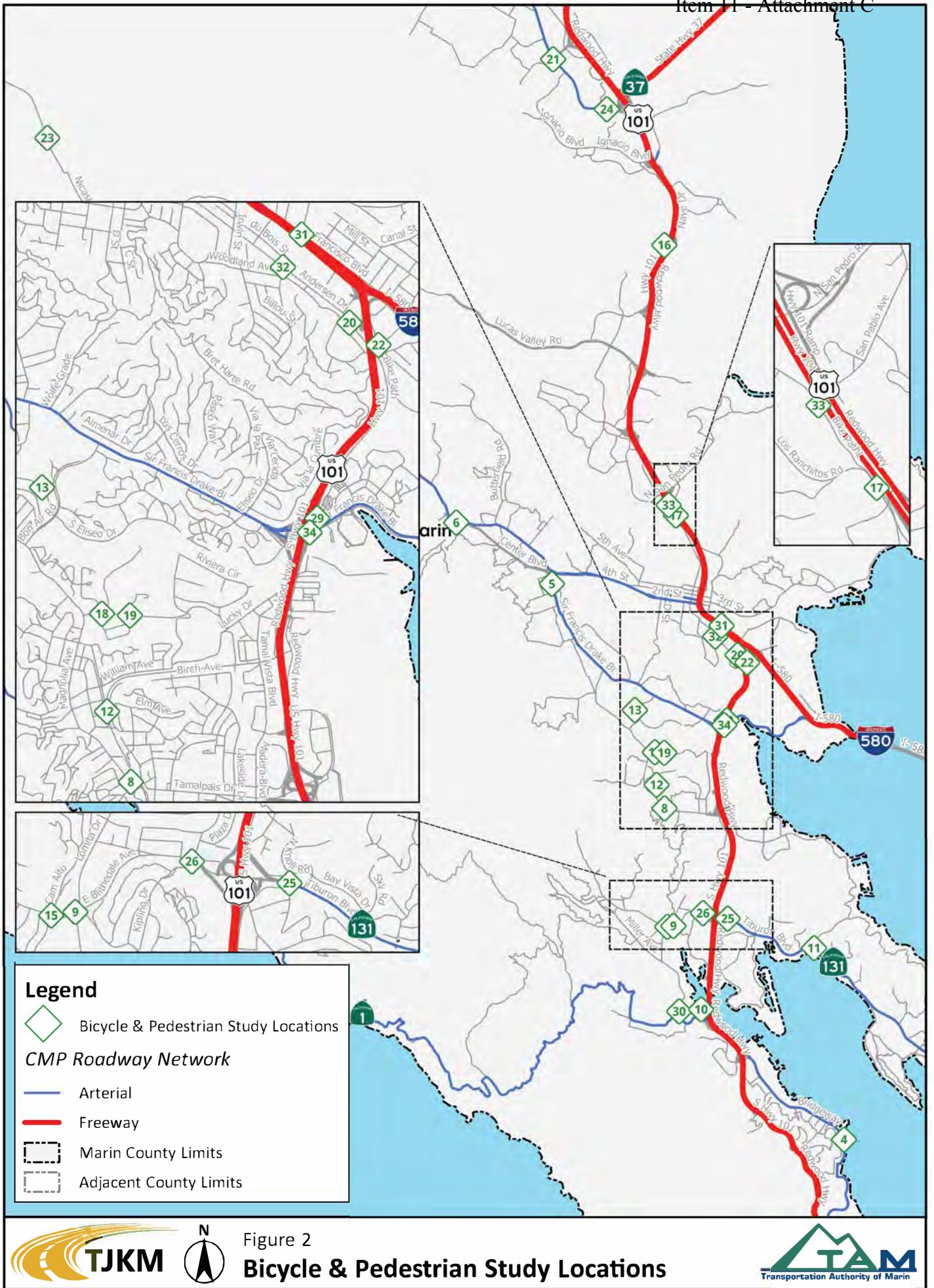
Bicycle and Pedestrian activity at various locations are routinely monitored for performance. Bicycle and pedestrian volumes were collected at 28 locations. **Table 8** lists the bicycle and pedestrian count locations. **Figure 2** illustrates the bicycle and pedestrian count locations. Bicycle and pedestrian counts were collected on weekdays for a 14-hour period from 6:00 AM to 8:00 PM and for a four-hour weekend midday period between 10:00 AM and 2:00 PM. The surveys also included adult and youth demographic attributes. The total bicycle and pedestrian volumes were then compared to the historical data from previous years. The data collected showed an offset in the peak periods for bicycle and pedestrian users relative to vehicular traffic peaks.

Table 8: Bicycle and Pedestrian Count Locations

ID	Count Location Description and City
1	Tiburon Blvd. @ Main St., Tiburon
4	Bridgeway @ Princess St., Sausalito
5	San Anselmo Ave. @ Tunstead Ave. (Southern Intersection), San Anselmo
6	Broadway @ Bolinas Rd., Fairfax
8	Magnolia Ave. @ Ward St., Larkspur
9	Mill Valley-Sausalito Path @ E. Blithedale Ave., Mill Valley
10	Mill Valley-Sausalito Path @ Tennessee Valley Path Junction, Tam Junction
11	Tiburon Bike Path @ Blackie's Pasture/McKegney Green, Tiburon
12	Larkspur-Corte Madera Path @ Baltimore Ave., Larkspur
13	Corte Madera Creek Path @ Bon Air Rd., Greenbrae
15	Camino Alto @ E. Blithedale Ave., Mill Valley
16	Pacheco Hill Path @ Alameda del Prado, Novato
17	Los Ranchitos Rd. @ Lincoln Hill Multi-Use Pathway, San Rafael
18	Doherty Dr. @ Larkspur Plaza Dr./Rose Ln. West, Larkspur
19 ²	Doherty Dr. @ Rose Ln. East, Larkspur

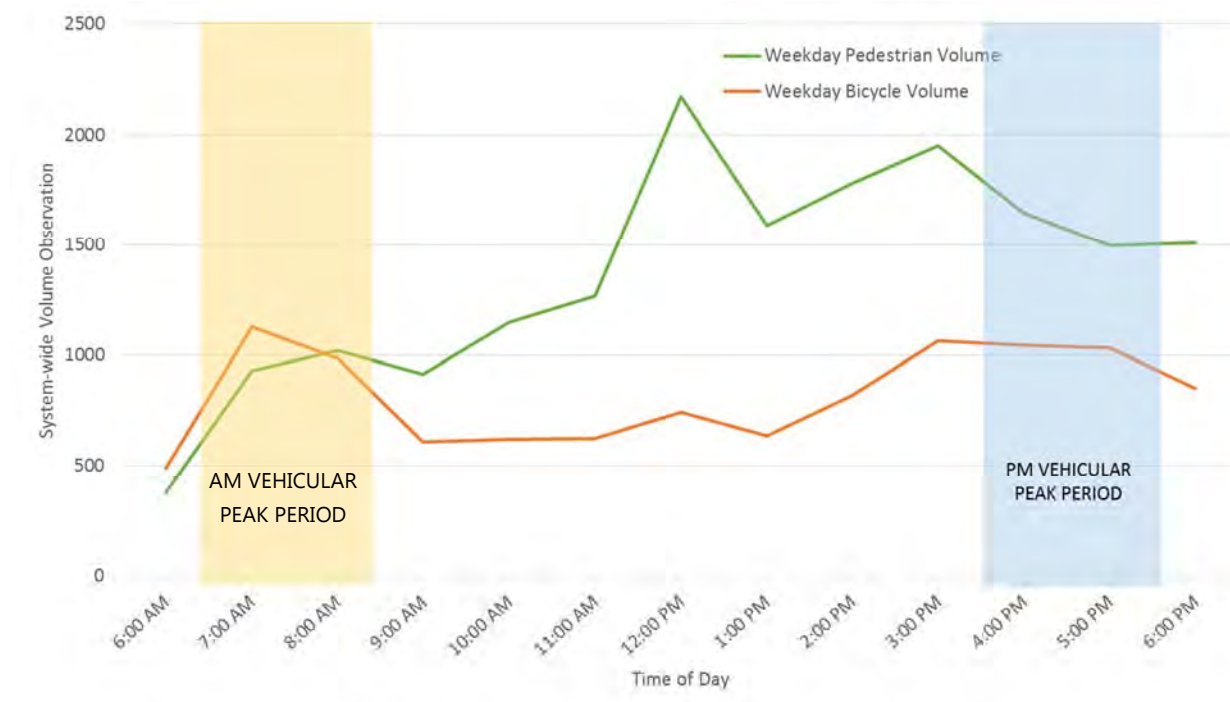
ID	Count Location Description and City
20	Andersen Dr. @ Cal Park Tunnel Path, San Rafael
21	S. Novato Blvd. @ Rowland Wy., Novato
22	Bellam Boulevard @ Andersen Dr., San Rafael
23	Nicasio Valley Rd. @ Nicasio School, Nicasio
24	Enfrente Bike Path @ S. Novato Blvd., Novato
25	Tiburon Blvd. @ S. Knoll Rd., Mill Valley
26	E. Blithedale Ave. @ Tower Drive, Mill Valley
29 ²	Central Marin Ferry Connector Bridge @ Sir Francis Drake Blvd., Larkspur
30 ²	Almonte Blvd. @ Shoreline Hwy., Mill Valley
31 ²	Francisco Blvd. E. @ Bay St., San Rafael
32 ²	Andersen Dr. @ Du Bois St., San Rafael
33 ²	Merrydale Rd. @ Lincoln Hill Multi-Use Pathway, San Rafael
34 ²	US 101 NB Off-Ramp @ Marin County Bike Route 20 / Sir Francis Drake Blvd., Larkspur

Notes: ¹ID Numbers are non-sequential to retain consistency with 2014 Monitoring Report and previous reports.
²New count location for 2016



During the weekday monitoring, overall pedestrian activity was highest during the two-hour PM peak period, while overall bicycle activity was similar in both peak periods, but slightly higher during the two-hour AM peak period. This system-wide observation varied considerably from location to location. During the weekend two-hour midday peak period, overall bicycle and pedestrian activity nearly doubled from what was observed during the weekdays, most notably for bicycles. This trend shows that many users on the weekend are recreational users and do not necessarily commute during the weekdays via bicycling or walking.

The following chart shows the total sum of all system-wide bicycle and pedestrian observations, respectively, over the course the 14-hour monitoring period.



Additionally, the adult to youth ratio for bicyclists and pedestrians was 7:93 for both modes, system-wide at all locations combined. Locations closer to schools show much higher youth to adult ratios, in some cases showing youth volumes exceeding adult volumes.

Overall, in terms of system-wide comparisons, the data showed a relatively significant shift from the 2014 data, which showed overall 15:85 and 20:80 splits between youths and adults for cyclists and pedestrians respectively.

The average weekday bicycle volume per location in 2016 shows an 85% increase over 2014, and 31% increase over a five-year average (2007 to 2014). In 2016, the average weekday pedestrian volume per location shows a twofold increase over 2014, and 40% increase over a five-year average (2007 to 2014).

3.4 Performance Measures

One additional performance measure, travel time reliability, described below allows TAM to further measure transportation system performance in Marin County.

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. Drivers 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.

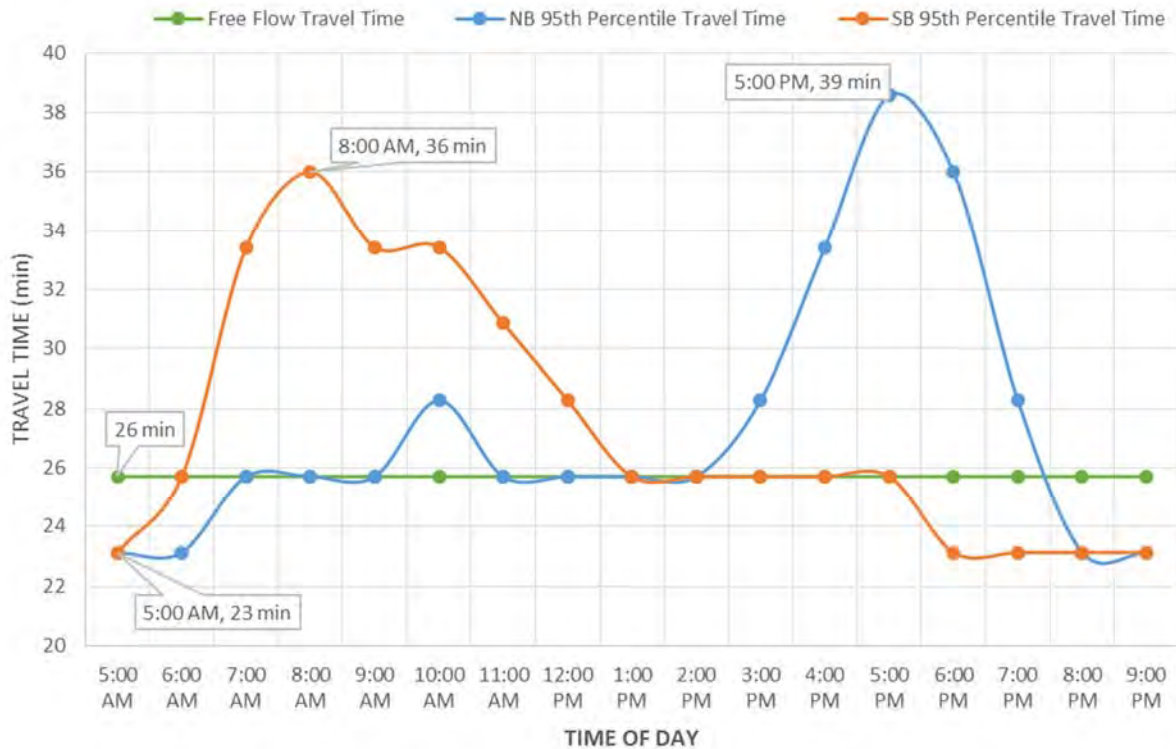
Travel time reliability measures are relatively new, but a few have proven effective. Most measures compare high-delay days to those with an average delay. The most effective methods of measuring travel time reliability are 90th or 95th percentile travel times, buffer index, and planning time index. The planning time index method has been used to compare travel times along US 101 in Marin County.

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.

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 (15×1.6) to ensure on-time arrival 95% of the time.

The graph below compares the travel time along US 101 in Marin County under free flow conditions to the NB and SB 95th percentile travel times between 5:00 AM and 9:00 PM. Planning time index data was collected by TJKM from the Caltrans Performance Measurement System (PeMS) for midweek days during October 2016, excluding holidays and any days with adverse weather.

US 101 – Marin County Travel Time Comparison



As this graph shows, 95th percentile travel times vary over the course of a day from approximately 23 minutes to 39 minutes in the NB direction and from 23 minutes to 36 minutes in the SB direction.

The free flow travel time along the same corridor is approximately 26 minutes, assuming a speed of 60 mph. NB traffic experienced more delays during the afternoon commute period, with a maximum planning time index of 1.5 at 5:00 PM. SB traffic experienced more delays during the morning commute period, with a maximum planning time index of 1.4 at 8:00 AM. It should be noted that the free flow speed of 60 mph is lower than the posted speed limit of 65 mph. In the evening and very early morning, 95th percentile travel times dropped below free flow travel times, indicating that traffic tended to speed up and approach the speed limit.

In addition to the above, TAM can also include factors such as seasonal variation, weather, and incidents to calculate the travel time along US 101 and I-580 within Marin County. Based on studies conducted within the United States, weather generally increases travel time by approximately 10%.

4. TRANSPORTATION DEMAND MANAGEMENT

4.1 Purpose and Intent of Legislation

TDM strategies are utilized to improve efficiency of the existing transportation systems without significant expansion of the infrastructure. These strategies focus on ways to reduce solo driving and/or to eliminate need for driving all together. Some of the commonly used strategies that aim at cutting down solo driving include carpool, vanpool, bicycles, transit, and park & ride lots. Strategies to reduce VMTs include alternatives such as telecommuting, flexible work schedules and parking cash-out programs. Improving a balance between available jobs and housing also help encourage non-auto modes of transportation. Use of TDM strategies help cities and counties in their attempt to balance the growing need for transportation and availability of limited transportation dollars.

The CMP is required to include all elements identified in the California Government Code Section 65089(b). Subsection (3) requires that all CMPs include a TDM element that outlines projects and strategies that promote alternate modes of transportation and thereby help reduce traffic congestion and improve air quality. Effective January 1997, with the passage of Assembly Bill (AB) 2419, the "Trip Reduction" component is no longer required in the CMP. This places higher emphasis on various travel demand strategies that will help cut down VMTs on the regional freeways and major arterials and the GHG emissions in the Bay Area.

As local governments review new development proposals and make key decisions on planning and zoning matters, they have opportunity to ensure that TDM measures are adequately factored into this decision making process. As they develop and adopt their annual operating and capital budgets, they can allocate necessary funds so that the TDM strategies are adequately financed and implemented in a timely manner. Although not required, local governments may also choose to support (through resolution or other means) regional TDM measures, including carpool lanes and ridesharing facilities and programs, which could be implemented by other agencies, such as TAM or MTC.

4.2 Transportation Demand Management in Marin County

TAM recognizes that as a result of regional job and population growth patterns and increased travel demand, the peak-period travel speeds will continue to deteriorate on freeways and arterials within the County. Due to limited availability of funds and opportunities for system expansion, it is critical that various TDM strategies are utilized to address the growing transportation needs of the County residents and businesses. Along with improving roadway operations and improving local transit service in response to this forecasted growth in traffic, it is also important to implement TDM measures to improve the operating efficiency of the existing county transportation system. The TDM element of the CMP encourages an on-going process that promotes local and regional planning to reduce traffic congestion.

A broad range of TDM options is available to the County and its 11 cities for further consideration and implementation. These measures and classified into four categories:

1. **Traffic operational improvements:** Typically, this category includes improvements at intersections or along corridors that result in improved traffic flow and reduced congestion. These

improvements could also come through such diverse sources as increased ridesharing or minor modifications to the highway system.

2. Transit improvements: This category includes various strategies that encourage use of transit over auto. This includes better transit connections, real-time transit arrival information, bike-racks on transit, easier fare payment options, etc.
3. Traffic mitigation measures: These strategies involve addressing impacts of new developments, and mostly implemented by developers or employers.
4. Land-use planning and regulations: This category of actions focus on limiting demand for transportation or to mandate implementation of traffic mitigation techniques through the land-use planning or approval processes.

In general, implementation of various TDM strategies requires close coordination and collaboration among public and private sectors. Caltrans and City/County public works departments implement most traffic operational improvements, while Marin Transit and Golden Gate Transit implement transit improvements. Land use planning and zoning regulations are legislated and enforced by local governments with outreach to private sector entities to be impacted by such regulations.

TAM continues to expand its TDM and commute alternative efforts. A Vanpool Incentive Program, emergency ride home program, carpool, rideshare, and transit promotion has been authorized under Measure B, TAM's vehicle registration fund.

4.3 Air Quality Plan Consistency with RTP

MTC is responsible for developing a RTP that addresses transportation challenges for future years. This Plan identifies various Transportation Control Measures (TCMs) contained in the federal and state air quality plans to achieve and maintain standards for ozone and carbon monoxide. As required by the California statutes, the CIP of the Marin County's CMP conforms to the transportation-related vehicle emission air quality mitigation measures. The Marin CMP includes numerous project types and programs that are identified in the TCM plan, and promotes the region's adopted TCMs for the federal and state clean air plans.

In April 2017, the Bay Area Air Quality Management District (BAAQMD) adopted the latest Clean Air Plan. The TCMs identified in the current plan are refined from prior TCMs to better define the actions and have been expanded to include greenhouse gas emission mitigation actions. **Table 9** lists chapters of the Marin CMP that provide opportunities to address the TCMs applicable to the CMP. There are currently no unmet TCMs in the Bay Area's implementation plans for air quality.

Table 9: 2017 Bay Area Clean Air Plan Transportation Control Measures in Marin CMP

TCM	Description	CMP Reference
TR1 Clean Air Teleworking Initiative	Develop teleworking best practices for employers and develop additional strategies to promote telecommuting. Promote teleworking on Spare the Air Days.	Chapter 4, Transportation Demand Management
TR2 Trip Reduction Programs	Implement the regional Commuter Benefits Program (Rule 14-1) that requires employers with 50 or more Bay Area employees to provide commuter benefits. Encourage trip reduction policies and programs in local plans, e.g., general and specific plans while providing grants to support trip reduction efforts. Encourage local governments to require mitigation of vehicle travel as part of new development approval, to adopt transit benefits ordinances in order to reduce transit costs to employees, and to develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. Fund various employer-based trip reduction programs.	Chapter 4, Transportation Demand Management
TR3 Local and Regional Bus Service	Fund local and regional bus projects, including operations and maintenance.	Chapter 7, Capital Improvement Program
TR4 Local and Regional Rail Service	Fund local and regional rail service projects, including operations and maintenance.	Chapter 7, Capital Improvement Program
TR5 Transit Efficiency and Use	Improve transit efficiency and make transit more convenient for riders through continued operation of 511 Transit, full implementation of Clipper® fare payment system and the Transit Hub Signage Program.	Chapter 3, Performance Measures
TR6 Freeway and Arterial Operations	Improve the performance and efficiency of freeway and arterial systems through operational improvements, such as implementing the Freeway Performance Initiative, the Freeway Service Patrol and the Arterial Management Program.	Chapter 7, Capital Improvement Program
TR7 Safe Routes to Schools and Safe Routes to Transit	Provide funds for the regional Safe Routes to School and Safe Routes to Transit Programs.	Chapter 7, Capital Improvement Program
TR8 Ridesharing, Last-Mile Connection	Promote carpooling and vanpooling by providing funding to continue regional and local ridesharing programs, and support the expansion of carsharing programs. Provide incentive funding for pilot projects to evaluate the feasibility and cost-effectiveness of innovative ridesharing and other last-mile solution trip reduction strategies. Encourage employers to promote ridesharing and car sharing to their employees.	Chapter 4, Transportation Demand Management
TR9 Bicycle and Pedestrian Access and Facilities	Encourage planning for bicycle and pedestrian facilities in local plans, e.g., general and specific plans, fund bike lanes, routes, paths and bicycle parking facilities.	Chapter 7, Capital Improvement Program
TR10 Land Use Strategies	Support implementation of Plan Bay Area, maintain and disseminate information on current climate action plans and other local best practices, and collaborate with regional partners to identify innovative funding mechanisms to help local governments address air quality and climate change in their general plans.	Chapter 4, Transportation Demand Management
TR11 Value Pricing	Implement and/or consider various value pricing strategies.	Not applicable to Marin County
TR12 Smart Driving	Implement smart driving programs with businesses, public agencies and possibly schools and fund smart driving projects.	Chapter 3, Performance Measures
TR13 Parking Policies	Encourage parking policies and programs in local plans, e.g., reduce minimum parking requirements; limit the supply of off-street parking in transit-oriented areas; unbundle the price of parking spaces; support implementation of demand-based pricing (such as "SF Park") in high-traffic areas.	Chapter 4, Transportation Demand Management
TR15 Public Outreach and Education	Implement the Spare the Air Every Day Campaign including Spare the Air alerts, employer program, and community resource teams, a PEV Outreach campaign and the Spare the Air Youth Program.	Chapter 3, Performance Measures

Source: Bay Area Air Quality Management District (2017).

4.4 Transportation Demand Management – Completed and Current Actions

TAM continues to develop and implement projects and programs that improve traffic flow conditions, encourage use of transit, bicycling and walking; and promote alternatives to solo driving. Some of the recently completed and current projects include the following:

Commute Options

There are several options available to Marin residents and businesses that encourage transit, carpooling and vanpool. In June 2013, TAM conducted a survey and completed a report titled “The Marin Commuter” that outlines various green commute alternatives available to Marin commuters. TAM continues to support 511 Rideshare Options, Park & Ride lots, Golden Gate Ferry and Sonoma Marin Area Rail Transit (SMART) since 2017. In December 2016, the TAM Board of Commissioners authorized a partnership agreement with Lyft, Inc. a ridesharing mobile application, to provide a coupon code for up to \$5 off of Lyft services to and from any SMART train station in Marin. TAM also supports Vanpool Incentives Program and an Emergency Ride Home Program. Its “Go Time Marin” Commuter Toolkit provides useful information on developing and managing a successful employee commute program at employment sites.

Bicycle and Pedestrian Plan Updates

Bicycle and Pedestrian Master Plan updates for the County, Corte Madera, Fairfax, Larkspur, Mill Valley, Novato, San Anselmo, Sausalito, and Tiburon was completed in 2016. Updates to the Bicycle and Pedestrian Master Plan brings more local and regional funds to support bicycle and pedestrian infrastructure projects and thereby encourages more commuters to shift from auto to transit, bicycling and walking.

Ramp Metering

The Ramp Metering Program is part of the larger Freeway Performance Initiative, a partnership between The MTC, Caltrans and local congestion management agencies. The initiative works to apply technology to reduce the effects of congestion, including ramp metering, message signs, roving tow trucks to clear incidents, and 511 traveler information. The first phase of metering was recommended to occur on the US 101 NB ramps from Spencer Avenue to Sir Francis Drake Boulevard. Caltrans and MTC have suspended final design activities on the Phase-One Ramp Metering Project due to lack of funding for the project.

Marin-Sonoma Narrows Project

This project will expand the US 101 corridor to six lanes by adding carpool lanes from SR 37 to just north of Corona Road overcrossing in Petaluma and updating infrastructure connecting the freeway to local roads. The current construction for Phase 1 started in 2011 and is scheduled to be completed in 2016, with future phases to continue as funding becomes available.

- Phase 1 Projects currently under construction/expected completion:
 1. Petaluma Boulevard South Interchange (B2): Constructs a new interchange and supporting frontage roads to serve Petaluma Boulevard South and closes uncontrolled access points. Includes construction of the Petaluma River Bridge to accommodate future HOV lanes. Currently under construction.

2. San Antonio Bridge Replacement & Curve Improvement (B3): Realigns the highway westward in the vicinity of San Antonio Creek, establishes a new frontage road for improved access, and raises the grade of the bridge at the creek to address periodic flooding concerns. Expected completion date late 2018/early 2019.
3. Bike lanes: A continuous bike route is planned from Novato to Petaluma, using a combination of Class I and Class II bike lanes.
4. US 101 Planting and Orange Avenue Soundwall (L1A): Planted trees and other vegetation along the constructed corridor in Novato. Installed a soundwall on the NB lanes between DeLong Avenue and Atherton Avenue. Currently under construction.
- Phase 1 Projects completed:
 1. NB Route 116(E) (C3): Replaced separation bridge and widened SB separation bridge to accommodate HOV lanes on US101. Completed in 2015.
 2. Southerly Interchange (B1): Constructed a new interchange and frontage roads to serve San Antonio Road, and closed uncontrolled access points. Included Class I and Class II bike paths. Completed in 2014.
 3. NB HOV Lane (A3): Extended the NB HOV lane from Atherton to 1.4 miles south of the Redwood Landfill Interchange.
 4. SB HOV Lane (A2): Extended SB HOV lane to Franklin overhead.
 5. HOV Lanes in Novato (A1): Addressed congestion by adding HOV lanes through median widening, which included NB HOV lanes from Highway 37 to north of Atherton Boulevard and SB HOV lanes from Highway 37 to Rowland Boulevard.

Future Projects (Currently Unfunded)

1. B1 Phase II: Construct NB and SB HOV lanes between the Marin County/Sonoma County line and Atherton Avenue. Funding expected after 2018.
2. B2 Phase II: Construct NB and SB HOV lanes between Petaluma Boulevard South and the Marin/Sonoma County line and stripe for HOV lanes from Petaluma Boulevard South to Route 116. Funding expected by 2018.
3. C2 and B2 Phase II: Add NB and SB HOV Lanes on US101 in Petaluma (Sonoma County).
4. B1 Phase II: Add NB and SB HOV Lanes on Hwy 101 in northern Marin County.
5. A4 Phase II: Add a SB HOV lane through Novato.
6. B5 Phase II: Add NB and SB HOV lanes, frontage road improvements and a bike path between the Sonoma and Marin county line.

Central Marin Ferry Connection Multi-Use Pathway

The new bridge provides a separated bicycle/pedestrian connection from San Rafael through the Cal Park Hill Tunnel to the Larkspur Ferry Terminal and the Corte Madera Creek path, across Sir Francis Drake Boulevard. The project is funded through the MTC-sponsored Regional Measure 2 Program and Regional Bicycle Program, the County-sponsored Non-Motorized Transportation Pilot Program, 1/2 Cent Transportation Sales Tax Interest Revenue, and the Bay Area Air Quality District-sponsored Transportation Fund for Clean Air. Project Sponsors include: TAM, the County of Marin, the City of Larkspur, and SMART.



The first phase of the project has been completed. The second phase is expected to be constructed by 2017 and the third phase by 2019.

These are some of the projects and strategies being implemented by TAM and the Marin County cities. They exemplify the County's commitment to use of alternate modes of transportation to solo driving and reducing reliance on auto travel, lessening burden on the over-extended freeways and highways, and improving air quality.

5. LAND USE ANALYSIS

5.1 Purpose and Intent of Legislation

Section 65089(b)(4) of the California Government Code requires that a CMP include a program to analyze the impacts of land use decisions made by local jurisdictions on the regional transportation system (both highways and transit).

The Land Use Analysis Program must include an estimate of the costs to mitigate impacts of development on the highway and transit systems. The legislation allows the cost of mitigating interregional travel (trips that do not begin in Marin County or trips that travel entirely through Marin County) to be excluded from the mitigation cost estimate. Public and private (developer) contributions to regional transportation improvements may be credited.

The legislation does not modify the role of local jurisdictions in making land use decisions and in determining the responsibilities of project proponents to mitigate those impacts. However, TAM has the authority to withhold gas tax subventions to local governments provided by Proposition 111 if a local jurisdiction fails to meet the requirements outlined in the Monitoring and Conformance chapter of the CMP (Chapter 8). Further guidance on the Land Use Analysis Program is found in the Congestion Management Resource Handbook (Caltrans, November 1990, pages 35-37).

The Land-Use Analysis Program is particularly important because it affects, or is affected by:

- The CMP Designated Transportation System and Roadway Level of Service Standards (see Chapters 1 and 2);
- Performance Measures (see Chapter 3);
- The MTM, which can be used to analyze the impacts of land use changes on both highways and transit (see Chapter 6); and
- The Capital Improvement Program (see Chapter 7).

The intent of the Land Use Analysis Program is to improve the linkage between local land use decisions and regional transportation facility decisions; to better assess the impacts of development in one community on another; and to promote information sharing between local governments when the decisions made by one jurisdiction have an impact on another.

The Land Use Analysis Program for the Marin County CMP is a process designed to improve upon decisions about land use and the spending of funds on highway and transit improvements in the county. The process is intended to work in a positive, cooperative fashion that supports the needs of local, county, regional and state governments.

TAM acts as a resource to local governments in performing transportation analyses of land use changes on the CMP designated transportation network. The MTM is used to analyze the transportation effects of local general plan updates and amendments and other major development decisions. The California Environmental Quality Act (CEQA) provides a framework for such assessment. To avoid duplication, the Land Use Analysis Program is intended to make maximum use of the CEQA process.

Cities can develop and maintain their own transportation models for use in local forecasting or impact analysis. However, as discussed in Chapter 6, their models should be approved by TAM for consistency with countywide and regional transportation models. Currently, no cities in Marin County have their own multimodal model for local forecasting.

The Marin County CMP has established two separate information and analysis processes regarding determination of local land use impacts. Under Part A, local governments forward information on proposed major developments, major general plan updates or other amendments to TAM during the period when the local jurisdiction is reviewing the application. Part B requires participation in a biennial tracking update of projected land uses for use in modeling both traffic and transit impacts.

5.2 Land Use Analysis Program Part A

In Part A, local governments inform TAM about any general plan updates or amendments, or major developments concurrent with the local governments' approval process. By analyzing general plan updates or amendments or major development proposals rather than by each individual development permit, cities and TAM can proactively take into account regional transportation impacts and needs, and also determine ways to finance transportation costs in advance of development proposals. According to TAM staff, as of August 2015 there are 20 major development proposals in the near-term horizon as listed in **Table 10**.

Table 10: Major Development Proposals in Near-Term Horizon

Project	Jurisdiction
Corte Madera Inn Rebuild Project	Town of Corte Madera
Marin General Hospital Project	Marin County
Casa Bueno Townhomes	Town of Corte Madera
BioMarin Specific Plan Amendment Senior Housing Facility	San Rafael
Tiburon Martha Co. Development	County Of Marin
North Coast Land Holdings Community Plan Amendment/Master Plan Amendment on the Golden Gate Baptist Seminary Project	County Of Marin
Novato General Plan Update	Novato
Corte Madera Restoration Hardware Expansion	Corte Madera
The Oaks (Daphne O Krestine Trust) Master Plan Amendment / Precise Development Plan / Design Review (P1547)	County Of Marin
Marin City Community Services District Master Plan	County Of Marin
San Rafael General Plan	San Rafael
1203 Lincoln	San Rafael
Northgate Walk	San Rafael
815 B Street Mixed Use Project	San Rafael
Hamilton Square	Novato
Wood Hollow Hotel	Novato
Bahia Heights	Novato
Hamilton Cottages	Novato
Hanna Ranch Mixed Use Project	Novato
Residence Inn Novato	Novato

Threshold for Part A Analysis

If a general plan update or amendment, or major development proposal is projected to generate a net increase of 100 vehicle trips during the PM (afternoon) peak hour, information is to be forwarded to TAM for comment and is subject to a CMP analysis. Local jurisdictions are responsible for determining which projects meet these criteria. The PM peak hour is most appropriate for this determination given that for most roadway segments, traffic levels of service are worse during the PM peak hour than during the AM peak hour. Examples of projects that typically meet the 100-trip threshold include 100 single-family homes, 150 apartment units, 5,000 square feet of retail space, or 40,000 square feet of office space.

Procedures for Part A Analysis

The local jurisdiction reviewing the proposed land use development or proposing a change to their general plan should notify TAM of the impending action and prepare a traffic impact study (either a stand-alone study or part of an Environmental Impact Report) through a Notice of Preparation or similar process. In addition to the proposed land use change, the sponsor should submit information on potential highway network and transit system changes in their jurisdiction that could result from implementation through project or ordinance approvals, or changes to the circulation element policies or maps in their general plan.

Once TAM receives a project notice, TAM staff will prepare a response directing the applicant on what analysis is appropriate to fulfill CMP requirements. The TAM staff response should include a recommended approach to apply the travel model for use in the study. TAM usually recommends applying the county travel model under these specific situations:

1. General plan updates and amendments are normally processed well before any construction takes place. This provides more time for transportation impacts to be analyzed and mitigation measures developed than would occur if the analysis took place closer to actual project construction.
2. Existing general plans have already been incorporated into the Year 2035 land uses for the countywide model, as well as for the MTC regional travel model. The TAM model is currently being updated to Year 2040 land uses consistent with Plan Bay Area projections. Thus, any land development project that conforms to the general plan should not materially alter the forecast results generated by computer analysis already completed or being completed for the CMP. Only changes in (or amendments to) existing general plans could cause significant change in the Year 2035 / 2040 model forecasts.
3. A city or the county may consider general plan updates or amendments no more than four times during any year according to state law. This reduces the possible model runs that would be required.
4. Most (but not all) general plan updates or amendments are for developments of significant size.

Future levels of service are based on the land use assumptions and corresponding travel demand forecasts based on current general plans. The information on noticing that should be forwarded to TAM includes:

- Precise location of the project(s) with map, including street access location;

- Proposed project land use(s) and number of dwelling units or square footage of development;
- Any available traffic studies, including trip generation rates assumed in determining whether the general plan update or amendment met the 100-trip threshold; and
- Expected occupancy of each land use in Year 2040, with completion date and phasing.

The MTM is available to be used as part of the local development review process where appropriate. The local jurisdiction is responsible for determining future baseline traffic volumes, but may use the MTM for background or cumulative conditions analyses. The local jurisdiction remains responsible for identifying mitigations and funding any costs associated with a Negative Declaration or Environmental Impact Report for any project. It should be noted that the MTM is managed directly by TAM; therefore TAM must coordinate and manage any use of the model.

It may be appropriate for TAM to participate in a Part A land use analysis, especially if it involves using the MTM. If TAM participates in a Part A analysis, TAM would make modifications to its land use database contained in the model. A model run would include all highway and transit improvements (not just those on CMP designated facilities) for which funds seem reasonably secure, and also any improvements the applicant is willing to pay for as a condition of development approval. TAM would forward this information to the local agency, which would consider any level of service reduction in making their decision to approve or not to approve the development project / general plan amendment. In developing conditions for project approval, the local jurisdiction would then have the option of:

- Requiring additional mitigations from the developer, such as TDM measures (e.g., transit service, flex time, etc.), roadway improvements that would improve the LOS to the adopted standard, or other system improvements that would improve air quality as allowed by the CMP legislation;
- Delaying the project until a certain highway or transit project is constructed;
- Working closely with the TAM staff on development of a Deficiency Plan if it appears that a CMP system segment does not meet the adopted LOS standard; or
- Choosing not to implement any of the above measures and risk having the LOS not meet the adopted standard on certain roadway segments in a future year. In this case, the local government would risk losing the increment of gasoline taxes provided by Proposition 111.

Once a study of the transportation impacts is completed, the local jurisdiction should send a draft copy to TAM for referral and comment. If the draft is prepared as part of an Environmental Impact Report, TAM concerns should be addressed in a final certification.

Once any remaining concerns expressed by TAM have been addressed and final documentation is completed, the local jurisdiction sends final project information and documentation to TAM as part of the Part A compliance.

5.3 Land Use Analysis Program Part B

TAM Monitors proposed project development projects in Marin County for CMP analysis. Many projects in Marin County are generally too small to effectively analyze using the county model on an individual basis. As mentioned earlier in Part A, large projects requiring a city or county general plan update or

amendment should be analyzed using the model. Participation in development tracking is simple and useful for three principal reasons:

- Local jurisdictions already are responsible for reporting information for all land use development;
- Compliance with Part B of the Land Use Analysis Program is easily attained by biennially submitting a complete account of all residential and commercial projects approved in the preceding submittal and reviewing the PROPDEV inventory for that jurisdiction; and
- Adjacent jurisdictions are able to account for nearby cumulative development more easily.

Once TAM has received updates on land use changes from the planning departments of each local government in Marin County, it performs updates to the MTM with updated land use information as appropriate addition to land use changes, local governments are also responsible for advising TAM of planned changes to the roadway network and transit system based on their knowledge of developer mitigations, ordinance approvals, or changes to the circulation element of their general plan.

5.4 Additional Periodic Compliance

In addition to the Part A and Part B program elements that demonstrate biennial compliance, local governments should report when periodic changes occur in two other special instances:

- Each jurisdiction should report changes to local traffic LOS standards, and confirm that they are consistent with or more restrictive than the LOS standards in the CMP.
- Each jurisdiction should inform TAM when any other changes to the transportation network have occurred or changed, or are programmed to occur or change within their local capital improvements program or budget, or in any administrative directives.

5.5 Relationship of Land Use Analysis Program to CEQA

Local governments continue to have lead agency responsibility under CEQA for performing Environmental Impact Reports and Negative Declarations and conducting transportation analyses supporting these documents. Local government should continue to propose and analyze mitigation strategies. TAM may comment through the CEQA process, keeping local governments informed as to the adequacy of the analysis and approving any transportation models used as part of the analysis. TAM may also provide local governments with information on cumulative impacts.

5.6 Impacts of Non-Compliance

In the future, if any Marin County jurisdiction does not comply with each of these CMP requirements, (when TAM makes any necessary non-conformance determination for each jurisdiction), that jurisdiction is found in non-conformance and may risk:

- Losing an increment in its gasoline tax subvention funds; and/or
- Not having projects programmed in the RTIP.

6. TRAVEL DEMAND MODEL

6.1 Purpose and Intent of Legislation

California Government Code Section 65089(c) requires that every CMA, in consultation with the regional transportation planning agency (MTC in the Bay Area), cities, and the county, develop a uniform database on traffic impacts for use in a countywide travel demand model. The State statute also requires the countywide model to be the basis for transportation models used for county sub-areas and cities, and that all models are consistent with the modeling methodology and databases used by the regional transportation planning agency. The CMA also approves sub-county area transportation models and models used by local jurisdictions for land-use impact analysis, if local jurisdictions decide to develop them. In Marin County, the MTM is routinely updated as part of the consistency determination process with MTC.

The purpose of the travel demand model requirement is to guide the CMA decision-making process in identifying the most effective balance of transportation programs and projects that maintain LOS standards, which includes:

1. Consideration of the benefits of transit service and TDM programs, and
2. The need for projects that improve congestion on the CMP designated network.

The modeling requirement is also intended to assist local agencies in assessing the impact of new development on the transportation system. TAM needs to consider the nature of the analysis, functions of specific analytical tools, and its available resources when deciding how to fulfill this requirement of the statute.

6.2 Local Agency Requirements

At this time, there are no specific requirements of local agencies, other than supplying the base year land use information that is noted in Chapter 5. TAM expects to continue operating and refining its own countywide model, although cities may also create and use their own model subject to the above legislative requirements.

6.3 Travel Demand Forecast Overview

A distinct and measurable relationship between travel demand, land use patterns, and transportation systems is the basis for modern transportation planning practice. Transportation models have been developed as the best tools available to quantify this relationship; however, it is complex. Research on more effective transportation modeling continues to evolve.

CMP legislation requires consistency with the regional travel model. This chapter summarizes the MTM performance and its consistency with the MTC Travel Demand Model guidelines for CMPs. The last conformity evaluation of the MTM was completed in 2015 and remains current as of this CMP update. MTC is currently developing guidance for the next conformity evaluation.

6.4 Existing and Past Programs

Bay Area travel demand modeling has been characterized by extensive travel behavior studies and model development by MTC, the recognized Metropolitan Planning Organization and regional transportation planning agency for the Bay Area, in cooperation with the Association of Bay Area Governments (ABAG). Since the early 1970's, MTC has had the responsibility and also funding at the Federal level to develop models of travel behavior. Marin County, in developing its own travel demand model (MTM), has built on information and logic from the MTC model.

MTC is required to review any sub-regional model for consistency with the MTC model. TAM staff assists with any model revisions. The remainder of this chapter contains the MTC checklist and responses for model consistency.

Land use forecasts for Marin County jurisdictions are currently consistent with ABAG's Projections 2013. The MTM currently includes the Plan Bay Area land use projections for Year 2040. Plan Bay Area is the combined RTP and Sustainable Communities Strategy for the Bay Area. In measures including households, population, jobs, and employed residents, the changes in the model update will be within the MTC criteria for sub-regional model consistency. Thus, Marin County will continue to fall within the model consistency checklist.

6.5 MTC Modeling Consistency

MTC's has established regionally consistent model "sets" for application by MTC and the CMAs. In the winter of 2010/2011, MTC replaced the modeling tool used by TAM to develop the MTM – named *BAYCAST-90* – that had been in place, with relatively minor modifications, for the past two decades with a more sophisticated, activity-based model – named *Travel Model One*. The approach remains the same: a checklist is used to adjudge consistency across model components.

Checklist

MTC requires local CMAs to submit a checklist for model consistency. This checklist guides CMAs through their model development and consistency review process by providing an inventory of specific products to be developed and submitted to MTC, and by describing standard practices and assumptions to be followed. The checklist items are highlighted in this section.

Because of the complexity of the topic, the checklist may need additional detailed information to explain differences in methodologies or data. Significant differences will be resolved between MTC and the CMA, taking advantage of the Regional Model Working Group. Standard formats for model comparisons will be developed by MTC for use in future guidelines. With regard to the MTM, no difference in data occurs that requires resolution.

Update Process

TAM model forecasts must be updated as necessary every two years to four to be consistent with MTC's forecasts. Alternative approaches to fully re-running the entire model are available, including incremental approaches that apply factors to demographic inputs or to trip tables. Similarly, the horizon year must be the same as the TIP horizon year. However, interpolation and extrapolation approaches are acceptable,

with appropriate attention to network changes. These alternative approaches should be reviewed with MTC. The MTM is routinely updated to reflect new development and transportation projects within Marin County.

Marin Travel Model Conformity to MTC Model Data

The MTM conforms to MTC consistency guidelines. The conformity between the MTM and MTC forecasting was established in October 2013 and confirmed in 2015. The next model conformity check is to be determined by future MTC guidance. Below is a list of MTC checklist requirements and the products required for each.

A. General Approach

PRODUCT 1: The TAM Countywide Model was developed in 1989 with a standard, four-step trips based model procedure and is a direct implementation of the MTC FCAST 1980/81 model. The auto ownership, trip generation, trip distribution, mode choice and trip assignment steps all use MTC procedures consistent with the FCAST model sets. The TAM Countywide Model is a focused version of the MTC FCAST model in that there is considerably more zonal and network detail within Marin County, similar detail in San Francisco and Sonoma County to MTC, and a more coarse skeletal system in the remaining counties. The model has a traditional trip purpose definition of home-based work, home-based shop/other, home-based social/recreation, non-home based, home-based college and home-based school similar to the MTC FCAST model. The model develops trip generation using a Fortran program with calibrated trip production and attraction equations and rates consistent with MTC FCAST. The model distributes trips based on travel time friction factors using a gravity model with two-dimensional matrix balancing and utilizes k-factors for home-based work trips to improve the estimates compared to the MTC regional model. Transit routes are coded in the model for Muni, ferries, and Golden Gate Transit from Marin to San Francisco. Mode choice is conducted using a standard multinomial logit formulation for home-based work to predict auto trips for drive-alone, shared ride two and shared ride three, and transit trips. A simple binomial model is used for the other purposes to predict auto and transit trips. At this stage the model does not forecast non-motorized trips (pedestrian and bicycle). Trip assignment is conducted for the AM and PM peak one-hour periods and for daily trips using a standard BPR style speed-flow relationship. The capacities and speeds on the road network incorporate the five area types (Core, Central Business District, Other Central Business District, Residential Areas and Rural Areas) and six facility types (Freeway, Expressway, Undivided Arterial, Collector Street, Centroid Connector and Divided Arterial) consistent with the MTC FCAST system.

B. Demographic/Economic/Land Use Forecasts

PRODUCT 2: The 2040 socio-demographic data in the TAM Countywide Model is based on the latest Plan Bay Area data and disaggregated (reallocated) within Marin and Sonoma counties, and aggregated outside. The resulting deviation is no greater than $\pm 1\%$ from the county level totals

provided by ABAG for households, household population, jobs and employed residents for the subject counties, and match ABAG estimates exactly outside the subject counties.

PRODUCT 3: At this time, the TAM Countywide Model does not include a 2010 base year. It is anticipated the next update to the TAM model (October 2015) will update the base year to 2010.

PRODUCT 4: Land uses were allocated within Marin County directly consistent with the MTC RTAZ totals and disaggregated to the finer TAZs within Marin County. Data at the MTC TAZ level in Marin County was allocated to the smaller Marin model TAZs using local land use development patterns, but MTC zone level control totals were preserved in the allocation process.

C. Pricing Assumptions

PRODUCT 5: The TAM model was originally calibrated using pricing assumptions consistent with the 1980 calibration assumptions therefore all prices are expressed in \$1980. These assumptions were updated with each subsequent model validation. However, since this round did not update the validation, the pricing was unchanged. TAM has provided MTC with a table showing comparisons between \$1980, \$1990, \$2000 and \$2010 levels that is relatively consistent with the latest MTC pricing assumptions for automobile costs.

D. Network Assumptions

PRODUCT 6: The TAM Countywide Model uses MTC regional highway and transit assumptions for the other bay area counties with a more detailed network definition within Marin and Sonoma County. The 2040 horizon year is consistent with the latest MTC RTP plan.

E. Automobile Ownership

PRODUCT 7: The TAM Countywide Model uses average auto ownership assumptions based on zonal average auto ownership values taken directly from the MTC FCAST regional model for Marin, Sonoma and San Francisco counties. Auto ownership assumptions are not utilized for the other bay area counties. As comparison for the latest Conformity, average values were computed for the MTC Model One auto ownership for each county and compared to similar values for the TAM Countywide Model. Because the auto ownership parameters are based on the documented calibration for year 1990 conditions using the MTC FCAST process, the auto ownership model has not been adjusted to better match the MTC results at this stage. When the TAM Countywide Model is next updated, the auto ownership results will be directly compared to 2010 Census data as well as the corresponding results from MTC Travel Model One. Adjustments will be made to the calculation of auto and transit accessibility as well as calibration coefficients to ensure better consistency of auto ownership results.

F. Tour/Trip Generation

PRODUCT 8: The TAM Countywide Model implements the MTC FCAST trip generation process using a FORTRAN program. The Travel Model One does not calculate trips from each land use, but instead develops a set of tours based on activities which are then turned into trips.

The total daily trips in the TAM Countywide Model are 6% lower than the daily trips generated from tours in Travel Model One. This is likely because the tours can consider several types of short trips on the way to and from primary activities that may be consolidated in the FCAST trips based model system.

G. Activity/Trip Location

The TAM Countywide Model uses the MTC FCAST model trip distribution process and basic factors to estimate activity/trip locations. Additional adjustment factors (“K factors”) were applied to more closely match the MTC FCAST model estimates of county-to-county trip patterns for the 2000 calibration year. These calibrated adjustment factors are used for all forecast years.

PRODUCT 9: Average trip lengths in miles are compared for the 2040 horizon year. The MTC Travel Model One results are reported for tour types while the TAM Countywide Model results are reported for trip purposes. For home-based work trips, the average trip distance between the TAM Countywide Model and MTC Model One is -1.43 miles or -14%. For all purposes, the average trip distance between the TAM Countywide Model and MTC Model One is 0.17 miles or 3%.

PRODUCT 10: The county-to-county trip patterns were compared for 2040 journey-to-work patterns. The 2040 journey-to-work patterns for the TAM Countywide Model were estimated by dividing home-based work trips by a factor of 1.5. This factor was estimated based on prior comparisons of 2000 Census Journey to Work data and 2000 Home-Based Work trip estimates from various travel models. Overall, the TAM Countywide Model is within 1% of the MTC’s Travel Model One for the number of bay area travelers. The TAM Countywide Model is within 7% of the MTC’s Travel Model One for the number of travelers with both home and workplace within Marin County.

H. Travel Mode Choice

The mode choice in the TAM Countywide Model is based on the multinomial logit formulation of the MTC FCAST model. Comparisons between the TAM Countywide Model and the MTC’s Travel Model One focus on the more aggregate results (“higher level nests”) where direct comparisons are possible. The TAM Countywide Model does not currently predict non-motorized modes.

PRODUCT 11: Trips by mode for the 2040 horizon year are compared between the tour types in MTC’s Travel Model One and the closest corresponding trip purpose in the TAM Countywide Model.

Overall, the TAM Countywide Model is 13% higher than the MTC’s Travel Model One for automobile mode share and 0.6% higher for transit mode share. The TAM Countywide Model is 15% higher than the MTC’s Travel Model One for Home Based work automobile mode share and 6% lower for transit mode share.

I. Traffic Assignment

Traffic assignment results are compared to the MTC’s Travel Model One in terms of region-level, time-period-specific comparison of VMT and vehicle hours traveled (VHT) by facility type, and

region-level, time-period-specific comparison of estimated average speed on freeways and all other facilities. The TAM Countywide Model only predicts traffic for the AM and PM peak hour periods and for daily conditions.

PRODUCT 12: Vehicle miles and hours of travel are compared with the MTC's Travel Model One for the 2040 horizon year. The only time periods that can be directly compared with the TAM Countywide Model are the AM and PM. peak hour periods and the daily conditions. The TAM Countywide Model does not include traffic assignments for the early AM, AM and PM peak four-hour, midday or evening periods.

The TAM Countywide Model estimates 2040 12% lower daily VMT and 29% lower daily VHT than the MTC's Travel Model One.

PRODUCT 13: Estimated average speeds for freeways and non-freeways are compared with the MTC Model One for the 2040 horizon year. The only time periods that can be directly compared with the TAM Countywide Model are the AM and PM peak hour periods and daily. Overall, the TAM Countywide Model daily speeds are within -2% for freeways, -14% for other facilities and 25% for all facilities combined when compared to the MTC Travel Model One speeds.

6.6 Relationship to Marin County Capital Improvement Program

The current MTM includes all relevant projects listed in the State Transportation Improvement Program (STIP) for the 2040 horizon year.

The MTM is used for assessing the impacts of capital improvements. CMP statutes stipulate three criteria for projects selected for the CIP:

- Projects must maintain or improve the traffic level-of-service and transit performance standards,
- Project land use impacts must be mitigated, and
- Projects must conform to vehicle emissions and air quality mitigation measures

Toward that end, MTM results are typically used in evaluating relevant projects in the CIP chapter (Chapter 7), in preparing a project list for RTIP consideration by MTC and also for developing and programming any supplementary revenue sources.

7. CAPITAL IMPROVEMENT PROGRAM

7.1 Purpose and Intent of Legislation

CMPs are required by California Government Code Section 65089(b)(5) to include a seven-year CIP to maintain or improve the performance of the multimodal system for the movement of people and goods and to mitigate regional transportation impacts identified through the Land Use Analysis Program. Capital improvement projects must conform to transportation-related vehicle emissions and air quality mitigation measures. In the Bay Area, such TCMs are contained in the Bay Area 2017 Clean Air Plan.

7.2 Relationship to Regional Transportation Plan

MTC adopted the current RTP, Plan Bay Area, in July 2017. The action elements and projects for the CMP's CIP are consistent with the assumptions, goals, policies, actions and projects identified in the RTP. MTC made a significant effort to adopt policies that complement and support programs of Federal, State, and regional agencies. The RTP is updated every four years, with Plan Bay Area 2040 document updated in March 2017.

7.3 Relationship to Regional Transportation Improvement Program

TAM's CIP is the basis for determining which projects are included in the RTIP. Inclusion of a project in the RTIP is the first step in obtaining a funding commitment from the State. Projects that MTC includes in the RTIP are then recommended to the California Transportation Commission (CTC) for inclusion in the State Transportation Improvement Program (STIP). If the CTC includes a project in the STIP, it has approved the project for the necessary environmental studies and project design, which ultimately leads to a final decision on whether a project is implemented.

Projects that are to be included in the RTIP must be first included in TAM's CIP. However, it should be noted that MTC is responsible for assembling the RTIP, and also, the RTIP is a funding-constrained document. This CIP is developed with information from the current RTIP, which MTC adopted in September 2014. The dynamic nature of funding requires minor amendments to the plan several times a year.

7.4 Relationship to Air Quality Attainment Plans

The TAM CIP project list must show consistency to air quality attainment plans. The Bay Area 2017 Clean Air Plan, prepared by the Bay Area Air Quality Management District, is the current adopted plan. Various TCMs have been adopted as a part of this plan. MTC gives priority to those proposed projects that support or help implement any of the TCMs (see Chapter 4 for a listing and discussion of TCMs). Examples of such projects include HOV lanes and ramp meter bypass lanes for HOVs.

7.5 Project Funding Identified in TAM Measure A Strategic Plan

Marin County voters passed Measure A, the County's 1/2-cent transportation sales tax, in 2004. A Strategic Plan for this measure was developed that outlines how collected funds will be spent. This plan is routinely updated to reflect current agency strategies. As many projects are also funded partially through Measure A revenues, the relationship of the CIP to this Strategic Plan is important.

The most recent update, the Measure A Strategic Plan Update 2016, discusses strategies in four areas. Each strategy and key capital improvements are described as follows:

- Strategy 1: Develop a seamless local bus transit system that improves mobility and serves community needs including special transit for seniors and the disabled (paratransit services). This strategy includes transit capital investments.
- Strategy 2: Fully fund and ensure the accelerated completion of the Highway 101 Carpool Lane Gap Closure Project through San Rafael. This strategy is a capital improvement project that is effectively completed.
- Strategy 3: Maintain, improve and manage Marin County’s local transportation infrastructure, including roads, bikeways, sidewalks, and pathways. This category includes capital improvements for local and regional streets, roads and paths.
- Strategy 4: Reduce school-related congestion and provide safer access to schools. This category includes capital projects related to safe routes and safe pathways to schools.

The Strategic Plan includes proposed allocations for each strategy through FY 2024/25. The Sales Tax Programming/Expenditure Summary for key capital projects between 2016 and 2025 have been identified and are summarized in **Table 11**.

Table 11: Marin County Measure A Strategic Plan Capital Projects

Strategy	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Strategy 1 – Local Bus Transit									
Sub-strategy 1: Local Bus Transit System	\$13,995,922	\$9,180,948	\$9,384,713	\$9,592,552	\$9,804,549	\$10,020,785	\$10,241,347	\$10,466,319	\$10,898,429
Sub-strategy 2: Rural Bus Transit System	\$1,450,213	\$744,401	\$760,923	\$777,775	\$794,963	\$812,496	\$830,379	\$848,620	\$883,656
Sub-strategy 3: Special Needs Transit Service	\$2,572,019	\$2,233,204	\$2,282,768	\$2,333,324	\$2,384,890	\$2,437,488	\$2,491,138	\$2,545,861	\$2,650,969
Sub-strategy 4: Bus Transit Facilities	\$4,948,140	\$1,488,802	\$1,521,845	\$1,555,549	\$1,589,927	\$1,624,992	\$1,660,759	\$1,697,241	\$1,767,313
Strategy 2 – 101 Gap Closure									
Strategy 2: 101 Gap Closure	\$1,175,804	-	\$2,825,529	-	-	-	-	-	-
Strategy 3 – Local Infrastructure									
Sub-strategy 1: Major Roads	\$1,840,000	\$1,800,000	\$13,485,000	\$14,800,000	\$5,000,000	-	-	-	-
Sub-strategy 2: Local Roads	\$3,240,324	\$3,311,863	\$3,384,833	\$3,459,262	\$3,535,179	\$3,612,615	\$3,691,600	\$3,772,165	\$3,926,907

Strategy	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	FY 2021/22	FY 2022/23	FY 2023/24	FY 2024/25
Strategy 4 – School Access									
Sub-strategy 1: Safe Routes to Schools	\$810,000	\$655,000	\$655,000	\$660,000	\$650,000	\$730,000	\$730,000	\$775,000	\$807,018
Sub-strategy 2: Crossing Guards	\$946,000	\$1,076,000	\$1,015,000	\$970,000	\$1,010,000	\$1,175,000	\$1,020,000	\$1,035,000	\$1,110,000
Sub-strategy 3: Safe Pathways	\$100,000	\$100,000	\$437,858	\$834,222	\$854,276	\$874,730	\$895,594	\$916,875	\$957,751

Source: Transportation Authority of Marin, Measure A – Transportation Sales Tax Strategic Plan Update, 2016

7.6 Marin-Sonoma Narrows Project and Funding

The Marin-Sonoma Narrows (MSN) section of US 101 is a nationally and regionally significant highway linking the San Francisco Bay Area and Oregon. It is also the only continuous north/south route through Marin County. The State designated the Narrows as an Inter-Regional Route of Significance, and US 101 is listed as a Focus Route in California’s 1998 Interregional Transportation Strategic Plan. As a result of these various designations, the MSN Project has received State discretionary funding on four separate occasions.

The existing segment (monitored Segment 3G) of US 101 through the Narrows has two lanes in each direction, sections that do not meet current freeway standards (including expressway sections with at-grade intersections), and consistently maintains a poor LOS in many sections. The MSN Project consists of widening approximately 17 miles of US 101 from four to six lanes by adding one HOV lane in each direction; creating a controlled access freeway section through the historic “Narrows,” and upgrading the highway to current freeway standards from SR 37 in Novato to Old Redwood Highway in Petaluma.

Project funding was awarded in prior years. In May 2008, the CTC awarded \$66.04 million in ITIP funding to the project. In 2012, the CTC increased the Proposition 1B Corridor Mobility Improvement Account (CMIA) funds from \$82.4 million to \$172.5 million in addition to previously committed federal, state and regional funding. This increases available funding to nearly \$398 million out of an estimated \$745 million total project cost.

TAM, the Sonoma County Transportation Authority (SCTA), and Caltrans have developed individual projects divided into three segments. A discussion of the projects by segment is listed in **Table 12**. A continuous bike route is also planned through all projects by utilizing a combination of Class I and II bike lanes.

Table 12: Marin-Sonoma Narrows Project

Segment A City of Novato from South of State Route 37 to north of Atherton Ave.	Segment B The City of Novato and end in the City of Petaluma, beginning north of Atherton Ave. and continuing to State Route 116	Segment C The City of Petaluma from State Route 116 to the Corona Rd. overcrossing
A1-HOV Lanes in Novato – HOV lanes have been added through median widening. This includes NB HOV lanes from SR 37 to north of Atherton Blvd. and SB HOV lanes from SR 37 to Rowland Blvd. Both lanes were constructed and opened to traffic in August 2012.	B1-Southerly Interchange – a new interchange, adding on to the existing Redwood Landfill overcrossing, and supporting frontage roads will be built to serve San Antonio Rd., enabling the closure of uncontrolled access points. Construction started in April 2013 and completed in October 2014.	C3-Replace the NB Route 116 E Separation Bridge and widen SB separation bridge to accommodate HOV Lanes on US 101 – Construction started in April 2013
A2-Extend SB HOV Lane – to Franklin overhead. Construction started in June 2013 and completed in November 2013	B2-Petaluma Blvd. South Interchange - constructs a new interchange and supporting frontage roads to serve Petaluma Blvd. South and closes uncontrolled access points. This project also includes construction of the Petaluma River Bridge to accommodate future HOV lanes. Construction started in April 2013 and is expected to be completed in Summer 2016.	–
A3-Extended NB HOV Lane – from Atherton to 1.4 miles south of the Redwood Landfill Interchange. Construction started in April 2013 and completed in October 2014.	B3-San Antonio Curve Correction – the mainline highway curve across the Marin/Sonoma county line at San Antonio Creek will be reconstructed to lower the existing highway grade just north of the creek in order to improve sight distances. A new US101 bridge over San Antonio Creek is included. The highway will be raised upward to prevent future freeway closures due to periodic flooding. Construction will begin in Spring 2016.	–

7.7 Recent Project Funding Identified in CTC Programs

The CTC manages several funding programs, including the State Transportation Improvement Program (STIP), funds from Propositions 1B and 116, and the State Highway Operations and Protection Program (SHOPP).

The STIP lists include allocations for each of California’s counties. The share for Marin County includes both general program and specific project amounts. The most recently adopted CTC allocations for Marin County projects are shown in **Table 13**. The most recent STIP (adopted in August 2017) has allocations from FY 2016/17 until FY 2020/21.

Table 13: State Transportation Improvement Program Projects in Marin County

Project	Agency	Program Amount	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
Planning, Programming and Monitoring	TAM	206	206	-	-	-	-
Planning, Programming and Monitoring	MTC	24	24	-	-	-	-
Marin-Sonoma Narrows: San Antonio Rd	Caltrans	(21)	(21)				
Planning, Programming and Monitoring	TAM	206	-	206	-	-	-
Planning, Programming and Monitoring	MTC	51	-	25	26	-	-
Parkade Area Circulation Improvements	Fairfax	255	-	255	-	-	-

Note: Funds are in \$1,000's

Source: California Transportation Commission, 2017 Report of STIP Balances County and Interregional Shares, August 2017

Marin County originally received funds through the adoption of Proposition 1B in 2006. This proposition created the CMIA. In the original 2007 adopted program, CMIA funds were key funding sources to help complete three major projects in Marin County:

- The widening of westbound I-580 westbound to NB US 101 connector in San Rafael (completed in 2010). The completion eased congestion for traffic traveling to and from the East Bay via the Richmond-San Rafael Bridge.
- The construction of HOV lanes within Novato (part of the MSN project).
- The construction of interchanges and partial HOV lanes between Novato and Petaluma (part of the MSN project) was scheduled to receive CMIA funding in 2012

The SHOPP lists 16 projects in Marin County as part of the most recent project list developed in 2016. The project list is shown in **Table 14**. The projects primarily consist of roadway safety improvements and projects addressing storm damage, including culvert replacement, drainage system upgrades, embankment and slope reconstruction, retaining wall construction, and bridge railing replacement.

Table 14: State Highway Operations and Protection Program (SHOPP) Projects

Route	Location	Description	Amount	Project Year
SR 1	Near Mill Valley, at Tennessee Valley Rd.	Repair roadway slip-out	\$2,536	2017/18
SR 1	Near Mill Valley, at 0.2 mile north of Loring Ave.	Provide drainage system and install rock slope protection	\$2,894	2016/17
SR 1	Near Olema, 1.8 miles south of Olema	Replace culvert with a bridge	\$6,340	2017/18
SR 1	Near Muir Beach, 0.3 mile north of Seacape Dr.	Construct tie-back wall	\$4,219	2016/17
SR 1	Near Muir Beach, 0.2 mile north of Cold Stream Fire Rd.	Construct tie-back wall	\$3,309	2016/17
SR 1	Near Muir Beach, at Cold Stream Rd.	Construct retaining wall	\$2,139	2016/17
US 101	In San Rafael, at the Route 101/580 interchange	Repair sinking pavement and drainage systems	\$3,912	2016/17
SR 1	In Marin County, near Tamalpais-Homestead Valley, from 0.2 mile west of Erica Rd. to Valley Ford Rd.; also in Napa County, on Route 29, from PM 48.0 to PM 48.6	Install centerline rumble strips	\$8,416	2016/17
US 101	Near Mill Valley, from Redwood Hwy. Frontage Rd. to Route 131 (Tiburon Blvd.)	Install concrete barrier	\$9,409	2017/18
SR 1	In Almonte, near Route 101 off-ramp to Route 1; also from Coyote Creek to Flamingo Rd.	Upgrade pedestrian facilities	\$4,576	2017/18
US 101	In Sausalito, Corte Madera, Larkspur, and Tiburon, on Routes 101 and 131 at various locations	Upgrade curb ramps, driveways and sidewalks	\$3,239	2016/17
SR 1	Near Point Reyes Station, at Lagunitas Creek Bridge No. 27-0023	Replace bridge	\$7,076	2018/19
SR 1	Near Point Reyes Station, at Millerton Gulch Bridge No. 27-0114	Repair damaged embankment and construct retaining wall	\$8,180	2017/18
US 101	In San Rafael, from Route 101 NB off-ramp to 2nd St. at San Rafael Harbor Bridge No. 27-0033	Replace bridge	\$10,264	2017/18
US 101	San Rafael on Route 101 at Miller Creek Bridge No. 27-0004	Scour mitigation	\$1,875	2016/17
SR 1	Near Point Reyes Station and Olema, from Olema Creek Bridge to north of Cypress Rd.; also, near Tomales, from south of Tomales-Petaluma Rd. to south of Valley Ford Rd. (PM 45.0/50.5)	Pavement rehabilitation	\$18,480	2019/20

Note: Funds are in \$1,000's

Source: Caltrans State Highway Operations and Protection Program (SHOPP), March 2016

7.8 Recent Project Funding Identified in RTIP

Additional transportation projects are also ongoing in Marin County. Many have been recognized in the RTIP, updated by MTC in December 2015. In addition to these identified funding programs, additional capital transportation investments are made from time to time. These often involve funding from local sources (such as development fees or development agreements) or from specialized funding made available, but not incorporated into multi-year funding documents. The current list of projects are listed in **Table 15**.

Table 15: Regional Transportation Improvement Program (RTIP) Projects

RTP ID	Project/Program	Total Project Cost	Committed Funds	Discretionary Funds
17030006	Implement Marin Sonoma Narrows HOV Lane and Corridor Improvements Phase 2	\$136	\$ -	\$136
17030002	Climate Program: TDM and Emission Reduction Technology	\$1	\$ -	\$1
17030013	San Rafael Transit Center (SRTC) Relocation Project	\$36	\$ -	\$36
17030015	SMART Downtown San Rafael to Larkspur Rail Extension	\$42	\$2	\$40
17030011	Widen Novato Boulevard between Diablo Ave. and Grant Ave.	\$17	\$ -	\$17
17030001	Bicycle and Pedestrian Program	\$30	\$ -	\$30
17030003	County Safety, Security and Other	\$4	\$ -	\$4
17030010	Highway Improvement Studies	\$5	\$ -	\$5
17030014	Larkspur Ferry Terminal Parking Garage – Planning Study	\$1	\$ -	\$1
17030005	Minor Transit Improvements	\$42	\$ -	\$42
17030016	Multimodal Streetscape	\$49	\$ -	\$49
17030004	Roadway Operations	\$20	\$ -	\$20
17030012	Sir Francis Drake Blvd. / Red Hill Ave. / Center Blvd. (known as "The Hub") – Project Development	\$6	\$ -	\$6
17030008	Tiburon East Blithedale Interchange – PAED	\$12	\$ -	\$12
17030007	US 101 / 580 Interchange Direct Connector – PAED	\$15	\$ -	\$15
17030009	Access Improvements to Richmond San Rafael Bridge	\$7	\$ -	\$7

Note: Amounts shown in millions of year-of-expenditure dollars.

Source: TAM & Plan Bay Area 2040, Metropolitan Transportation Commission RTIP, March 2017

7.9 Project Funding Identified in TAM Measure B Strategic Plan

The annual VRF was increased in November 2010 by \$10 to fund transportation improvements and collection began in May 2011. In July 2011, the TAM Board adopted the VRF Strategic Plan, as required by the VRF Expenditure Plan. The Strategic Plan serves as the programming document for the projects and programs that are contained in the three elements defined in the Expenditure Plan:

- **Element 1:** maintain local streets and Class I pathways, including, but not limited to, road maintenance, safety improvements, emergency pothole repair, crosswalk and accessibility enhancements, intersection control, drainage improvements, streetscape improvements, and Class I bicycle and pedestrian pathway maintenance and improvements. This element is divided

into two sub-elements: Element 1a for local streets and roads and Element 1b for Class I bicycle and pedestrian pathways.

- **Element 2:** improve mobility for seniors and people with disabilities by implementing a Mobility Management Program, supporting and enhancing Whistlestop and other local services, creating a “Paratransit Plus” program to serve older seniors who may not qualify for service under the Americans with Disabilities Act, and implementing other innovative programs to provide mobility to seniors as an alternative to driving.
- **Element 3:** implement three core strategies and programs, including: 1) School Safety and Congestion Reduction; 2) Commuter Alternatives to enhance or expand existing alternative programs to reduce single occupancy commuting; and 3) Electric Vehicle and other Alternative Fuel Programs to support alternative fuel education and implementation programs.

The Measure B VRF Strategic Plan includes proposed allocations for each element through FY 2020/21. These allocation amounts are summarized in **Table 16**.

Table 16: Marin County Measure B Strategic Plan Capital Projects

Element	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
Element 1: Maintain Local Streets and Pathways							
Element 1a: Local Streets	-	-	\$2,230,550	-	-	\$2,192,400	-
Element 1b: Bike/Ped Pathways	\$104,400	\$104,400	\$104,400	\$104,400	\$104,400	\$104,400	\$104,400
Element 2: Improve Transit for Seniors and Persons with Disabilities							
Element 2: Transit for Senior and Disabled	\$730,800	\$730,800	\$730,800	\$730,800	\$730,800	\$730,800	\$730,800
Element 3: Reduce Congestion and Pollution							
Element 3.1: School Safety and Congestion - Crossing Guard	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
Element 3.1: School Safety and Congestion - Street Smart	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
Element 3.2: Commute Alternatives	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000
Element 3.3: Alternative Fuel Promotion	\$197,000	\$197,000	\$197,000	\$197,000	\$197,000	\$197,000	\$197,000

Source: 10-Year Measure B Vehicle registration Fee Revenue and Programming Summary, Transportation Authority of Marin 2011

7.10 Project Funding Identified in Local Jurisdictions’ Bicycle Plans

Marin County’s local jurisdictions have adopted Bicycle/Pedestrian Master Plans with planned related infrastructure improvements. By reference, the Marin County CMP recognizes those plans and planned facilities. Individual bicycle and pedestrian improvements will be implemented as scheduled by local agencies, and as funding becomes available. Funding sources will vary, and include TFCA funds, as well as Measure A, Safe Routes to Schools, and other local funds.

8. DEFICIENCY PLAN PROCEDURES

8.1 Purpose and Intent of Legislation

California Government Code Sections 65089.3, 65089.4, and 65089.5 govern the conformance process. These sections require that TAM determine every two years whether Marin County, including cities and towns within the county, conform to the requirements of the CMP based on information obtained through monitoring.

If TAM believes that a local government is not conforming to CMP requirements, it must then hold a noticed public hearing to determine areas of nonconformance. If after the public hearing TAM still believes that the local government is not conforming to CMP requirements, it must provide written notice to the local government citing the specific instances of nonconformance. The local government then has 90 days to remedy the instances of nonconformance. If after 90 days the local government has not remedied the nonconformance instances, TAM will make a finding of nonconformance and notify the State Controller to withhold certain gas tax subvention funds.

8.2 Local Government Conformance Requirements

CMP legislation has established the following requirements of a conformance determination for local jurisdictions:

- Maintain the highway LOS standards outlined in the CMP (Chapter 2).
- Participate in adoption and implementation of a deficiency plan when highway and roadway LOS standards are not maintained on portions of the designated system.
- Participate in a program to analyze the impact of land use decisions, including the estimate of the costs associated with mitigating these impacts. Specific requirements and recommendations are outlined in the Land Use Analysis Program element of the CMP (Chapter 5).

If either Marin County, or cities and towns within the county, do not meet each of these CMP requirements when TAM is scheduled to make its conformance determination for each jurisdiction ("Jurisdiction" referring to the local government that has the greatest segment distance within its boundaries per CMP definition), the jurisdiction is found in nonconformance. In this case, the jurisdiction may risk losing an increment in its gasoline tax subvention funds and not having projects programmed in the RTIP.

8.3 Local Government Monitoring Requirements

TAM must take active steps to ensure that Marin County and each city and town in Marin County at least biennially conform to each requirement of the CMP legislation. Monitoring must be done for several reasons:

- Congestion is projected to increase, which will waste valuable time and add to the transportation costs of goods and services.
- Congestion causes energy to be wasted and contributes to worsening of air quality.

- Coordinated growth management and transportation planning is essential to minimizing both travel time and costs.

The CMP legislation specifies that jurisdictions that do not demonstrate conformance to the requirements are to lose street and highway subvention money. Many jurisdictions use this money for maintenance of existing streets and roads so as not to neglect their transportation infrastructure.

Outlined below are the major actions that may be required by each jurisdiction to ensure CMP conformance. TAM currently performs all required LOS monitoring.

Maintaining Highway Level of Service Standards

TAM biennially monitors level of service on segments of CMP designated routes within Marin County and its jurisdictions. Where a segment falls within two or more jurisdictions, the jurisdiction responsible for the segment is the jurisdiction with the greatest segment mileage. The monitoring program occurs during the AM (7:00 AM to 9:00 AM) and PM (4:30 PM to 6:30 PM) peak periods. The traffic counts also should be taken in the spring (April or May), with counts at fall periods acceptable when needed (September or October). Consistent with this, the 2015 CMP update includes counts from October and November 2014. The LOS analysis based on these counts is consistent with the LOS methods outlined in the highway LOS standards (Chapter 2).

Transportation improvements or changed economic conditions may result in changes in LOS over consecutive monitoring cycles. If LOS is determined to be A, B, or C for any year that is monitored, the monitoring frequency could be reduced to every other CMP (four years), until such time as the segment is found to operate at LOS D or worse. Any segment determined to operate at LOS D should then be monitored for each CMP (two-year intervals). Grandfathered facilities that currently operate at LOS F do not have to be improved, but nevertheless their conditions should be monitored with each CMP.

Participation in Required Deficiency Plans

Where roadway facilities experience congestion worse than the roadway LOS standards established in Chapter 2, the congestion should be monitored annually until the congestion eases. If the LOS standard is exceeded for two CMP cycles, the roadway is then considered potentially deficient. A determination to see whether a Deficiency Plan is required once the exempted trips allowed in state legislation are assumed not to exist.

If TAM determines a segment that has not been grandfathered does not meet the adopted LOS standards (D for principal arterial roadways; E for freeways), then that jurisdiction must:

- Immediately propose and designate funds for measures that improve the LOS to meet or be better than the adopted LOS standard which TAM would then incorporate into the CIP, or
- Create a “deficiency plan” in accordance with CMP requirements. A deficiency plan requires the local government to:
 1. Analyze the cause of the deficiency and define improvements to the facility that maintain the LOS standard, or

2. Define improvements that have a measurable improvement on the transportation system's LOS or substantial air quality benefit and determine the cost of the improvements.

TAM has published guidelines governing specific issues related to Deficiency Plan preparation on its website. For all deficient facilities (including those that are grandfathered), TAM and its partnering agencies should develop an "operational plan" to minimize congestion on these facilities. Operational plans are envisioned as a description of capital projects, multimodal programs, and/or roadway management techniques that a local jurisdiction intends to advocate for implementation by that jurisdiction or others (such as Caltrans for State facilities).

All incorporated cities and towns in Marin County, along with unincorporated County areas, are in conformance at this time. Therefore, no deficiency plans will be required by this CMP.

Maintaining Program to Analyze Impacts from Land Use Decisions

Land use impact analysis monitoring requirements are detailed in the Land Use Analysis Program (Chapter 5). There are two general requirements:

1. For any general plan update or amendment or major development proposal that would result in a net increase of 100 or more PM peak hour vehicle trips, local governments are to forward information on the application to TAM and run the county model to obtain transportation impact information related to the amendment/development. The jurisdiction is responsible for conducting the model run if requested by TAM, which could be performed: (1) by the jurisdiction, (2) by a consultant hired by the jurisdiction, or (3) by TAM (only if staff is available to do the work). The jurisdiction requesting the model run reimburses the County for the cost of the model run. Model results are useful to cities and the County as part of their current review and approval processes, especially for purposes of defining the necessary mitigation measures.
2. Each jurisdiction is to be responsible for preparing and transmitting land use data to TAM for use in the MTM, as well as tracking land use buildout through issuance of planning and building permits. This requirement ties in with the existing property development ("PROPDEV") database that local governments are already using, as well as the County Community Development Agency's Countywide Land Use Database. TAM biennially runs the MTM in order to update future year LOS information in the CMP. Local governments can find this information useful when updating the land use and circulation elements of their general plans.

9. STUDY REFERENCES

- 2014 Transportation System Monitoring Report for Transportation Authority of Marin, TJKM (Final, June 2013).
- Congestion Management Program 2013 Update for Transportation Authority of Marin, TJKM, 2013.



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