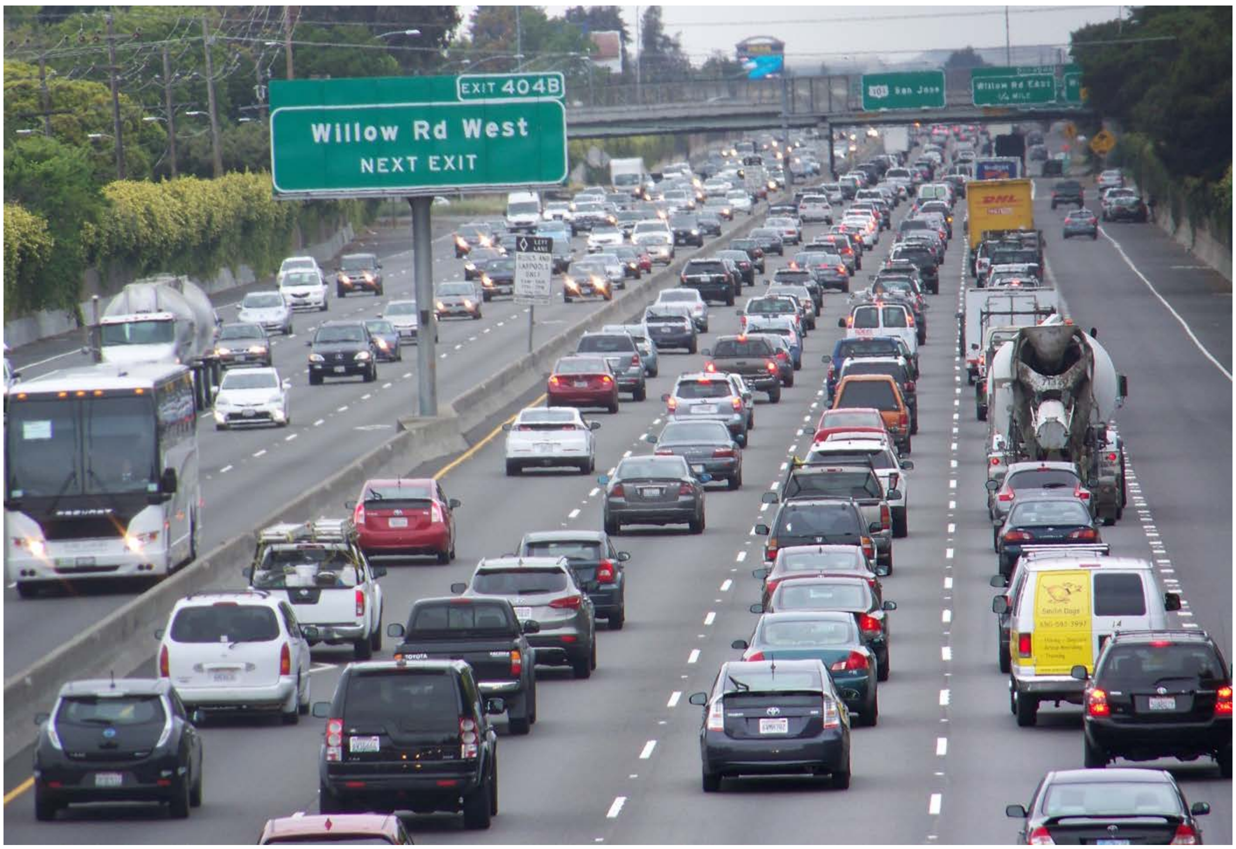
San Mateo County Transportation Authority
City/County Association of Governments of San Mateo County

State Highway System Congestion and Safety Performance Assessment – San Mateo County

January 2017



State Highway System Congestion and Safety Assessment in San Mateo County

Background

This analysis is intended to assess the existing 2015 conditions of the current state highway system network in San Mateo County for congestion and safety. The various performance measures used are detailed in the following sections along with how they should be interpreted with regard to the associated elements considered and their meaning.

Transportation Performance Measures for 2015 in San Mateo County

Determining a Methodology

The method used in this analysis initially evolved from the transportation related work performed by the Metropolitan Transportation Commission (MTC) that is updated annually and referred to as part of Vital Signs, which is an innovative monitoring initiative that tracks trends related to transportation, land and people, the economy and the environment for the nine-county San Francisco Bay Area. In reviewing this large scale document for the region, the various performance measures were assessed to determine a sub-set that would have application to the goals of C/CAG and the Transportation Authority (TA) to better understand countywide congestion and safety. The first initiative taken was to determine the level of detail needed for San Mateo County. MTC focuses more on the big picture of things while a more detailed view is needed for countywide consideration. Therefore, it was determine to define the segmentation based on the availability of operations data. INRIX provides measured speed data to MTC through a contract for the 511 program. This data is then made available to MTC members for free for planning purposes. INRIX utilizes traffic message channel (TMC) segments as the basis for defining road sections on which to report speed. TMC location codes were originally conceived of as points on the road network, typically assigned at significant decision points, interchanges or intersections for the purpose of describing locations of traffic incidents in an unambiguous format, independent of map vendor. INRIX reports traffic flow data by considering the road segments implied by the distance between consecutive TMC location codes, referred to as TMC Segments.

In order to leverage the Congestion Management Process (CMP) work completed by C/CAG, it was decided to make use of the dataset used for the latest update for the 2015 CMP. The period reflected in that analysis was for Tuesdays, Wednesdays, and Thursdays (as typically applied for traffic analysis to avoid Mondays and Fridays that may reflect transitional traffic patterns closer to the weekends) between March – May 2015. The assessment of the State Highway System Congestion in San Mateo County is based on data from the countywide travel demand model and INRIX travel speeds for 2015.

A short-list of congestion and safety performance measures was identified for application in San Mateo County that could be updated for a more detailed analysis using available data sources. These performance measures included total delay, percent of free-flow speed, travel time reliability, traffic collisions resulting in fatalities and injuries, and traffic collision rates. For Delay, MTC focuses on congestion delay which measures only delay when speeds drop below 35 mph. This is the threshold where the freeways begin to operate inefficiently. Given C/CAG is evaluating all state roadways within the County, the threshold of 35 mph does not necessarily apply to non-controlled access facilities like state routes that have signals or rural routes. Therefore, it was determined to use Total Delay as measured below free-flow speed other than a pre-determined threshold of 35 mph.

Free-flow speed is the unconstrained speed of traffic during off-peak periods taking into account normal friction of each corridor including ramps, signals, driveways, etc. Free-flow speed is specific to each corridor measured down to the segment level since each area will have unique performance characteristics. Another performance measure used is percentage free-flow. This is one in the same range of total delay, but one all drivers can easily relate. This places all roadways in the same range of each other no matter the speed limit or operating characteristics, which makes it easier to compare performance across the network.

In addition to total delay and free-flow speed, a performance measure that is important to drivers is consistency of travel time. Within the transportation industry, this is referred to as travel time reliability. It is a function of the variability of travel time from day to day throughout a period of time. This relates to the unpredictability of traffic conditions, thus variability as compared to everyday delays or bottlenecks.

Defining Performance Measures

Congestion

The performance measure results are summarized for the AM and PM peak periods. For the purpose of the analysis, the supporting figures and tables are based on the worst hour of the respective periods. For the AM peak, that was found to be 8-9 am and for the PM peak, it was 5-6 pm. The represented thresholds in each legend were determined based on the distribution of the results. Each category includes approximately the same percentage of the resulting segments.

Total Delay, as opposed to Congested Delay primarily reported by MTC, accounts for delay compared to free-flow speed measured and reported by INRIX. FHWA defines free-flow speed as the measured average speed when there are no constraints placed on a driver by other vehicles on the road. When free-flow speed is measured varies by corridor and segment based on the conditions in the area. It is given that the longer a segment is, the more apt it is to accumulate delay. With that in mind, the units of measure for Total Delay are divided by the segment length which results in a delay value at a unit length level. The delay is further factored by the respective model volume that experienced the measured volume. The resulting units are Vehicle – Hours of Delay per mile (VHD / mile). The source of the volumes for the analysis is the C/CAG – VTA Travel Demand Model for the 2015 year. The results for Total Delay over the region are illustrated in **Figures 1 and 2** for the AM and PM Peak Period, respectively.

Another performance measure reported for consideration is the percentage free-flow speed. The State Highway System Congestion and Safety Assessment include the evaluation of all state roadways in the County. As such, this includes freeways (controlled access facilities) and local state routes that have driveways, traffic signals, and in some instances, stop signs on the rural routes. Therefore, it is more appropriate to compare average speeds to measured free-flow speed instead of average speed to the posted speed limit. Posted speed limit on the local state routes are difficult to maintain given the frequency of driveways, traffic signals, and the quality of the signal timing. Therefore, in order to highlight the conditions due to volume (congestion) and lessen the implications due to traffic signal timing (delay), this assessment compares to free-flow. In this context, speed limits are seen as maximum values vs. averages given the impact of traffic signals, driveways, friction along the corridor, etc. This is especially true along non-control access facilities. The results for percentage free-flow over the region are illustrated in **Figures 3 and 4** for the AM and PM Peak Period, respectively.

A more specific travel time reliability performance measure is referred to as the Buffer Index. Buffer Index in literal terms is the percent of time a driver must add to the average travel time for their trip in order to arrive on time to the destination 95% of the time over a month. A buffer index value of 25% indicates a driver would need to add 25% additional travel time over the average trip time (for an average 40 min trip, the driver would need to add 10 extra minutes) given the variability of the drive time over a typical month. The results for the region are illustrated in **Figures 5 and 6** for the AM and PM Peak Period, respectively.

Figures 7 and 8 highlight the worst performing 25 segments based on the Total Delay performance measure for the AM and PM peak hours, respectively. For the AM peak hour, 18 of the worst 25 segments are in close proximity to the US 101 and SR 92 interchange. In the southbound direction, the segments include the length from Penninsula to Hillsdale while the northbound side is similarly high on the list from Fashion Island Blvd to 3rd Ave. During the PM period, US 101 occupies 6 of the top 7 spots given the high total delays in these 2.99 miles segments between Whipple and Ralson Avenue. Together, these 6 segments contribute over 2,719.5 vehicle-hours of delay / mile during the PM peak hour or 67% of the Total Delay for the worst 10 segments.

Based on Percentage Free Flow, the corresponding figures for the AM and PM peak hour are illustrated on **Figures 9 and 10**, respectively. Similarly to Total Delay, during the AM peak hour, the southbound direction of US 101 around the SR 92 interchange appears high on the list for low Percentage of Free Flow speed from Penninsula to Hillsdale. Also, during the PM peak period, US 101 appears at the top of the list of worst performers for the Percentage Free Flow performance measure. US 101 between Brittan Avenue and Ralston fill five of the top six positions. Having an average speed between 18-24% of free flow produces a large amount of delay. These performance measure results mean that the average speed on these segments are between 12-16 mph, far below the free flow speed of around 66 mph.

When considering travel time reliability, or inconsistency of travel time, once again, many of the segments stadling the SR 92 and US 101 interchange are high on the worst 25 list for the AM peak hour as shown on **Figure 11**. US 101 holds down three of the top 10 spots during the PM peak period as included in **Figure 12.** These segments for TTR are south of the top ranking segments for the other two performance measures. This means that segments near Ralston are consistently poor performing and thus fall down the list in terms on travel time reliability since there is less variance. CA-92 between Polhemus Road and De Anza Boulevard comes to the top of the worst segments for this performance measure given the resulting Buffer Index of 3.04. This value means that a driver must allow an additional 304% of the average travel time (essentially quadrupling the average travel time) for this segment in order to cover the variance 95% of the time.

Safety

For the assessment of safety performance on the State Highway System in San Mateo County, crash data over a three-year period (2013-2015) was used to identify all fatality and injury collisions as well as crash rates accounting for all traffic collisions. Collision data for the state highway system was obtained from the California Highway Patrol collision data. Data source was the Statewide Integrated Traffic Records System (SWITRS) database and included the following highways: SR 1, SR 35, SR 82, SR 84, SR 92, US 101, SR 109, SR 114, I-280, and I-380. Each record provided detailed information for each collision, including the location (defined by state route and highway postmile), the direction/side of highway, severity (fatality, injury, property damage only), and party type (vehicle, pedestrian, or bicylist).
The crash records were processed so that they could be mapped using GIS database. Each crash record was assigned to the nearest 1/10 postmile and mapped to the Caltrans State Highway Network (SHN) and Postmile System.

For this analysis, the crash rates were calculated based on a network used by INRIX to report traffic data. The links of the network are referred to as TMC segments. Using GIS, the collisions were associated with a TMC segment and aggregated to determine the number of crashes in the three-year study period for each TMC segment.

Based on average annual collisions, **Figure 13** displays traffic collisions, including injury and fatalities and **Figure 14** displays traffic collision rate per mile.

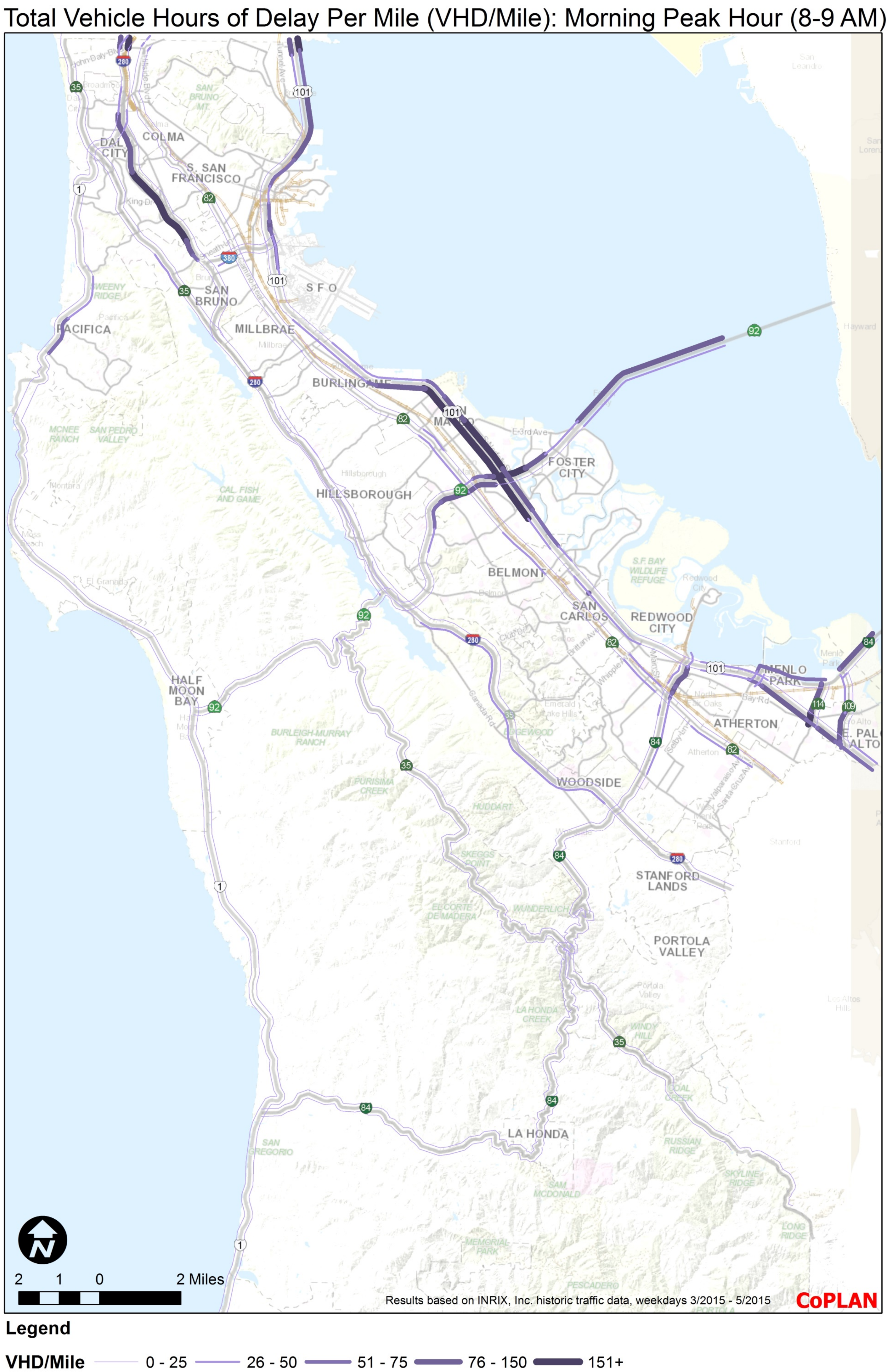


Figure 1: Total Vehicle Hours of Delay per Mile (AM Peak Period 8-9 AM)

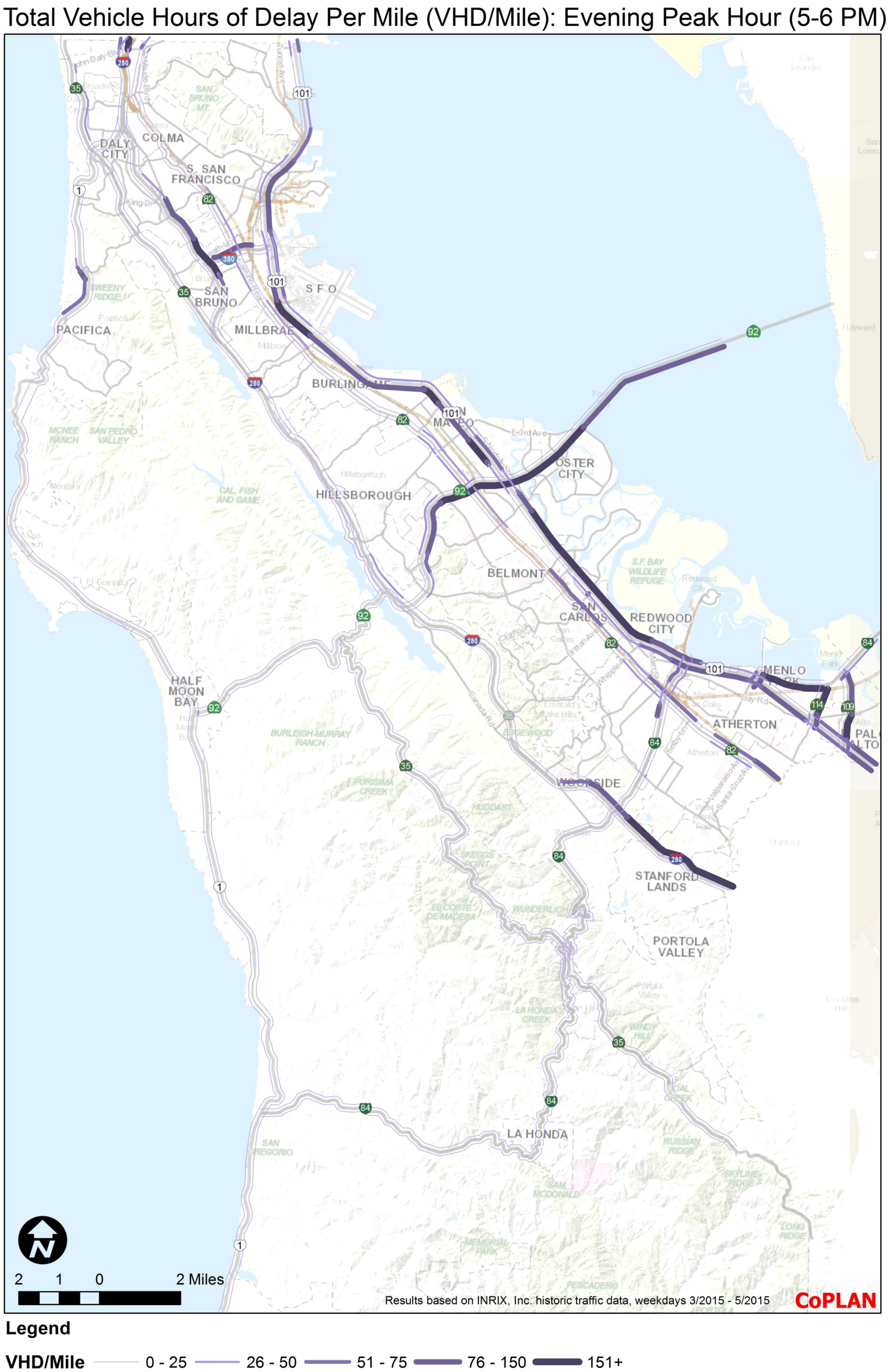


Figure 2: Total Vehicle Hours of Delay per Mile (PM Peak Period 5-6 PM)

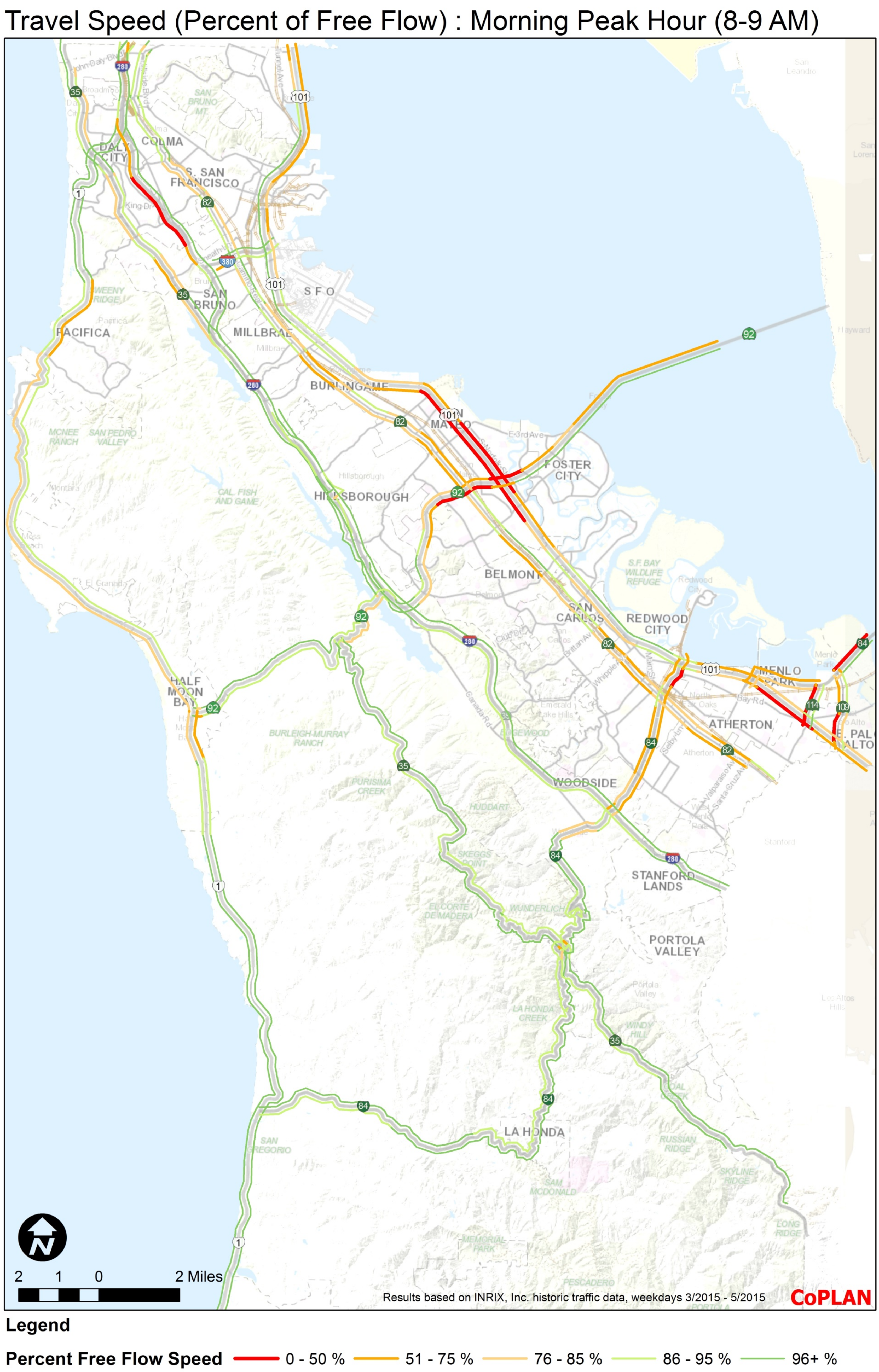


Figure 3: Percent of Free Flow Speed (AM Peak Period 8-9 AM)

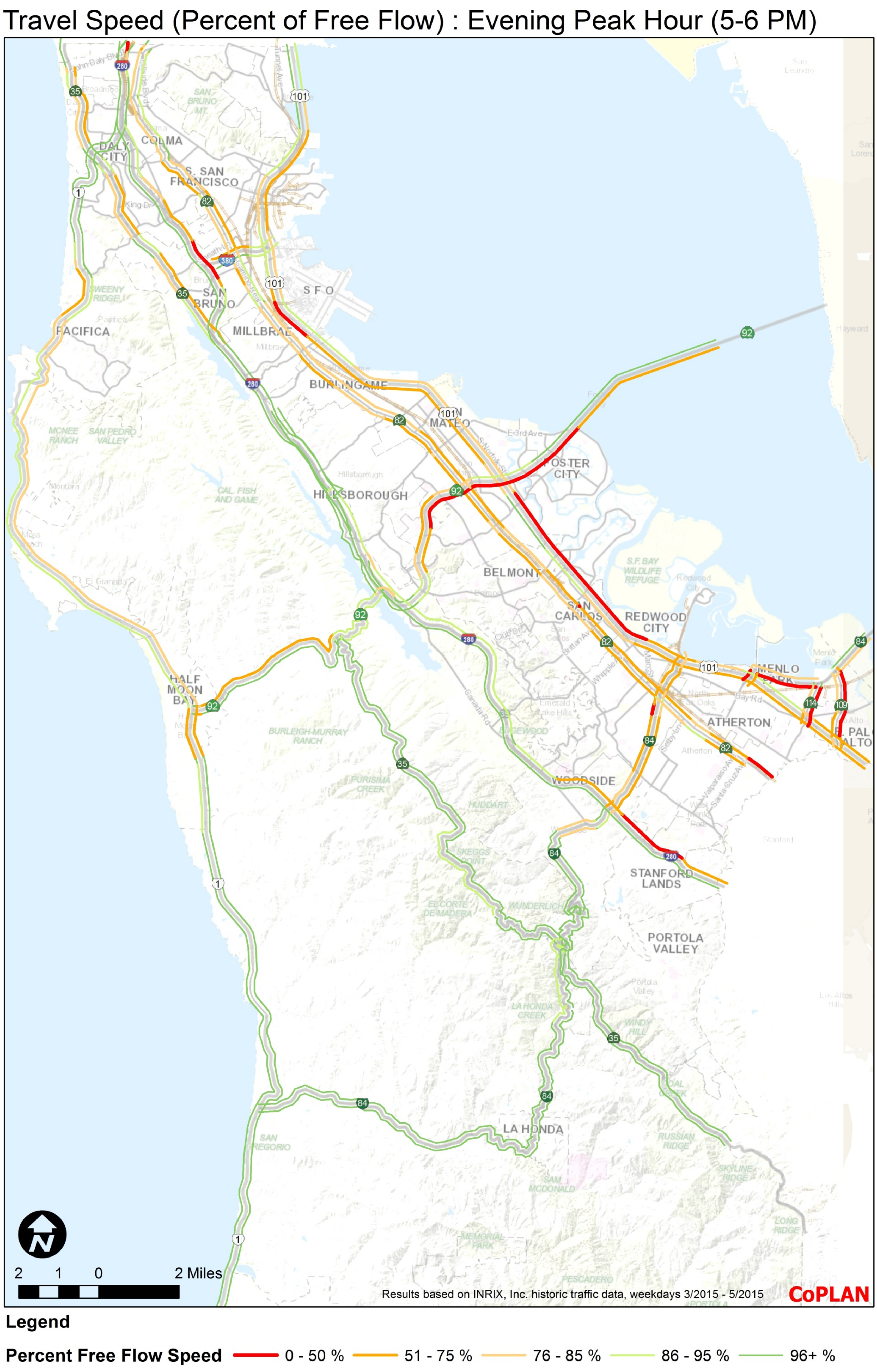


Figure 4: Percent of Free Flow Speed (PM Peak Period 5-6 PM)

Travel Time Reliability (Buffer Index): Morning Peak Hour (8-9 AM)

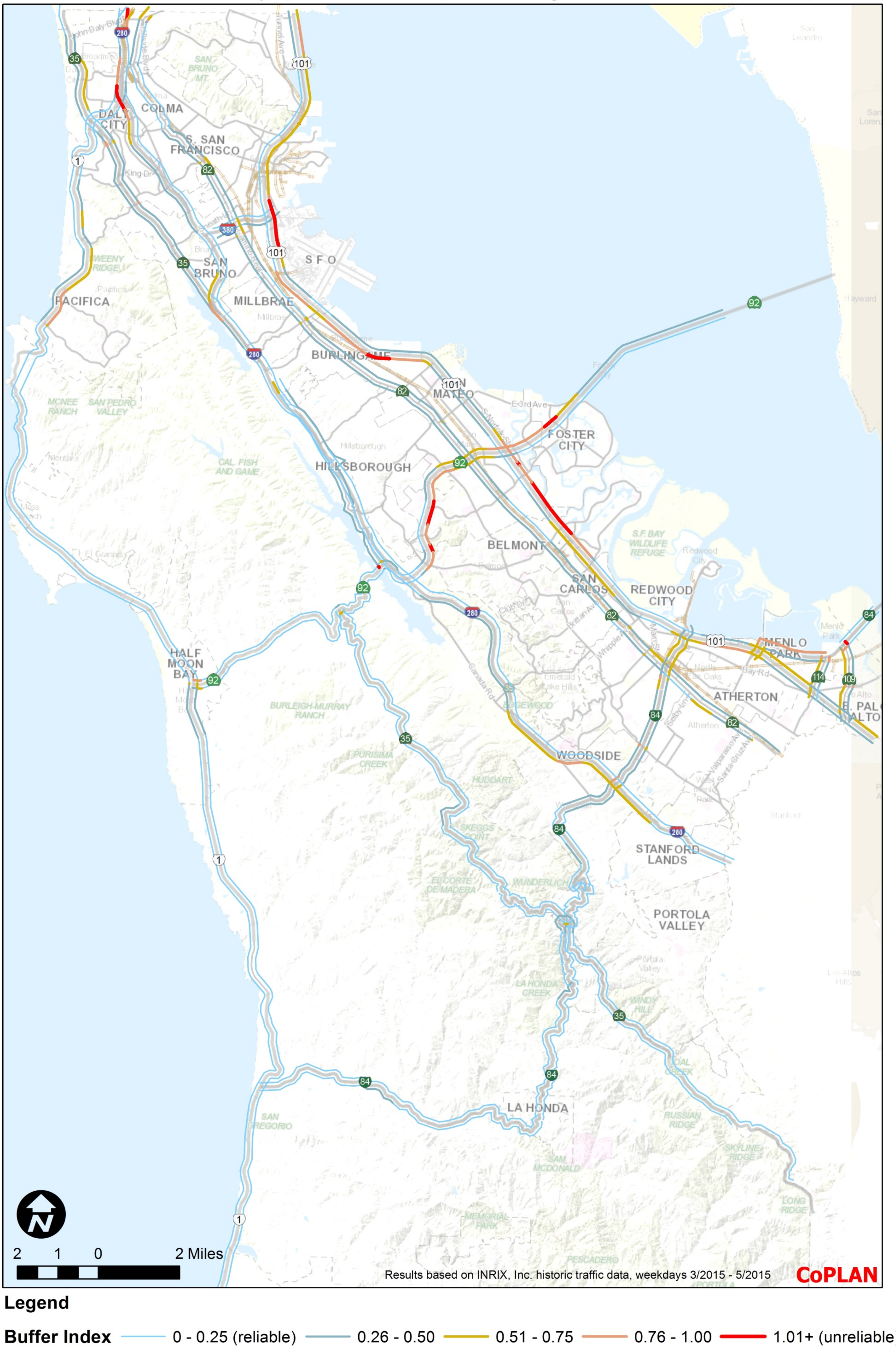


Figure 5: Travel Time Reliability (Buffer Index for AM Peak Period 8-9 AM)

Travel Time Reliability (Buffer Index): Evening Peak Hour (5-6 PM)

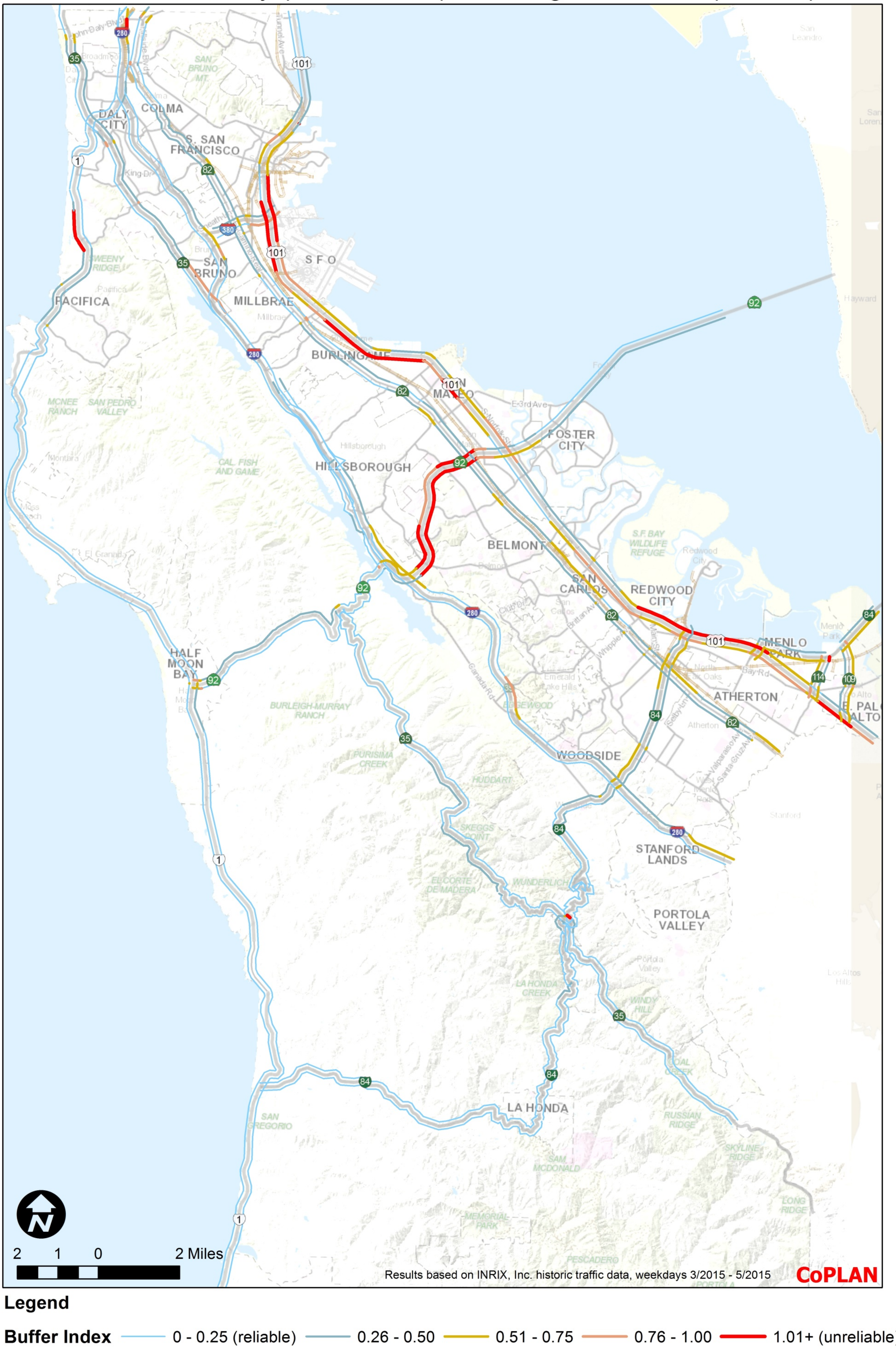
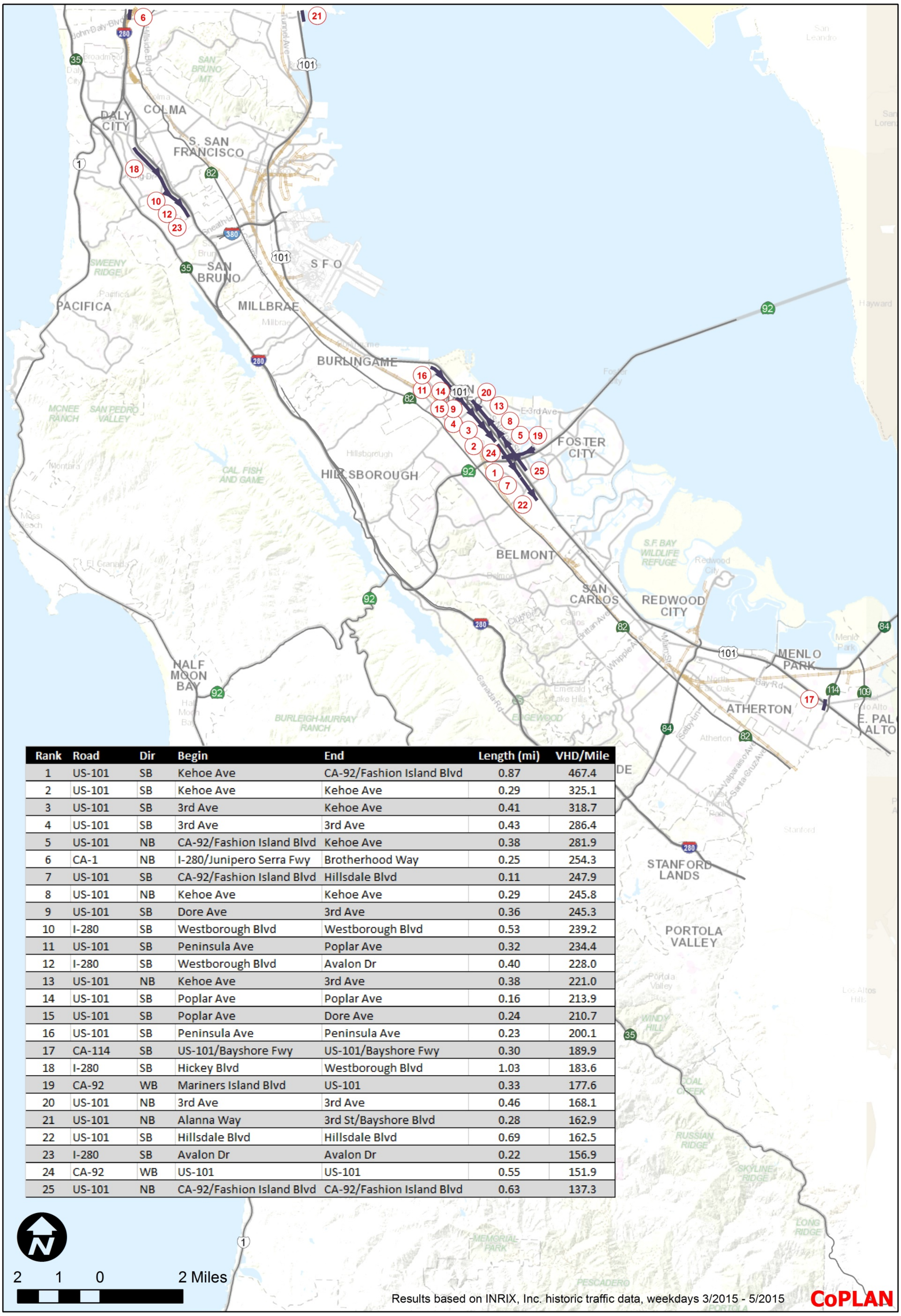


Figure 6: Travel Time Reliability (Buffer Index for PM Peak Period 5-6 PM)

Worst 25 Segments based on Total Delay (VHD/Mile) : Morning Peak Hour (8-9 AM)



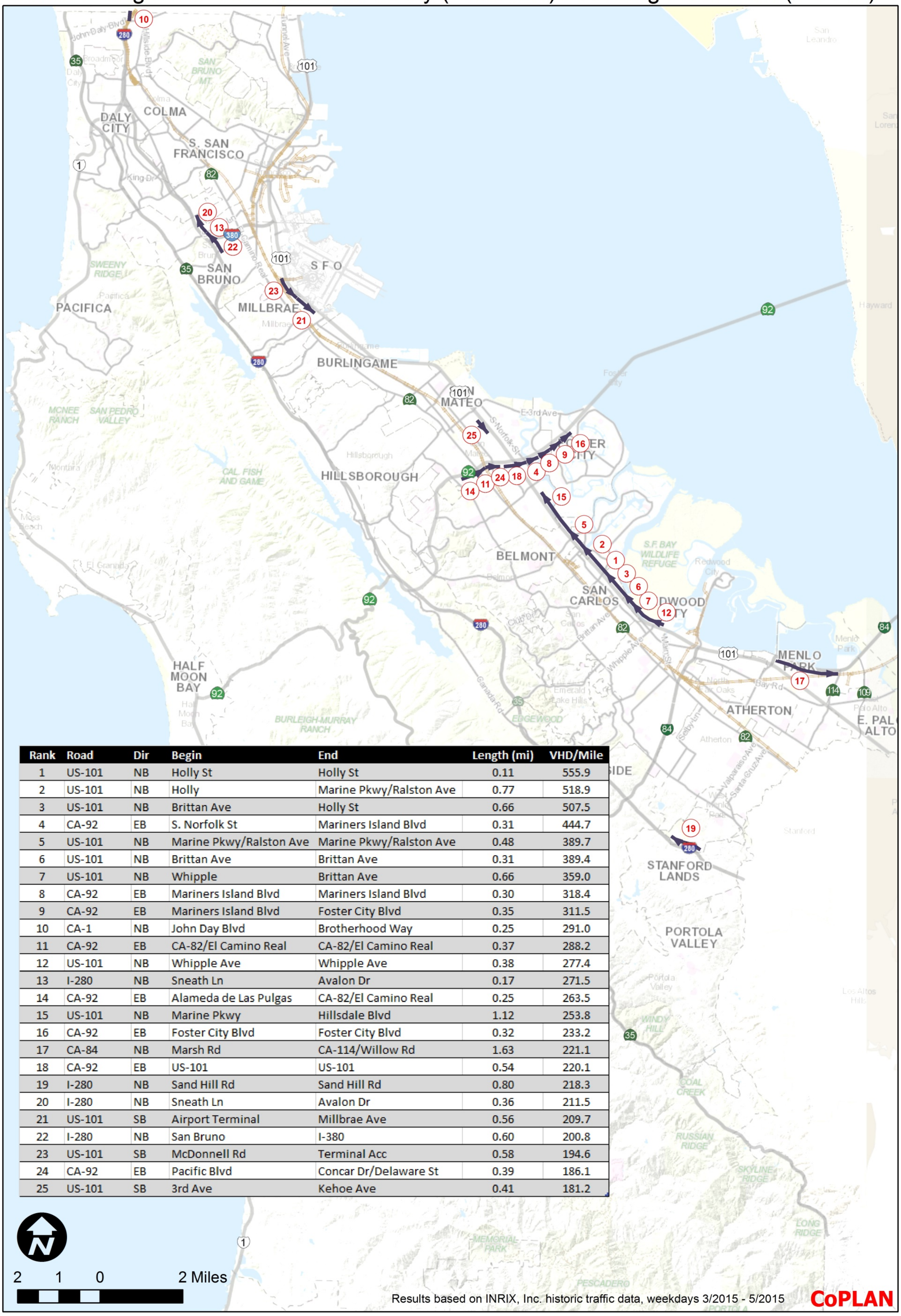
Rank	Road	Dir	Begin	End	Length (mi)	VHD/Mile
1	US-101	SB	Kehoe Ave	CA-92/Fashion Island Blvd	0.87	467.4
2	US-101	SB	Kehoe Ave	Kehoe Ave	0.29	325.1
3	US-101	SB	3rd Ave	Kehoe Ave	0.41	318.7
4	US-101	SB	3rd Ave	3rd Ave	0.43	286.4
5	US-101	NB	CA-92/Fashion Island Blvd	Kehoe Ave	0.38	281.9
6	CA-1	NB	I-280/Junipero Serra Fwy	Brotherhood Way	0.25	254.3
7	US-101	SB	CA-92/Fashion Island Blvd	Hillsdale Blvd	0.11	247.9
8	US-101	NB	Kehoe Ave	Kehoe Ave	0.29	245.8
9	US-101	SB	Dore Ave	3rd Ave	0.36	245.3
10	I-280	SB	Westborough Blvd	Westborough Blvd	0.53	239.2
11	US-101	SB	Peninsula Ave	Poplar Ave	0.32	234.4
12	I-280	SB	Westborough Blvd	Avalon Dr	0.40	228.0
13	US-101	NB	Kehoe Ave	3rd Ave	0.38	221.0
14	US-101	SB	Poplar Ave	Poplar Ave	0.16	213.9
15	US-101	SB	Poplar Ave	Dore Ave	0.24	210.7
16	US-101	SB	Peninsula Ave	Peninsula Ave	0.23	200.1
17	CA-114	SB	US-101/Bayshore Fwy	US-101/Bayshore Fwy	0.30	189.9
18	I-280	SB	Hickey Blvd	Westborough Blvd	1.03	183.6
19	CA-92	WB	Mariners Island Blvd	US-101	0.33	177.6
20	US-101	NB	3rd Ave	3rd Ave	0.46	168.1
21	US-101	NB	Alanna Way	3rd St/Bayshore Blvd	0.28	162.9
22	US-101	SB	Hillsdale Blvd	Hillsdale Blvd	0.69	162.5
23	I-280	SB	Avalon Dr	Avalon Dr	0.22	156.9
24	CA-92	WB	US-101	US-101	0.55	151.9
25	US-101	NB	CA-92/Fashion Island Blvd	CA-92/Fashion Island Blvd	0.63	137.3

Legend

Worst 25 Segments based on Total Delay Per Mile (8-9 AM)

Figure 7: Worst 25 Segments based on Total Delay (VHD / mile for AM Peak Period 8-9 AM)

Worst 25 Segments based on Total Delay (VHD/Mile) : Evening Peak Hour (5-6 PM)



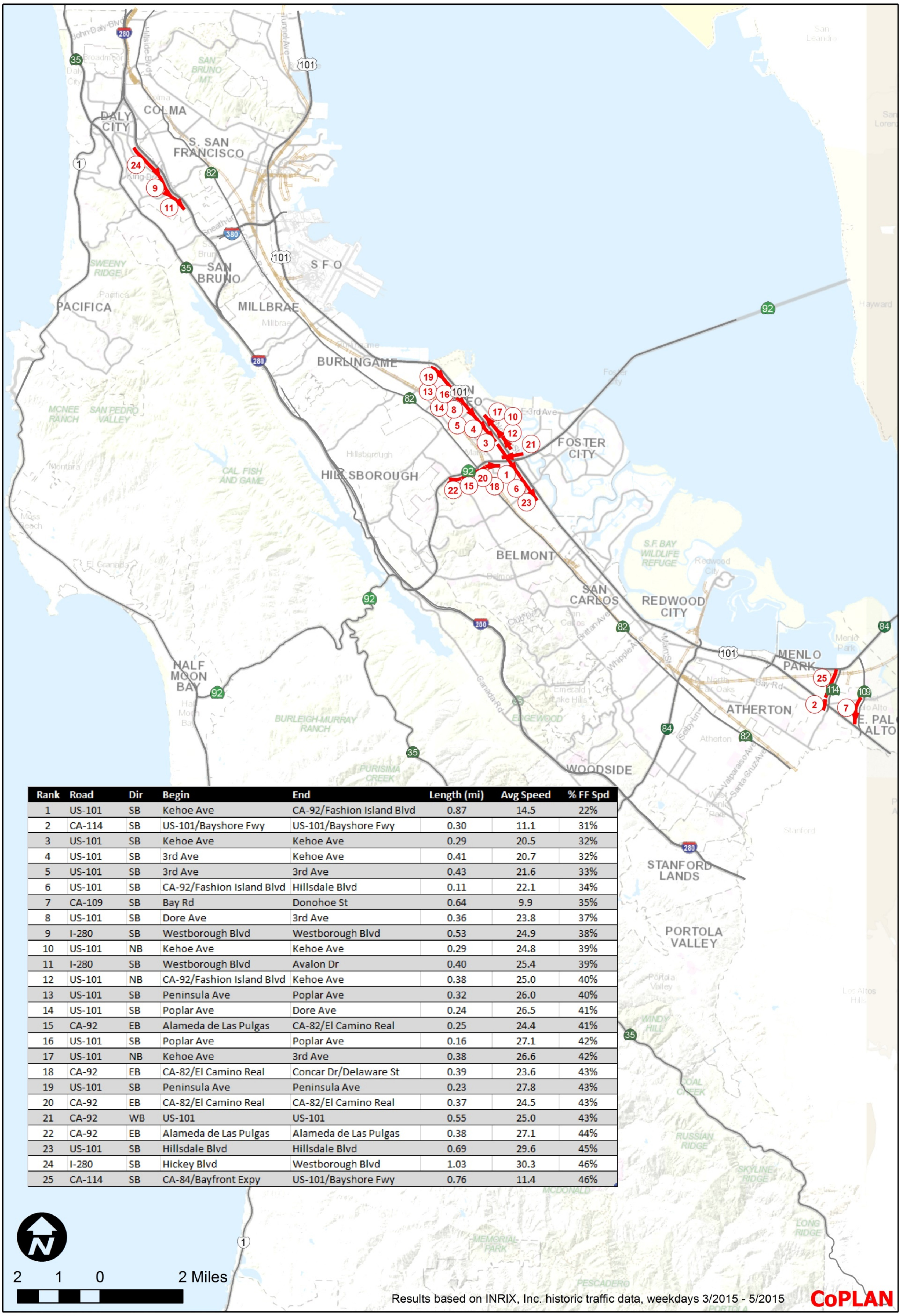
Rank	Road	Dir	Begin	End	Length (mi)	VHD/Mile
1	US-101	NB	Holly St	Holly St	0.11	555.9
2	US-101	NB	Holly	Marine Pkwy/Ralston Ave	0.77	518.9
3	US-101	NB	Brittan Ave	Holly St	0.66	507.5
4	CA-92	EB	S. Norfolk St	Mariners Island Blvd	0.31	444.7
5	US-101	NB	Marine Pkwy/Ralston Ave	Marine Pkwy/Ralston Ave	0.48	389.7
6	US-101	NB	Brittan Ave	Brittan Ave	0.31	389.4
7	US-101	NB	Whipple	Brittan Ave	0.66	359.0
8	CA-92	EB	Mariners Island Blvd	Mariners Island Blvd	0.30	318.4
9	CA-92	EB	Mariners Island Blvd	Foster City Blvd	0.35	311.5
10	CA-1	NB	John Day Blvd	Brotherhood Way	0.25	291.0
11	CA-92	EB	CA-82/El Camino Real	CA-82/El Camino Real	0.37	288.2
12	US-101	NB	Whipple Ave	Whipple Ave	0.38	277.4
13	I-280	NB	Sneath Ln	Avalon Dr	0.17	271.5
14	CA-92	EB	Alameda de Las Pulgas	CA-82/El Camino Real	0.25	263.5
15	US-101	NB	Marine Pkwy	Hillsdale Blvd	1.12	253.8
16	CA-92	EB	Foster City Blvd	Foster City Blvd	0.32	233.2
17	CA-84	NB	Marsh Rd	CA-114/Willow Rd	1.63	221.1
18	CA-92	EB	US-101	US-101	0.54	220.1
19	I-280	NB	Sand Hill Rd	Sand Hill Rd	0.80	218.3
20	I-280	NB	Sneath Ln	Avalon Dr	0.36	211.5
21	US-101	SB	Airport Terminal	Millbrae Ave	0.56	209.7
22	I-280	NB	San Bruno	I-380	0.60	200.8
23	US-101	SB	McDonnell Rd	Terminal Acc	0.58	194.6
24	CA-92	EB	Pacific Blvd	Concar Dr/Delaware St	0.39	186.1
25	US-101	SB	3rd Ave	Kehoe Ave	0.41	181.2

Legend

Worst 25 Segments based on Total Delay Per Mile (5-6 PM)

Figure 8: Worst 25 Segments based on Total Delay (VHD / mile for PM Peak Period 5-6 PM)

Worst 25 Segments based on Travel Speed (Percent of Free Flow) : Morning Peak Hour (8-9 AM)



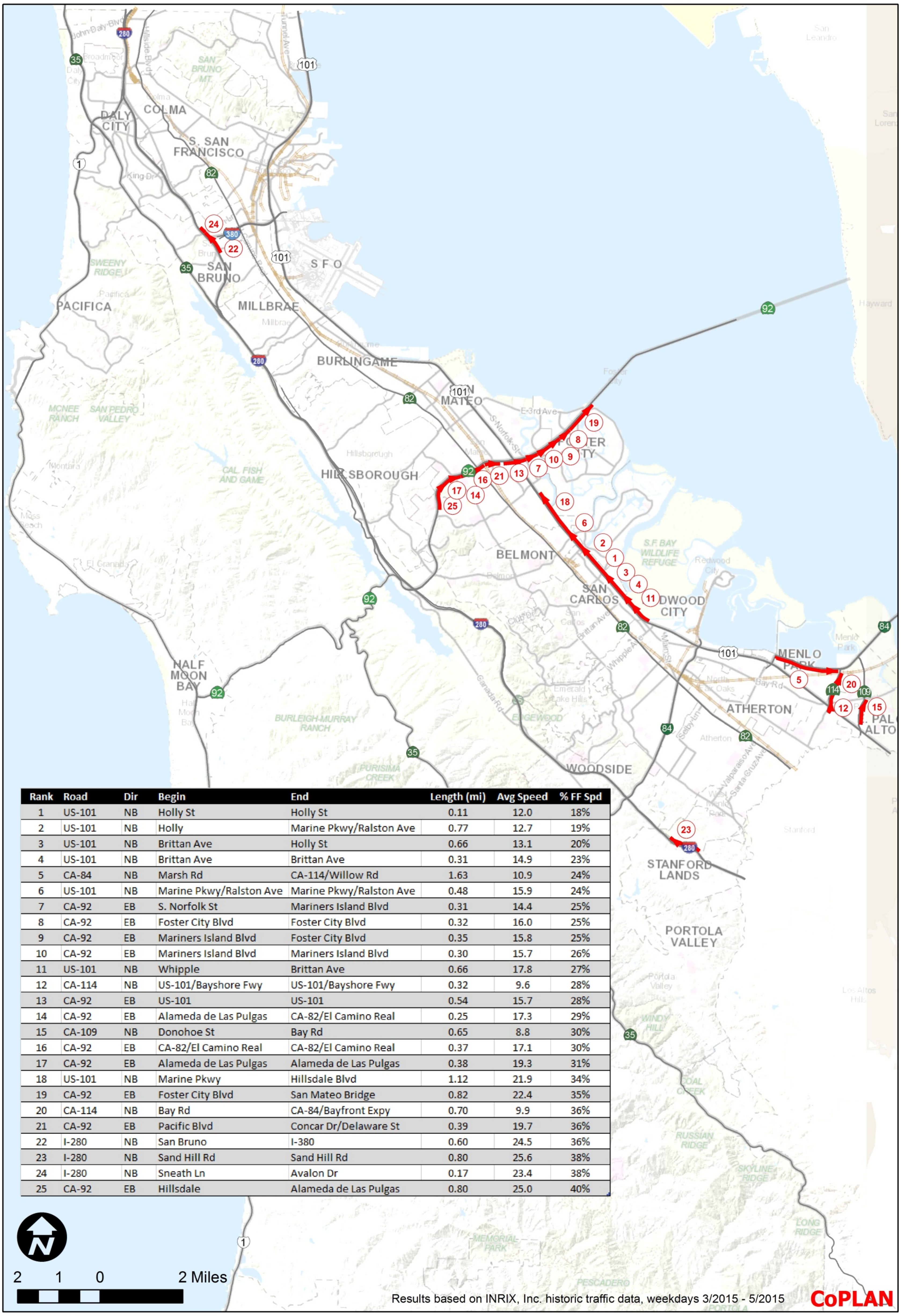
Rank	Road	Dir	Begin	End	Length (mi)	Avg Speed	% FF Spd
1	US-101	SB	Kehoe Ave	CA-92/Fashion Island Blvd	0.87	14.5	22%
2	CA-114	SB	US-101/Bayshore Fwy	US-101/Bayshore Fwy	0.30	11.1	31%
3	US-101	SB	Kehoe Ave	Kehoe Ave	0.29	20.5	32%
4	US-101	SB	3rd Ave	Kehoe Ave	0.41	20.7	32%
5	US-101	SB	3rd Ave	3rd Ave	0.43	21.6	33%
6	US-101	SB	CA-92/Fashion Island Blvd	Hillsdale Blvd	0.11	22.1	34%
7	CA-109	SB	Bay Rd	Donohoe St	0.64	9.9	35%
8	US-101	SB	Dore Ave	3rd Ave	0.36	23.8	37%
9	I-280	SB	Westborough Blvd	Westborough Blvd	0.53	24.9	38%
10	US-101	NB	Kehoe Ave	Kehoe Ave	0.29	24.8	39%
11	I-280	SB	Westborough Blvd	Avalon Dr	0.40	25.4	39%
12	US-101	NB	CA-92/Fashion Island Blvd	Kehoe Ave	0.38	25.0	40%
13	US-101	SB	Peninsula Ave	Poplar Ave	0.32	26.0	40%
14	US-101	SB	Poplar Ave	Dore Ave	0.24	26.5	41%
15	CA-92	EB	Alameda de Las Pulgas	CA-82/El Camino Real	0.25	24.4	41%
16	US-101	SB	Poplar Ave	Poplar Ave	0.16	27.1	42%
17	US-101	NB	Kehoe Ave	3rd Ave	0.38	26.6	42%
18	CA-92	EB	CA-82/El Camino Real	Concar Dr/Delaware St	0.39	23.6	43%
19	US-101	SB	Peninsula Ave	Peninsula Ave	0.23	27.8	43%
20	CA-92	EB	CA-82/El Camino Real	CA-82/El Camino Real	0.37	24.5	43%
21	CA-92	WB	US-101	US-101	0.55	25.0	43%
22	CA-92	EB	Alameda de Las Pulgas	Alameda de Las Pulgas	0.38	27.1	44%
23	US-101	SB	Hillsdale Blvd	Hillsdale Blvd	0.69	29.6	45%
24	I-280	SB	Hickey Blvd	Westborough Blvd	1.03	30.3	46%
25	CA-114	SB	CA-84/Bayfront Expy	US-101/Bayshore Fwy	0.76	11.4	46%

Legend

Worst 25 Segments based on % Free Flow Speed (8-9 AM)

Figure 9: Worst 25 Segments based on Travel Speed (% of Free Flow for AM Peak Period 8-9 AM)

Worst 25 Segments based on Travel Speed (Percent of Free Flow) : Evening Peak Hour (5-6 PM)



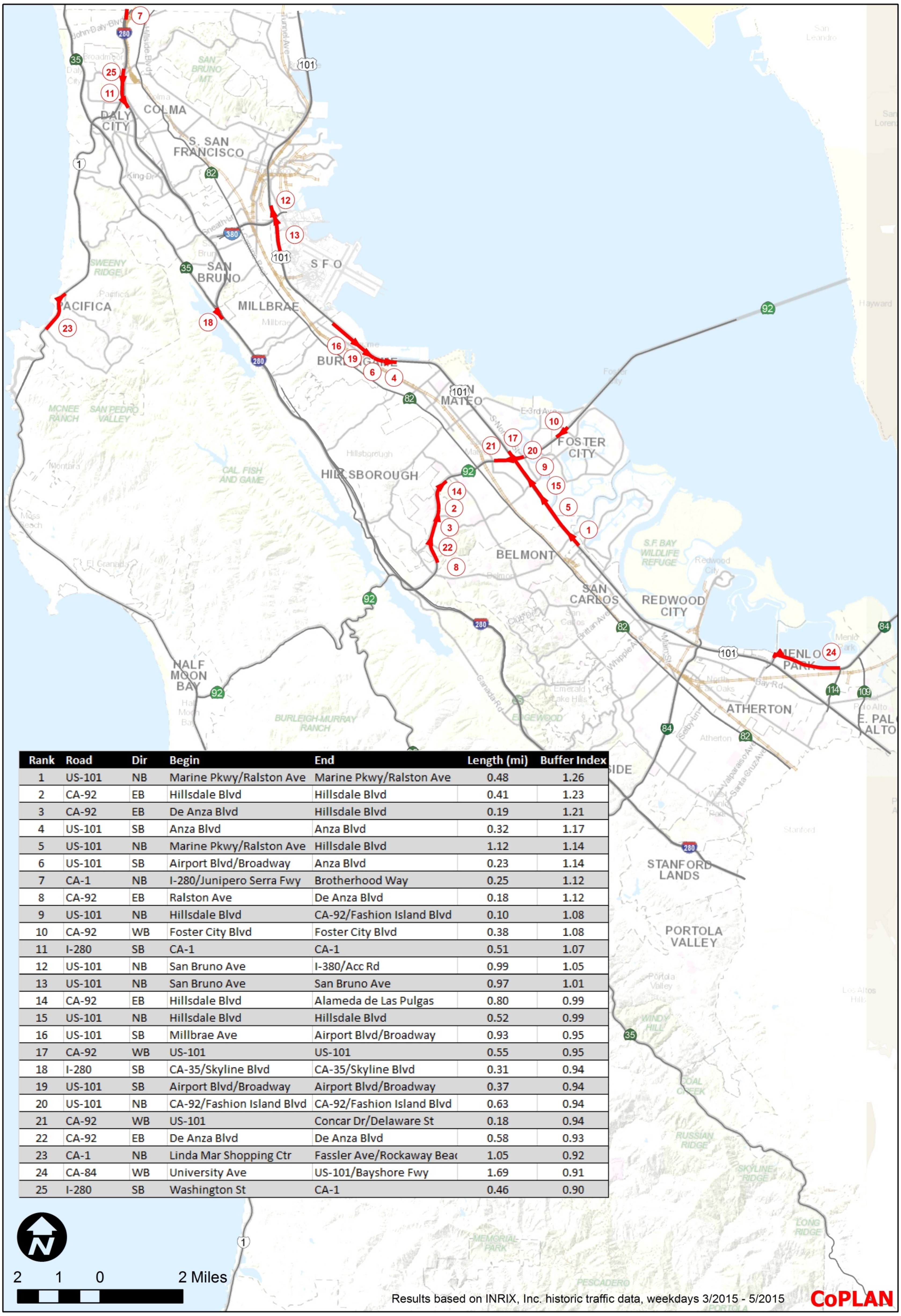
Rank	Road	Dir	Begin	End	Length (mi)	Avg Speed	% FF Spd
1	US-101	NB	Holly St	Holly St	0.11	12.0	18%
2	US-101	NB	Holly	Marine Pkwy/Ralston Ave	0.77	12.7	19%
3	US-101	NB	Brittan Ave	Holly St	0.66	13.1	20%
4	US-101	NB	Brittan Ave	Brittan Ave	0.31	14.9	23%
5	CA-84	NB	Marsh Rd	CA-114/Willow Rd	1.63	10.9	24%
6	US-101	NB	Marine Pkwy/Ralston Ave	Marine Pkwy/Ralston Ave	0.48	15.9	24%
7	CA-92	EB	S. Norfolk St	Mariners Island Blvd	0.31	14.4	25%
8	CA-92	EB	Foster City Blvd	Foster City Blvd	0.32	16.0	25%
9	CA-92	EB	Mariners Island Blvd	Foster City Blvd	0.35	15.8	25%
10	CA-92	EB	Mariners Island Blvd	Mariners Island Blvd	0.30	15.7	26%
11	US-101	NB	Whipple	Brittan Ave	0.66	17.8	27%
12	CA-114	NB	US-101/Bayshore Fwy	US-101/Bayshore Fwy	0.32	9.6	28%
13	CA-92	EB	US-101	US-101	0.54	15.7	28%
14	CA-92	EB	Alameda de Las Pulgas	CA-82/El Camino Real	0.25	17.3	29%
15	CA-109	NB	Donohoe St	Bay Rd	0.65	8.8	30%
16	CA-92	EB	CA-82/El Camino Real	CA-82/El Camino Real	0.37	17.1	30%
17	CA-92	EB	Alameda de Las Pulgas	Alameda de Las Pulgas	0.38	19.3	31%
18	US-101	NB	Marine Pkwy	Hillsdale Blvd	1.12	21.9	34%
19	CA-92	EB	Foster City Blvd	San Mateo Bridge	0.82	22.4	35%
20	CA-114	NB	Bay Rd	CA-84/Bayfront Expy	0.70	9.9	36%
21	CA-92	EB	Pacific Blvd	Concar Dr/Delaware St	0.39	19.7	36%
22	I-280	NB	San Bruno	I-380	0.60	24.5	36%
23	I-280	NB	Sand Hill Rd	Sand Hill Rd	0.80	25.6	38%
24	I-280	NB	Sneath Ln	Avalon Dr	0.17	23.4	38%
25	CA-92	EB	Hillsdale	Alameda de Las Pulgas	0.80	25.0	40%

Legend

Worst 25 Segments based on % Free Flow Speed (5-6 PM)

Figure 10: Worst 25 Segments based on Travel Speed (% of Free Flow for PM Peak Period 5-6 PM)

Worst 25 Segments based onTravel Time Reliability (Buffer Index) : Morning Peak Hour (8-9 AM)



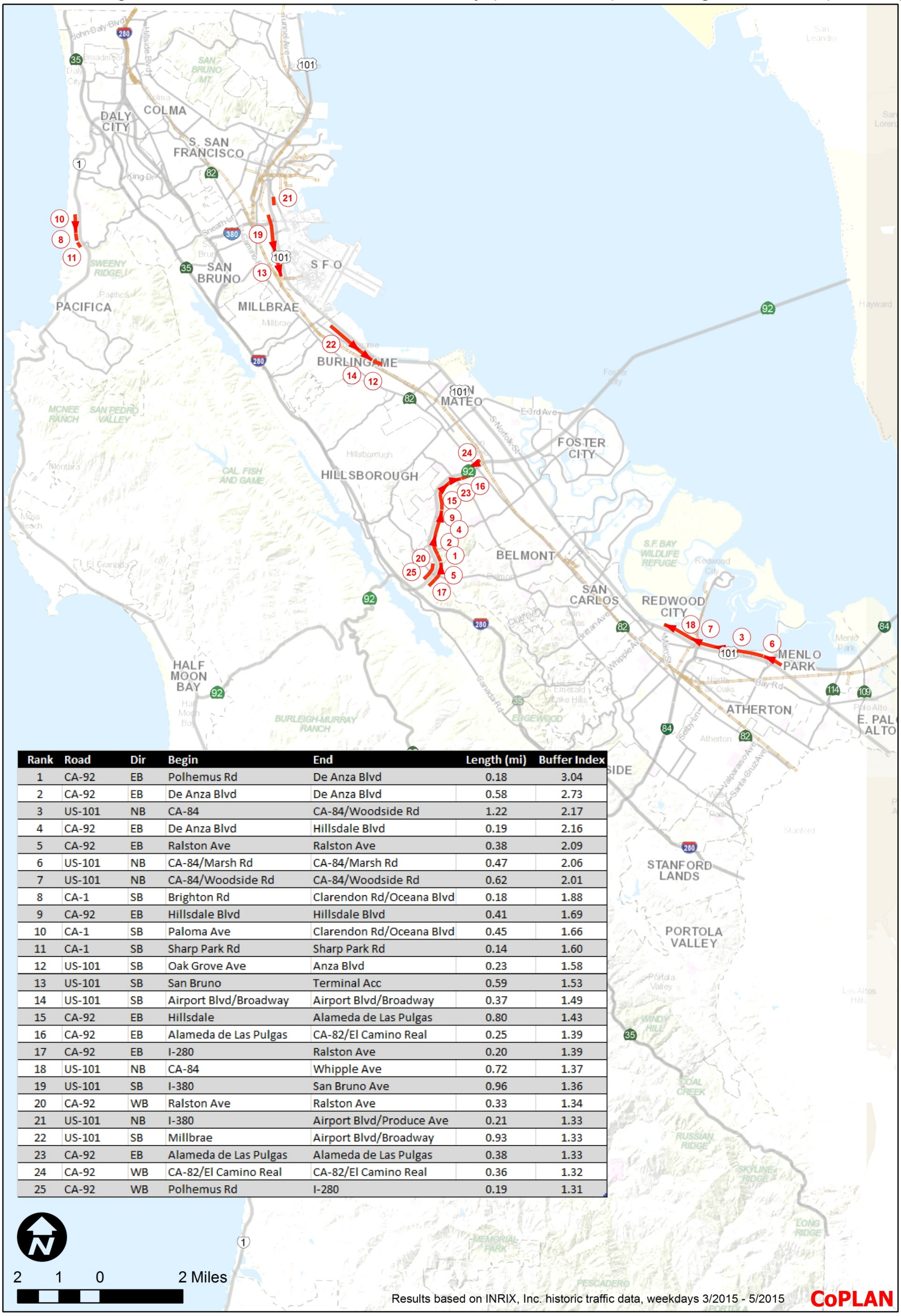
Rank	Road	Dir	Begin	End	Length (mi)	Buffer Index
1	US-101	NB	Marine Pkwy/Ralston Ave	Marine Pkwy/Ralston Ave	0.48	1.26
2	CA-92	EB	Hillsdale Blvd	Hillsdale Blvd	0.41	1.23
3	CA-92	EB	De Anza Blvd	Hillsdale Blvd	0.19	1.21
4	US-101	SB	Anza Blvd	Anza Blvd	0.32	1.17
5	US-101	NB	Marine Pkwy/Ralston Ave	Hillsdale Blvd	1.12	1.14
6	US-101	SB	Airport Blvd/Broadway	Anza Blvd	0.23	1.14
7	CA-1	NB	I-280/Junipero Serra Fwy	Brotherhood Way	0.25	1.12
8	CA-92	EB	Ralston Ave	De Anza Blvd	0.18	1.12
9	US-101	NB	Hillsdale Blvd	CA-92/Fashion Island Blvd	0.10	1.08
10	CA-92	WB	Foster City Blvd	Foster City Blvd	0.38	1.08
11	I-280	SB	CA-1	CA-1	0.51	1.07
12	US-101	NB	San Bruno Ave	I-380/Acc Rd	0.99	1.05
13	US-101	NB	San Bruno Ave	San Bruno Ave	0.97	1.01
14	CA-92	EB	Hillsdale Blvd	Alameda de Las Pulgas	0.80	0.99
15	US-101	NB	Hillsdale Blvd	Hillsdale Blvd	0.52	0.99
16	US-101	SB	Millbrae Ave	Airport Blvd/Broadway	0.93	0.95
17	CA-92	WB	US-101	US-101	0.55	0.95
18	I-280	SB	CA-35/Skyline Blvd	CA-35/Skyline Blvd	0.31	0.94
19	US-101	SB	Airport Blvd/Broadway	Airport Blvd/Broadway	0.37	0.94
20	US-101	NB	CA-92/Fashion Island Blvd	CA-92/Fashion Island Blvd	0.63	0.94
21	CA-92	WB	US-101	Concar Dr/Delaware St	0.18	0.94
22	CA-92	EB	De Anza Blvd	De Anza Blvd	0.58	0.93
23	CA-1	NB	Linda Mar Shopping Ctr	Fassler Ave/Rockaway Beac	1.05	0.92
24	CA-84	WB	University Ave	US-101/Bayshore Fwy	1.69	0.91
25	I-280	SB	Washington St	CA-1	0.46	0.90

Legend

Worst 25 Segments based on Travel Time Reliability (Buffer Index) (8-9 AM)

Figure 11: Worst 25 Segments based on Travel Time Reliability (Buffer Index for AM Peak Period 8-9 AM)

Worst 25 Segments based onTravel Time Reliability (Buffer Index) : Evening Peak Hour (5-6 PM)



Rank	Road	Dir	Begin	End	Length (mi)	Buffer Index
1	CA-92	EB	Polhemus Rd	De Anza Blvd	0.18	3.04
2	CA-92	EB	De Anza Blvd	De Anza Blvd	0.58	2.73
3	US-101	NB	CA-84	CA-84/Woodside Rd	1.22	2.17
4	CA-92	EB	De Anza Blvd	Hillsdale Blvd	0.19	2.16
5	CA-92	EB	Ralston Ave	Ralston Ave	0.38	2.09
6	US-101	NB	CA-84/Marsh Rd	CA-84/Marsh Rd	0.47	2.06
7	US-101	NB	CA-84/Woodside Rd	CA-84/Woodside Rd	0.62	2.01
8	CA-1	SB	Brighton Rd	Clarendon Rd/Oceana Blvd	0.18	1.88
9	CA-92	EB	Hillsdale Blvd	Hillsdale Blvd	0.41	1.69
10	CA-1	SB	Paloma Ave	Clarendon Rd/Oceana Blvd	0.45	1.66
11	CA-1	SB	Sharp Park Rd	Sharp Park Rd	0.14	1.60
12	US-101	SB	Oak Grove Ave	Anza Blvd	0.23	1.58
13	US-101	SB	San Bruno	Terminal Acc	0.59	1.53
14	US-101	SB	Airport Blvd/Broadway	Airport Blvd/Broadway	0.37	1.49
15	CA-92	EB	Hillsdale	Alameda de Las Pulgas	0.80	1.43
16	CA-92	EB	Alameda de Las Pulgas	CA-82/El Camino Real	0.25	1.39
17	CA-92	EB	I-280	Ralston Ave	0.20	1.39
18	US-101	NB	CA-84	Whipple Ave	0.72	1.37
19	US-101	SB	I-380	San Bruno Ave	0.96	1.36
20	CA-92	WB	Ralston Ave	Ralston Ave	0.33	1.34
21	US-101	NB	I-380	Airport Blvd/Produce Ave	0.21	1.33
22	US-101	SB	Millbrae	Airport Blvd/Broadway	0.93	1.33
23	CA-92	EB	Alameda de Las Pulgas	Alameda de Las Pulgas	0.38	1.33
24	CA-92	WB	CA-82/El Camino Real	CA-82/El Camino Real	0.36	1.32
25	CA-92	WB	Polhemus Rd	I-280	0.19	1.31

Legend

Worst 25 Segments based on Travel Time Reliability (Buffer Index) (5-6 PM)

Figure 12: Worst 25 Segments based on Travel Time Reliability (Buffer Index for PM Peak Period 5-6 PM)

Traffic Collisions: Fatalities and Injuries

Legend

Injury

Fatality

The following segments may have missing data from the Statewide Integrated Traffic Records Systems (SWITRS): Bayfront Expressway, El Camino Real in San Mateo and Colma

Results based on reported collisions from calendar year 2013 to 2015

Figure 13: Traffic Collisions: Fatalities and Injuries

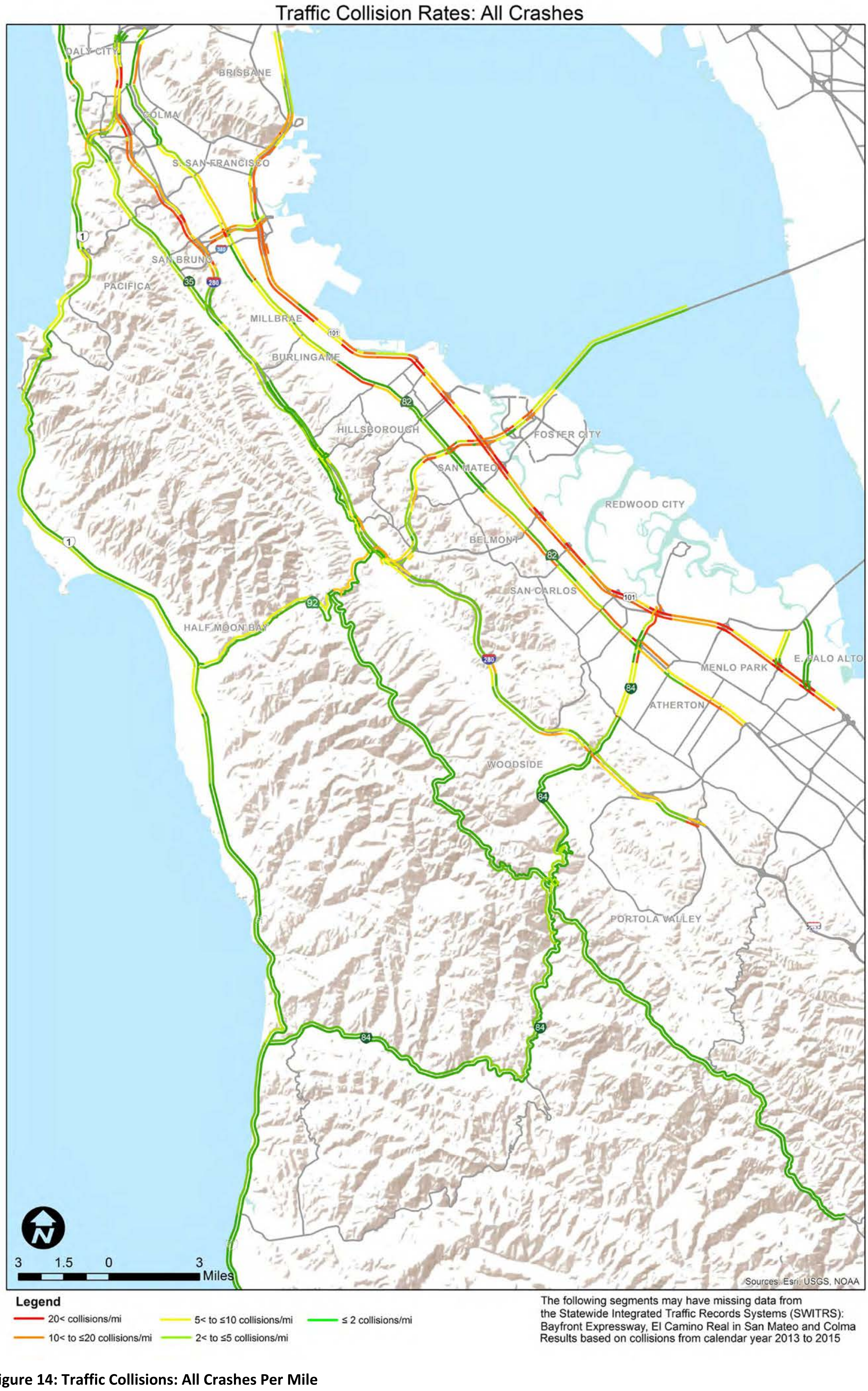


Figure 14: Traffic Collisions: All Crashes Per Mile