Attachment F

Traffic Engineering Performance Assessment (TEPA)

SR 37 Improvement Project
Traffic Engineering Performance Assessment (TEPA)

This Traffic Engineering Performance Assessment (TEPA) was prepared using traffic data and VISSIM traffic software analysis results from the SR 37 Transportation and Sea Level Rise Corridor Improvement Plan (SR 37 Corridor Plan). Existing and future year traffic conditions were assessed during the AM and PM peak period in both the eastbound and westbound directions of SR 37. The limits of the study were between the US 101 and SR 29 interchanges. A future year (2022) scenario was assessed for the No Build and two Build Alternatives (a 3-lane contra-flow option and a 4-lane option). The Build Alternatives would provide additional capacity in the 2-lane conventional highway section of SR 37 between the Mare Island interchange and the SR 121 intersection. To measure the potential improvements of the Build Alternatives, the following operational measures of effectiveness (MOEs) associated with the No Build and Build Alternatives for SR 37 from US 101 to SR 29 are included in this TEPA:

- Vehicle Miles Traveled (VMT)
- Total Delay (veh-hours)
- Average Running Speed (mph)
- Travel Time (minutes)

The intent of the TEPA is to identify existing and future operational deficiencies and recommend roadway projects to improve overall traffic conditions.

Existing Conditions

Traffic volumes and heavy vehicle percentage data along the study corridor were collected for the mainline, on-ramps, and off-ramps between April 1, 2017 and April 7, 2017.

AM Peak Period

During the weekday AM peak period, there is no significant delay on the eastbound SR 37. However, a bottleneck was observed on westbound SR 37 in the conventional highway segment between the lane drop west of the Mare Island interchange and the SR 121 intersection. The longest queue associated with this bottleneck extended approximately 6,500 feet east to the Wilson Avenue interchange ramps. Vehicles were also observed to travel below typical bottleneck speeds for approximately one mile within the bottleneck section.

Figure 1 shows the hourly traffic volumes along westbound SR 37 at Skaggs Island. This location is within the bottleneck section for westbound SR 37 and shows the approximate throughput of the bottleneck. On a typical weekday, the mainline throughput traffic volume ranges between 1,100 and 1,400 vehicles per hour per lane, which is well below the expected one-way capacity for a conventional 2-lane highway.

Kimley»Horn

Figure 2 shows the travel time survey data by time for WB SR 37. This data shows that the maximum travel times from Fairgrounds Drive to US 101 for the midweek were approximately 45 to 47 minutes, about 22 to 25 minutes longer than travel times during uncongested periods, and occurred at approximately 6:30 AM. The maximum travel time for the Saturday survey data was approximately 30 minutes and occurred at 1:00 PM.

Table 1 shows the weekday AM hourly mainline and ramp traffic volumes for both the eastbound and westbound directions. During the AM peak period, trucks account for approximately 9 percent of the vehicles on westbound SR 37. This is significant because heavy vehicles can negatively impact bottleneck throughput. Also in the AM peak period, vehicles eligible to use the heavy occupancy vehicles (HOV) lane account for approximately 11 percent of the total vehicle composition.

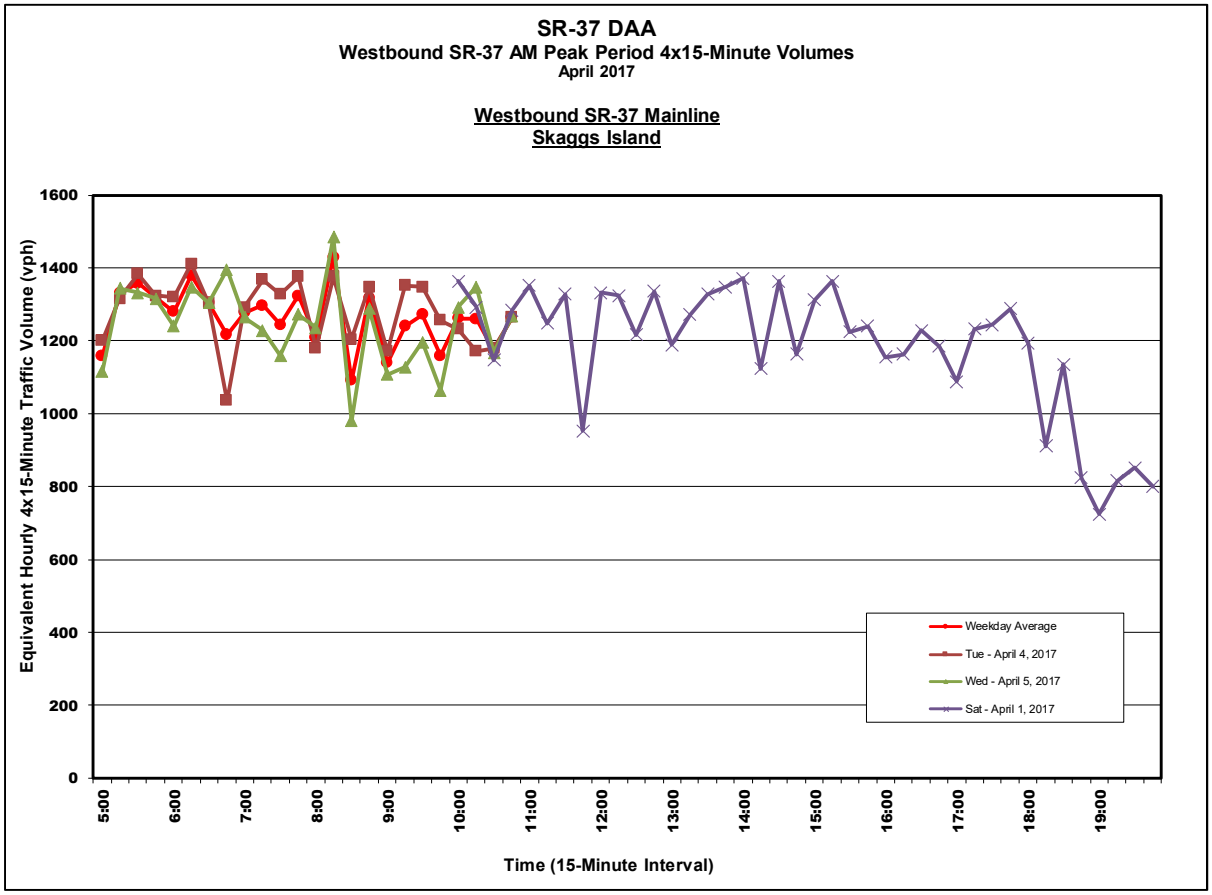

Figure 1: Westbound SR 37 – Mainline Traffic Volume Data at Skaggs Island

Kimley»Horn

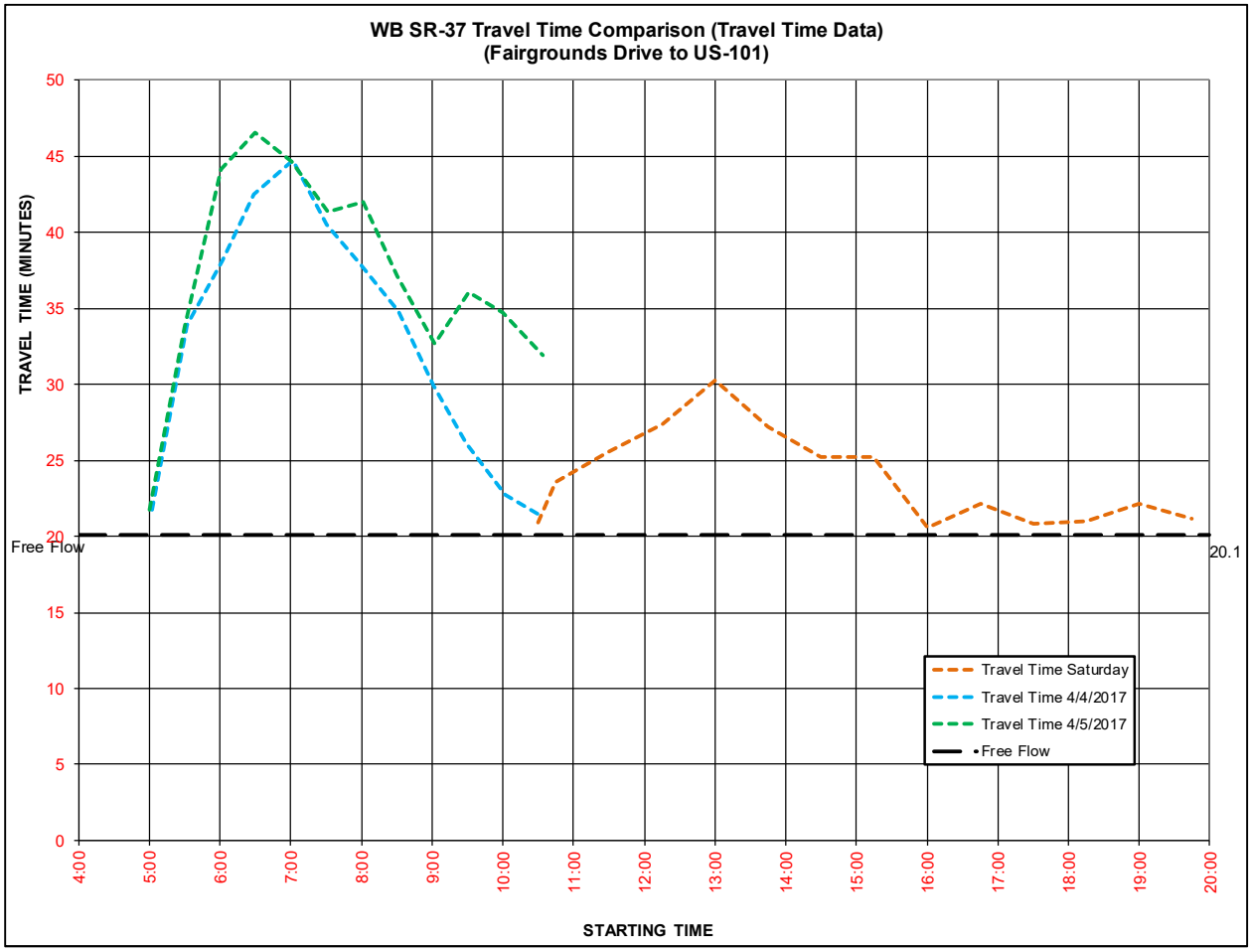

Figure 2: Westbound SR 37 – Mainline Travel Time from Fairgrounds Drive to US 101

Kimley»Horn

Table 1: Weekday AM Peak Period Mainline and Ramp Volumes

		AM Peak Period					
		5 to 6 AM	6 to 7 AM	7 to 8 AM	8 to 9 AM	9 to 10 AM	10 to 11 AM
EB SR-37	US 101 Connector	183	495	840	960	814	904
	Marsh Dr Off-Ramp	0	2	1	5	6	10
	Marsh Dr On-Ramp	1	1	1	2	1	2
	Atherton Ave Off-Ramp	28	49	67	79	82	99
	Harbor Dr On-Ramp	37	93	167	143	95	72
	Lakeville Rd. Off-Ramp	12	13	25	45	54	58
	Lakeville Rd. on-ramp	259	434	435	407	334	283
	SR-121 off-ramp	66	177	418	428	382	409
	SR-121 on-ramp	22	43	83	66	70	60
	Mainline Volume at Noble Rd	387	824	1069	1018	922	874
	Walnut Ave Off-Ramp	54	77	113	85	72	41
	Walnut Ave On-Ramp	38	64	77	85	108	185
	Wilson Ave Off-Ramp	38	73	104	96	87	72
	Wilson Ave On-Ramp	84	154	280	251	221	245
	SR-29 Mainline	336	825	1147	1166	1095	1060
WB SR-37	SR-37 Mainline East of SR-29	1206	1193	1254	1352	1188	1098
	SB SR-29 Off-Ramp	110	168	288	385	321	310
	NB SR-29 On-Ramp	96	87	93	71	91	87
	SB SR-29 On-Ramp	310	312	310	248	198	156
	Wilson Ave Off-Ramp	265	516	612	433	253	206
	Wilson Ave On-Ramp	98	108	82	61	97	101
	Walnut Ave Off-Ramp	64	16	46	112	141	110
	Walnut Ave On-Ramp	288	404	409	324	239	255
	Mainline Volume at Skaggs Island	1292	1295	1286	1262	1203	1241
	SR-121 off-ramp	27	45	66	82	87	63
	SR-121 on-ramp	374	679	495	501	563	520
	Lakeville Rd Off-ramp	238	298	407	447	537	562
	Lakeville Rd On-ramp	199	524	383	174	97	82
	Harbor Dr Off-Ramp	2	8	7	7	8	6
	Harbor Dr On-Ramp	9	18	16	28	22	20
	Atherton Ave Off-Ramp	49	86	129	131	63	65
	Atherton Ave On-Ramp	29	83	145	163	109	103
	Hanna Ranch Rd Off-Ramp	1	0	2	1	3	1
	Hanna Ranch Rd On-Ramp	2	4	6	10	17	16
	US 101 NB Connector	96	153	198	264	255	220
	US 101 SB Connector	1121	1935	1556	1209	1149	1037

Source: Kimley-Horn 2017

Kimley»Horn

PM Peak Period

During the weekday PM peak period, there is no significant delay on the westbound SR 37. However, a major bottleneck was observed on the eastbound SR 37 in the conventional highway segment between the lane drop east of SR 121 intersection and the Mare Island interchange. The mainline queue approaching this bottleneck was observed to extend as far west as the Petaluma River Bridge, which is approximately 4 miles. It should be noted that there also are additional slowdowns and stopping at the signalized intersections of SR 37/Lakeville Road and SR 37/SR 121 and at the railroad crossing within the area of queue approaching the bottleneck. Slowdowns within the bottleneck section also occur near Noble Road and the Sonoma Creek Bridge. Overall, vehicles within the bottleneck section were observed to travel at slow speeds from downstream of the lane drop east of SR 121 to Skaggs Island Road.

Figure 3 shows the hourly traffic volumes on the one-lane section on eastbound SR 37 at Noble Road. This location is within the eastbound bottleneck section and shows the approximate throughput of the bottleneck. On a typical weekday, the mainline bottleneck throughput for the single eastbound lane peaks at approximately 1,400 vphpl at 2:00 PM and was observed to be as low as 1,100 vph.

Figure 4 shows the travel time survey data by start time for EB SR 37. This data shows that the maximum travel times from US 101 to Fairgrounds Drive for the midweek are approximately 100 minutes and occur at approximately 5:00 PM. The maximum travel times for the Saturday survey data were approximately 40 minutes and occurred at 4:30 PM. It should also be noted that there is a significant lane imbalance leading up to the intersection of SR 37 and SR 121, as the majority of the traffic on westbound SR 37 approaching the intersection continues on westbound SR 37 rather than going north on SR 121. The travel time surveys are reflective of traffic using the right lane approaching the intersection to continue on westbound SR 37. Queuing and travel times for these vehicles are significantly longer than those for traffic destined for SR 121 and using the left lane approaching the intersection. Additionally, it should be noted that some vehicles were observed bypassing portions of the right lane queues by using the left lane approaching the intersection and cutting in to the right lane near the intersection, or making the left turn onto SR 121, U-turning at the Sonoma Raceway, and making a left turn back onto SR 37 at the intersection. These maneuvers increase the travel time and queuing for right lane traffic.

Table 2 shows the weekday PM hourly mainline and ramp traffic volumes for both eastbound and westbound directions. During the PM peak period, trucks account for approximately 5 percent of the vehicles on the eastbound SR 37. Again, this is significant because heavy vehicles potentially can slow down traffic, especially on the one lane segment of the eastbound SR 37. Also in the PM peak period, vehicles eligible to use the HOV lane account for approximately 22 percent of the total vehicle composition.

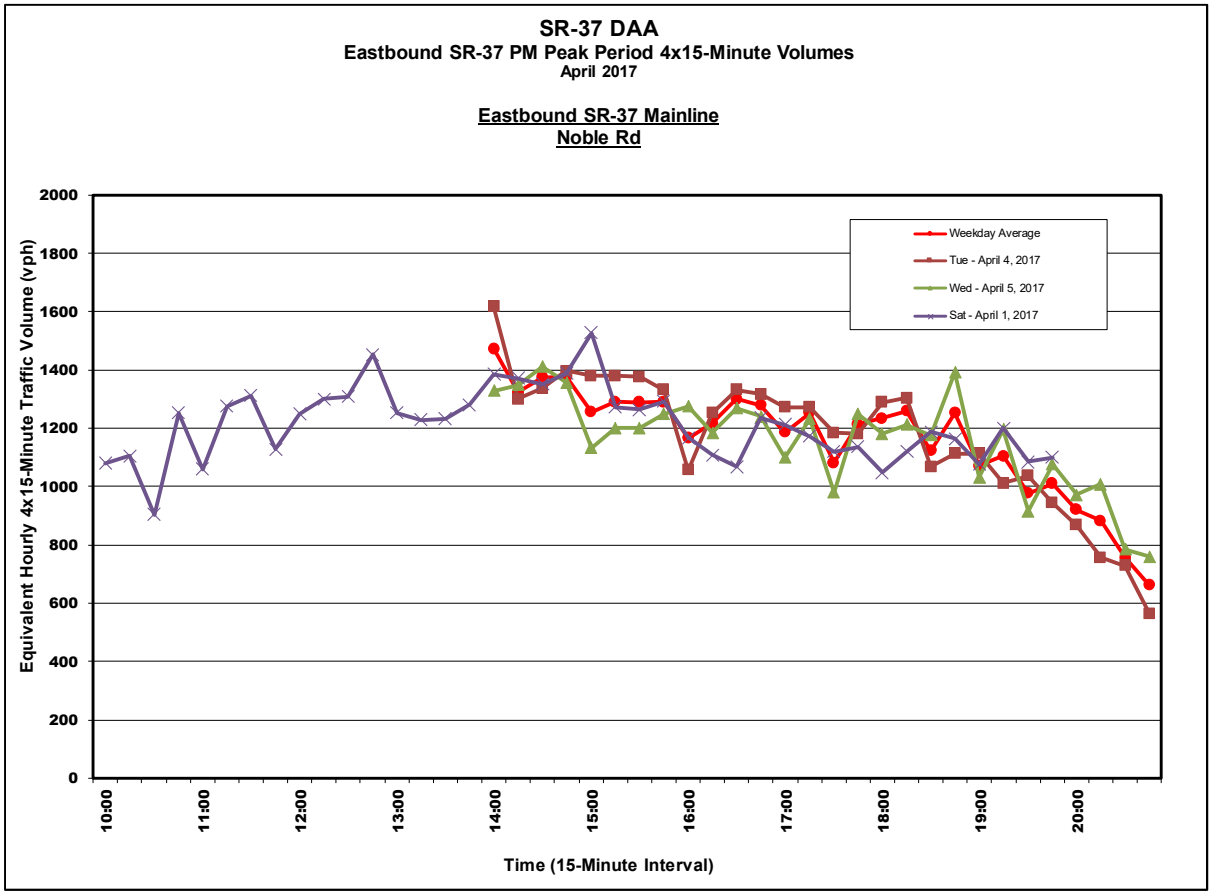

Figure 3: Eastbound SR 37 – Mainline Traffic Volume Data at Noble Road

Kimley»Horn

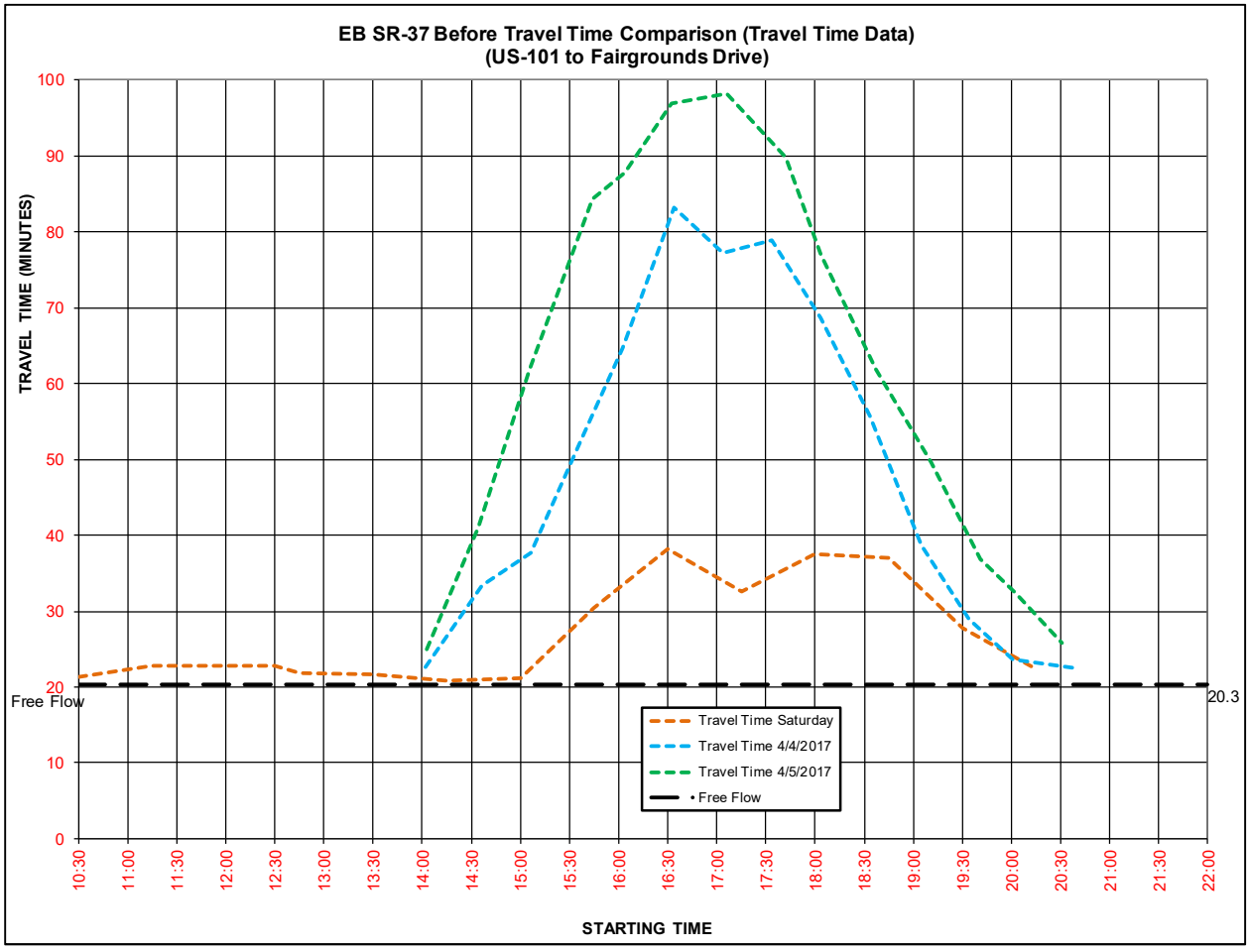

Figure 4: Eastbound SR 37 – Mainline Travel Time from US 101 to Fairgrounds Drive

Kimley»Horn

Table 2: Weekday PM Peak Period Mainline and Ramp Volumes

		PM Peak Period						
		2 to 3 PM	3 to 4 PM	4 to 5 PM	5 to 6 PM	6 to 7 PM	7 to 8 PM	8 to 9 PM
EB SR-37	US 101 Connector	1876	2377	2024	1213	1097	880	831
	Marsh Dr Off-Ramp	2	3	1	1	1	0	1
	Marsh Dr On-Ramp	5	3	3	3	2	2	3
	Atherton Ave Off-Ramp	157	138	124	136	94	65	43
	Harbor Dr On-Ramp	113	173	140	134	85	73	43
	Lakeville Rd. Off-Ramp	373	581	619	511	352	182	117
	Lakeville Rd. on-ramp	439	328	302	223	128	149	139
	SR-121 off-ramp	497	410	355	277	393	423	286
	SR-121 on-ramp	261	296	379	427	306	150	44
	Mainline Volume at Noble Rd	1387	1281	1241	1184	1217	1041	805
	Walnut Ave Off-Ramp	76	77	111	102	101	104	67
	Walnut Ave On-Ramp	197	253	228	120	100	86	73
	Wilson Ave Off-Ramp	117	121	136	129	132	129	106
	Wilson Ave On-Ramp	262	326	395	521	451	361	248
	SR-29 Mainline	1540	1596	1634	1744	1528	1335	1106
WB SR-37	SR-37 Mainline East of SR-29	1419	1321	1383	1294	1069	815	603
	SB SR-29 Off-Ramp	384	405	361	344	332	262	200
	NB SR-29 On-Ramp	100	96	114	108	72	57	58
	SB SR-29 On-Ramp	178	194	212	209	227	160	94
	Wilson Ave Off-Ramp	284	334	388	397	376	296	240
	Wilson Ave On-Ramp	123	107	133	162	111	61	54
	Walnut Ave Off-Ramp	98	90	93	100	107	70	30
	Walnut Ave On-Ramp	79	98	125	120	61	25	17
	Mainline Volume at Skaggs Island	1105	1119	1136	990	781	485	388
	SR-121 off-ramp	95	78	94	91	77	33	19
	SR-121 on-ramp	412	438	445	486	400	195	122
	Lakeville Rd Off-ramp	415	570	538	551	376	194	125
	Lakeville Rd On-ramp	50	48	70	138	92	100	97
	Harbor Dr Off-Ramp	3	6	4	8	7	2	5
	Harbor Dr On-Ramp	24	21	19	22	12	13	6
	Atherton Ave Off-Ramp	79	90	98	122	85	49	29
	Atherton Ave On-Ramp	95	96	96	87	76	47	24
	Hanna Ranch Rd Off-Ramp	2	2	2	2	1	2	1
	Hanna Ranch Rd On-Ramp	11	10	9	10	5	3	5
	US 101 NB Connector	162	141	133	136	114	67	39
	US 101 SB Connector	778	813	830	1001	798	413	263

Source: Kimley-Horn 2017

Kimley»Horn

2022 Conditions

Forecasted Traffic Volumes

Future 2022 forecast volumes were estimated from the MTC Travel Model One, Plan Bay Area 2040 version. From 2015 to 2040, the average annual growth rate within the study area is projected to be approximately 0.8% per year. The 2022 mainline and ramp forecast volumes are shown in **Table 3**.

Table 3: Weekday 2022 Peak Period Mainline and Ramp Forecast Volumes

		2022 Demand Volumes-AM Peak Period						2022 Demand Volumes- PM Peak Period						
		5 to 6 AM	6 to 7 AM	7 to 8 AM	8 to 9 AM	9 to 10 AM	10 to 11 AM	2 to 3 PM	3 to 4 PM	4 to 5 PM	5 to 6 PM	6 to 7 PM	7 to 8 PM	8 to 9 PM
EB SR-37	US 101 Connector	191	516	875	1000	848	941	1953	2474	2107	1263	1142	916	865
	Marsh Dr Off-Ramp	1	3	2	6	7	11	3	4	2	2	2	1	2
	Marsh Dr On-Ramp	2	2	2	3	2	3	6	4	4	4	3	3	4
	Atherton Ave Off-Ramp	30	51	70	83	86	104	164	144	130	142	98	68	45
	Harbor Dr On-Ramp	39	97	174	149	99	75	118	181	146	140	89	76	45
	Lakeville Rd. Off-Ramp	13	14	27	47	57	61	389	605	645	532	367	190	122
	Lakeville Rd. on-ramp	270	452	453	424	348	295	457	342	315	233	134	156	145
	SR-121 off-ramp	69	185	435	446	398	426	518	427	370	289	409	441	298
	SR-121 on-ramp	23	45	87	69	73	63	272	309	395	445	319	157	46
	Mainline Volume at Noble Rd	412	859	1057	1063	822	775	1732	2130	1820	1120	811	608	638
	Walnut Ave Off-Ramp	57	81	118	89	75	43	80	81	116	107	106	109	70
	Walnut Ave On-Ramp	40	67	81	89	113	193	206	264	238	125	105	90	76
	Wilson Ave Off-Ramp	40	76	109	100	91	75	122	126	142	135	138	135	111
	Wilson Ave On-Ramp	88	161	292	262	230	255	273	340	412	543	470	376	259
	SR-29 Mainline	443	930	1203	1225	999	1105	2009	2527	2212	1546	1142	830	792
WB SR-37	SR-37 Mainline East of SR-29	1256	1242	1305	1407	1237	1143	1477	1375	1440	1347	1113	849	628
	SB SR-29 Off-Ramp	115	175	300	401	335	323	400	422	376	358	346	273	209
	NB SR-29 On-Ramp	100	91	97	74	95	91	105	100	119	113	75	60	61
	SB SR-29 On-Ramp	323	325	323	259	207	163	186	202	221	218	237	167	98
	Wilson Ave Off-Ramp	276	537	637	451	264	215	296	348	404	414	392	309	250
	Wilson Ave On-Ramp	102	113	86	64	101	106	128	112	139	169	116	64	57
	Walnut Ave Off-Ramp	67	17	48	117	147	115	102	94	97	105	112	73	32
	Walnut Ave On-Ramp	300	421	426	338	249	266	83	102	131	125	64	27	18
	Mainline Volume at Skaggs Island	1623	1463	1252	1173	1143	1116	1181	1027	1173	1095	755	512	371
	SR-121 off-ramp	29	47	69	86	91	66	99	82	98	95	81	35	20
	SR-121 on-ramp	390	707	516	522	586	542	429	456	464	506	417	203	127
	Lakeville Rd Off-ramp	248	311	424	466	559	585	432	594	560	574	392	202	131
	Lakeville Rd On-ramp	208	546	399	182	101	86	53	50	73	144	96	105	101
	Harbor Dr Off-Ramp	3	9	8	8	9	7	4	7	5	9	8	3	6
	Harbor Dr On-Ramp	10	19	17	30	23	21	25	22	20	23	13	14	7
	Atherton Ave Off-Ramp	51	90	135	137	66	68	83	94	102	127	89	51	31
	Atherton Ave On-Ramp	31	87	151	170	114	108	99	100	100	91	80	49	25
	Hanna Ranch Rd Off-Ramp	2	1	3	2	4	2	3	3	3	3	2	3	2
	Hanna Ranch Rd On-Ramp	3	5	7	11	18	17	12	11	10	11	6	4	6
	US 101 NB Connector	152	174	192	249	228	203	174	122	128	133	111	77	66
	US 101 SB Connector	1780	2195	1511	1140	1028	959	1004	764	944	929	684	516	381

Source: Kimley-Horn 2017

Project Alternatives

An Interim Project and an Ultimate Project are being proposed for the two-lane conventional highway segment of the SR 37 corridor between the Mare Island interchange and the SR 121 intersection. The Interim Project would provide improvements on the existing roadway at current elevation, while the Ultimate Project would provide improvements on a raised and/or elevated roadway adjacent to the current road at a design elevation to accommodate anticipated sea level rise.

Interim Project:

The following two alternatives were proposed for the Interim Project, which would reconfigure the existing two-lane conventional highway segment with limited or no widening at current elevation.

1. Alternative I1: A three-lane contra-flow segment is proposed from the SR 121 intersection to the Mare Island interchange. The three-lane contra-flow section would include a moveable barrier in the median, which would provide two lanes in the peak direction of travel and one lane in the off-peak direction of travel. During the AM peak period, the contra-flow HOV/Express lane would be used in the westbound direction and during the PM peak period, the contra-flow HOV/Express lane would be used in the eastbound direction. This alternative would also provide for shared bicycle usage on the 10-foot right shoulders.
2. Alternative I2: This alternative would include two general purpose lanes, similar to existing conditions, and add a part-time lane on shoulder in each direction during the peak period. The respective additional lane on shoulder would open for the peak direction of travel, i.e. westbound during the AM peak period and eastbound in the PM peak direction and would be managed lanes. The alternative would require bike shuttle service to transport bicyclists across the corridor in the peak direction of travel during peak periods when the shoulder lane is open to vehicular use.

Ultimate Project:

The following two alternatives are proposed for the Ultimate Project.

1. Alternative U1: Construct a new four-lane SR 37 between east of the SR 121 intersection and west of the Mare Island interchange at sea level rise design elevation with a hybrid combination of fill and causeway designs.
2. Alternative U2: Construct a new four-lane SR 37 between east of the SR 121 intersection and west of the Mare Island interchange at sea level rise design elevation with full length causeway.

2022 SR 37 Travel Time and Performance Measures

The SR 37 Corridor Plan analyzed the traffic operations of the study corridor. The relevant methodology and results are summarized in this section.

A VISSIM model was developed for the study limits between US 101 and SR 29 and calibrated to replicate the existing (2017) field conditions collected for the SR 37 Corridor Plan. The calibration process included the MOEs mentioned previously. Once calibrated, the VISSIM model was then applied to evaluate the future conditions and project alternatives.

Since both Interim Project alternatives (3-lane contra-flow and the 2-lane with part-time lane on shoulder) would have similar capacities during peak periods, which include two lanes for the peak direction of travel and one lane for the off-peak direction, traffic operations analyses would yield similar results. Therefore, for VISSIM modeling purposes, these were analyzed as one scenario labeled as "3-Lane Alt" shown in **Table 4** and **Table 5**. For the Ultimate Project alternative with a 4-lane highway, the

two construction alternatives (hybrid or all causeway), are also expected to yield similar traffic operations analysis results, and therefore were analyzed as one scenario labeled as "4-Lane Alt" shown in **Table 4** and **Table 5**.

Peak direction travel times for the existing conditions, No Build, 3-Lane Alternative, and 4-Lane Alternative are summarized in **Table 4**. Existing travel times were collected in the field using the floating car technique while 2022 travel times were extracted from VISSIM models.

Table 4: SR 37 Peak Direction Travel Time Comparisons

Westbound SR 37 Travel Time - AM Peak Period						
			2022 AM-3-Lane Alt Travel Time (min)		2022 AM- 4-Lane Alt Travel Time	
Time Interval	Existing AM Field Travel Time (min)	2022 AM No Build Travel Time (min)	HOV Lane	GP Lane	HOV Lane	GP Lane
5 to 6 AM	27.7	42.2	21.4	22.4	21.4	22.4
6 to 7 AM	45.3	57.8	21.8	22.8	21.8	22.8
7 to 8 AM	42.9	57.1	21.6	22.6	21.6	22.6
8 to 9 AM	39.6	57.6	21.5	22.5	21.6	22.6
9 to 10 AM	34.4	53.3	21.5	22.5	21.8	22.5
10 to 11 AM	33.3	51.4	21.4	22.4	21.4	22.4
Average	**37.2**	**53.2**	**21.5**	**22.5**	**21.6**	**22.5**
Eastbound SR 37 Travel Time - PM Peak Period						
	Existing PM Field	2022 PM No Build	2022 PM-Interim 3-Lane Travel Time (min)		2022 PM- 4-Lane Travel Time (min)	
Time Interval	Travel Time (min)	Travel Time (min)	HOV Lane	GP Lane	HOV Lane	GP Lane
2 to 3 PM	30.5	44.6	22.7	23.7	21.6	22.6
3 to 4 PM	59.2	89.5	24.2	26.2	23.2	27.2
4 to 5 PM	83.2	138.6	25.2	27.2	23.9	29.9
5 to 6 PM	85.9	121.3	22.5	23.5	21.5	23.5
6 to 7 PM	65.8	86.5	22.3	23.3	21.3	22.3
7 to 8 PM	38.5	62.2	22.3	23.3	21.3	22.3
8 to 9 PM	26.0	28.4	22.3	22.3	21.3	22.3
Average	**55.6**	**81.6**	**23.1**	**24.2**	**22.0**	**24.3**

Source: Kimley-Horn 2017

The 2022 No Build average travel times are expected to increase by 43 percent during AM peak and 47% during the PM peak compared to the existing travel times.

HOV/Express lane travel times under both 3-Lane and 4-Lane Alternatives are expected to be approximately 60 percent less and 73 percent less than the general purpose lane travel time in the 2022 No Build condition travel times during the AM peak and PM peak, respectively. This is due to the presence of these lanes allowing these vehicles to bypass some congestion and the additional capacity they provide in the bottleneck section between the SR-121 intersection and the Mare Island interchange. The additional capacity also results in reduced general purpose lane travel times. Under both the 3-Lane and 4-Lane Alternatives, travel times are expected to decrease by approximately 58 percent during the AM peak and 70 percent during the PM peak compared to the 2022 No Build conditions.

The corridor-wide mobility performance results for Existing Conditions and Year 2022 were extracted from VISSIM for each alternative. The summary of results comparing the existing conditions, base conditions (No Build), and proposed alternatives on SR 37 are shown in **Table 5**.

Table 5: SR 37 System Performance Comparisons

Performance Measures	Existing AM	2022 AM Peak Period			Existing PM	2022 PM Peak Period		
		No Build	3-Lane Alt	4-Lane Alt		No Build	3-Lane Alt	4-Lane Alt
VMT	275,076	283,090	288,365	288,345	336,874	371,037	371,825	371,455
Total Delay (Veh-hours)	2066	4103	887	865	11,569	12,161	759	727
Average Running Speed (mph)	40	32	48	48	33	24	52	52
Percentage Differences (%)- Compare to No Build								
VMT	n/a	n/a	2%	2%	n/a	n/a	0%	0%
Total Delay (Veh-hours)	n/a	n/a	-78%	-79%	n/a	n/a	-94%	-94%
Average Running Speed (mph)	n/a	n/a	50%	50%	n/a	n/a	117%	117%

Source: Kimley-Horn 2017

As in indicated in **Table 5**, 2022 No Build VMT increases by approximately 3 percent during the AM peak and by approximately 10 percent during PM peak when compared to Existing conditions. Average travel speeds are expected to be reduced by 20 percent during the AM peak and by 27 percent during the PM peak from existing conditions to 2022 No Build conditions.

VMT is similar for all alternatives in 2022 because all traffic demand would be served within the analysis periods. The 3-lane Alternative and 4-lane Alternative have nearly identical performance measures in the Year 2022 because they both have two lanes in the peak direction of travel, and off-peak direction traffic congestion is not expected to develop by Year 2022. The total delay would improve by approximately 78 percent during the AM peak period and 94 percent during the PM peak period when compared to the 2022 No Build conditions. In addition, travel speeds would increase by 50 percent in the AM peak period and by 117 percent in the PM peak period compared to the 2022 No Build conditions.

TEPA Findings and Recommendations

The existing conditions presented in this TEPA reflect the current conditions of the SR 37 study segment. If no improvements are implemented, future operating conditions along SR 37 will be further degraded in the peak direction as traffic demands increase. In the off-peak direction, the single lane capacity appears to be sufficient for the existing and anticipated 2022 traffic demand.

The TEPA Work Plan development process is used as a scoping tool in refining the extent of the study locations to be evaluated in the upcoming PA&ED phase. As described in the previous sections, the 3-lane Alternative and 4-lane Alternative perform better than the No Build Alternative in 2022 due to additional capacity in the peak direction.

Recommended Scope for PA&ED

The following are identified as the scope of the future traffic study:

Study Limit*:* The recommended project study limits for the traffic operations analysis model is the segment of SR 37 from US 101 to SR 29. This segment contains the extent of the existing congestion along the corridor. These limits may need to be adjusted during PA&ED to fully account for existing and expected future corridor congestion.

Traffic Data Collection*:* Data was collected in April 2017 for the mainline volumes, ramp volumes, intersection volumes, mainline heavy vehicle percentages, mainline vehicle occupancy, mainline travel times and speeds, and ramp queue observations. Due to restriping on eastbound SR 37 at SR 121 in April 2018, the existing conditions have changed from when data was collected in April 2017. Therefore, it is recommended that new eastbound SR 37 data be collected for the PA&ED phase. No significant changes occurred to the westbound direction, and therefore no new existing data would need to be collected as long as the data used for the PA&ED phase is less than three years old. Additional truck percentage on SR 37 during harvest season in Fall will be needed since that is the peak truck usage for the study corridor and was not collected for the SR 37 Corridor Plan.

Analysis Tool and Study Periods*:* The microscopic simulation software VISSIM is recommended as the analysis tool because it is a full-featured microscopic simulation software with the capability to assess HOV and or managed lane facilities as well as intersection and interchange operations needed for this intricate study corridor.

To fully capture the duration of traffic congestion, traffic operations analysis should be, at a minimum, conducted from 4 AM to 11 AM during the AM peak period and from 1 PM to 10 PM during the PM peak period. Note that if future 2045 congestion shows longer periods of congestion, the analysis hours will need to be extended. In addition, the non-peak directions will also be analyzed (eastbound in AM peak and westbound in PM peak).

Existing Conditions*:* The calibrated VISSIM model from the SR 37 Corridor Plan will be made available for the PA&ED phase of the project and will need to be updated, calibrated and validated based on the new traffic data to be collected. An Existing Conditions Report will be submitted to Caltrans for review and comment.

Traffic Forecasting*:* Future forecast demands on SR 37 will be developed for the Opening Year and Design Year (20 years after opening year) using the latest version of the MTC's travel demand model. The Interim Project opening year is expected to be 2025, and the design year would be 2045. For purposes of scoping the analysis for the Ultimate Project, the opening year is assumed to be 2030, and the design year is assumed to be 2050. A traffic forecasting report will be submitted for Caltrans' review and comment.

Traffic Safety Analysis and Collision Analysis: The safety analysis will focus on the safety impact of the proposed improvements on operating conditions and collision potential by utilizing traffic and collision data and analytical tools and processes.

Traffic operational analysis will be conducted for the Opening Year (short-term) and the Design Year (long-term). The findings of the PA&ED traffic analysis will be documented in a Traffic Operational Analysis Report (TOAR), which will be used to select the preferred alternative and support the project purpose and need based on the following measures of effectiveness (MOEs):

- Vehicle and Person Miles Traveled (VMT & PMT)
- Vehicle and Person Hours of Delay (VHD & PHD)
- Average Travel Speed (mph)
- Travel Time (minutes)
- HOV/Managed Lane Time Savings (minutes)
- Person and Vehicle Throughput
- Travel Time Reliability

In conclusion, this TEPA presents the current study area performance deficiencies associated with the project and is used as a tool to determine the scope of the traffic analysis that will be produced during the PA&ED phase of the project.