

Appendix C2 Ground Transportation and Level-of-Service Analysis

Appendix Summary

The methodology of the operations analysis conforms with the City of Los Angeles Transportation Assessment Guidelines for an operational evaluation of a land use project. The analysis includes delay and queuing analysis using intersection level of service (LOS) methodologies from the latest edition of the Highway Capacity Manual (HCM, TRB 2016) which is used to evaluate the operation of the project driveways and nearby intersections by using the Synchro software package.

Appendix C2 contains:

- Intersection Operating Level of Service Analysis for
 - Baseline (2019)
 - Future year 2027 with and without the Proposed Project
 - Future year 2036 with and without the Proposed Project
 - Future year 2045 with and without the Proposed Project
- Queuing Analysis for baseline and Future Year 2045 at
 - John S. Gibson Boulevard/I-110 Northbound Ramps (West Basin Container Terminal gate 1)
 - Front Street/Knoll Drive/ West Basin Container Terminal gate 2
- City of Los Angeles Vehicle Miles Traveled (VMT) Calculator Version 1.3 Results

The LOS analysis showed that vehicular traffic, including heavy-duty trucks, resulting from operation of the proposed Project would substantially increase delay at one location (Figueroa/I-110 Ramps) in 2027 but at no other location in any other analysis year.

The queueing analysis showed that the proposed Project would substantially increase queue length in the southbound turning lane of the John S Gibson/I-110 Northbound Ramps intersection, but that longer queue would not exceed the length of the turning lane and would therefore not interfere with through traffic.

The VMT analysis showed that although the proposed Project requires a calculation of VMT, the change in VMT would represent a less-than-significant impact per the City of Los Angeles guidelines.

The model outputs for the LOS and queuing analyses are available on request from the LAHD Environmental Management Division.

1.1 Intersection Operating Conditions Analysis

Level of Service (LOS) is a qualitative indication of an intersection's operating conditions as represented by traffic congestion and delay. Operating conditions are assessed using actual traffic counts at the study intersections and modelling of future conditions. Field-collected traffic count data collected in February 2018 and May 2019 during the A.M. or P.M. peak periods is used for the baseline conditions for the roadway intersections near the project site. Future year traffic forecasts for the Project and background traffic is from outputs of the PortTAM model as described in Appendix C-1.

Future peak-hour "without project" traffic conditions for the study intersections in the vicinity of the project identified in Section 3.3 were developed using the intersection analysis methodologies, including an ambient growth rate to the study horizon year and adding traffic generated by related projects.

Another measure of operating conditions is the volume-to-capacity ratio (V/C), which depicts the extent to which actual traffic volumes at an intersection approach the intersection's theoretical capacity to handle traffic. A V/C of 1.0 would indicate an intersection operating at capacity, which would be expected to be a very congested condition, while a V/C of 0.10 would suggest a free-flowing traffic condition.

The associated LOS and the resultant operating conditions for intersection delay are shown in Table C-2.1. This analysis studied 11 intersections in the vicinity of the proposed Projects that would be likely to be affected by the proposed Project's vehicular traffic, including heavy-duty trucks. The baseline operating conditions, including V/C ratios, for those study intersections are shown in Table C-2.2.

Table C-2.1: Level of Service Definitions

Intersections (delay [seconds])	LOS	Operating Condition
≤10.0	A	Little or no delay
>10.0 and ≤15.0	B	Short Traffic Delays
>15.0 and ≤25.0	C	Average traffic delays
>25.0 and ≤35.0	D	Long traffic delays
>35.0 and ≤50.0	E	Very long traffic delays
>50.0	F	Severe congestion.

Table C-2.2: Baseline Intersection Level of Service

Study Intersection	Baseline			
	AM Peak Hour		PM Peak Hour	
	LOS	V/C	LOS	V/C
1. Alameda/Anaheim	B	0.552	F	0.923
2. Henry Ford/Anaheim	B	0.558	C	0.728
3. Harry Bridges/Broad	A	0.395	A	0.500
4. Harry Bridges/Avalon	A	0.536	A	0.537
5. Harry Bridges/Fries	A	0.524	B	0.595
6. Harry Bridges/N. Access Road	A	0.388	A	0.510

Study Intersection	Baseline			
	AM Peak Hour		PM Peak Hour	
	LOS	V/C	LOS	V/C
7. Figueroa/I-110 Ramps	A	0.456	B	0.567
8. JSG/I-110 NB Ramps (WBCT gate 1)	B	0.638	B	0.586
9. Front St/Knoll Dr/WBCT gate 2)	A	0.289	A	0.318
10. Front St/Harbor Bl/I-110 NB Ramps	A	0.543	A	0.422
11. Harbor/Swinford/SR47 Ramps	C	0.659	B	0.563

1.2 Future Year Analysis

Future year analysis for 2027, 2036, and 2045 was performed using traffic forecasts for the Project site and regional traffic from outputs of the PortTAM model, as described in Appendix C1. The results are presented in tables C-2.3 through C-2.5; in those tables, delay is expressed as seconds per vehicle.

Project-Area Transportation Improvements

Caltrans' State Route 47/Vincent Thomas Bridge and Front Street/Harbor Boulevard Interchange Reconfiguration Project (OPR 2019) would alter three of the nearby intersections to the Project site. The westbound SR-47 on-ramp would be relocated to the north to line up with the intersection of Knoll Drive with Harbor Boulevard/Front Street. The intersection of the Harbor Boulevard with the SR-47 Ramps /Swinford Street would be slightly reconfigured as it will no longer be the westbound off-ramp which would connect at Knoll Drive with the westbound on-ramp. The existing westbound SR-47 on-ramp between Swinford Street and Knoll Drive would be closed. The project is expected to be completed by end of 2025.

Table C-2.3: Future Year 2027 Intersection Level of Service

Study Intersection	Future Year 2027								Change in Delay	
	No Project				With Project					
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		a.m.	p.m.
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)		
1. Alameda/Anaheim	C	24.0	C	31.4	C	24.3	C	31.8	0.3	0.4
2. Henry Ford/Anaheim	C	28.3	D	40.3	C	28.3	C	40.6	0.0	0.3
3. Harry Bridges/Broad	A	5.2	A	6.0	A	5.3	A	6.0	0.1	0.0
4. Harry Bridges/Avalon	B	11.0	B	14.7	B	10.9	B	14.8	-0.1	0.1
5. Harry Bridges/Fries	A	5.8	A	8.2	A	5.8	A	8.2	0.0	0.0
6. Harry Bridges/N. Access Road	B	10.2	B	11.8	B	10.4	B	12.2	0.2	0.4
7. Figueroa/I-110 Ramps	C	23.6	C	32.7	C	23.6	E	66.4	0.0	33.7
8. JSG/I-110 NB Ramps (WBCT gate 1)	C	29.6	C	33.6	C	30.8	D	36.4	1.2	2.8
9. Front St/Knoll Dr/WBCT gate 2)	B	13.7	C	29.4	B	13.8	C	29.5	0.1	0.1
10. Front St/Harbor Bl/I-110 NB Ramps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11. Harbor/Swinford/SR47 Ramps	C	26.2	C	25.2	C	26.2	C	25.2	0.0	0.0

Table C-2.4: Future Year 2036 Intersection Level of Service

Study Intersection	Future Year 2036								Change in Delay	
	No Project				With Project					
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		a.m.	p.m.
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)		
1. Alameda/Anaheim	C	21.2	C	30.8	A	21.5	C	31.4	0.3	0.6
2. Henry Ford/Anaheim	C	31.7	D	43.0	C	31.8	D	43.2	0.1	0.2
3. Harry Bridges/Broad	A	4.2	A	5.4	A	4.2	A	5.5	0.0	0.1
4. Harry Bridges/Avalon	A	10.0	A	15.3	A	9.9	B	15.3	-0.1	0.0
5. Harry Bridges/Fries	A	6.3	A	8.7	A	6.4	A	8.8	0.1	0.1
6. Harry Bridges/N. Access Road	C	32.4	A	14.0	B	15.5	B	14.6	-16.9	0.6
7. Figueroa/I-110 Ramps	C	32.4	D	35.7	C	32.9	D	37.4	0.5	1.7
8. JSG/I-110 NB Ramps (WBCT gate 1)	C	34.8	D	37.8	D	36.2	D	42.3	1.4	4.5
9. Front St/Knoll Dr/WBCT gate 2)	B	18.8	D	50.1	B	18.8	D	50.2	0.0	0.1
10. Front St/Harbor Bl/I-110 NB Ramps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11. Harbor/Swinford/SR47 Ramps	C	30.1	D	40.2	C	30.1	D	37.4	0.0	-2.8

Table C-2.5: Future Year 2045 Intersection Level of Service

Study Intersection	Future Year 2045								Change in Delay	
	No Project				With Project					
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		a.m.	p.m.
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)		
1. Alameda/Anaheim	C	22.0	D	38.2	C	22.1	D	38.5	0.1	0.3
2. Henry Ford/Anaheim	C	33.2	D	46.4	C	33.2	D	46.5	0.0	0.1
3. Harry Bridges/Broad	A	4.2	A	5.5	A	4.3	A	5.5	0.1	0.0
4. Harry Bridges/Avalon	A	9.9	B	16.2	A	9.9	B	16.2	0.0	0.0
5. Harry Bridges/Fries	A	6.3	A	8.5	A	6.4	A	8.6	0.1	0.1
6. Harry Bridges/N. Access Road	B	15.3	B	14.8	B	15.6	B	15.1	0.3	0.3
7. Figueroa/I-110 Ramps	C	33.3	D	40.4	C	33.5	D	40.9	0.2	0.5
8. JSG/I-110 NB Ramps (WBCT gate 1)	D	36.5	D	45.8	D	36.7	D	45.9	0.2	0.1
9. Front St/Knoll Dr/WBCT gate 2)	B	19.7	E	66.3	B	19.7	E	66.4	0.0	0.1
10. Front St/Harbor Bl/I-110 NB Ramps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11. Harbor/Swinford/SR47 Ramps	C	31.5	D	51.1	C	31.5	D	51.1	0.0	0.0

The change in delay at intersections is based on additional traffic volumes affecting the operations of the intersection such as the amount of green signal time given each signal phase. Changes in delay are experienced at the intersections closest to the proposed Project.

The results of the LOS analysis show that the proposed Project would have little long-term effect on operating conditions at the study intersections. The maximum increase in delay would be 33.7 seconds per vehicle, which would occur in 2027 at the Figueroa St/I-110 ramps intersection in the p.m. peak hour and would substantially decrease LOS, from level C to level E. By 2036, however, LOS would return to an acceptable level D and operating conditions at that intersection would be unaffected by the proposed Project.

1.3 Queuing Analysis

The transportation assessment includes a queueing analysis to determine if project-related traffic queueing is expected to increase traffic diversion so as to burden neighborhood streets. Project access is considered constrained if the project's traffic would contribute to unacceptable queueing on an avenue or boulevard (as designated in the City of Los Angeles's Mobility Plan 2035 [COLA 2016]) at project driveway(s) or would cause or substantially extend queueing at nearby signalized intersections. In Mobility Plan 2035, John S. Gibson Boulevard is defined as a Boulevard II and Front Street/Harbour Boulevard is defined as an Avenue I. The Project is not forecast to affect local residential streets. Unacceptable or extended queueing may be defined as:

- Spillover from turn pockets into through lanes.
- Block cross streets or alleys.
- Contribution to "gridlock" congestion.

Queueing analysis was performed for the intersections closest to the proposed Project gates.

- John S. Gibson Boulevard/I-110 Northbound Ramps (West Basin Container Terminal Gate 1)
- Front Street/Knoll Drive./ West Basin Container Terminal Gate 2

For signalized intersections Synchro computes queues for the 50 percentile and 95 percentile volumes. Queueing is reported as the 95th percentile length of queue forecasted to occur during the analysis hour in Tables C-2.6 and C-2.7 for the AM and PM peak hours of the Baseline year (2019) and Year 2045.

Table C-2.6: 95th Percentile Queue at John S. Gibson Boulevard/I-110 Northbound Ramps (West Basin Container Terminal Gate 1)

Study Intersection	95th Percentile Queue Length (in feet)						Difference	
	Baseline		2045 No Proj		2045 With Proj			
	AM	PM	AM	PM	AM	PM	AM	PM
Eastbound Left	26	20	87	131	87	131	0	0
Eastbound Through	42	41	58	75	69	94	11	19
Westbound Left	28	63	44	143	52	172	8	29
Westbound Through	21	47	76	147	76	147	0	0
Northbound Left	500	261	495	458	495	458	0	0
Northbound Through	192	181	235	196	226	193	(9)	(3)
Southbound Left	126	141	451	488	554	587	103	99
Southbound Through	267	303	330	500	330	500	0	0

Table E-3.7: 95th Percentile Queue at Front Street/Knoll Drive./ West Basin Container Terminal Gate 2

Study Intersection	95th Percentile Queue Length (in feet)						Difference	
	Baseline		2045 No Proj		2045 With Proj			
	AM	PM	AM	PM	AM	PM	AM	PM
Eastbound Left	N/A	N/A	38	431	38	431	0	0
Eastbound Through	N/A	N/A	92	98	91	98	(1)	0
Eastbound Right	N/A	N/A	22	651	23	651	1	0
Westbound Left	N/A	N/A	20	173	20	173	0	0
Westbound Through	N/A	N/A	0	176	0	176	0	0
Northbound Left	N/A	N/A	660	1063	662	1063	2	0
Northbound Through	N/A	N/A	58	73	58	73	0	0
Southbound Left	N/A	N/A	114	71	115	71	1	0
Southbound Through	N/A	N/A	136	404	136	404	0	0

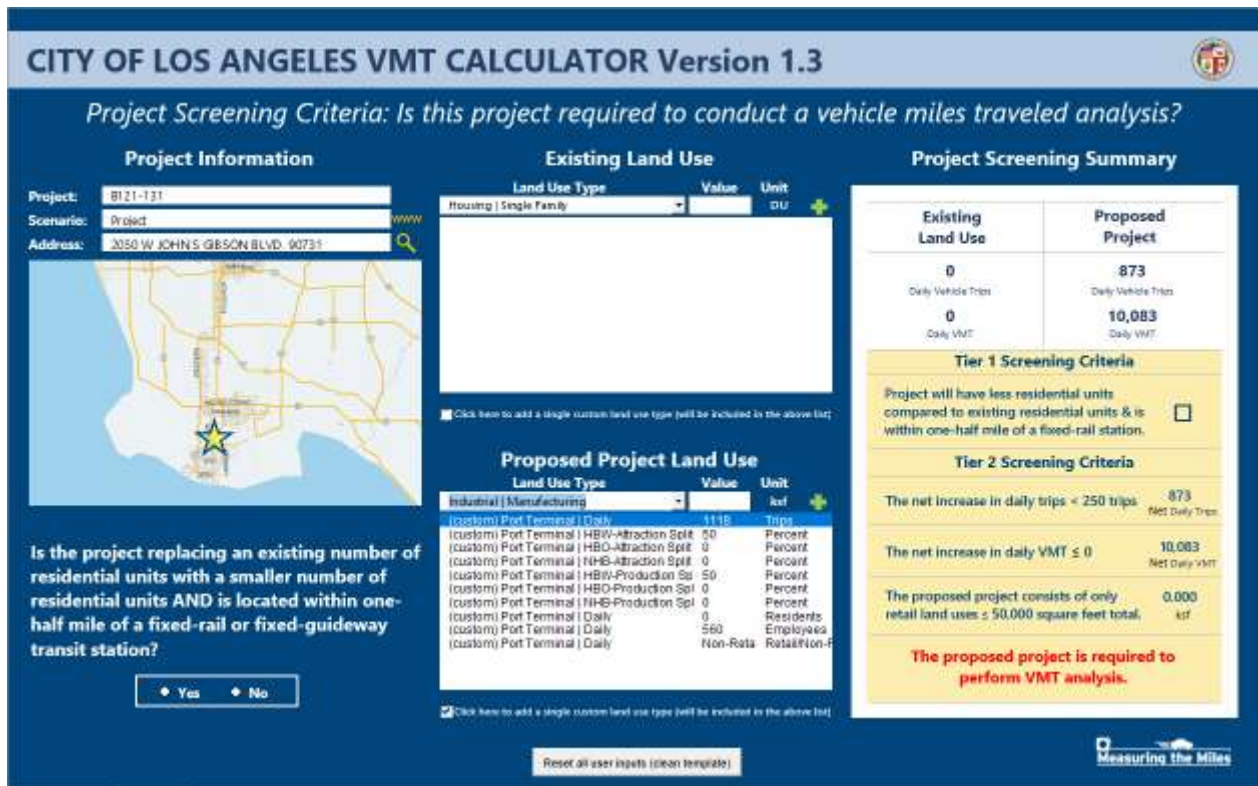
As shown in the queuing analysis, the proposed Project at full operation would extend queues at both intersections, with the largest increase added to the southbound left-turn at John S. Gibson Boulevard at the I-110 Northbound Ramps. However, because the southbound left-turn storage lane for that movement is 680 feet long, the proposed Project would not cause a queue that would extend beyond the storage lane and interfere with through traffic.

1.4 City of Los Angeles Vehicle Miles Traveled Calculator Version 1.3 Results

The City of Los Angeles’ VMT Calculator (LADOT 2020) tool is specifically designed and intended to be used to develop project-specific daily household VMT per capita and daily work VMT per employee metrics for residential and office land-use development projects in the City of Los Angeles. It implements the methodologies, screening criteria, and impact significance thresholds described in Section 2.2 of LADOT’s Transportation Assessment Guidelines for residential and employment projects.

Since the proposed Project is a land use (port terminal) that is not included as a standard land use in the Institute of Transportation Engineers Trip Generation Manual (ITE 2021), the specific estimated site employees was input into the model. The VMT Calculator’s Screening Criteria Conclusion (an example screenshot is in Figure C-2.1) determines whether or not a proposed project is required to perform a VMT analysis.

Figure C-2.1. Example VMT Screening Analysis.



1.5 References

COLA (City of Los Angeles). 2016. Department of City Planning. Mobility Plan 2035 An Element of the General Plan. Adopted September 2016.

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LADOT (City of Los Angeles Department of Transportation). 2020. Vehicle Miles Traveled Calculator Version 1.3. Available at:

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OPR (Governor's Office of Planning and Research). 2019. State Route 47/Vincent Thomas Bridge and Front Street/Harbor Boulevard Interchange Reconfiguration Project. SCH #2018101003.

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