Appendix D

Noise Modeling Calculations



Representative Construction Equipment and Levels Site Preparation (LEQ)

				Reference Emission	
	Distance to Nearest	Combined Predicted		Noise Levels (L _{max}) at 50	Usage
Location	Receptor in feet	Noise Level (L _{eq} dBA)	Equipment	feet ¹	Factor ¹
threshold	741	55.0	Backhoe	80	0.4
1887 Q Street	60	82.2	Excavator	85	0.4
2125 Foster Avenue	200	68.4	Dump Truck	84	0.4

Ground Type soft
Source Height 8
Receiver Height 5
Ground Factor² 0.63

Predicted Noise Level ³	L _{eq} dBA at 50 feet ³
Backhoe	76.0
Excavator	81.0
Dump Truck	80.0

Combined Predicted Noise Level (Leg dBA at 50 feet)

84

Sources:

 $L_{eq}(equip) = E.L.+10*log(U.F.) - 20*log(D/50) - 10*G*log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

 $^{^{1}\}mbox{Obtained}$ from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

 $^{^3}$ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).



Traffic Noise Spreadsheet Calculator

Project:

		Segment Description and Location	on		Existing	Existing + Project	Δ Existing – Existing +
Number	Name	From		То	Conditions	Conditions	Project
Summ	ary of Net Changes						
1	Foster Avenue	Project Driveway	East		58.3	59.7	1.4
2	Foster Avenue	Project Driveway	West		58.3	59.1	0.8

^{*}All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.



Traffic Noise Spreadsheet Calculator

Project:																		
				Input										Output				
Noise Level Descriptor: Leq Site Conditions: Hard Traffic Input: ADT Traffic K-Factor: 10						Distan Directi												
	Segment Descrin	tion and Location			Speed	Centerline			Traffic Di	stribution	Characte	ristics		Leq,	Di	stance to Co	ntour, (feet)	•
Number		From	To	ADT	(mph)	Near	Far	% Auto	% Medium				% Night	_	75 dBA	70 dBA	65 dBA	60 dBA
Exis	ting Conditions			7.5	· · ·					,	<u> </u>		J	, ,,,,,				
1	Foster Avenue	Project Driveway	East	1,090	25	10	30	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.3		1	4	12
2	Foster Avenue	Project Driveway	West	1,090	25	10	30	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	58.3		1	4	12

^{*}All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.



Traffic Noise Spreadsheet Calculator

Project:																		
								Input	:							Output		
Noi	se Level Descriptor Site Conditions Traffic Input Traffic K-Factor	s: Hard t: ADT				Distar Direct												
	Segment Descrip	tion and Location			Speed	Centerlin			Traffic D	istribution	Characte	ristics		Leq,	D	istance to Co	ontour, (feet)	la
Number		From	То	ADT	(mph)	Near	Far	% Auto	% Medium				% Night	(dBA) _{5,6,7}	70 dBA	65 dBA	60 dBA	55 dBA
Exis	ting + Project Co	nditions		7.5	· · ·					<u>, </u>	<u> </u>		J	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
1	Foster Avenue	Project Driveway	East	1,514	25	10	30	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.7	2	5	16	52
2	Foster Avenue	Project Driveway	West	1,302	25	10	30	97.0%	2.0%	1.0%	80.0%		5.0%	59.1	1	4	14	44

^{*}All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

<u>Citation # Citations</u>

1	Caltrans Technical Noise Supplement. 2009 (November). Table (5-11), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Table (4-2), Pg 4-17.
2	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Equation (4-5), Pg 4-17.
3	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32.	FHWA 2004 TNM Version 2.5
4	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-11), Pg 5-47, 48.	FHWA 2004 TNM Version 2.5
5	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-23), Pg 2-51, 52.
6	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-27), Pg 2-57.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-24), Pg 2-53.
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8	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-7), Pg 5-45.	FHWA 2004 TNM Version 2.5
9	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-8), Pg 5-45.	FHWA 2004 TNM Version 2.5
10	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-9), Pg 5-45.	FHWA 2004 TNM Version 2.5
11	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-13), Pg 5-49.	FHWA 2004 TNM Version 2.5
12	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-14), Pg 5-49.	FHWA 2004 TNM Version 2.5
13	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-	PD-96-010. 1998 (January). Equation (16), Pg 67
14	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-	PD-96-010. 1998 (January). Equation (20), Pg 69
15	Federal Highway Administration Traffic Noise Model Technical Manual Report No. FHWA-	PD-96-010 1998 (January) Equation (18) Pg 69

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California Department of Transportation (Caltrans). 2009 (November). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed August 17, 2017.

California Department of Transportation (Caltrans). 2013 (September). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf. Accessed August 17, 2017.

Federal Highway Administration. 2004. Traffic Noise Model Version 2.5. Available: https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25/. Accessed August 17, 2017.