

Appendix M

Noise Calculations

Traffic Noise Calculations

Project Number: 3397 IP Athos

Model Description: Reference Energy Mean Emission Levels (REMEL): speed-dependent emission levels from FHWA-RD-77-108
See Caltrans Technical Noise Supplement (TeNS 2013): Table 4-2

Model Assumptions: no shielding, no barriers, no finite road adjustment
Results given for Peak or Event Hour [Leq(h)] vph; CNEL from ADT vpd-distributed per time fractions

Road Segment / Receptor Inputs

Road Name/Segment: SR177 at So Access
Scenario: baseline or existing

Day	Evening	Night
7am-7pm	7pm-10pm	10pm-7am
12	3	9

Average Daily Traffic Mix (%)		
7am-7pm	7pm-10pm	10pm-7am
85	5	10

Receptor Distance: >15m Ref: 30.5 (m)
100.1 (ft)

Drop-off (alpha 0.5=soft, 0=hard): 0.00 (alpha)
Speed: 65 (mph)
105 (kph)

Ref: 4/16/2018 Traffic Study, Fig 3 (p.9)
(baseline peak hr counts shown as lower than avg daytime hr)

Vehicle Type Mix	ADT	Peak Hr	Day	Evening	Night
	(vpd)	(vph)	(vph)	(vph)	(vph)
	2800	125	198.3	46.7	31.1
	ADT Mix (%)	Peak Hr (vph)	Day (vph)	Evening (vph)	Night (vph)
Autos	92.50	115.6	183.5	43.2	28.8
Medium Duty Trucks	3.75	4.7	7.4	1.8	1.2
Heavy Duty Trucks	3.75	4.7	7.4	1.8	1.2

Ref: Caltrans 2016 Daily Truck Traffic (7.5% trucks - equal MDT & HDT)

REMEL Traffic Flow Adjustment					
	(TeNS 2013)	Peak Hr	Day	Evening	Night
Autos	76.8	-12.8	-10.8	-17.1	-18.9
MD Trucks	82.2	-26.8	-24.7	-31.0	-32.8
HD Trucks	86.3	-26.8	-24.7	-31.0	-32.8

	A	B	C
	41.7408	1.1485	50.128
	33.919	20.591	68.003
	35.8799	21.0197	74.298

Distance Adjustment
-3.1

Centerline Distance to CNEL Contour

Scenario Results

Leq(h)	Leq(h)	Leq(h)	Leq(h)
Peak Hour	Day	Evening	Night
(dBA)	(dBA)	(dBA)	(dBA)
62.7	64.7	58.4	56.6

Ldn @ Rec (dBA)	CNEL @ Rec (dBA)
65.2	65.4

70	65	60	55
Contour XX CNEL (ft)	Contour YY CNEL (ft)	Contour ZZ CNEL (ft)	Contour ZZ CNEL (ft)
49.5	106.6	229.7	495.0

Traffic Noise Calculations

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Model Description: Reference Energy Mean Emission Levels (REMEL): speed-dependent emission levels from FHWA-RD-77-108
See Caltrans Technical Noise Supplement (TeNS 2013): Table 4-2

Model Assumptions: no shielding, no barriers, no finite road adjustment
Results given for Peak or Event Hour [Leq(h)] vph; CNEL from ADT vpd-distributed per time fractions

Road Segment / Receptor Inputs

Road Name/Segment: SR177 at So Access
Scenario: ambient + project

Day	Evening	Night
7am-7pm	7pm-10pm	10pm-7am
12	3	9

Average Daily Traffic Mix (%)

7am-7pm	7pm-10pm	10pm-7am
85	5	10

Receptor Distance: >15m Ref: 30.5 (m)
100.1 (ft)

Drop-off (alpha 0.5=soft, 0=hard): 0.00 (alpha)
Speed: 65 (mph)
105 (kph)

*Ref: 4/16/2018 Traffic Study, Fig 4 (p.18) & Table 2
(project adds ~480 veh/peak hr on SR177)*

Vehicle Type Mix	ADT (vpd)	Peak Hr (vph)	Day (vph)	Evening (vph)	Night (vph)
Autos	3940	605	279.1	65.7	43.8
Medium Duty Trucks	1.00	6.1	2.8	0.7	0.4
Heavy Duty Trucks	2.00	12.1	5.6	1.3	0.9

Ref: 4/16/2018 Traffic Study, Table 2, project adds 6 trucks/peak hr

REMEL Traffic Flow Adjustment

	(TeNS 2013)	Peak Hr	Day	Evening	Night
Autos	76.8	-5.8	-9.1	-15.4	-17.2
MD Trucks	82.2	-25.6	-29.0	-35.3	-37.1
HD Trucks	86.3	-22.6	-26.0	-32.3	-34.0

	A	B	C
	41.7408	1.1485	50.128
	33.919	20.591	68.003
	35.8799	21.0197	74.298

Distance Adjustment
-3.1

Centerline Distance to CNEL Contour

Scenario Results

Leq(h) Peak Hour (dBA)	Leq(h) Day (dBA)	Leq(h) Evening (dBA)	Leq(h) Night (dBA)
68.8	65.5	59.2	57.4

Ldn @ Rec (dBA)	CNEL @ Rec (dBA)
66.0	66.2

70	65	60	55
Contour XX CNEL (ft)	Contour YY CNEL (ft)	Contour ZZ CNEL (ft)	Contour ZZ CNEL (ft)
55.8	120.2	259.1	558.1

							Composite at Receptor	
							Leq(h) (dBA)	
							54.3	
Operations (Inverters/Tracker Motors)	Inverters (spec. @ 10m, SMA 2015)	66	100	66.0	200	54.0	2.5E+05	
	Tracker Motors (estd. PVMS DEIR p.3.11-15)	50	10	40.0	200	28.0	6.3E+02	
	Pickup Truck (RCNM, sporadic use factor)	75	1	55.0	200	43.0	2.0E+04	
							Composite at Receptor	
							Leq(h) (dBA)	
							45.8	
Operations (hypothetical a/c system for battery)	Generic Equiv (81 dB @ 10 ft, Sta Paula 2017 IS)	67	100	67.0	800	42.9	2.0E+04	
	Inverters (spec. @ 10m, SMA 2015)	66	100	66.0	800	41.9	1.6E+04	
	Tracker Motors (estd. PVMS DEIR p.3.11-15)	50	10	40.0	500	20.0	1.0E+02	
	Pickup Truck (RCNM, sporadic use factor)	75	1	55.0	500	35.0	3.2E+03	

Vibration Source Levels for Construction Equipment

Project Number: 3397 IP Athos

Model Approach and Cite: FTA, 2006: Table 12-2

Reference Source (at 25 ft): PPV 0.210 in/sec , Vibratory Roller (compactor)

Reference Source (at 25 ft): Lv 94 VdB, Vibratory Roller (compactor)

Vibration Assessment

FTA, 2006: p 12-11

	D (ft) =	ppv(eq) =	Building Damage (over 0.5 in/sec)	Adverse Reaction Threshold (over 0.2 in/sec)	Lv(D) =	Human Annoyance (over 80 VdB)
(ref)	25	0.210 in/sec	No	Yes	94.0 VdB	Yes
At 50 feet	50	0.074 in/sec	No	No	85.0 VdB	Yes
At 100 feet	100	0.026 in/sec	No	No	75.9 VdB	No
At 300 feet	300	0.005 in/sec	No	No	61.6 VdB	No

Reference Source (at 25 ft): PPV 1.518 in/sec , Pile Driver (impact, upper range)

Reference Source (at 25 ft): Lv 112 VdB, Pile Driver (impact, upper range)

Vibration Assessment

FTA, 2006: p 12-11

	D (ft) =	ppv(eq) =	Building Damage (over 0.5 in/sec)	Adverse Reaction Threshold (over 0.2 in/sec)	Lv(D) =	Human Annoyance (over 80 VdB)
(ref)	25	1.518 in/sec	Yes	Yes	112.0 VdB	Yes
At 50 feet	50	0.537 in/sec	Yes	Yes	103.0 VdB	Yes
At 100 feet	100	0.190 in/sec	No	No	93.9 VdB	Yes
At 300 feet	300	0.037 in/sec	No	No	79.6 VdB	No

Reference Source (at 25 ft): PPV 0.089 in/sec , Large Bulldozer

Reference Source (at 25 ft): Lv 87 VdB, Large Bulldozer

Vibration Assessment

FTA, 2006: p 12-11

	D (ft) =	ppv(eq) =	Building Damage (over 0.5 in/sec)	Adverse Reaction Threshold (over 0.2 in/sec)	Lv(D) =	Human Annoyance (over 80 VdB)
(ref)	25	0.089 in/sec	No	No	87.0 VdB	Yes
At 50 feet	50	0.031 in/sec	No	No	78.0 VdB	No
At 100 feet	100	0.011 in/sec	No	No	68.9 VdB	No
At 300 feet	300	0.002 in/sec	No	No	54.6 VdB	No

Reference Source (at 25 ft): PPV 0.076 in/sec , Loaded Trucks
 Reference Source (at 25 ft): Lv 86 VdB, Loaded Trucks

Vibration Assessment

FTA, 2006: p 12-11

	D (ft) =	ppv(eq) =	Building Damage (over 0.5 in/sec)	Adverse Reaction Threshold (over 0.2 in/sec)	Lv(D) =	Human Annoyance (over 80 VdB)
(ref)	25	0.076 in/sec	No	No	86.0 VdB	Yes
At 50 feet	50	0.027 in/sec	No	No	77.0 VdB	No
At 100 feet	100	0.010 in/sec	No	No	67.9 VdB	No
At 300 feet	300	0.002 in/sec	No	No	53.6 VdB	No