Appendix F

Noise

Calculation Service		**Date:**	**May 12th, 2011**
Navcon Project #:	**102360**		
Project Engineer:	**Hans J. Forschner**		

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Customer:

Aspen Environmental Group	**Contact:**	**Lisa Blewitt, Jon Davidson**
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Work Sheets:

Caculation Parameter	**Documentation of Calculation Parameters**
Source Input	**Summary of the Noise Source Sound Power Level, Alternative 1, 2 & 3**
Calc Results Alternative 1	**158 Turbines Receiver Results for different metreological conditions**
Calc Results Alternative 2	**137 Turbines Receiver Results for different metreological conditions**
Calc Results Alternative 3	**105 Turbines Receiver Results for different metreological conditions**

Software Version:	**SoundPLAN 7.0 - Kernel version: 4/19/2011**

Prediction Model 1:	ISO 9613 -2 "Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation", 1993
Prediction Model:	ISO 9613 -2 "Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation", 1993
Air absorption:	ISO 9613-1 "Acoustics -- Attenuation of sound during propagation outdoors -- Part 1: Calculation of the absorption of sound by the atmosphere"
Environment:	
Air pressure	1013.25 mbar
rel. Humidity	(1) 50%, (2) 40, (3) 10%, (4) 5%
Temperature	(1) 10 °C = 50 °F, (2) 20 °C = 68 °F, (3) 30 °C = 86 °F, (4) 40 °C = 104 °F
Maximum Screening Loss:	
Single Barrier	20 dB
Multiple Barrier	25 dB
Screening Method:	Vertical and Horizontal Screening Activated
Number of Reflections:	3
Receiver Height above Ground	2 m
Maximum Search:	4000 m
Assessment:	Leq, Ldn
Ground:	Ground g=0.4, 40 % absoptive / 60 % reflective

	1/1 Octave Band Sound Power Level [dB]										
Wind Turbine Noise Data	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	**Lw**		
Siemens SWT-2.3-101 7+ m/s Std.	109.7	110.5	106.7	105.3	102.1	97.2	90.2	88.3	114.9	dBL	Standard Sound Power Level
	83.5	94.4	98.1	102.1	102.1	98.4	91.2	87.2	107.0	dBA	
Siemens SWT-2.22-101 7+ m/s Std.	109.6	110.1	105.6	104.0	101.1	96.3	89.6	87.8	114.4	dBL	Derated Turbine - Sound Power Level
	83.4	94.0	97.0	100.8	101.1	97.5	90.6	86.7	106.0	dBA	

Total Number of Wind Turbines:

158	Turbine Alternative 1
137	Turbine Alternative 2
105	Turbine Alternative 3

Derated Turbines:

2	Turbine Alternative 1
2	Turbine Alternative 2
0	Turbine Alternative 3

Predicted Noise Levels, 158 Wind Turbine Locations

			Model		ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
			Temp [C/F]		10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
			Humidity [%]		50%		40%		10%		5%		50%	
Name	**X m**	**Y m**	**Z m**	**TH m**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**
Location L-1	593509.8	3624509.6	123.8	119.8	49.5	43.1	48.9	42.4	47.1	40.7	45.8	39.4	51.1	44.7
Location L-2	592008.4	3623765.5	156.1	152.1	48.7	42.3	47.9	41.5	46.0	39.6	44.6	38.2	50.8	44.4
Location L-3	592886.2	3622306.7	163.6	159.6	46.2	39.8	45.2	38.8	43.2	36.7	41.6	35.2	48.4	42.0
Location L-4	596062.7	3620974.4	120.2	116.2	44.2	37.8	43.3	36.9	41.4	35.0	39.9	33.5	47.0	40.6

X, Y	UTM Coordinates [m]
Z	Recevier Height above sea level [m]
TH	Terrain Height [m]
Ldn	Day Night Level (10 dB correction for night time 10 pm - 7 am)
Leq	Average Sound Level dBA

Nord 2000 - Always 8 m/s downwind

Difference to ISO 9613 10C 50%

ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
50%		40%		10%		5%		5%	
Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq
0.0	0.0	0.6	0.7	2.4	2.4	3.7	3.7	-1.6	-1.6
0.0	0.0	0.8	0.8	2.7	2.7	4.1	4.1	-2.1	-2.1
0.0	0.0	1.0	1.0	3.0	3.1	4.6	4.6	-2.2	-2.2
0.0	0.0	0.9	0.9	2.8	2.8	4.3	4.3	-2.8	-2.8

Predicted Noise Levels, 137 Wind Turbine Locations

			Model		ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
			Temp [C/F]		10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
			Humidity [%]		50%		40%		10%		5%		50%	
Name	**X m**	**Y m**	**Z m**	**TH m**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**
Location L-1	593509.8	3624509.6	123.8	119.8	49.3	42.9	48.6	42.2	46.9	40.5	45.6	39.2	50.8	44.4
Location L-2	592008.4	3623765.5	156.1	152.1	48.7	42.3	47.8	41.4	46.0	39.6	44.6	38.1	50.8	44.4
Location L-3	592886.2	3622306.7	163.6	159.6	46.0	39.6	45.1	38.7	43.1	36.6	41.5	35.1	48.1	41.7
Location L-4	596062.7	3620974.4	120.2	116.2	43.4	37.0	42.6	36.2	40.7	34.3	39.3	32.9	46.5	40.1

X, Y	UTM Coordinates [m]
Z	Recevier Height above sealevel [m]
TH	Terrain Height [m]
Ldn	Day Night Level (10 dB correction for night time 10 pm - 7 am)
Leq	Average Sound Level dBA

Nord 2000 - Always 8 m/s downwind

Difference to ISO 9613 10C 50%

ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
50%		40%		10%		5%		5%	
Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq
0.0	0.0	0.7	0.7	2.4	2.4	3.7	3.7	-1.5	-1.5
0.0	0.0	0.9	0.9	2.7	2.7	4.1	4.2	-2.1	-2.1
0.0	0.0	0.9	0.9	2.9	3.0	4.5	4.5	-2.1	-2.1
0.0	0.0	0.8	0.8	2.7	2.7	4.1	4.1	-3.1	-3.1

APPENDIX F: Construction / Operation Stationary Source Noise Composites

Project Number: 3116
Project Name: Ocotillo Express Wind Project

Equipment Types from Data Request 2, Q4; Quanties from Data Request 1, Q1-14. O&M and Substation equipment per Will Walters 1/11/2011.
Equipment noise levels and usage factors from FHWA Highway Construction Noise Handbook, Final Report, August 2006.
Table 9.1, Actual Measured levels, unless unavailable then Spec. 721.560 levels.
Use per hour assumed based on RCNM default values.

CONSTRUCTION

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Road Construction						
Road Grader (Grader)	85	40	2	2640	49.6	Distance from L1 to closest road is 0.5 mile
Sheepsfoot Roller (Roller)	80	20	2	2640	41.6	
Medium Dozer (Dozer)	82	40	1	2640	43.6	
		Total Quantity of Equipment:	5			
		Peak Unmitigated Composite Leq(h):	**51.1**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA
Cumulative (Road Construction + Ambient)					
Road Construction	51.1	100	1	50	51.1
Ambient (daytime)	41	100	1	50	41.0
		Total Quantity of Equipment:	2		
		Peak Unmitigated Composite Leq(h):	**51.5**		

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Road Construction						
Road Grader (Grader)	85	40	2	2400	50.4	Distance from Jucumba Wilderness to
Sheepsfoot Roller (Roller)	80	20	2	2400	42.4	closest WTG is 0.45 mile
Medium Dozer (Dozer)	82	40	1	2400	44.4	
		Total Quantity of Equipment:	5			
		Peak Unmitigated Composite Leq(h):	**51.9**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA
Cumulative (Road Construction + Ambient)					
Road Construction	51.9	100	1	50	51.9
Ambient (daytime)	47	100	1	50	47.0
		Total Quantity of Equipment:	2		
		Peak Unmitigated Composite Leq(h):	**53.1**		

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Foundation Construction						
Medium Dozer (Dozer)	82	40	2	2640	46.6	Distance from L1 to closest wind turbine is 0.5 mile
Excavator	81	40	1	2640	42.6	Not included in DR#1, Q1-14, but listed in DR#2, Q4
Compaction Roller (Roller)	80	20	2	2640	41.6	
Water Truck (Flat-Bed Truck)	74	40	1	2640	35.6	
		Total Quantity of Equipment:	6			
		Peak Unmitigated Composite Leq(h):	**49.1**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Erection						
Large Crane (Crane)	81	16	2	2640	41.6	Distance from L1 to closest wind turbine is 0.5 mile
Medium Crane (Crane)	81	16	2	2640	41.6	
		Total Quantity of Equipment:	4			
		Peak Unmitigated Composite Leq(h):	**44.6**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Grading of O&M Complex						
980 Loader (Front End Loader)	79	40	3	8448	35.2	Distance from L2 to O&M complex is 1.6 miles
Compaction Roller (Roller)	80	20	2	8448	31.5	
Grader (Grader)	85	40	2	8448	39.5	
		Total Quantity of Equipment:	7			
		Peak Unmitigated Composite Leq(h):	**41.3**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Civil/Building of O&M Complex						
14 Ton Crane (Crane)	81	16	2	8448	31.5	Distance from L2 to O&M complex is 1.6 miles
150 Ton Crane (Crane)	81	16	2	8448	31.5	
Forklift (Front End Loader)	79	40	1	8448	30.5	
Manlift (Man Lift)	75	20	4	8448	29.5	
		Total Quantity of Equipment:	9			
		Peak Unmitigated Composite Leq(h):	**36.8**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Grading of Substation						
980 Loader (Front End Loader)	79	40	3	6336	37.7	Distance from L2 to substation is 1.2 miles
Compaction Roller (Roller)	80	20	2	6336	34.0	
Grader (Grader)	85	40	2	6336	42.0	
		Total Quantity of Equipment:	7			
		Peak Unmitigated Composite Leq(h):	**43.8**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Civil of Substation						
14 Ton Crane (Crane)	81	16	1	6336	31.0	Distance from L2 to substation is 1.2 miles
Driller (Drill Rig Truck)	79	20	2	6336	33.0	
Ditch Digger (Backhoe)	78	40	2	6336	35.0	
Forklift (Front End Loader)	79	40	1	6336	33.0	
Tractor (Tractor)	84	40	2	6336	41.0	
		Total Quantity of Equipment:	8			
		Peak Unmitigated Composite Leq(h):	**43.2**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Electrical of Substation						
14 Ton Crane (Crane)	81	16	2	6336	34.0	Distance from L2 to substation is 1.2 miles
150 Ton Crane (Crane)	81	16	2	6336	34.0	
Forklift (Front End Loader)	79	40	1	6336	33.0	
Manlift (Man Lift)	75	20	4	6336	32.0	
		Total Quantity of Equipment:	9			
		Peak Unmitigated Composite Leq(h):	**39.3**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Transformer Assembly and Processing of Substation						
50 Ton Crane (Crane)	81	16	2	6336	34.0	Distance from L2 to substation is 1.2 miles
Forklift (Front End Loader)	79	40	1	6336	33.0	
Manlift (Man Lift)	75	20	1	6336	26.0	
		Total Quantity of Equipment:	4			
		Peak Unmitigated Composite Leq(h):	**36.9**			

Construction Equipment	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Activity: Concrete Batch Plant						
Concrete Batch Plant	83	15	1	8976	29.7	Distance from L2 to batch plant is 1.7 miles
		Total Quantity of Equipment:	1			
		Peak Unmitigated Composite Leq(h):	**29.7**			

OPERATIONS AND MAINTENANCE

O&M	dBA @ 50 ft	Hour (%)	Quantity	Receptor feet	Leq(h) dBA	
Crane	81	16	1	2,640	38.6	Distance from L1 to closest wind turbine is 0.5 mile
Manlift	75	20	1	2,640	33.6	
		Total Quantity of Equipment:	2			
		Peak Unmitigated Composite Leq(h):	**39.8**			

Assumptions: Worst-case O&M estimated when two pieces of equipment operating simultaneously in the same area. Assume grader and pick-up truck (road maintenance) or crane and man lift (turbine maintenance).

O&M	Lmax Ref @ 50 ft	Use Per (%)	Quantity	Distance to feet	Equip dBA	
Grader	85	40	1	2,640	46.6	Distance from L1 to closest road is 0.5 mile
Pick-up Truck	75	40	1	2,640	36.6	
		Total Quantity of Equipment:	2			
		Peak Unmitigated Composite Leq(h):	**47.0**			

Substation	Lmax Ref dBA @ 50 ft	Use Per Hour (%)	Quantity	Distance to Receptor feet	Equip Leq(h) dBA	
Transformer	66	100	1	6,336	23.9	Distance from L2 to substation is 1.2 miles
Transformer	66	100	1	6,236	24.1	
		Total Quantity of Equipment:	2			
		Peak Unmitigated Composite Leq(h):	**27.0**			

Note: Two transformers, 100 feet apart, generating 86 dBA at the transformer (~5 feet), which is equivalent to 66 dBA at 50 feet.

California Vehicle Noise Calculation: Construction Traffic Mix (Trucks+Autos)

Project Number: 3116
Project Name: Ocotillo Express Wind Project
Model Description: Reference Energy Mean Emission Levels (REMEL) for California Vehicle Noise, Caltrans Technical Noise Supplement (11/09): Figure 5-9
Model Assumptions: no shielding, no barrier, no traffic flow adjustment (result : highest noise); uniform vehicle class mix

EXISTING CONDITIONS (2012)

			Vehicle Distribution Fractions				Number of Hours: (hrs)		
			HD Tks	MD Tks	Autos		7am-7pm	7pm-10pm	10pm-7am
Distance: >15m Ref:	15.0	(m)	11.2	4.8	84.0	Fraction	12	3	9
Drop-off (alpha 0.5=soft, 0=hard):	0.00	(alpha)	83.8	80.1	72.7	REMEL (dBA)	Backgd Traffic: (%)		
Speed:	55	(mph)					7am-7pm	7pm-10pm	10pm-7am
	89	(kph)					83	4	13

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	*65 Contour XX CNEL (ft)*	*60 Contour YY CNEL (ft)*	*55 Contour ZZ CNEL (ft)*
W. Evans Hewes Highway, East of Imperial Highway (2012)	260	26.0	18.0	3.5	3.8	58.18	56.58	49.43	49.78	57.9	***16.6***	***35.7***	***77.0***

Source/Assumptions: Traffic Report (LLG, 2011) - Existing Conditions Construction Year (2012) for ADT. Assumes a 5% growth factor from existing conditions (Dec. 2010). Vehicle distribution assumed to be the same as I-8 e/o Ocotillo from Imperial County Noise Element, 1993 - Table 3. Data not collected as part of traffic counts.

Vehicle Distribution Fractions				Number of Hours: (hrs)		
HD Tks	MD Tks	Autos		7am-7pm	7pm-10pm	10pm-7am
20.7	2.3	77.0	Fraction	12	3	9
			REMEL (dBA)	Backgd Traffic: (%)		
				7am-7pm	7pm-10pm	10pm-7am
				80	5	15

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	*65 Contour XX CNEL (ft)*	*60 Contour YY CNEL (ft)*	*55 Contour ZZ CNEL (ft)*
Imperial Highway, I-8 EB Ramp to SR-98 Yuba Cutoff (2012)	250	25.0	16.7	4.2	4.2	59.48	57.71	51.69	51.69	59.6	***21.4***	***46.1***	***99.4***

Source/Assumptions: Traffic Report (LLG, 2011) - Existing Conditions Construction Year (2012) for ADT. Assumes a 5% growth factor from existing conditions (Dec. 2010). Vehicle distribution assumed to be the same as SR-98 w/o Ocotillo from Imperial County Noise Element, 1993 - Table 3. Data not collected as part of traffic counts.

Vehicle Distribution Fractions				Number of Hours: (hrs)		
HD Tks	MD Tks	Autos		7am-7pm	7pm-10pm	10pm-7am
20.7	2.3	77.0	Fraction	12	3	9
			REMEL (dBA)	Backgd Traffic: (%)		
				7am-7pm	7pm-10pm	10pm-7am
				70	12	18

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	*65 Contour XX CNEL (ft)*	*60 Contour YY CNEL (ft)*	*55 Contour ZZ CNEL (ft)*
SR-98 (Yuha Cutoff), West of Imperial Highway (2012)	1200	120.0	70.0	48.0	24.0	66.29	63.95	62.31	59.30	67.1	***67.7***	***145.8***	***314.2***

Source/Assumptions: Traffic Report (LLG, 2011) - Existing Conditions Construction Year (2012) for ADT. Assumes a 5% growth factor from existing conditions (Dec. 2010).
Vehicle distribution from Imperial County Noise Element, 1993 - Table 3 (SR-98 w/o 8).

EXISTING + PROJECT CONSTRUCTION (2012)

Vehicle Distribution Fractions			Backgd Traffic: (%)		
HD Tks	MD Tks	Autos	7am-7pm	7pm-10pm	10pm-7am
26.8	1.6	71.6	94.5	1.4	4.1

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	***65 Contour XX CNEL (ft)***	***60 Contour YY CNEL (ft)***	***55 Contour ZZ CNEL (ft)***
W. Evans Hewes Highway, East of Imperial Highway (2012)	798	79.8	62.8	3.7	3.6	65.29	64.25	51.98	51.87	62.9	***35.9***	***77.3***	***166.6***

Source/Assumptions: Existing traffic (see above) plus construction traffic per the Traffic Report (LLG, 2011). Existing=11.2% HvyDuty (29), 4.8% MdDuty (13), 84% autos (218). Construction = 185 trucks (HvyDuty) and 353 employees (autos). Combination = 214 Hvy Duty (26.8%), 13 MdDuty (1.6%), 571 autos (71.6%) = 798. Construction would typically occur during daylight hours, so increase existing background traffic % in 7am-7pm timeframe for all construction traffic.

Vehicle Distribution Fractions			Backgd Traffic: (%)		
HD Tks	MD Tks	Autos	7am-7pm	7pm-10pm	10pm-7am
25.9	1.9	72.2	84.7	4.2	11.1

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	***65 Contour XX CNEL (ft)***	***60 Contour YY CNEL (ft)***	***55 Contour ZZ CNEL (ft)***
Imperial Highway, I-8 EB Ramp to SR-98 Yuba Cutoff (2012)	320	32.0	22.6	4.5	3.9	61.32	59.71	52.68	52.13	60.6	***25.1***	***54.1***	***116.6***

Source/Assumptions: Existing traffic (see above) plus construction traffic per the Traffic Report (LLG, 2011). Existing=20.7% HvyDuty (52), 2.3% MdDuty (6), 77% autos (192). Construction = 31 trucks (HvyDuty) and 39 employees (autos). Combination = 83 Hvy Duty (25.9%), 6 MdDuty (1.9%), 231 autos (72.2%) = 320. Construction would typically occur during daylight hours, so increase existing background traffic % in 7am-7pm timeframe for all construction traffic.

Vehicle Distribution Fractions			Backgd Traffic: (%)		
HD Tks	MD Tks	Autos	7am-7pm	7pm-10pm	10pm-7am
22.0	2.2	75.8	71.7	11.3	17.0

SEGMENT	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	***65 Contour XX CNEL (ft)***	***60 Contour YY CNEL (ft)***	***55 Contour ZZ CNEL (ft)***
SR-98 (Yuha Cutoff), West of Imperial Highway (2012)	1270	127.0	75.9	47.8	24.0	66.71	64.48	62.47	59.48	67.3	***70.5***	***151.9***	***327.2***

Source/Assumptions: Existing traffic (see above) plus construction traffic per the Traffic Report (LLG, 2011). Existing=20.7% HvyDuty (248), 2.3% MdDuty (28), 77% autos (924). Construction = 31 trucks (HvyDuty) and 39 employees (autos). Combination = 279 Hvy Duty (22.0%), 28 MdDuty (2.2%), 963 autos (75.8%) = 1,270. Construction would typically occur during daylight hours, so increase existing background traffic % in 7am-7pm timeframe for all construction traffic.

California Vehicle Noise Calculation: Operations Traffic Mix (Trucks+Autos)

Project Number: 3116
Project Name: Ocotillo Express Wind Project
Model Description: Reference Energy Mean Emission Levels (REMEL) for California Vehicle Noise, Caltrans Technical Noise Supplement (11/09): Figure 5-9
Model Assumptions: no shielding, no barrier, no traffic flow adjustment (result : highest noise); uniform vehicle class mix

Existing + Wind Farm Operations

			Vehicle Distribution Fractions				Number of Hours: (hrs)		
			HD Tks	MD Tks	Autos		7am-7pm	7pm-10pm	10pm-7am
Distance: >15m Ref:	15.0	(m)	9.2	4.2	86.6	Fraction	12	3	9
Drop-off (alpha 0.5=soft, 0=hard):	0.00	(alpha)	83.8	80.1	72.7	REMEL (dBA)	**Backgd Traffic: (%)**		
Speed:	55	(mph)					**7am-7pm**	**7pm-10pm**	**10pm-7am**
	89	(kph)					86	3	11

SEGMENT/CONDITION	Autos Count (vpd)	Peak (vph)	Av Day Hr (vph)	Av Eve Hr (vph)	Av Nite Hr (vph)	Leq(h) Peak (dBA)	Leq(h) Av Day Hr (dBA)	Leq(h) Av Eve Hr (dBA)	Leq(h) Av Nite Hr (dBA)	CNEL (dBA)	***65 Contour XX CNEL (ft)***	***60 Contour YY CNEL (ft)***	***55 Contour ZZ CNEL (ft)***
W. Evans Hewes Highway, East of Imperial Highway (2012)	314	31.4	22.5	3.1	3.8	58.53	57.08	48.53	49.40	57.9	***16.4***	***35.4***	***76.2***

Assumptions: Estimated based on employees (17), plus additional temporary workers (10). 27 r/t or 54 one-way trips for operations (7am-7pm assumed) + 260 existing.

Predicted Noise Levels, 105 Wind Turbine Locations

			Model		ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
			Temp [C/F]		10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
			Humidity [%]		50%		40%		10%		5%		50%	
Name	**X m**	**Y m**	**Z m**	**TH m**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**	**Ldn**	**Leq**
Location L-1	593509.8	3624509.6	123.8	119.8	44.4	38.0	43.6	37.2	41.8	35.3	40.4	34.0	46.0	39.6
Location L-2	592008.4	3623765.5	156.1	152.1	46.3	39.9	45.4	39.0	43.4	37.0	41.9	35.5	48.8	42.3
Location L-3	592886.2	3622306.7	163.6	159.6	39.6	33.2	38.3	31.9	36.1	29.6	34.2	27.8	41.6	35.2
Location L-4	596062.7	3620974.4	120.2	116.2	<32	<26	<32	<26	<32	<26	<32	<26	<32	<26

X, Y	UTM Coordinates [m]
Z	Recevier Height above sealevel [m]
TH	Terrain Height [m]
Ldn	Day Night Level (10 dB correction for night time 10 pm - 7 am)
Leq	Average Sound Level dBA

Nord 2000 - Always 8 m/s downwind

Note:

The prediction for Location 4 does not find any wind turbines. The search radius is 4,000 m (2.5 miles).

The contribution from all turbine beyond 4,000 m are Leq < 26 dBA -> Ldn < 32 dB.

Difference to ISO 9613 10C 50%

ISO 9613		ISO 9613		ISO 9613		ISO 9613		Nord 2000	
10 C / 50 F		20 C / 68 F		30 C / 86 F		40 C / 104 F		10 C / 50 F	
50%		40%		10%		5%		5%	
Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq	Ldn	Leq
0.0	0.0	0.8	0.8	2.6	2.7	4.0	4.0	-1.6	-1.6
0.0	0.0	0.9	0.9	2.9	2.9	4.4	4.4	-2.5	-2.4
0.0	0.0	1.3	1.3	3.5	3.6	5.4	5.4	-2.0	-2.0
-	-	-	-	-	-	-	-	-	-