APPENDIX II-H

NOISE MEASUREMENT DATA AND TRAFFIC NOISE IMPACTS CALCULATIONS

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SLM & RTA Summary

Translated:	2-Sep-10	7:06:31
File Translated:	Y:\824 Measurements\Shell Carson\13Jan_ST_.slmdl	
Model Number:	824	
Serial Number:	A3007	
Firmware Rev:	4.283	
Software Version:	3.12	
Name:	EDAW, Inc.	
Descr1:	1420 Kettner Blvd., Ste. 620	
Descr2:	San Diego, CA 92101	
Setup:	SLM&RTA.ssa	
Setup Descr:	SLM & Real-Time Analyzer	
Location:	MS1	
Note 1:		
Note 2:		

Overall Any Data

Start Time:	13-Jan-10	15:38:00
Elapsed Time:	15:30.8	

	A Weight	C Weight	Flat
Leq:	70.1 dBA	77.1 dBC	78.4 dBF
SEL:	99.8 dBA	106.8 dBC	108.1 dBF
Peak:	95.0 dBA	99.7 dBC	103.8 dBF
	1/13/2010 15:44	1/13/2010 15:44	1/13/2010 15:52
Lmax (slow):	82.2 dBA	88.9 dBC	89.5 dBF
	1/13/2010 15:44	1/13/2010 15:45	1/13/2010 15:45
Lmin (slow):	56.2 dBA	65.3 dBC	66.3 dBF
	1/13/2010 15:52	1/13/2010 15:52	1/13/2010 15:52
Lmax (fast):	83.4 dBA	90.0 dBC	94.3 dBF
	1/13/2010 15:44	1/13/2010 15:45	1/13/2010 15:52
Lmin (fast):	55.5 dBA	64.2 dBC	65.1 dBF
	1/13/2010 15:52	1/13/2010 15:52	1/13/2010 15:52
Lmax (impulse):	83.8 dBA	93.0 dBC	98.5 dBF
	1/13/2010 15:44	1/13/2010 15:52	1/13/2010 15:52
Lmin (impulse):	56.0 dBA	66.0 dBC	67.0 dBF
	1/13/2010 15:52	1/13/2010 15:45	1/13/2010 15:45

Spectra

Start Time:	13-Jan-10	15:38:00	Run Time:	15:30.8		
Freq Hz	Leq 1/3 Oct	Leq 1/1 Oct	Max 1/3 Oct	Max 1/1 Oct	Min 1/3 Oct	Min 1/1 Oct
12.5	68.3		79.1		40	
16	68.4	72.6	77.9	84.3	42.5	46.5
20	66.5		81.1		42.3	
25	65.2		77.9		45.5	
31.5	63.2	69.2	73.7	80.4	47.2	50.9
40	64.6		73.7		45.6	
50	66.6		78.5		48.6	
63	69.2	73.3	81.3	84.2	49.9	54.8
80	69.2		77.4		51.3	
100	66.3		76.5		50.8	
125	66.9	70.6	80	82.6	48.8	53.8
160	63.4		75.8		46.6	
200	62.9		75.6		45.5	
250	62.3	67	76.7	84.1	45.1	49.4
315	61.2		82.4		42.9	
400	58.9		74		43.5	
500	59.5	64.5	73.7	79.1	43.2	48.5
630	60.6		75.1		44.4	
800	62.5		74.4		45.9	
1000	63	67.2	74.6	78.6	45.9	50.4
1250	61.7		72.2		45.1	
1600	60		70.5		41.7	
2000	56.8	62.4	69.9	74.8	38.1	43.8
2500	54.4		69.8		34.3	
3150	51.6		68.5		31.3	
4000	48.4	54	65.3	70.9	29.5	34.4
5000	45.9		62.9		26.9	
6300	43.1		61.1		24.6	
8000	41.5	46.1	59	64.1	21.6	27.2
10000	37.6		56.9		19.6	
12500	37.7		56.6		18.6	
16000	35.4	40.7	51.1	57.8	20	25.1
20000	33.9		40.8		21.7	

Ln Start Level:	15 dB
L 1.00	75.7 dBA
L 5.00	73.9 dBA
L 50.00	68.9 dBA
L 90.00	62.3 dBA
L 95.00	60.1 dBA
L 99.00	57.6 dBA

SLM & RTA Summary

Translated:	2-Sep-10 7:10:35
File Translated:	Y:\824 Measurements\Shell Carson\13Jan-ST__001.slmdl
Model Number:	824
Serial Number:	A3007
Firmware Rev:	4.283
Software Version:	3.12
Name:	EDAW, Inc.
Descr1:	1420 Kettner Blvd., Ste. 620
Descr2:	San Diego, CA 92101
Setup:	SLM&RTA.ssa
Setup Descr:	SLM & Real-Time Analyzer
Location:	MS2
Note 1:	
Note 2:	

Overall Any Data

Start Time:	13-Jan-10 13:30:01		
Elapsed Time:	15:59.6		
	A Weight	C Weight	Flat
Leq:	48.8 dBA	60.7 dBC	63.3 dBF
SEL:	78.7 dBA	90.6 dBC	93.1 dBF
Peak:	85.9 dBA	86.4 dBC	86.3 dBF
	1/13/2010 13:39	1/13/2010 13:39	1/13/2010 13:39
Lmax (slow):	63.7 dBA	71.1 dBC	71.9 dBF
	1/13/2010 13:35	1/13/2010 13:42	1/13/2010 13:42
Lmin (slow):	44.6 dBA	58.3 dBC	60.8 dBF
	1/13/2010 13:34	1/13/2010 13:30	1/13/2010 13:40
Lmax (fast):	67.0 dBA	73.0 dBC	76.4 dBF
	1/13/2010 13:39	1/13/2010 13:42	1/13/2010 13:37
Lmin (fast):	43.9 dBA	56.5 dBC	58.4 dBF
	1/13/2010 13:34	1/13/2010 13:30	1/13/2010 13:30
Lmax (impulse):	71.7 dBA	73.9 dBC	79.5 dBF
	1/13/2010 13:39	1/13/2010 13:42	1/13/2010 13:37
Lmin (impulse):	44.1 dBA	59.1 dBC	61.4 dBF
	1/13/2010 13:34	1/13/2010 13:30	1/13/2010 13:30

Spectra

Start Time:	13-Jan-10	13:30:01	Run Time:	15:59.6		
Freq Hz	Leq 1/3 Oct	Leq 1/1 Oct	Max 1/3 Oct	Max 1/1 Oct	Min 1/3 Oct	Min 1/1 Oct
12.5	58.4		62.8		40	
16	55.9	61.4	59.4	65.5	40.2	44.8
20	54.9		58.8		39.8	
25	52.9		57		38.9	
31.5	53.2	57.8	54.5	61.2	40.4	45
40	53.1		57.4		41	
50	51.9		57		40.8	
63	52.8	56.8	57.9	61.3	43.6	47.2
80	51.3		53.9		42.4	
100	49.2		54.9		41.3	
125	47.7	52.3	58.7	62.5	37.9	43.7
160	44.2		58.5		36	
200	43.2		62.1		35.1	
250	42.3	46.9	60	65.6	35.1	39.3
315	40.6		60.2		33	
400	40.3		58.8		33	
500	41	45.7	61	64.9	32.8	38.4
630	41.4		60.2		34.9	
800	41.3		59		35.5	
1000	40.3	44.9	56.5	62	35.4	39.4
1250	38.2		55.2		32.3	
1600	35.7		52.1		29.3	
2000	33.7	39	50.8	55.6	25.8	31.6
2500	32.7		48.9		23.5	
3150	32		41.4		22	
4000	31.2	35.9	30.1	41.9	20.6	25.7
5000	30		26.9		19.8	
6300	27.7		24.4		18.8	
8000	26.3	31	23.5	28.3	18.8	23.5
10000	24		22.5		18.7	
12500	22.4		20.8		18.8	
16000	21.7	27	21.1	26.3	20	25
20000	22.6		22.4		21.5	

Ln Start Level:	15 dB
L 1.00	59.3 dBA
L 5.00	51 dBA
L 50.00	47 dBA
L 90.00	45.5 dBA
L 95.00	45.2 dBA
L 99.00	44.8 dBA

Site	Location	Date	Time	Duration	Leq		Lmax	Lmin	L(90)
LT-1	Shell Distribution I	20Sep 11	11:00:00	900	49.7	8.40E+07	59	46.7	47.2
LT-1	Shell Distribution I	20Sep 11	11:15:00	900	52	1.43E+08	66.3	47.4	48.3
LT-1	Shell Distribution I	20Sep 11	11:30:00	900	53.9	2.21E+08	68.5	47.2	47.8
LT-1	Shell Distribution I	20Sep 11	11:45:00	900	52.9	1.75E+08	68.4	47.4	48.1
LT-1	Shell Distribution I	20Sep 11	12:00:00	900	52.9	1.75E+08	66.5	47.1	47.6
LT-1	Shell Distribution I	20Sep 11	12:15:00	900	53.1	1.84E+08	68.2	47.1	47.5
LT-1	Shell Distribution I	20Sep 11	12:30:00	900	53.9	2.21E+08	68.6	47	48
LT-1	Shell Distribution I	20Sep 11	12:45:00	900	52.7	1.68E+08	65.4	46.3	47.6
LT-1	Shell Distribution I	20Sep 11	13:00:00	900	54.2	2.37E+08	68.8	46.9	47.4
LT-1	Shell Distribution I	20Sep 11	13:15:00	900	54.7	2.66E+08	70.3	47.3	47.8
LT-1	Shell Distribution I	20Sep 11	13:30:00	900	51.7	1.33E+08	68.8	47.2	47.8
LT-1	Shell Distribution I	20Sep 11	13:45:00	900	50.3	9.64E+07	58.7	47.7	48.2
LT-1	Shell Distribution I	20Sep 11	14:00:00	900	52.9	1.75E+08	67.8	47.5	48.2
LT-1	Shell Distribution I	20Sep 11	14:15:00	900	49.2	7.49E+07	57.2	47.3	48.1
LT-1	Shell Distribution I	20Sep 11	14:30:00	900	51.1	1.16E+08	60.8	48.1	48.8
LT-1	Shell Distribution I	20Sep 11	14:45:00	900	50.2	9.42E+07	57.6	47.5	48.3
LT-1	Shell Distribution I	20Sep 11	15:00:00	900	50.2	9.42E+07	60.9	47.6	48.3
LT-1	Shell Distribution I	20Sep 11	15:15:00	900	50.2	9.42E+07	59	48	48.4
LT-1	Shell Distribution I	20Sep 11	15:30:00	900	54.3	2.42E+08	66.5	48.1	49.1
LT-1	Shell Distribution I	20Sep 11	15:45:00	900	49.6	8.21E+07	52.7	48.2	48.7
LT-1	Shell Distribution I	20Sep 11	16:00:00	900	50.5	1.01E+08	57.5	48.5	49
LT-1	Shell Distribution I	20Sep 11	16:15:00	900	50.4	9.87E+07	55	48.5	49.1
LT-1	Shell Distribution I	20Sep 11	16:30:00	900	54.4	2.48E+08	69	48.8	49.3
LT-1	Shell Distribution I	20Sep 11	16:45:00	900	54.1	2.31E+08	66.7	48.8	49.6
LT-1	Shell Distribution I	20Sep 11	17:00:00	900	50.7	1.06E+08	55.6	48.8	49.3
LT-1	Shell Distribution I	20Sep 11	17:15:00	900	53.8	2.16E+08	69.2	47.8	48.7
LT-1	Shell Distribution I	20Sep 11	17:30:00	900	49.3	7.66E+07	56.5	47.5	48.2
LT-1	Shell Distribution I	20Sep 11	17:45:00	900	51.2	1.19E+08	61.1	47.7	48.3
LT-1	Shell Distribution I	20Sep 11	18:00:00	900	50.1	9.21E+07	55.7	48.2	48.8
LT-1	Shell Distribution I	20Sep 11	18:15:00	900	51.9	1.39E+08	64.6	47.9	48.7
LT-1	Shell Distribution I	20Sep 11	18:30:00	900	50.4	9.87E+07	58.8	48.3	48.7
LT-1	Shell Distribution I	20Sep 11	18:45:00	900	50	9.00E+07	62	47.6	48.2
LT-1	Shell Distribution I	20Sep 11	19:00:00	900	50	9.00E+07	56.5	48	48.4
LT-1	Shell Distribution I	20Sep 11	19:15:00	900	53.7	2.11E+08	63.6	49	50
LT-1	Shell Distribution I	20Sep 11	19:30:00	900	53.3	1.92E+08	64.7	48.9	49.4
LT-1	Shell Distribution I	20Sep 11	19:45:00	900	50.5	1.01E+08	54.7	48.7	49.2
LT-1	Shell Distribution I	20Sep 11	20:00:00	900	50.3	9.64E+07	55.6	48.4	49.1
LT-1	Shell Distribution I	20Sep 11	20:15:00	900	51.5	1.27E+08	61.3	48	48.7
LT-1	Shell Distribution I	20Sep 11	20:30:00	900	49.8	8.59E+07	54.9	47.5	48.2
LT-1	Shell Distribution I	20Sep 11	20:45:00	900	49	7.15E+07	64	46.5	47.1
LT-1	Shell Distribution I	20Sep 11	21:00:00	900	49.5	8.02E+07	60.9	46.5	47.2
LT-1	Shell Distribution I	20Sep 11	21:15:00	900	48.5	6.37E+07	54.5	45.9	47
LT-1	Shell Distribution I	20Sep 11	21:30:00	900	48.8	6.83E+07	59.2	46	46.3
LT-1	Shell Distribution I	20Sep 11	21:45:00	900	47.8	5.42E+07	55.7	45.6	46.2
LT-1	Shell Distribution I	20Sep 11	22:00:00	900	47.8	5.42E+07	56.9	45.2	46
LT-1	Shell Distribution I	20Sep 11	22:15:00	900	47.7	5.30E+07	60.1	45	45.6
LT-1	Shell Distribution I	20Sep 11	22:30:00	900	52.2	1.49E+08	59.3	46	47.5
LT-1	Shell Distribution I	20Sep 11	22:45:00	900	48.1	5.81E+07	57.5	45	46.2
LT-1	Shell Distribution I	20Sep 11	23:00:00	900	47.3	4.83E+07	53.2	45.6	46.1
LT-1	Shell Distribution I	20Sep 11	23:15:00	900	46.2	3.75E+07	55.2	44.3	44.7
LT-1	Shell Distribution I	20Sep 11	23:30:00	900	46.1	3.67E+07	53	43.7	44.3
LT-1	Shell Distribution I	20Sep 11	23:45:00	900	46.6	4.11E+07	56.6	44.2	44.9
LT-1	Shell Distribution I	21Sep 11	0:00:00	900	46.1	3.67E+07	60.3	44.1	44.4
LT-1	Shell Distribution I	21Sep 11	0:15:00	900	46.8	4.31E+07	57.7	43.8	44.3
LT-1	Shell Distribution I	21Sep 11	0:30:00	900	51	1.13E+08	69.8	44.2	45.2
LT-1	Shell Distribution I	21Sep 11	0:45:00	900	46.8	4.31E+07	54.7	44.3	45.2
LT-1	Shell Distribution I	21Sep 11	1:00:00	900	46.2	3.75E+07	54.8	43.5	44.5
LT-1	Shell Distribution I	21Sep 11	1:15:00	900	46	3.58E+07	50.5	43.7	44.8
LT-1	Shell Distribution I	21Sep 11	1:30:00	900	46.1	3.67E+07	56.6	42.8	43.7
LT-1	Shell Distribution I	21Sep 11	1:45:00	900	44.2	2.37E+07	54.6	42.6	43
LT-1	Shell Distribution I	21Sep 11	2:00:00	900	41.9	1.39E+07	46.1	39.8	40.3
LT-1	Shell Distribution I	21Sep 11	2:15:00	900	44.1	2.31E+07	48.5	40	41.8
LT-1	Shell Distribution I	21Sep 11	2:30:00	900	42.6	1.64E+07	49.7	39.7	40.2
LT-1	Shell Distribution I	21Sep 11	2:45:00	900	44	2.26E+07	53.3	40.5	42
LT-1	Shell Distribution I	21Sep 11	3:00:00	900	43.7	2.11E+07	52.7	41.1	41.9
LT-1	Shell Distribution I	21Sep 11	3:15:00	900	44.1	2.31E+07	52.4	40.3	41.3

LT-1	Shell Distribution I	21Sep 11	3:30:00	900	45.3	3.05E+07	52.3	41.5	42.7
LT-1	Shell Distribution I	21Sep 11	3:45:00	900	45.4	3.12E+07	50.7	41.8	43.1
LT-1	Shell Distribution I	21Sep 11	4:00:00	900	44.7	2.66E+07	54	40.7	42.5
LT-1	Shell Distribution I	21Sep 11	4:15:00	900	45.1	2.91E+07	52.5	42.5	43.1
LT-1	Shell Distribution I	21Sep 11	4:30:00	900	45.4	3.12E+07	51	42.3	43.4
LT-1	Shell Distribution I	21Sep 11	4:45:00	900	46.2	3.75E+07	51.8	43.5	44.5
LT-1	Shell Distribution I	21Sep 11	5:00:00	900	44	2.26E+07	50.3	40.8	41.6
LT-1	Shell Distribution I	21Sep 11	5:15:00	900	46	3.58E+07	57.1	41.6	43.1
LT-1	Shell Distribution I	21Sep 11	5:30:00	900	46.9	4.41E+07	51.6	42	43.5
LT-1	Shell Distribution I	21Sep 11	5:45:00	900	47.1	4.62E+07	53.1	43.6	44.7
LT-1	Shell Distribution I	21Sep 11	6:00:00	900	47.1	4.62E+07	53.6	43.3	45
LT-1	Shell Distribution I	21Sep 11	6:15:00	900	47	4.51E+07	58.5	43.1	44.1
LT-1	Shell Distribution I	21Sep 11	6:30:00	900	47.4	4.95E+07	57.7	43.8	45.1
LT-1	Shell Distribution I	21Sep 11	6:45:00	900	46.1	3.67E+07	58.3	42.9	43.6
LT-1	Shell Distribution I	21Sep 11	7:00:00	900	49.2	7.49E+07	61.4	44.1	45.1
LT-1	Shell Distribution I	21Sep 11	7:15:00	900	56.2	3.75E+08	75.5	44.9	46.2
LT-1	Shell Distribution I	21Sep 11	7:30:00	900	50.4	9.87E+07	62.2	46.8	47.6
LT-1	Shell Distribution I	21Sep 11	7:45:00	900	50.9	1.11E+08	58.5	47.6	48.6
LT-1	Shell Distribution I	21Sep 11	8:00:00	900	50.9	1.11E+08	58.8	46.6	48.2
LT-1	Shell Distribution I	21Sep 11	8:15:00	900	49.2	7.49E+07	55.8	46.3	47.2
LT-1	Shell Distribution I	21Sep 11	8:30:00	900	52.9	1.75E+08	69.6	45.8	46.8
LT-1	Shell Distribution I	21Sep 11	8:45:00	900	50.2	9.42E+07	59	47.2	48.2
LT-1	Shell Distribution I	21Sep 11	9:00:00	900	49.1	7.32E+07	55.7	46	47.1
LT-1	Shell Distribution I	21Sep 11	9:15:00	900	49.2	7.49E+07	58.1	46.4	47.2
LT-1	Shell Distribution I	21Sep 11	9:30:00	900	48.3	6.08E+07	56.9	45.5	46.7
LT-1	Shell Distribution I	21Sep 11	9:45:00	900	52.6	1.64E+08	69	46.4	47
LT-1	Shell Distribution I	21Sep 11	10:00:00	900	51.2	1.19E+08	63.5	46.3	47.1
LT-1	Shell Distribution I	21Sep 11	10:15:00	900	55.7	3.34E+08	76.6	46.1	46.7
LT-1	Shell Distribution I	21Sep 11	10:30:00	900	48.9	6.99E+07	54	46.1	47.2
LT-1	Shell Distribution I	21Sep 11	10:45:00	900	48.7	6.67E+07	55.4	46.2	47.1
			sum	86400		9.49E+09	**76.6**	**39.7**	
			min/ave	1440	**50.4**				**L(90)**
			Hours	24.0				**Averge**	**47.0**
								Minimum	**50.0**
								Maximum	**40.2**

Time	Leq
11:00 AM	52
12:00 PM	53
1:00 PM	53
2:00 PM	51
3:00 PM	52
4:00 PM	53
5:00 PM	52
6:00 PM	51
7:00 PM	52
8:00 PM	50
9:00 PM	49
10:00 PM	49
11:00 PM	47
12:00 AM	48
1:00 AM	46
2:00 AM	43
3:00 AM	45
4:00 AM	45
5:00 AM	46
6:00 AM	47
7:00 AM	53
8:00 AM	51
9:00 AM	50
10:00 AM	52
Average	**50**
Min	**43**
Max	**53.2**

24-Hour Leq	50.4
CNEL	54.7
Ldn	54.2
Max Leq	53.2
Min Leq	43.2
Lmax	76.6
Lmin	39.7
Peak	90.7
Average L_{10}	54.7
Average L_{33}	52.3
Average L_{50}	49.0
Average L_{90}	47.0

	Leq	Lmax
Daytime-Ever	51.6	76.6
Nighttime	46.1	69.8

Construction Traffic Noise Impacts, Proposed Project

Proposed Project

Basis:
70 km/hr (43 mph) vehicle speed
2 meter (6.6 ft.) high sound barrier 10 meters (33 ft.) from roadway centerline
195 automobiles/hr
28 heavy trucks/hr

From TNM 2.5 Lookup Tables:
(http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/)

Max. L_{eq} for 1000 automobiles/hr = 56.7 dBA at 20 meters
Max. L_{eq} for 1000 heavy trucks/hr = 73.5 dBA at 20 meters

$L_{eq,veh} = 10\log_{10}[V_{aut}/1000\ (10^{Leq,aut/10}) + V_{HT}/1000\ (10^{Leq,\ HT/10})]$ (TNM Lookup Tables Equation 1)
$= 10\log_{10}[195/1000\ (10^{56.7/10}) + 28/1000\ (10^{73.5/10})]$
$= 59$ dBA

$L_{eq,veh}$ = total hourly equivalent noise level from vehicles
V_{aut} = hourly automobile volume
$L_{eq,aut}$ = L_{eq} for 1000 automobiles/hr
V_{HT} = hourly heavy truck volume
$L_{eq,HT}$ = L_{eq} for 1000 heavy trucks/hr

Existing noise level = 65 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$ (National Institute for Occupational Safety and Health (NIOSH), 1978. Industrial Noise Control Manual http://www.cdc.gov/niosh/79-117pd.html)
$= 10\log_{10}(10^{65/10} + 10^{59/10})$
$= 66$ dBA

$L_{eq,tot}$ = total hourly equivalent noise level
$L_{eq,exist}$ = hourly equivalent existing noise level

Construction Traffic Noise Impacts, Alternative 2

Basis:
70 km/hr (43 mph) vehicle speed
2 meter (6.6 ft.) high sound barrier 10 meters (33 ft.) from roadway centerline
165 automobiles/hr
43 heavy trucks/hr

From TNM 2.5 Lookup Tables:
(http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/)

Max. L_{eq} for 1000 automobiles/hr = 56.7 dBA at 20 meters
Max. L_{eq} for 1000 heavy trucks/hr = 73.5 dBA at 20 meters

$L_{eq,veh} = 10\log_{10}[V_{aut}/1000\ (10^{Leq,aut/10}) + V_{HT}/1000\ (10^{Leq,\ HT/10})]$ (TNM Lookup Tables Equation 1)
$= 10\log_{10}[165/1000\ (10^{56.7/10}) + 43/1000\ (10^{73.5/10})]$
$= 60$ dBA

$L_{eq,veh}$ = total hourly equivalent noise level from vehicles
V_{aut} = hourly automobile volume
$L_{eq,aut} = L_{eq}$ for 1000 automobiles/hr
V_{HT} = hourly heavy truck volume
$L_{eq,HT} = L_{eq}$ for 1000 heavy trucks/hr

Existing noise level = 65 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$ (National Institute for Occupational Safety and Health (NIOSH), 1978. Industrial Noise Control Manual http://www.cdc.gov/niosh/79-117pd.html)
$= 10\log_{10}(10^{65/10} + 10^{60/10})$
$= 66$ dBA

$L_{eq,tot}$ = total hourly equivalent noise level
$L_{eq,exist}$ = hourly equivalent existing noise level

Construction Traffic Noise Impacts, Alternative 3

Basis:
70 km/hr (43 mph) vehicle speed
2 meter (6.6 ft.) high sound barrier 10 meters (33 ft.) from roadway centerline
165 automobiles/hr
21 heavy trucks/hr

From TNM 2.5 Lookup Tables:
(http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/)

Max. L_{eq} for 1000 automobiles/hr = 56.7 dBA at 20 meters
Max. L_{eq} for 1000 heavy trucks/hr = 73.5 dBA at 20 meters

$L_{eq,veh} = 10\log_{10}[V_{aut}/1000\ (10^{Leq,aut/10}) + V_{HT}/1000\ (10^{Leq,\ HT/10})]$ (TNM Lookup Tables Equation 1)
$= 10\log_{10}[165/1000\ (10^{56.7/10}) + 21/1000\ (10^{73.5/10})]$
$= 57$ dBA

$L_{eq,veh}$ = total hourly equivalent noise level from vehicles
V_{aut} = hourly automobile volume
$L_{eq,aut} = L_{eq}$ for 1000 automobiles/hr
V_{HT} = hourly heavy truck volume
$L_{eq,HT} = L_{eq}$ for 1000 heavy trucks/hr

Existing noise level = 65 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$ (National Institute for Occupational Safety and Health (NIOSH), 1978. Industrial Noise Control Manual http://www.cdc.gov/niosh/79-117pd.html)
$= 10\log_{10}(10^{65/10} + 10^{57/10})$
$= 66$ dBA

$L_{eq,tot}$ = total hourly equivalent noise level
$L_{eq,exist}$ = hourly equivalent existing noise level

Operational Traffic Noise Impacts, Residence Closest to Truck Driveway

Basis:
24 km/hr (14 mph) vehicle speed
190 meters (623 ft.) from driveway centerline
No sound barrier
12 heavy truck/hr

From TNM 2.5 Lookup Tables:
(http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/)

L_{eq} for 1000 heavy trucks/hr = 65.6 dBA

$L_{eq,veh} = 10\log_{10}(V_{HT}/1000\ 10^{Leq,\ HT/10})$ (TNM Lookup Tables Equation 1)
$= 10\log_{10}(12/1000\ (10^{65.6/10})$
$= 46$ dBA

$L_{eq,veh}$ = total hourly equivalent noise level from vehicles
V_{HT} = hourly heavy truck volume
$L_{eq,HT} = L_{eq}$ for 1000 heavy trucks/hr

Daytime:
Existing noise level = 53 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$ (National Institute for Occupational Safety and Health (NIOSH), 1978. Industrial Noise Control Manual http://www.cdc.gov/niosh/79-117pd.html)
$= 10\log_{10}(10^{53/10} + 10^{46/10})$
$= 54$ dBA

$L_{eq,tot}$ = total hourly equivalent noise level
$L_{eq,exist}$ = hourly equivalent existing noise level

Nighttime:
Existing noise level = 48 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$
$= 10\log_{10}(10^{48/10} + 10^{46/10})$
$= 50$ dBA

$L_{eq,tot}$ = total hourly equivalent noise level
$L_{eq,exist}$ = hourly equivalent existing noise level

Operational Traffic Noise Impacts, Public Roads

Basis:
70 km/hr (43 mph) vehicle speed
80 meters (262 ft.) from intersection centerline
No sound barrier
12 heavy truck/hr

From TNM 2.5 Lookup Tables:
(http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/)

L_{eq} for 1000 heavy trucks/hr = 69.9 dBA

$L_{eq,veh} = 10\log_{10}(V_{HT}/1000\ 10^{Leq,\ HT/10})$ (TNM Lookup Tables Equation 1)
$= 10\log_{10}(12/1000\ (10^{69.9/10})$
$= 51$ dBA

$L_{eq,veh}$ = total hourly equivalent noise level from vehicles
V_{HT} = hourly heavy truck volume
$L_{eq,HT} = L_{eq}$ for 1000 heavy trucks/hr

Existing noise level = 65 dBA

$L_{eq,tot} = 10\log_{10}(10^{Leq,exist/10} + 10^{Leq,\ veh/10})$ (National Institute for Occupational Safety and Health (NIOSH), 1978. Industrial Noise Control Manual http://www.cdc.gov/niosh/79-117pd.html)
$= 10\log_{10}(10^{65/10} + 10^{51/10})$
$= 65$ dBA