

---

# **Appendix M**

## Noise Modeling Data



## MEMORANDUM

---

**To:** SoCal Gas  
**From:** Mark Storm, INCE Bd. Cert. (Dudek)  
**Subject:** Ventura Compressor Station Modernization Project  
**Appendix M to Project PEA Noise Section 5.13**  
**Date:** July 19, 2023  
**Attachments:** (see bulleted list below)  
Figure M-1 – Locations of Baseline Outdoor Ambient Sound Level Survey  
Figure M-2 – Isometric View of Project Operations Sound Propagation Model Space  
Figure M-3 – Predicted Stationary Source Operation Noise from Proposed Project – All Four Compressors Active

---

The following are attachments that support the description of the Project environmental noise settings and predictive analyses for the Project noise and vibration assessment. The attachments are listed below by filename with brief descriptions of content.

- *M-1\_Baseline-Data-Summ\_North.pdf* – summary of collected data, expressed as hourly noise level metrics and statistical values, at the northern of two on-site monitoring positions from the field survey conducted by Dudek for SoCalGas at the Ventura Compressor Station from June 21, 2021, through June 28, 2021.
- *M-2\_Baseline-Data-Summ\_South.pdf* – summary of collected data, expressed as hourly noise level metrics and statistical values, at the southern of two on-site monitoring positions from the field survey conducted by Dudek for SoCal Gas at the Ventura Compressor Station from June 21, 2021, through June 28, 2021.
- *M-3\_RCNM-Worksheets.pdf* – presentation of input/output worksheets that calculate individual equipment noise levels per Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) mathematical expressions and reference equipment sound levels. Also includes Dudek-developed worksheets that logarithmically sum concurrent equipment noise expected on site for the indicated month in the proposed Project construction schedule.
- *M-4\_CadnaA-IO-Worksheets.pdf* – presentation of worksheets, using SoCalGas-provided data and Edison Electric Institute (EEI) Electric Power Plant Environmental Noise Guidance (EPPENG) techniques to estimate Project operation emission sources as inputs for the three-dimensional (3-D) sound propagation model prepared with commercially available Datakustic CadnaA software.
- *M-5\_Baseline-Noise-Level-Methodology.pdf* – narrative of the procedure used to collect outdoor ambient sound levels in the field, and explanation of the technique applied (including mathematical expressions) to

calculate the baseline Ventura Compressor Station operation noise levels for usage to assess Project operation noise assessment.

- *Figs-M1-M2-M3\_mcs071623.pdf* – presents Figures M-1, M-2, and M-3 as follows:
  - Figure M-1 displays the two onsite baseline outdoor ambient sound level survey positions (northern monitoring location [NML] and southern monitoring location [SML]) and the survey durations from which data has been presented in PEA Section 5.13;
  - Figure M-2 displays an annotated isometric view of the Project noise sources and obstacles as input with CadnaA software; and
  - Figure M-3 displays the results of aggregate Project operation noise propagation on site and towards the surrounding community across a horizontal plane 5 feet above local grade (i.e., typical pedestrian listener elevation).

Please refer to the PEA Section 5.13 for context for the above-listed content, with successive files attached in like order.

Should you have any questions, please do not hesitate to contact me at [mstorm@dudek.com](mailto:mstorm@dudek.com).

Sincerely,



Mark Storm, INCE Bd. Cert.  
Acoustic Services Manager

	CNEL	DNL	LAeq	ASmax	LASmin	LA10	LA50	LA90	CNEL	DNL
15:40	D9	D9	61	81	53	63	59	57	0	N1
16:40	D10	D10	60	82	55	62	58	57	1	N2
17:40	D11	D11	60	77	55	62	58	57	2	N3
18:40	D12	D12	59	74	53	61	56	55	3	N4
19:40	E1	D13	58	75	54	60	56	56	4	N5
20:40	E2	D14	59	82	55	61	58	57	5	N6
21:40	E3	D15	59	84	55	59	57	56	6	N7
22:40	N8	N8	58	69	55	59	57	56	7	D1
23:40	N9	N9	57	70	56	58	57	56	8	D2
00:40	N1	N1	57	76	55	57	57	56	9	D3
01:40	N2	N2	56	64	54	56	56	55	10	D4
02:40	N3	N3	57	72	55	57	56	56	11	D5
03:40	N4	N4	57	69	55	57	57	56	12	D6
04:40	N5	N5	58	70	55	59	57	56	13	D7
05:40	N6	N6	60	79	55	62	57	57	14	D8
06:40	N7	N7	61	75	56	64	58	57	15	D9
07:40	D1	D1	61	77	56	62	59	57	16	D10
08:40	D2	D2	63	76	56	65	59	57	17	D11
00:00	N1	N1	57	76	56	58	57	56	18	D12
00:00	N1	N1	57	76	56	58	57	56	19	E1
00:00	N1	N1	57	76	56	58	57	56	20	E2
00:00	N1	N1	57	76	56	58	57	56	21	E3
00:00	N1	N1	57	76	56	58	57	56	22	N8
00:00	N1	N1	57	76	56	58	57	56	23	N9
		<b>largest</b>	<b>63</b>	<b>84</b>	<b>56</b>	<b>65</b>	<b>59</b>	<b>57</b>		
		<b>smallest</b>	<b>56</b>	<b>64</b>	<b>53</b>	<b>56</b>	<b>56</b>	<b>55</b>		
		1								
24-hour			59	84	53	60	57	56		
Leq day	D		#N/A							
Leq eve	E		59							
Leq night	N		58							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		58							
LDN			#N/A							

	CNEL	DNL	LAeq	ASmax	LASmin	LA10	LA50	LA90	CNEL	DNL
10:00	D4	D4	61	83	55	62	58	57	0	N1
11:00	D5	D5	61	77	56	62	59	58	1	N2
12:00	D6	D6	60	75	55	62	58	57	2	N3
13:00	D7	D7	62	84	55	64	60	58	3	N4
14:00	D8	D8	62	85	54	63	59	57	4	N5
15:00	D9	D9	61	76	54	63	58	57	5	N6
16:00	D10	D10	60	77	56	62	59	58	6	N7
17:00	D11	D11	61	77	55	63	59	57	7	D1
18:00	D12	D12	60	76	55	63	58	57	8	D2
19:00	E1	D13	60	77	55	61	58	56	9	D3
20:00	E2	D14	59	70	54	60	57	57	10	D4
21:00	E3	D15	59	76	56	61	58	57	11	D5
22:00	N8	N8	58	73	55	59	57	57	12	D6
23:00	N9	N9	59	83	56	59	57	57	13	D7
00:00	N1	N1	58	69	56	58	57	57	14	D8
01:00	N2	N2	57	71	56	58	57	57	15	D9
02:00	N3	N3	57	70	56	58	57	57	16	D10
03:00	N4	N4	58	78	56	58	57	57	17	D11
04:00	N5	N5	58	72	56	58	57	57	18	D12
05:00	N6	N6	59	72	56	60	58	57	19	E1
06:00	N7	N7	61	73	57	64	59	58	20	E2
07:00	D1	D1	63	76	57	65	61	59	21	E3
08:00	D2	D2	63	79	57	65	61	60	22	N8
09:00	N1	N1	58	69	56	58	57	57	23	N9
	<b>largest</b>		<b>63</b>	<b>85</b>	<b>57</b>	<b>65</b>	<b>61</b>	<b>60</b>		
	<b>smallest</b>		<b>57</b>	<b>69</b>	<b>54</b>	<b>58</b>	<b>57</b>	<b>56</b>		
24-hour			60	85	54	61	58	57		
Leq day	D		#N/A							
Leq eve	E		59							
Leq night	N		59							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		59							
LDN			#N/A							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
10:00	D4	62	75	56	64	60	59	0	N1	
11:00	D5	63	82	55	64	60	58	1	N2	
12:00	D6	61	83	55	62	58	57	2	N3	
13:00	D7	64	92	58	65	61	60	3	N4	
14:00	D8	63	79	57	65	61	60	4	N5	
15:00	D9	62	76	55	64	60	58	5	N6	
16:00	D10	64	84	56	66	62	59	6	N7	
17:00	D11	63	81	57	65	62	60	7	D1	
18:00	D12	63	88	56	65	60	58	8	D2	
19:00	E1	61	83	55	63	58	57	9	D3	
20:00	E2	59	77	55	61	58	57	10	D4	
21:00	E3	59	71	55	60	57	57	11	D5	
22:00	N8	58	73	55	59	57	56	12	D6	
23:00	N9	58	74	56	59	57	57	13	D7	
00:00	N1	57	69	55	58	57	56	14	D8	
01:00	N2	57	72	56	57	57	56	15	D9	
02:00	N3	57	70	56	57	57	56	16	D10	
03:00	N4	57	71	56	57	57	56	17	D11	
04:00	N5	57	72	55	58	57	56	18	D12	
05:00	N6	59	79	56	60	57	57	19	E1	
06:00	N7	62	81	56	64	59	57	20	E2	
07:00	D1	62	78	56	64	59	58	21	E3	
08:00	D2	64	77	56	65	61	59	22	N8	
09:00	N1	57	69	55	58	57	56	23	N9	
		<b>largest</b>	<b>64</b>	<b>92</b>	<b>58</b>	<b>66</b>	<b>62</b>	<b>60</b>		
		<b>smallest</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>57</b>	<b>57</b>	<b>56</b>		
		1								
24-hour		61	92	55	62	59	58			
Leq day	D	#N/A								
Leq eve	E	60								
Leq night	N	58								
CNEL		#N/A								
Leq day		D	#N/A							
Leq night		N	58							
LDN		#N/A								

			LAeq	ASmax	LASmin	LA10	LA50	LA90			
	CNEL	DNL							CNEL	DNL	
09:06	D3	D3	71	84	57	71	69	68	0	N1	N1
10:06	D4	D4	72	85	60	72	70	68	1	N2	N2
11:06	D5	D5	70	87	59	70	68	67	2	N3	N3
12:06	D6	D6	67	86	56	66	63	61	3	N4	N4
13:06	D7	D7	71	91	61	72	69	68	4	N5	N5
14:06	D8	D8	71	82	56	72	69	68	5	N6	N6
15:06	D9	D9	70	85	56	70	67	66	6	N7	N7
16:06	D10	D10	64	76	56	66	61	59	7	D1	D1
17:06	D11	D11	63	77	57	65	62	60	8	D2	D2
18:06	D12	D12	64	83	56	66	62	60	9	D3	D3
19:06	E1	D13	60	76	55	62	57	57	10	D4	D4
20:06	E2	D14	59	72	56	62	57	56	11	D5	D5
21:06	E3	D15	59	75	56	60	58	57	12	D6	D6
22:06	N8	N8	59	73	56	59	57	57	13	D7	D7
23:06	N9	N9	58	77	56	59	57	57	14	D8	D8
00:06	N1	N1	58	80	56	58	57	57	15	D9	D9
01:06	N2	N2	57	70	56	57	57	56	16	D10	D10
02:06	N3	N3	57	71	56	57	57	56	17	D11	D11
03:06	N4	N4	58	72	56	58	57	57	18	D12	D12
04:06	N5	N5	58	71	56	59	57	57	19	E1	D13
05:06	N6	N6	60	78	56	61	58	57	20	E2	D14
06:06	N7	N7	65	77	57	66	62	60	21	E3	D15
07:06	D1	D1	72	86	62	73	70	69	22	N8	N8
08:06	D2	D2	75	89	57	75	73	71	23	N9	N9
		<b>largest</b>	<b>75</b>	<b>91</b>	<b>62</b>	<b>75</b>	<b>73</b>	<b>71</b>			
		<b>smallest</b>	<b>57</b>	<b>70</b>	<b>55</b>	<b>57</b>	<b>57</b>	<b>56</b>			
		1									
24-hour			68	91	55	65	62	61			
Leq day	D		71								
Leq eve	E		59								
Leq night	N		60								
CNEL			70								
Leq day	D		70								
Leq night	N		60								
LDN			70								



		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
09:11	D3	74	89	58	72	70	68	0	N1	
10:11	D4	76	87	61	76	74	72	1	N2	
11:11	D5	73	89	57	70	67	65	2	N3	
12:11	D6	73	90	56	69	66	65	3	N4	
13:11	D7	72	88	55	70	66	64	4	N5	
14:11	D8	73	88	57	72	68	67	5	N6	
15:11	D9	75	89	59	74	71	70	6	N7	
16:11	D10	73	89	56	71	67	66	7	D1	
17:11	D11	74	90	57	72	69	68	8	D2	
18:11	D12	67	81	55	67	62	60	9	D3	
19:11	E1	60	73	55	62	58	57	10	D4	
20:11	E2	61	87	56	63	58	57	11	D5	
21:11	E3	59	72	56	61	58	57	12	D6	
22:11	N8	59	77	55	60	57	56	13	D7	
23:11	N9	58	71	56	59	57	56	14	D8	
00:11	N1	58	75	54	58	56	56	15	D9	
01:11	N2	57	78	53	58	56	56	16	D10	
02:11	N3	58	71	56	58	57	57	17	D11	
03:11	N4	57	71	56	58	57	56	18	D12	
04:11	N5	58	71	56	58	57	57	19	E1	
05:11	N6	59	74	56	60	58	57	20	E2	
06:11	N7	61	76	56	63	59	58	21	E3	
07:11	D1	76	88	59	77	75	73	22	N8	
08:11	D2	76	88	57	76	74	73	23	N9	
		<b>largest</b>	<b>76</b>	<b>90</b>	<b>61</b>	<b>77</b>	<b>75</b>	<b>73</b>		
		<b>smallest</b>	<b>57</b>	<b>71</b>	<b>53</b>	<b>58</b>	<b>56</b>	<b>56</b>		
		1								
24-hour		71	90	53	66	63	62			
Leq day	D	74								
Leq eve	E	60								
Leq night	N	58								
CNEL		72								
Leq day		D	73							
Leq night		N	58							
LDN		72								

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
09:05	D3	71	86	55	69	66	65	0	N1
10:05	D4	65	81	56	66	64	62	1	N2
11:05	D5	64	77	55	65	62	60	2	N3
12:05	D6	61	76	54	63	58	56	3	N4
13:05	D7	66	79	58	68	64	62	4	N5
14:05	D8	64	78	55	66	63	61	5	N6
15:05	D9	62	83	54	63	59	58	6	N7
16:05	D10	61	78	55	63	59	58	7	D1
17:05	D11	64	75	54	65	62	60	8	D2
18:05	D12	62	83	54	64	59	57	9	D3
19:05	E1	59	75	54	61	57	56	10	D4
20:05	E2	59	78	55	61	57	56	11	D5
21:05	E3	64	94	56	61	58	57	12	D6
22:05	N8	59	73	56	61	58	57	13	D7
23:05	N9	58	71	55	59	57	57	14	D8
00:05	N1	58	76	55	58	57	56	15	D9
01:05	N2	57	70	55	58	57	56	16	D10
02:05	N3	57	71	56	58	57	57	17	D11
03:05	N4	57	70	56	58	57	57	18	D12
04:05	N5	57	72	56	58	57	57	19	E1
05:05	N6	58	71	56	59	57	57	20	E2
06:05	N7	59	78	56	60	58	57	21	E3
07:05	D1	65	82	57	66	63	61	22	N8
08:05	D2	70	88	57	69	67	66	23	N9
	<b>largest</b>	<b>71</b>	<b>94</b>	<b>58</b>	<b>69</b>	<b>67</b>	<b>66</b>		
	<b>smallest</b>	<b>57</b>	<b>70</b>	<b>54</b>	<b>58</b>	<b>57</b>	<b>56</b>		
	1								
24-hour		64	94	54	62	60	59		
Leq day	D	66							
Leq eve	E	61							
Leq night	N	58							
CNEL		67							
Leq day	D	65							
Leq night	N	58							
LDN		67							

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
08:56	D2	68	79	62	70	67	66	0	N1
09:56	D3	68	78	55	68	66	65	1	N2
10:56	D4	69	86	65	71	69	68	2	N3
11:56	D5	69	80	59	69	67	65	3	N4
12:56	D6	65	78	54	65	62	61	4	N5
13:56	D7	70	81	61	71	69	67	5	N6
14:56	D8	65	80	55	65	62	61	6	N7
15:56	D9	69	82	57	69	67	66	7	D1
16:56	D10	68	79	54	68	65	64	8	D2
17:56	D11	60	77	54	62	57	56	9	D3
18:56	D12	59	74	55	61	57	56	10	D4
19:56	E1	60	80	55	61	57	56	11	D5
20:56	E2	59	73	55	60	57	56	12	D6
21:56	E3	58	75	55	59	56	56	13	D7
22:56	N8	58	79	54	58	56	55	14	D8
23:56	N9	57	71	55	57	56	56	15	D9
00:56	N1	57	72	55	57	57	56	16	D10
01:56	N2	57	70	55	57	56	56	17	D11
02:56	N3	57	71	55	57	57	56	18	D12
03:56	N4	58	71	55	58	57	56	19	E1
04:56	N5	59	75	55	60	57	56	20	E2
05:56	N6	62	77	56	65	59	57	21	E3
06:56	N7	67	80	57	68	65	63	22	N8
07:56	D1	70	81	59	70	68	66	23	N9
	<b>largest</b>	<b>70</b>	<b>86</b>	<b>65</b>	<b>71</b>	<b>69</b>	<b>68</b>		
	<b>smallest</b>	<b>57</b>	<b>70</b>	<b>54</b>	<b>57</b>	<b>56</b>	<b>55</b>		
	1								
24-hour		65	86	54	64	61	60		
Leq day	D	68							
Leq eve	E	59							
Leq night	N	61							
CNEL		69							
Leq day	D	67							
Leq night	N	61							
LDN		69							

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
14:45	D8	61	80	51	62	58	55	0	N1
15:45	D9	58	79	48	61	56	53	1	N2
16:45	D10	58	82	50	60	55	53	2	N3
17:45	D11	57	69	50	60	54	52	3	N4
18:45	D12	57	79	49	59	53	51	4	N5
19:45	E1	56	70	50	58	53	52	5	N6
20:45	E2	57	82	51	59	53	52	6	N7
21:45	E3	56	75	51	58	53	53	7	D1
22:45	N8	54	69	51	56	53	52	8	D2
23:45	N9	55	75	52	56	54	53	9	D3
00:45	N1	54	66	52	54	53	53	10	D4
01:45	N2	53	63	50	53	53	52	11	D5
02:45	N3	54	75	51	55	53	53	12	D6
03:45	N4	54	67	52	55	53	53	13	D7
04:45	N5	56	69	52	57	54	53	14	D8
05:45	N6	58	69	52	61	56	54	15	D9
06:45	N7	60	80	52	63	57	55	16	D10
07:45	D1	59	71	51	61	56	54	17	D11
08:45	D2	58	75	50	61	54	52	18	D12
09:45	D3	60	79	49	61	55	53	19	E1
10:45	D4	64	80	51	64	60	58	20	E2
11:45	D5	59	81	49	61	55	52	21	E3
12:45	D6	60	79	49	62	55	53	22	N8
13:45	D7	60	78	49	62	57	54	23	N9
	<b>largest</b>	<b>64</b>	<b>82</b>	<b>52</b>	<b>64</b>	<b>60</b>	<b>58</b>		
	<b>smallest</b>	<b>53</b>	<b>63</b>	<b>48</b>	<b>53</b>	<b>53</b>	<b>51</b>		
	1								
24-hour		58	82	48	59	55	53		
Leq day	D	60							
Leq eve	E	56							
Leq night	N	56							
CNEL		63							
Leq day	D	59							
Leq night	N	56							
LDN		63							

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
16:52	D10	58	71	50	61	56	53	0	N1
17:52	D11	59	78	49	62	56	52	1	N2
18:52	D12	58	72	50	61	55	53	2	N3
19:52	E1	56	72	48	58	53	52	3	N4
20:52	E2	56	69	51	58	53	53	4	N5
21:52	E3	55	68	51	57	53	53	5	N6
22:52	N8	55	77	52	56	54	53	6	N7
23:52	N9	54	66	52	55	54	54	7	D1
00:52	N1	56	70	52	56	55	55	8	D2
01:52	N2	54	65	52	54	54	53	9	D3
02:52	N3	55	72	52	55	54	54	10	D4
03:52	N4	55	73	52	56	53	53	11	D5
04:52	N5	56	70	52	58	54	54	12	D6
05:52	N6	61	82	53	62	57	55	13	D7
06:52	N7	60	77	52	63	57	55	14	D8
07:52	D1	59	76	49	61	56	53	15	D9
08:52	D2	57	73	48	59	54	51	16	D10
09:52	D3	57	78	48	60	54	51	17	D11
10:52	D4	59	80	47	61	54	51	18	D12
11:52	D5	57	70	48	60	55	52	19	E1
12:52	D6	62	78	51	63	59	56	20	E2
13:52	D7	59	74	53	61	58	56	21	E3
14:52	D8	60	73	50	62	58	55	22	N8
15:52	D9	64	87	50	64	59	56	23	N9
	<b>largest</b>	<b>64</b>	<b>87</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>56</b>		
	<b>smallest</b>	<b>54</b>	<b>65</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>51</b>		
24-hour		58	87	47	59	55	53		
Leq day	D	60							
Leq eve	E	56							
Leq night	N	57							
CNEL		64							
Leq day	D	59							
Leq night	N	57							
LDN		64							

		LAeq	ASmax	LASmin	LA10	LA50	LA90				
CNEL	DNL							CNEL	DNL		
17:37	D11	61	88	52	62	58	56	0	N1		
18:37	D12	58	75	51	61	56	54	1	N2		
19:37	E1	57	74	52	60	55	53	2	N3		
20:37	E2	56	69	50	58	53	52	3	N4		
21:37	E3	56	77	50	57	53	52	4	N5		
22:37	N8	55	67	51	57	54	53	5	N6		
23:37	N9	56	75	52	56	54	54	6	N7		
00:37	N1	55	69	53	56	55	54	7	D1		
01:37	N2	55	67	52	55	54	54	8	D2		
02:37	N3	55	73	52	55	54	53	9	D3		
03:37	N4	54	73	51	55	53	52	10	D4		
04:37	N5	56	77	52	57	53	53	11	D5		
05:37	N6	58	71	52	61	56	54	12	D6		
06:37	N7	61	82	52	64	58	55	13	D7		
07:37	D1	61	77	51	63	57	54	14	D8		
08:37	D2	60	72	51	62	58	56	15	D9		
09:37	D3	61	75	51	63	58	56	16	D10		
10:37	D4	60	78	52	62	58	55	17	D11		
11:37	D5	58	72	50	60	56	53	18	D12		
12:37	D6	60	75	50	62	57	55	19	E1		
13:37	D7	60	83	50	62	57	54	20	E2		
14:37	D8	60	79	49	62	57	54	21	E3		
15:37	D9	61	73	52	63	59	57	22	N8		
16:37	D10	59	68	51	62	58	55	23	N9		
		<b>largest</b>	<b>61</b>	<b>88</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>57</b>			
		<b>smallest</b>	<b>54</b>	<b>67</b>	<b>49</b>	<b>55</b>	<b>53</b>	<b>52</b>			
		1									
24-hour		59	88	49	60	56	54				
Leq day	D	60									
Leq eve	E	56									
Leq night	N	57									
CNEL		64									
Leq day		D	59								
Leq night		N	57								
LDN		64									

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
17:09	D11	60	75	53	62	59	57	0	N1
18:15	D12	63	82	52	64	59	57	1	N2
19:15	E1	57	76	48	60	54	52	2	N3
20:15	E2	56	70	49	59	53	51	3	N4
21:15	E3	56	71	50	58	53	52	4	N5
22:15	N8	56	72	50	57	53	53	5	N6
23:15	N9	59	88	53	57	54	54	6	N7
00:15	N1	55	70	52	56	54	54	7	D1
01:15	N2	54	66	52	55	54	54	8	D2
02:15	N3	54	74	52	55	54	53	9	D3
03:15	N4	56	74	52	57	55	55	10	D4
04:15	N5	56	71	52	57	55	54	11	D5
05:15	N6	61	88	53	61	56	55	12	D6
06:15	N7	61	82	52	63	58	56	13	D7
07:15	D1	60	73	49	62	58	55	14	D8
08:15	D2	61	72	53	63	59	57	15	D9
09:15	D3	59	73	49	60	56	54	16	D10
10:15	D4	58	73	48	61	56	53	17	D11
11:15	D5	58	69	50	60	56	53	18	D12
12:15	D6	61	80	50	62	58	56	19	E1
13:15	D7	59	75	48	61	56	52	20	E2
14:15	D8	61	78	49	62	58	55	21	E3
15:15	D9	61	81	52	64	59	56	22	N8
16:15	D10	59	71	50	62	57	54	23	N9
	<b>largest</b>	<b>63</b>	<b>88</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>57</b>		
	<b>smallest</b>	<b>54</b>	<b>66</b>	<b>48</b>	<b>55</b>	<b>53</b>	<b>51</b>		
	1								
24-hour		59	88	48	60	56	54		
Leq day	D	60							
Leq eve	E	56							
Leq night	N	58							
CNEL		65							
Leq day	D	60							
Leq night	N	58							
LDN		64							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
16:58	D10	59	76	49	61	56	54	0	N1	
17:58	D11	58	73	48	61	55	52	1	N2	
18:58	D12	56	74	47	59	53	50	2	N3	
19:58	E1	56	71	49	59	53	51	3	N4	
20:58	E2	56	75	50	59	53	51	4	N5	
21:58	E3	56	79	51	58	54	53	5	N6	
22:58	N8	55	70	51	56	53	53	6	N7	
23:58	N9	55	71	51	57	54	53	7	D1	
00:58	N1	54	72	48	55	52	51	8	D2	
01:58	N2	54	68	49	55	53	52	9	D3	
02:58	N3	54	69	51	54	53	52	10	D4	
03:58	N4	55	74	52	55	53	53	11	D5	
04:58	N5	57	77	52	58	54	53	12	D6	
05:58	N6	61	86	52	61	56	55	13	D7	
07:01	D1	66	76	55	68	65	63	14	D8	
08:01	D2	64	78	55	65	62	60	15	D9	
09:01	D3	58	81	46	60	54	52	16	D10	
10:01	D4	58	76	48	60	55	52	17	D11	
11:01	D5	56	69	48	59	53	51	18	D12	
12:01	D6	57	73	47	60	54	51	19	E1	
13:01	D7	58	72	49	61	56	53	20	E2	
14:01	D8	58	77	49	60	54	52	21	E3	
15:01	D9	57	75	46	60	53	50	22	N8	
16:01	D10	57	74	47	60	54	51	23	N9	
		<b>largest</b>	<b>66</b>	<b>86</b>	<b>55</b>	<b>68</b>	<b>65</b>	<b>63</b>		
		<b>smallest</b>	<b>54</b>	<b>68</b>	<b>46</b>	<b>54</b>	<b>52</b>	<b>50</b>		
		1								
24-hour		59	86	46	59	55	53			
Leq day D		60								
Leq eve E		56								
Leq night N		#N/A								
CNEL		#N/A								
Leq day D		59								
Leq night N		#N/A								
LDN		#N/A								



		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
16:56	D10	57	69	47	60	54	51	0	N1
17:56	D11	58	72	47	61	55	52	1	N2
18:56	D12	56	79	47	59	51	49	2	N3
19:56	E1	57	76	47	60	53	50	3	N4
20:56	E2	63	93	49	59	53	52	4	N5
21:56	E3	57	76	51	59	54	53	5	N6
22:56	N8	55	69	51	57	53	52	6	N7
23:56	N9	57	85	52	57	54	53	7	D1
00:56	N1	55	73	51	55	53	53	8	D2
01:56	N2	54	70	52	55	53	53	9	D3
02:56	N3	54	67	51	54	53	53	10	D4
03:56	N4	54	70	52	54	53	53	11	D5
04:56	N5	55	72	51	56	53	53	12	D6
05:56	N6	56	69	51	57	54	53	13	D7
06:56	N7	61	79	52	62	57	55	14	D8
07:56	D1	60	77	48	61	56	54	15	D9
08:56	D2	58	75	46	60	55	52	16	D10
09:56	D3	57	73	46	59	53	51	17	D11
10:56	D4	58	75	48	60	55	52	18	D12
11:56	D5	57	73	49	60	55	52	19	E1
12:56	D6	57	72	49	60	54	52	20	E2
13:56	D7	58	75	49	60	55	52	21	E3
14:56	D8	58	77	46	60	54	51	22	N8
15:56	D9	59	82	46	61	55	52	23	N9
	<b>largest</b>	<b>63</b>	<b>93</b>	<b>52</b>	<b>62</b>	<b>57</b>	<b>55</b>		
	<b>smallest</b>	<b>54</b>	<b>67</b>	<b>46</b>	<b>54</b>	<b>51</b>	<b>49</b>		
24-hour		58	93	46	59	54	52		
Leq day	D	58							
Leq eve	E	60							
Leq night	N	56							
CNEL		64							
Leq day	D	58							
Leq night	N	56							
LDN		63							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
16:59	D10	D10	57	70	46	59	54	51	0 N1	N1
17:59	D11	D11	57	75	45	59	53	50	1 N2	N2
18:59	D12	D12	56	70	47	59	52	50	2 N3	N3
19:59	E1	D13	56	71	46	59	52	50	3 N4	N4
20:59	E2	D14	56	75	49	58	52	51	4 N5	N5
21:59	E3	D15	56	72	50	58	54	53	5 N6	N6
22:59	N8	N8	56	75	52	57	54	54	6 N7	N7
23:59	N9	N9	53	68	49	54	52	52	7 D1	D1
00:59	N1	N1	53	68	51	54	52	52	8 D2	D2
01:59	N2	N2	53	70	52	54	53	52	9 D3	D3
02:59	N3	N3	54	74	52	55	53	53	10 D4	D4
03:59	N4	N4	55	69	52	56	54	53	11 D5	D5
04:59	N5	N5	57	72	52	58	54	53	12 D6	D6
05:59	N6	N6	61	81	51	63	57	54	13 D7	D7
06:59	N7	N7	62	77	51	64	59	56	14 D8	D8
08:00	D2	D2	62	82	50	64	58	55	15 D9	D9
09:00	D3	D3	60	79	47	62	56	53	16 D10	D10
10:01	D4	D4	58	78	48	60	53	51	17 D11	D11
00:00	N1	N1	53	68	49	54	52	52	18 D12	D12
00:00	N1	N1	53	68	49	54	52	52	19 E1	D13
00:00	N1	N1	53	68	49	54	52	52	20 E2	D14
00:00	N1	N1	53	68	49	54	52	52	21 E3	D15
00:00	N1	N1	53	68	49	54	52	52	22 N8	N8
00:00	N1	N1	53	68	49	54	52	52	23 N9	N9
		<b>largest</b>	<b>62</b>	<b>82</b>	<b>52</b>	<b>64</b>	<b>59</b>	<b>56</b>		
		<b>smallest</b>	<b>53</b>	<b>68</b>	<b>45</b>	<b>54</b>	<b>52</b>	<b>50</b>		
24-hour			57	82	45	58	54	52		
Leq day	D		#N/A							
Leq eve	E		56							
Leq night	N		57							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		57							
LDN			#N/A							





**Construction Schedule**

Year	2029												2030												2031												2032														
	Month	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
<b>Construction Phase</b>																																																			
Subsurface Exploration (Site Preparation)																																																			
Existing Project Site Demo (Demolition A)																																																			
Site Preparation / Rough Grading (Grading)																																																			
Foundations (Building Construction 1)																																																			
Trenching / Undergrounds (Trenching)																																																			
Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)																																																			
Electrical & Instrumentation (Building Construction 3)																																																			
Paving (Paving)																																																			
Painting / Insulation (Architectural Coating)																																																			
Commissioning / Startup and Testing (Building Construction 4)																																																			
Decommissioning Demolition (Demolition B)																																																			
<b>Combined Construction Noise at Nearest Offsite Receptor:</b>																																																			
<b>186 Forbes Lane (186FL)</b>																																																			
Subsurface Exploration (Site Preparation)	58.0	58.0	58.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Existing Project Site Demo (Demolition A)	0.0	60.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Site Preparation / Rough Grading (Grading)	0.0	0.0	55.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Foundations (Building Construction 1)	0.0	0.0	0.0	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Trenching / Undergrounds (Trenching)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.8	56.8	56.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)	0.0	0.0	0.0	0.0	0.0	62.2	62.2	62.2	62.2	62.2	62.2	62.2	62.2	62.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electrical & Instrumentation (Building Construction 3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paving (Paving)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.0	48.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Painting / Insulation (Architectural Coating)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Commissioning / Startup and Testing (Building Construction 4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.2	58.2	58.2	58.2	58.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Decommissioning Demolition (Demolition B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.7	61.7	61.7		
<b>Concurrent Total (dBA)</b>	<b>58</b>	<b>63</b>	<b>60</b>	<b>61</b>	<b>61</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>65</b>	<b>63</b>	<b>62</b>	<b>65</b>	<b>65</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>58</b>	<b>59</b>	<b>59</b>	<b>59</b>	<b>58</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>62</b>	<b>62</b>	<b>62</b>						



To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per ETA guidance = 80  
allowable hours over which L<sub>eq</sub> is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted)

= Barrier of input height inserted between source and receptor

Table with columns: Project Phase No., Project Phase Description, Construction Equipment Type, Quantity, Reference Lmax @ 50 ft. from FHWA RCNM, Client Equipment Description, Data Source and/or Notes, Source to NSR Distance (ft.), Insertion Loss (dB), Reduction, Allowable Operation Time, and Allowable Operation Time. The table lists construction phases such as 'Subsurface Exploration (Site Preparation)', 'Existing Project Site Demo (Demolition A)', 'Site Preparation / Rough Grading (Grading)', 'Foundations (Building Construction 1)', 'Trenching / Undergrounds (Trenching)', 'Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)', 'Electrical & Instrumentation (Building Construction 3)', 'Paving (Paving)', 'Painting / Insulation (Architectural Coating)', 'Commissioning / Startup and Testing (Building Construction 4)', and 'Decommissioning Demolition (Demolition B)'. Each phase includes detailed equipment lists and associated noise parameters.





**Construction Schedule**

Year  
Month

2029: May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

2030: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

2031: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

2032: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

**Construction Phase**

Subsurface Exploration (Site Preparation)	✓	✓	✓																																					
Existing Project Site Demo (Demolition A)		✓																																						
Site Preparation / Rough Grading (Grading)			✓																																					
Foundations (Building Construction 1)				✓	✓	✓	✓	✓	✓	✓	✓	✓																												
Trenching / Undergrounds (Trenching)											✓	✓	✓																											
Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																			
Electrical & Instrumentation (Building Construction 3)																																								
Paving (Paving)																																								
Painting / Insulation (Architectural Coating)																																								
Commissioning / Startup and Testing (Building Construction 4)																																								
Decommissioning Demolition (Demolition B)																																								

**Combined Construction Noise at Nearest Offsite Receptor:**

		1675 North Olive Street (1675NOS)																																		
		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Subsurface Exploration (Site Preparation)		48.1	48.1	48.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Existing Project Site Demo (Demolition A)		0.0	51.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Site Preparation / Rough Grading (Grading)		0.0	0.0	45.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foundations (Building Construction 1)		0.0	0.0	0.0	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3	51.3
Trenching / Undergrounds (Trenching)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)		0.0	0.0	0.0	0.0	0.0	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2
Electrical & Instrumentation (Building Construction 3)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	50.9	
Paving (Paving)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Painting / Insulation (Architectural Coating)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commissioning / Startup and Testing (Building Construction 4)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decommissioning Demolition (Demolition B)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.7
<b>Concurrent Total (dBA)</b>		<b>48</b>	<b>53</b>	<b>50</b>	<b>51</b>	<b>51</b>	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>	<b>53</b>	<b>52</b>	<b>55</b>	<b>55</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>51</b>	<b>48</b>	<b>49</b>	<b>49</b>	<b>49</b>	<b>48</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	





















To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per FTA guidance = 80  
 allowable hours over which Leq is to be averaged = 1

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)  
 = Barrier of input height inserted between source and receptor

Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Temporary Barrier Insertion Loss (dB)	Additional Noise Reduction	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 1-hour Leq	Source	Receiver	Barrier	Source to	Rcvr. to	Source to	"A"	"B"	"C"	Path Length	Abarr					
												Elevation (ft)	Elevation (ft)	Height (ft)	Barr. ("A") Horiz. (ft)	Barr. ("B") Horiz. (ft)	Rcvr. ("C") Horiz. (ft)	(ft)	(ft)	(ft)	Diff. "P" (ft)	(dB)					
<b>EPFES</b>																											
crane	1	16	81		770	1		50.8	0.5	30	40	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
man lift	1	20	75		770	1		44.8	0.5	30	35	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
dump truck	1	40	76		770	1		45.8	0.5	30	39	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
flat bed truck	1	40	74		770	1		43.8	0.5	30	37	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
Total Noise from Staging Area at EPFES =											<b>44.0</b>																
<b>181WMD</b>																											
crane	1	16	81		880	0		50.6	0.5	30	40	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
man lift	1	20	75		880	0		44.6	0.5	30	35	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
dump truck	1	40	76		880	0		45.6	0.5	30	39	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
flat bed truck	1	40	74		880	0		43.6	0.5	30	37	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Noise from Staging Area at 181WMD =											<b>43.7 #</b>																
<b>1675NOS</b>																											
crane	1	16	81		790	12		39.2	0.5	30	28	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
man lift	1	20	75		790	12		33.2	0.5	30	23	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
dump truck	1	40	76		790	12		34.2	0.5	30	27	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
flat bed truck	1	40	74		790	12		32.2	0.5	30	25	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
Total Noise from Staging Area at 1675NOS =											<b>32.4 #</b>																
<b>186FL</b>																											
crane	1	16	81		800	0		51.5	0.5	30	41	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
man lift	1	20	75		800	0		45.5	0.5	30	35	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
dump truck	1	40	76		800	0		46.5	0.5	30	39	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
flat bed truck	1	40	74		800	0		44.5	0.5	30	37	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Noise from Staging Area at 186FL =											<b>44.7 #</b>																

			or available		
Clam Shovel (dropping)	Yes	20	87	93	87
Compactor (ground)	No	20	80	80	83
Compressor (air)	No	40	78	80	78
Concrete Batch Plant	No	15	83	83	-- N/A --
Concrete Mixer Truck	No	40	79	85	79
Concrete Pump Truck	No	20	81	82	81
Concrete Saw	No	20	90	90	90
Crane	No	16	81	85	81
Dozer	No	40	82	85	82
Drill Rig Truck	No	20	79	84	79
Drum Mixer	No	50	80	80	80
Dump Truck	No	40	76	84	76
Excavator	No	40	81	85	81
Flat Bed Truck	No	40	74	84	74
Front End Loader	No	40	79	80	79
Generator	No	50	72	72	81
Generator (<25KVA, VMS signs)	No	50	70	70	73
Gradall	No	40	83	85	83
Grader	No	40	85	85	-- N/A --
Grapple (on backhoe)	No	40	85	85	87
Horizontal Boring Hydr. Jack	No	25	80	80	82
Hydra Break Ram	Yes	10	90	90	-- N/A --
Impact Pile Driver	Yes	20	95	95	101
Jackhammer	Yes	20	85	85	89
Man Lift	No	20	75	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	90
Pavement Scarifier	No	20	85	85	90
Paver	No	50	77	85	77
Pickup Truck	No	40	55	55	75
Pneumatic Tools	No	50	85	85	85
Pumps	No	50	77	77	81
Refrigerator Unit	No	100	73	82	73
Rivit Buster/chipping gun	Yes	20	79	85	79
Rock Drill	No	20	81	85	81
Roller	No	20	80	85	80
Sand Blasting (Single Nozzle)	No	20	85	85	96
Scraper	No	40	84	85	84
Shears (on backhoe)	No	40	85	85	96
Skidsteer*	No	40	80	-- N/A --	-- N/A --
Slurry Plant	No	100	78	78	78
Slurry Trenching Machine	No	50	80	82	80
Soil Mix Drill Rig	No	50	80	80	-- N/A --
Tractor	No	40	84	84	-- N/A --
Vacuum Excavator (Vac-truck)	No	40	85	85	85
Vacuum Street Sweeper	No	10	80	80	82
Ventilation Fan	No	100	79	85	79
Vibrating Hopper	No	50	85	85	87
Vibratory Concrete Mixer	No	20	80	80	80
Vibratory Pile Driver	No	20	95	95	101
Warning Horn	No	5	83	85	83
Welder / Torch	No	40	73	73	74

\* [https://ia.cpuc.ca.gov/Environment/info/ene/mesa/attachment/A1503003%20ED-SCE-01%20Q.PD-01%20Attachment%20\(Revised%20Noise%20Levels%20Construction%20Equipment\).pdf](https://ia.cpuc.ca.gov/Environment/info/ene/mesa/attachment/A1503003%20ED-SCE-01%20Q.PD-01%20Attachment%20(Revised%20Noise%20Levels%20Construction%20Equipment).pdf)

(A-weighted)	69	85	98	108	111	111	109	106	101	117
Engine casing (L7044SG)	85	105	106	100	100	98	98	95	87	110
(A-weighted)	46	79	90	91	97	98	99	96	86	104
Engine casing (L7044SG)	85	105	106	100	100	98	98	95	87	110
(A-weighted)	46	79	90	91	97	98	99	96	86	104
Electric motor for e-driven compressor	1865	88	90	92	93	93	98	88	81	102
(A-weighted)	79	81	83	84	84	84	89	79	72	93
Electric motor for e-driven compressor	1865	88	90	92	93	93	98	88	81	102
(A-weighted)	79	81	83	84	84	84	89	79	72	93
total interior sound power level (dBA)	83	92	104	114	117	117	115	112	107	123

	ft
94.1	3.28
85.0	3.28
94.1	3.28
85.0	3.28

Atten.	
	9.1
	9.1

ENC, 2nd ed., Table 11.24 (1200 rpm)  
client says should be 85 dBA "(API 541 max limit)", so adjust w/ Atten  
ENC, 2nd ed., Table 11.24 (1200 rpm)  
client says should be 85 dBA "(API 541 max limit)", so adjust w/ Atten in CadnaA

	ft <sup>3</sup>									
room volume, with absorption	475200	15	15	15	15	15	15	15	15	15
		2	5	8	8	12	9	7	7	4
		17	20	23	23	27	24	22	22	19

building dimensions (ft)		
L	W	H
180	60	44

Table 6.2, EEI EPPENG, pick level for 10' distance from source to wall for "A"  
Additional acoustical absorption added per "MCSbldg\_int\_abs" worksheet calculation  
Total absorption value ("A")

**Transmission Losses (TL) of building shell elements**

	<i>(values in italics are estimates, regular text are from noted data source)</i>									
wall panel	1	7	13	20	30	41	49	51	53	
roof panel	1	7	13	20	30	41	49	51	53	
personnel access door	13	19	26	26	28	32	32	40	42	
roll-up door	10	16	22	23	24	31	44	50	52	
window	15	21	27	31	34	36	37	49	51	
ventilation fan port	4	10	11	14	19	25	24	21	18	
ridge vent (linear slot)	3	3	5	4	6	5	5	4	3	

	3	8
	14	14
	16	4
	4	4
174		0.1

assumes wall insulation complies with metal bldg. specification (STC32 min.), resembling the NAIMA B315 roof assembly rated for STC32; also appears to have an R19 consistent with 6" wall thickness and sound spec for NRC 0.85 on 60% of walls  
ENC, 2nd ed., Table 8.1, "2-skin metal door"  
based on Alpine Insul-Sound STC30 test report (100096189CRT-001a)  
Picked Viracon 3/8" overall - 3/16" glass, .030" PVB, 3/16" glass, reasonably consistent with Specs section 2.8.B.2  
NR from Rincon report Table 3  
assumes insulation within "acoustic ridge vent" behaves like room interior absorptive lining--see "ARVestNR" worksheet calculation--plus line of sight block (3 dB)

**Calculated area sound power levels (PWL)**

	ft <sup>2</sup>									
long wall area	7920	29	29	29	29	29	29	29	29	
(dBA)		88	88	92	94	83	75	67	63	97
short wall area	2640	24	24	24	24	24	24	24	24	
(dBA)		83	84	87	89	78	71	62	58	93
roof area	10800	30	30	30	30	30	30	30	30	
(dBA)		89	90	93	95	85	77	68	64	99
personnel access door area	24	4	4	4	4	4	4	4	4	
(dBA)		51	51	53	63	60	59	59	49	67
roll-up door area	196	13	13	13	13	13	13	13	13	
(dBA)		63	63	67	75	73	69	56	48	78
window area	64	8	8	8	8	8	8	8	8	
(dBA)		53	53	57	62	58	59	58	44	67
ventilation fan port area	16	2	2	2	2	2	2	2	2	
(dBA)		58	58	67	73	67	64	65	66	77
ridge vent slot area	17.4	2	2	2	2	2	2	2	2	
(dBA)		59	66	73	83	81	85	85	83	91

Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG

-----

[ ]

[ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ]

Blower for Gas Compressor electric motor inlet (A-weighted)	89	89	87	93	86	84	84	82	74	97	89.1	[ 3.28 ]	client-supplied data; you picked 1" SP (loudest levels on client-provided table) from 225 CPS & CPA 1550 rpm per client direction (but client didn't specify SP)
	50	63	71	84	83	84	85	83	73	91	83	[ 3.28 ]	
Blower for Gas Compressor electric motor outlet (A-weighted)	96	96	91	96	90	88	85	83	74	102	93.9	[ 3.28 ]	client-supplied data; you picked 1" SP (loudest levels on client-provided table) from 225 CPS & CPA 1550 rpm per client direction (but client didn't specify SP)
	57	70	75	87	87	88	86	84	73	94	86	[ 3.28 ]	
Vapor Recovery Unit													client says "90 dBA" each
Trane 5-ton HVAC unit for Office													client says "87 dBA" each (per 2/21/23 RC email)
Gas Engine Exhaust (A-weighted)	76	94	95	97	93	93	93	91	81	103	94.6	[ 3.28 ]	client-supplied data
	37	68	79	88	90	93	94	92	80	99	91	[ 3.28 ]	

**Scenario A: EPPENG default ("hard") % cover**

Square Feet (SF)	room dimensions in feet			Vol. (m)
	L	W	H	
	180	60	44	13448

Octave Band Center Frequency (Hz)

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>						
	0.01	0.05	0.1	0.2	0.45	0.65
	0.01	0.01	0.02	0.02	0.02	0.02

NRC Notes

	0%	0
	100%	21120
	0%	0
	100%	10800
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	10800
Total Square Footage TREATED	0%	0
Total Square Footage UNTREATED	100%	42720
TOTAL SQUARE FOOTAGE		42720

180 60

0.06 0.05 0.04 0.06 0.07 0.05

0.20 n/a  
0.02 III  
0.06 average absorption coefficient

Abs. Coeff - walls, treated		
Abs. Coeff - walls, untreated		
Abs. Coeff - ceiling, treated		
Abs. Coeff - ceiling, untreated		
Abs. Coeff - floor, untreated		
Total Sabins per OBCF		

<i>Sabins (A)</i>						
	0	0	0	0	0	0
	2112	1056	1267	1478	1901	1690
	0	0	0	0	0	0
	540	1080	108	1080	756	216
	108	108	216	216	216	216
	2760	2244	1591	2774	2873	2122

Notes:

- I painted concrete block (Egan, p. 52, #4)
  - II steel (Egan, p. 52, #15)
  - III concrete floor (Egan, p. 52, #15)
- NRC = noise reduction coefficient

**"60% of the internal surfaces = NRC 0.85" % cover**

Square Feet (SF)	room dimensions in feet			Vol. (m)
	L	W	H	
	180	60	44	

Octave Band Center Frequency (Hz)

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>						
	0.63	0.56	0.95	0.79	0.60	0.35
	0.1	0.05	0.06	0.07	0.09	0.08
	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.01	0.05	0.1	0.2	0.45	0.65
	0.01	0.01	0.02	0.02	0.02	0.02

NRC Notes

Abs. Coeff - walls, treated	80%	17000
Abs. Coeff - walls, untreated	20%	4120
Abs. Coeff - ceiling, treated	79%	8500
Abs. Coeff - ceiling, untreated	21%	2300
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	10800
Total Square Footage TREATED	60%	25500
Total Square Footage UNTREATED	40%	17220
TOTAL SF		42720

180 60 44  
180 60  
180 60

0.39 0.35 0.58 0.49 0.38 0.22

0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 I  
0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 II  
0.20 n/a  
0.02 III

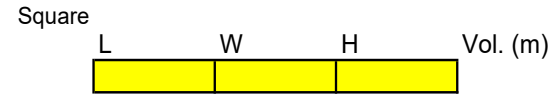
Abs. Coeff - walls, treated		
Abs. Coeff - walls, untreated		
Abs. Coeff - ceiling, treated		
Abs. Coeff - ceiling, untreated		
Abs. Coeff - floor, treated		
Abs. Coeff - floor, untreated		
Total Sabins per OBCF		

<i>Sabins (A)</i>						
	10710	9520	16150	13430	10200	5950
	412	206	247	288	371	330
	5355	4760	8075	6715	5100	2975
	115	230	23	230	161	46
	0	0	0	0	0	0
	108	108	216	216	216	216
	16700	14824	24711	20879	16048	9517

estimated noise reduction (difference between Scenarios A & B in NR, dB)

7.8 8.2 11.9 8.8 7.5 6.5

**Scenario A: no insulation % cover**



	0%	100%	0%	100%
Abs. Coeff - floor, treated	0	704	0	348
Abs. Coeff - floor, untreated	0	348	0	0
Total Square Footage TREATED	0	0	0	0
Total Square Footage UNTREATED	0	1400	0	1400
TOTAL SQUARE FOOTAGE	0	1400	0	1400

Abs. Coeff - walls, treated	0	174	2
Abs. Coeff - walls, untreated	0	174	2
Abs. Coeff - ceiling, treated	0	0	0
Abs. Coeff - ceiling, untreated	0	0	0
Abs. Coeff - floor, untreated	0	0	0
Total Sabins per OBCF	0	0	0

Notes:

- I painted concrete block (Egan, p. 52, #4)
  - II steel (Egan, p. 52, #15)
  - III open
- NRC = noise reduction coefficient

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>	0.01	0.05	0.1	0.2	0.45	0.65
	1	1	1	1	1	1

0.29	0.32	0.26	0.32	0.30	0.26
------	------	------	------	------	------

*Sabins (A)*

0	0	0	0	0	0
35	70	7	70	49	14
0	0	0	0	0	0
17	35	3	35	24	7
348	348	348	348	348	348
401	453	359	453	422	369

NRC Notes

0.20 n/a  
1.00 III

0.30 average absorption coefficient

**Scenario B: with insulation % cover**



	0%	100%	0%	100%
Abs. Coeff - walls, treated	0	704	0	348
Abs. Coeff - walls, untreated	0	348	0	0
Abs. Coeff - ceiling, treated	0	0	0	0
Abs. Coeff - ceiling, untreated	0	0	0	0
Abs. Coeff - floor, treated	0	348	0	0
Abs. Coeff - floor, untreated	0	0	0	0
Total Square Footage TREATED	25%	348	0	0
Total Square Footage UNTREATED	75%	1052	0	1052
TOTAL SF	0	1400	0	1400

Abs. Coeff - walls, treated	0	174	2	2
Abs. Coeff - walls, untreated	0	174	2	2
Abs. Coeff - ceiling, treated	0	174	2	2
Abs. Coeff - ceiling, untreated	0	174	2	2
Abs. Coeff - floor, treated	0	0	0	0
Abs. Coeff - floor, untreated	0	0	0	0
Total Sabins per OBCF	0	0	0	0

Notes:

- I painted concrete block (Egan, p. 52, #4)
  - II steel (Egan, p. 52, #15)
  - III open
- NRC = noise reduction coefficient

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.01	0.05	0.1	0.2	0.45	0.65
	1	1	1	1	1	1

0.43	0.44	0.49	0.50	0.43	0.35
------	------	------	------	------	------

*Sabins (A)*

0	0	0	0	0	0
35	70	7	70	49	14
219	195	331	275	209	122
0	0	0	0	0	0
0	0	0	0	0	0
348	348	348	348	348	348
602	613	686	693	606	484

NRC Notes

0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 II  
0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 II  
0.20 n/a  
1.00 III

0.46 average absorption coefficient

estimated noise reduction (difference between Scenarios A & B in NR, dB)

1.8	1.3	2.8	1.8	1.6	1.2
-----	-----	-----	-----	-----	-----



SoCal Gas - Ventura Compressor Station Modernization Project

Appendix M - CadnaA Sound Propagation Model Input Worksheets

Sound Levels (local)

Name	ID	Type	Oktave Spectrum (dB)										Source	
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin
new compressor bldg long wall panel	NCBLWP	Lw	A	88	88	92	94	83	75	67	63	59	97.5	127.7 calcd
new compressor bldg short wall panel	NCBSWP	Lw	A	83	84	87	89	78	71	62	58	54	92.6	122.7 calcd
new compressor bldg roof panel	NCBRP	Lw	A	89	90	93	95	85	77	68	64	60	98.6	128.7 calcd
new compressor bldg pers access door	NCBPAD	Lw	A	51	51	53	63	60	59	59	49	44	67.1	90.7 calcd
new compressor bldg roll-up door	NCBRUD	Lw	A	63	63	67	75	73	69	56	48	43	78.4	102.7 calcd
new compressor bldg window	NCBWIN	Lw	A	53	53	57	62	58	59	58	44	40	66.6	92.7 calcd
new compressor bldg vent fan port	NCBVFP	Lw	A	58	58	67	73	67	64	65	66	67	76.6	97.9 calcd
new compressor bldg acoustic ridge vent	NCBARV	Lw	A	59	66	73	83	81	85	85	83	82	91.3	100.8 calcd
substation transformer	SUBT	Lw	A	43	62	74	76	82	79	75	70	61	85.4	94.1 EEI EPPENG 4.2.5
discharge gas air cooler	DGAC	Lw	A	46	72	80	84	87	87	85	81	74	92.6	101.7 client data
comp electric motor blower inlet	CEMBI	Lw	A	50	63	71	84	83	84	85	83	91	97.1	client data
comp electric motor blower outlet	CEMBO	Lw	A	57	70	75	87	87	88	86	84	73	93.7	101.9 client data
gas engine exhaust (silenced)	GEXH	Lw	A	37	68	79	88	90	93	94	92	80	99	102.5 client data
gas engine jacket water cooler	GEJWC	Lw	A	83	96	94	91	88	85	82	78	73	90.7	99.6 client data
air-cooled condenser (chiller) 5-ton	ACCS	Lw		61.7	61.7	61.7	65.6	68.1	65.8	59.8	58.4	56.1	69.9	73.1 Bryant BH16-060 no sound blanket

Point Sources

Name	M.	ID	Result. PWL			Lw / Li Type	Value	norm. dB(A)	Correction			Sound Reduction		Attenuatio			K0 (dB)	Freq. (Hz)	Direct.	Height (ft)	Coordinates		
			Day (dBA)	Evening (dBA)	Night (dBA)				Day (dB(A))	Evening (dB(A))	Night (dB(A))	R	Area (ft <sup>2</sup> )	Day (min)	Special (min)	Night (min)					X (ft)	Y (ft)	Z (ft)
gas engine exhaust stack terminus		GEXT	99	99	99	Lw	GEXH		0	0	0					0		Chimney (l)	0.25	g	1071.58	929.65	60.25
gas engine exhaust stack terminus		GEXT	99	99	99	Lw	GEXH		0	0	0					0		Chimney (l)	0.25	g	1064.69	895.2	60.25
Trane 5-ton HVAC unit		ACC1	87	87	87	Lw	ACCS		0	0	0					-17.1		Chimney (l)	5	r	1341.5	797.71	5
Trane 5-ton HVAC unit		ACC2	87	87	87	Lw	ACCS		0	0	0					-17.1		Chimney (l)	5	r	1338.79	787.89	5

Area Sources

Name	M.	ID	Result. PWL			Lw / Li Type	Value	norm. dB(A)	Correction			Sound Reduction		Attenuatio			K0 (dB)	Freq. (Hz)	Direct.	Moving Pt. Src Number					
			Day (dBA)	Evening (dBA)	Night (dBA)				Day (dB(A))	Evening (dB(A))	Night (dB(A))	R	Area (ft <sup>2</sup> )	Day (min)	Special (min)	Night (min)				Day	Evening	Night			
new comp bldg roof		NCBR	98.6	98.6	98.6	Lw	NCBRP		0	0	0					0			(none)						
new comp bldg ridge vent		NCBRV	91.3	91.3	91.3	Lw	NCBARV		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
filter separation area		FS	80	80	80	Lw			0	0	0					0			(none)						
VRLU area		VRLUA	90	90	90	Lw			0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
new comp bldg fan port		NCBFP	76.6	76.6	76.6	Lw	NCBVFP		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
gas discharge cooler		GDC	92.6	92.6	92.6	Lw	DGAC		0	0	0					0			(none)						
VFD building		VFDB	85	85	85	Lw			0	0	0					0			(none)						
electric motor and blower inlet and outlet		EMBIO	95.6	95.6	95.6	Lw	CEMBI++CEMBO		0	0	0					0			(none)						
electric motor and blower inlet and outlet		EMBIO	95.6	95.6	95.6	Lw	CEMBI++CEMBO		0	0	0					0			(none)						
transformer		XMFR	85.4	85.4	85.4	Lw	SUBT		0	0	0					0			(none)						
transformer		XMFR	85.4	85.4	85.4	Lw	SUBT		0	0	0					0			(none)						
new comp gas engine air intake (silenced)		NCGEAI	91	91	91	Lw			0	0	0					0			(none)						
new comp gas engine air intake (silenced)		NCGEAI	91	91	91	Lw			0	0	0					0			(none)						
gas compressor engine cooler		GCEC	90.7	90.7	90.7	Lw	GEJWC		0	0	0					0			(none)						
gas compressor engine cooler		GCEC	90.7	90.7	90.7	Lw	GEJWC		0	0	0					0			(none)						

Vertical Area Sources

Name	M.	ID	Result. PWL			Lw / Li Type	Value	norm. dB(A)	Correction			Sound Reduction		Attenuatio			K0 (dB)	Freq. (Hz)	Direct.
			Day (dBA)	Evening (dBA)	Night (dBA)				Day (dB(A))	Evening (dB(A))	Night (dB(A))	R	Area (ft <sup>2</sup> )	Day (min)	Special (min)	Night (min)			
new comp bldg roll-up door		NCBRD	78.4	78.4	78.4	Lw	NCBRUD		0	0	0					3		(none)	
new comp bldg pers door		NCBPD	67.1	67.1	67.1	Lw	NCBPAD		0	0	0					3		(none)	
new comp bldg pers door on stairs		NCBPDOS	67.1	67.1	67.1	Lw	NCBPAD		0	0	0					3		(none)	
new comp bldg pers door on stairs		NCBPDOS	67.1	67.1	67.1	Lw	NCBPAD		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg window		NCBW	66.6	66.6	66.6	Lw	NCBWIN		0	0	0					3		(none)	
new comp bldg long wall		NCBLW	97.5	97.5	97.5	Lw	NCBLWP		0	0	0					3		(none)	
new comp bldg long wall		NCBLW	97.5	97.5	97.5	Lw	NCBLWP		0	0	0					3		(none)	
new comp bldg short wall		NCBSW	92.6	92.6	92.6	Lw	NCBSWP		0	0	0					3		(none)	
new comp bldg short wall		NCBSW	92.6	92.6	92.6	Lw	NCBSWP		0	0	0					3		(none)	
new comp bldg pers door on stairs		NCBPDOS	67.1	67.1	67.1	Lw	NCBPAD		0	0	0					3		(none)	
new comp bldg pers door on stairs		NCBPDOS	67.1	67.1	67.1	Lw	NCBPAD		0	0	0					3		(none)	
new comp bldg pers door on stairs		NCBPDOS	67.1	67.1	67.1	Lw	NCBPAD		0	0	0								

**Barrier**

Name	M.	ID	Absorption left	right	Z-Ext. (ft)	Cantilever horz. (ft)	vert. (ft)	Height Begin (ft)	End (ft)
new south wall 8ft		NSW8	0.1	0.1				8 r	
new west wall 11ft		NWW11	0.1	0.1				11 r	
existing north wall 10ft		ENW10	0.1	0.1				10 r	
existing north wall 8ft		ENW8	0.1	0.1				8 r	
existing east wall 12ft		EEW12						12 r	
existing east wall 8ft north leg		EEW8NL						8 r	
existing east wall 8ft central leg		EEW8CL						8 r	
existing east wall 8ft south leg		EEW8SL						8 r	

**Building**

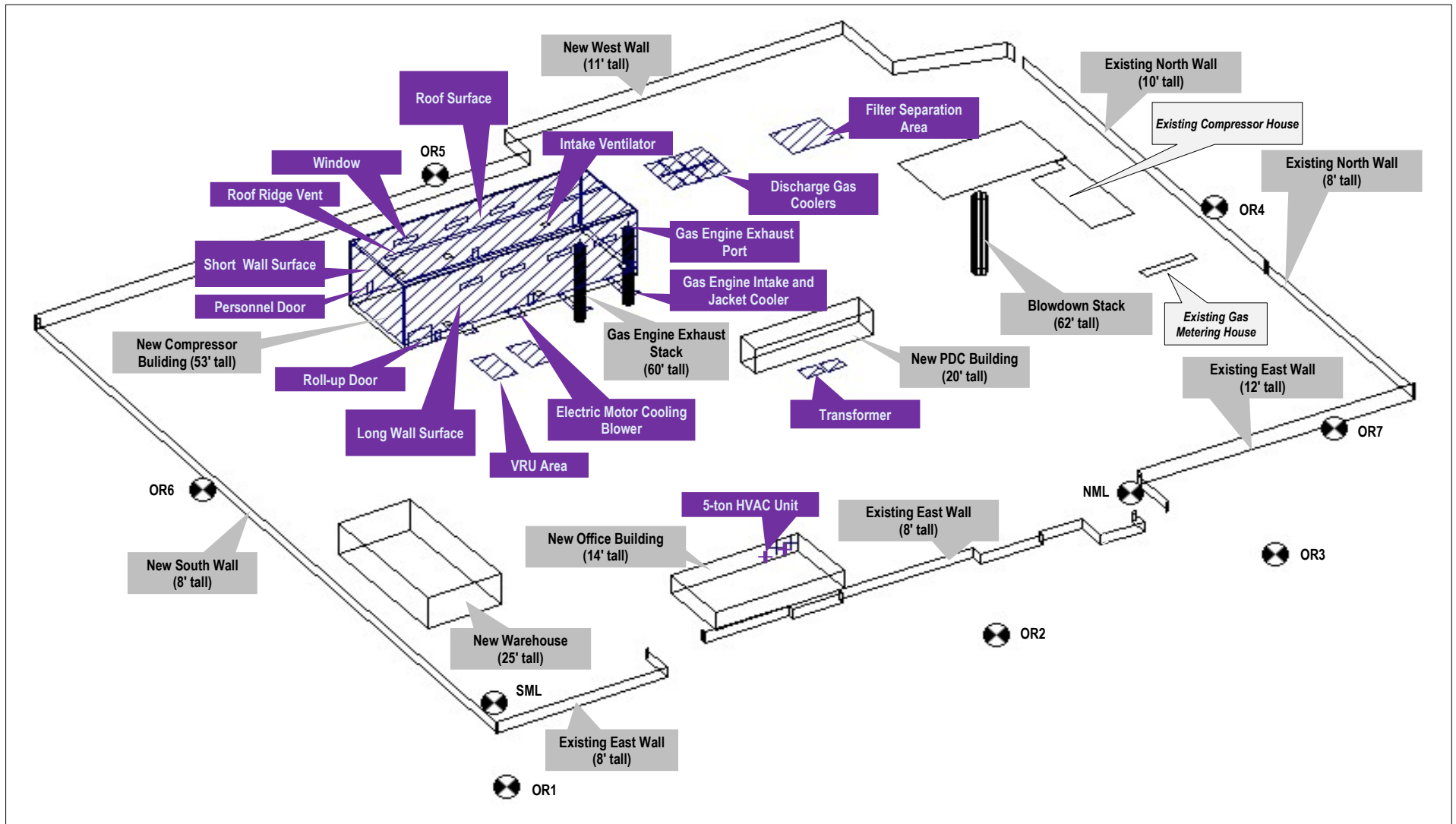
Name	M.	ID	RB	Residents	Absorption	Height Begin (ft)
old compressor house west	-	OCHW		0	0.1	0 r
old compressor house east	-	OCHE		0	0.1	0 r
old gas metering house	-	OGMH		0	0.1	0 r
new compressor building	+	NCBLDG		0	0.1	53 r
new warehouse building		NWBLDG		0	0.1	25 r
new office building		NOBLDG		0	0.1	14 r
PDC building		PDCBLDG		0	0.1	20 r

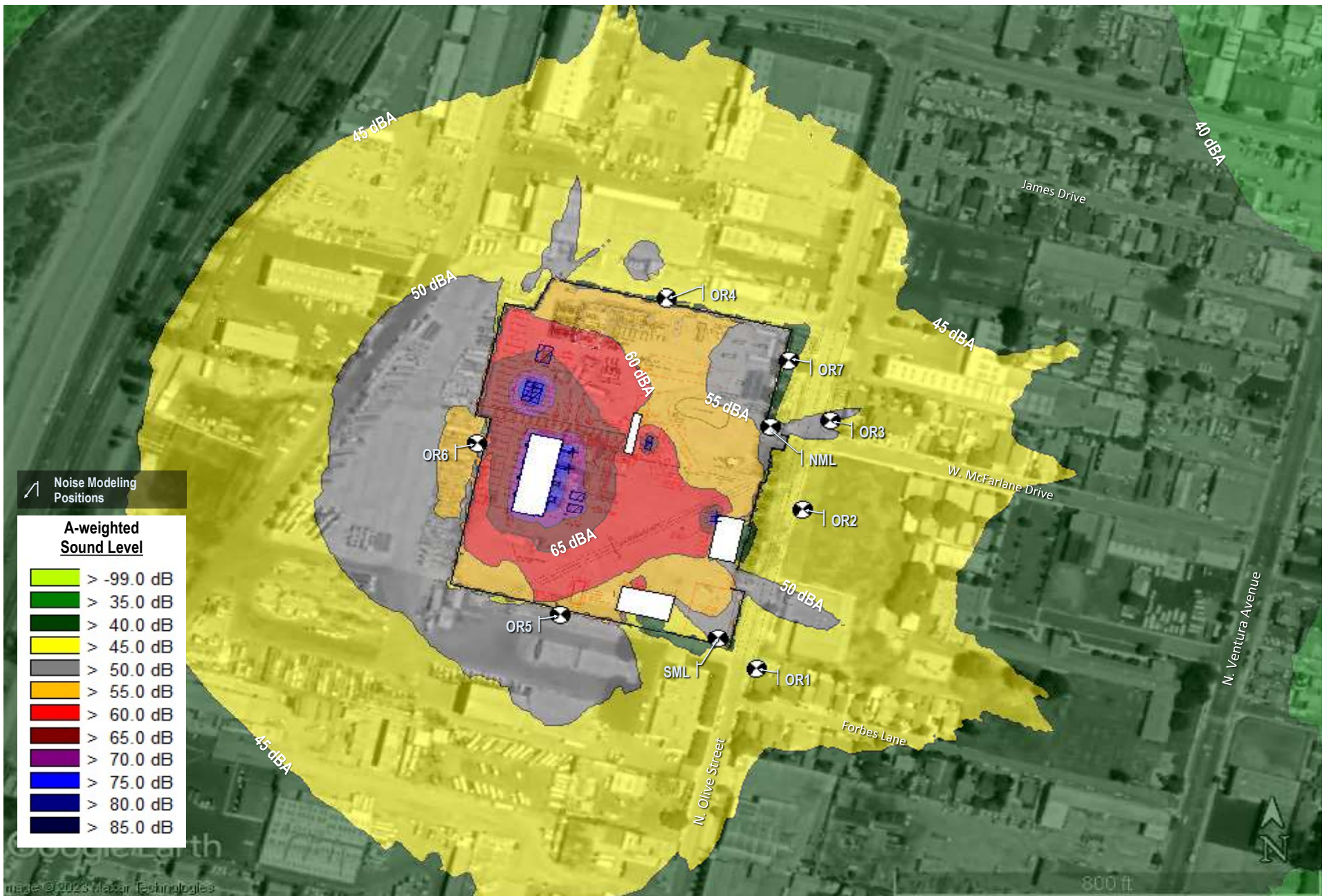
**Cylinder**

Name	M.	ID	Absorption Center		Radius	Height	
			x (ft)	y (ft)	(ft)	(ft)	
gas engine exhaust stack		GEES	0.1	1071.84	929.6	3.12	60 r
gas engine exhaust stack		GEES	0.1	1064.73	895.15	3.12	60 r
blowdown stack		BDS	0.1	1195.87	1103.58	4.5	62 r

**3D-Reflector**

Name	M.	ID	Absorption		Height Begin (???)
			left	right	
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r





SOURCE: Google 2023; Dudek 2023



**FIGURE M2**  
**Predicted Stationary Source Operation Noise from Proposed Project -- All Four Compressors Active**

SoCal Gas - Ventura Compressor Station Modernization Project PEAs

	CNEL	DNL	LAeq	ASmax	LASmin	LA10	LA50	LA90	CNEL	DNL
15:40	D9	D9	61	81	53	63	59	57	0	N1
16:40	D10	D10	60	82	55	62	58	57	1	N2
17:40	D11	D11	60	77	55	62	58	57	2	N3
18:40	D12	D12	59	74	53	61	56	55	3	N4
19:40	E1	D13	58	75	54	60	56	56	4	N5
20:40	E2	D14	59	82	55	61	58	57	5	N6
21:40	E3	D15	59	84	55	59	57	56	6	N7
22:40	N8	N8	58	69	55	59	57	56	7	D1
23:40	N9	N9	57	70	56	58	57	56	8	D2
00:40	N1	N1	57	76	55	57	57	56	9	D3
01:40	N2	N2	56	64	54	56	56	55	10	D4
02:40	N3	N3	57	72	55	57	56	56	11	D5
03:40	N4	N4	57	69	55	57	57	56	12	D6
04:40	N5	N5	58	70	55	59	57	56	13	D7
05:40	N6	N6	60	79	55	62	57	57	14	D8
06:40	N7	N7	61	75	56	64	58	57	15	D9
07:40	D1	D1	61	77	56	62	59	57	16	D10
08:40	D2	D2	63	76	56	65	59	57	17	D11
00:00	N1	N1	57	76	56	58	57	56	18	D12
00:00	N1	N1	57	76	56	58	57	56	19	E1
00:00	N1	N1	57	76	56	58	57	56	20	E2
00:00	N1	N1	57	76	56	58	57	56	21	E3
00:00	N1	N1	57	76	56	58	57	56	22	N8
00:00	N1	N1	57	76	56	58	57	56	23	N9
	<b>largest</b>		<b>63</b>	<b>84</b>	<b>56</b>	<b>65</b>	<b>59</b>	<b>57</b>		
	<b>smallest</b>		<b>56</b>	<b>64</b>	<b>53</b>	<b>56</b>	<b>56</b>	<b>55</b>		
	1									
24-hour			59	84	53	60	57	56		
Leq day	D		#N/A							
Leq eve	E		59							
Leq night	N		58							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		58							
LDN			#N/A							

	CNEL	DNL	LAeq	ASmax	LASmin	LA10	LA50	LA90	CNEL	DNL
10:00	D4	D4	61	83	55	62	58	57	0	N1
11:00	D5	D5	61	77	56	62	59	58	1	N2
12:00	D6	D6	60	75	55	62	58	57	2	N3
13:00	D7	D7	62	84	55	64	60	58	3	N4
14:00	D8	D8	62	85	54	63	59	57	4	N5
15:00	D9	D9	61	76	54	63	58	57	5	N6
16:00	D10	D10	60	77	56	62	59	58	6	N7
17:00	D11	D11	61	77	55	63	59	57	7	D1
18:00	D12	D12	60	76	55	63	58	57	8	D2
19:00	E1	D13	60	77	55	61	58	56	9	D3
20:00	E2	D14	59	70	54	60	57	57	10	D4
21:00	E3	D15	59	76	56	61	58	57	11	D5
22:00	N8	N8	58	73	55	59	57	57	12	D6
23:00	N9	N9	59	83	56	59	57	57	13	D7
00:00	N1	N1	58	69	56	58	57	57	14	D8
01:00	N2	N2	57	71	56	58	57	57	15	D9
02:00	N3	N3	57	70	56	58	57	57	16	D10
03:00	N4	N4	58	78	56	58	57	57	17	D11
04:00	N5	N5	58	72	56	58	57	57	18	D12
05:00	N6	N6	59	72	56	60	58	57	19	E1
06:00	N7	N7	61	73	57	64	59	58	20	E2
07:00	D1	D1	63	76	57	65	61	59	21	E3
08:00	D2	D2	63	79	57	65	61	60	22	N8
09:00	N1	N1	58	69	56	58	57	57	23	N9
		<b>largest</b>	<b>63</b>	<b>85</b>	<b>57</b>	<b>65</b>	<b>61</b>	<b>60</b>		
		<b>smallest</b>	<b>57</b>	<b>69</b>	<b>54</b>	<b>58</b>	<b>57</b>	<b>56</b>		
24-hour			60	85	54	61	58	57		
Leq day	D		#N/A							
Leq eve	E		59							
Leq night	N		59							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		59							
LDN			#N/A							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
10:00	D4	62	75	56	64	60	59	0	N1	
11:00	D5	63	82	55	64	60	58	1	N2	
12:00	D6	61	83	55	62	58	57	2	N3	
13:00	D7	64	92	58	65	61	60	3	N4	
14:00	D8	63	79	57	65	61	60	4	N5	
15:00	D9	62	76	55	64	60	58	5	N6	
16:00	D10	64	84	56	66	62	59	6	N7	
17:00	D11	63	81	57	65	62	60	7	D1	
18:00	D12	63	88	56	65	60	58	8	D2	
19:00	E1	61	83	55	63	58	57	9	D3	
20:00	E2	59	77	55	61	58	57	10	D4	
21:00	E3	59	71	55	60	57	57	11	D5	
22:00	N8	58	73	55	59	57	56	12	D6	
23:00	N9	58	74	56	59	57	57	13	D7	
00:00	N1	57	69	55	58	57	56	14	D8	
01:00	N2	57	72	56	57	57	56	15	D9	
02:00	N3	57	70	56	57	57	56	16	D10	
03:00	N4	57	71	56	57	57	56	17	D11	
04:00	N5	57	72	55	58	57	56	18	D12	
05:00	N6	59	79	56	60	57	57	19	E1	
06:00	N7	62	81	56	64	59	57	20	E2	
07:00	D1	62	78	56	64	59	58	21	E3	
08:00	D2	64	77	56	65	61	59	22	N8	
09:00	N1	57	69	55	58	57	56	23	N9	
		<b>largest</b>	<b>64</b>	<b>92</b>	<b>58</b>	<b>66</b>	<b>62</b>	<b>60</b>		
		<b>smallest</b>	<b>57</b>	<b>69</b>	<b>55</b>	<b>57</b>	<b>57</b>	<b>56</b>		
			<b>61</b>	<b>92</b>	<b>55</b>	<b>62</b>	<b>59</b>	<b>58</b>		
24-hour										
Leq day	D		#N/A							
Leq eve	E		60							
Leq night	N		58							
CNEL			#N/A							
Leq day	D		#N/A							
Leq night	N		58							
LDN			#N/A							

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
09:06	D3	71	84	57	71	69	68	0	N1
10:06	D4	72	85	60	72	70	68	1	N2
11:06	D5	70	87	59	70	68	67	2	N3
12:06	D6	67	86	56	66	63	61	3	N4
13:06	D7	71	91	61	72	69	68	4	N5
14:06	D8	71	82	56	72	69	68	5	N6
15:06	D9	70	85	56	70	67	66	6	N7
16:06	D10	64	76	56	66	61	59	7	D1
17:06	D11	63	77	57	65	62	60	8	D2
18:06	D12	64	83	56	66	62	60	9	D3
19:06	E1	60	76	55	62	57	57	10	D4
20:06	E2	59	72	56	62	57	56	11	D5
21:06	E3	59	75	56	60	58	57	12	D6
22:06	N8	59	73	56	59	57	57	13	D7
23:06	N9	58	77	56	59	57	57	14	D8
00:06	N1	58	80	56	58	57	57	15	D9
01:06	N2	57	70	56	57	57	56	16	D10
02:06	N3	57	71	56	57	57	56	17	D11
03:06	N4	58	72	56	58	57	57	18	D12
04:06	N5	58	71	56	59	57	57	19	E1
05:06	N6	60	78	56	61	58	57	20	E2
06:06	N7	65	77	57	66	62	60	21	E3
07:06	D1	72	86	62	73	70	69	22	N8
08:06	D2	75	89	57	75	73	71	23	N9
	<b>largest</b>	<b>75</b>	<b>91</b>	<b>62</b>	<b>75</b>	<b>73</b>	<b>71</b>		
	<b>smallest</b>	<b>57</b>	<b>70</b>	<b>55</b>	<b>57</b>	<b>57</b>	<b>56</b>		
	1								
24-hour		68	91	55	65	62	61		
Leq day	D	71							
Leq eve	E	59							
Leq night	N	60							
CNEL		70							
Leq day	D	70							
Leq night	N	60							
LDN		70							



		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
09:11	D3	74	89	58	72	70	68	0	N1	
10:11	D4	76	87	61	76	74	72	1	N2	
11:11	D5	73	89	57	70	67	65	2	N3	
12:11	D6	73	90	56	69	66	65	3	N4	
13:11	D7	72	88	55	70	66	64	4	N5	
14:11	D8	73	88	57	72	68	67	5	N6	
15:11	D9	75	89	59	74	71	70	6	N7	
16:11	D10	73	89	56	71	67	66	7	D1	
17:11	D11	74	90	57	72	69	68	8	D2	
18:11	D12	67	81	55	67	62	60	9	D3	
19:11	E1	60	73	55	62	58	57	10	D4	
20:11	E2	61	87	56	63	58	57	11	D5	
21:11	E3	59	72	56	61	58	57	12	D6	
22:11	N8	59	77	55	60	57	56	13	D7	
23:11	N9	58	71	56	59	57	56	14	D8	
00:11	N1	58	75	54	58	56	56	15	D9	
01:11	N2	57	78	53	58	56	56	16	D10	
02:11	N3	58	71	56	58	57	57	17	D11	
03:11	N4	57	71	56	58	57	56	18	D12	
04:11	N5	58	71	56	58	57	57	19	E1	
05:11	N6	59	74	56	60	58	57	20	E2	
06:11	N7	61	76	56	63	59	58	21	E3	
07:11	D1	76	88	59	77	75	73	22	N8	
08:11	D2	76	88	57	76	74	73	23	N9	
		<b>largest</b>	<b>76</b>	<b>90</b>	<b>61</b>	<b>77</b>	<b>75</b>	<b>73</b>		
		<b>smallest</b>	<b>57</b>	<b>71</b>	<b>53</b>	<b>58</b>	<b>56</b>	<b>56</b>		
24-hour		71	90	53	66	63	62			
Leq day	D	74								
Leq eve	E	60								
Leq night	N	58								
CNEL		72								
Leq day	D	73								
Leq night	N	58								
LDN		72								

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
09:05	D3	D3	71	86	55	69	66	65	0 N1	N1
10:05	D4	D4	65	81	56	66	64	62	1 N2	N2
11:05	D5	D5	64	77	55	65	62	60	2 N3	N3
12:05	D6	D6	61	76	54	63	58	56	3 N4	N4
13:05	D7	D7	66	79	58	68	64	62	4 N5	N5
14:05	D8	D8	64	78	55	66	63	61	5 N6	N6
15:05	D9	D9	62	83	54	63	59	58	6 N7	N7
16:05	D10	D10	61	78	55	63	59	58	7 D1	D1
17:05	D11	D11	64	75	54	65	62	60	8 D2	D2
18:05	D12	D12	62	83	54	64	59	57	9 D3	D3
19:05	E1	D13	59	75	54	61	57	56	10 D4	D4
20:05	E2	D14	59	78	55	61	57	56	11 D5	D5
21:05	E3	D15	64	94	56	61	58	57	12 D6	D6
22:05	N8	N8	59	73	56	61	58	57	13 D7	D7
23:05	N9	N9	58	71	55	59	57	57	14 D8	D8
00:05	N1	N1	58	76	55	58	57	56	15 D9	D9
01:05	N2	N2	57	70	55	58	57	56	16 D10	D10
02:05	N3	N3	57	71	56	58	57	57	17 D11	D11
03:05	N4	N4	57	70	56	58	57	57	18 D12	D12
04:05	N5	N5	57	72	56	58	57	57	19 E1	D13
05:05	N6	N6	58	71	56	59	57	57	20 E2	D14
06:05	N7	N7	59	78	56	60	58	57	21 E3	D15
07:05	D1	D1	65	82	57	66	63	61	22 N8	N8
08:05	D2	D2	70	88	57	69	67	66	23 N9	N9
		<b>largest</b>	<b>71</b>	<b>94</b>	<b>58</b>	<b>69</b>	<b>67</b>	<b>66</b>		
		<b>smallest</b>	<b>57</b>	<b>70</b>	<b>54</b>	<b>58</b>	<b>57</b>	<b>56</b>		
		1								
24-hour			64	94	54	62	60	59		
Leq day	D		66							
Leq eve	E		61							
Leq night	N		58							
CNEL			67							
Leq day	D		65							
Leq night	N		58							
LDN			67							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
08:56	D2	D2	68	79	62	70	67	66	0 N1	N1
09:56	D3	D3	68	78	55	68	66	65	1 N2	N2
10:56	D4	D4	69	86	65	71	69	68	2 N3	N3
11:56	D5	D5	69	80	59	69	67	65	3 N4	N4
12:56	D6	D6	65	78	54	65	62	61	4 N5	N5
13:56	D7	D7	70	81	61	71	69	67	5 N6	N6
14:56	D8	D8	65	80	55	65	62	61	6 N7	N7
15:56	D9	D9	69	82	57	69	67	66	7 D1	D1
16:56	D10	D10	68	79	54	68	65	64	8 D2	D2
17:56	D11	D11	60	77	54	62	57	56	9 D3	D3
18:56	D12	D12	59	74	55	61	57	56	10 D4	D4
19:56	E1	D13	60	80	55	61	57	56	11 D5	D5
20:56	E2	D14	59	73	55	60	57	56	12 D6	D6
21:56	E3	D15	58	75	55	59	56	56	13 D7	D7
22:56	N8	N8	58	79	54	58	56	55	14 D8	D8
23:56	N9	N9	57	71	55	57	56	56	15 D9	D9
00:56	N1	N1	57	72	55	57	57	56	16 D10	D10
01:56	N2	N2	57	70	55	57	56	56	17 D11	D11
02:56	N3	N3	57	71	55	57	57	56	18 D12	D12
03:56	N4	N4	58	71	55	58	57	56	19 E1	D13
04:56	N5	N5	59	75	55	60	57	56	20 E2	D14
05:56	N6	N6	62	77	56	65	59	57	21 E3	D15
06:56	N7	N7	67	80	57	68	65	63	22 N8	N8
07:56	D1	D1	70	81	59	70	68	66	23 N9	N9
		<b>largest</b>	<b>70</b>	<b>86</b>	<b>65</b>	<b>71</b>	<b>69</b>	<b>68</b>		
		<b>smallest</b>	<b>57</b>	<b>70</b>	<b>54</b>	<b>57</b>	<b>56</b>	<b>55</b>		
24-hour			65	86	54	64	61	60		
Leq day	D		68							
Leq eve	E		59							
Leq night	N		61							
CNEL			69							
Leq day	D		67							
Leq night	N		61							
LDN			69							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
14:45	D8	61	80	51	62	58	55	0	N1	
15:45	D9	58	79	48	61	56	53	1	N2	
16:45	D10	58	82	50	60	55	53	2	N3	
17:45	D11	57	69	50	60	54	52	3	N4	
18:45	D12	57	79	49	59	53	51	4	N5	
19:45	E1	56	70	50	58	53	52	5	N6	
20:45	E2	57	82	51	59	53	52	6	N7	
21:45	E3	56	75	51	58	53	53	7	D1	
22:45	N8	54	69	51	56	53	52	8	D2	
23:45	N9	55	75	52	56	54	53	9	D3	
00:45	N1	54	66	52	54	53	53	10	D4	
01:45	N2	53	63	50	53	53	52	11	D5	
02:45	N3	54	75	51	55	53	53	12	D6	
03:45	N4	54	67	52	55	53	53	13	D7	
04:45	N5	56	69	52	57	54	53	14	D8	
05:45	N6	58	69	52	61	56	54	15	D9	
06:45	N7	60	80	52	63	57	55	16	D10	
07:45	D1	59	71	51	61	56	54	17	D11	
08:45	D2	58	75	50	61	54	52	18	D12	
09:45	D3	60	79	49	61	55	53	19	E1	
10:45	D4	64	80	51	64	60	58	20	E2	
11:45	D5	59	81	49	61	55	52	21	E3	
12:45	D6	60	79	49	62	55	53	22	N8	
13:45	D7	60	78	49	62	57	54	23	N9	
		<b>largest</b>	<b>64</b>	<b>82</b>	<b>52</b>	<b>64</b>	<b>60</b>	<b>58</b>		
		<b>smallest</b>	<b>53</b>	<b>63</b>	<b>48</b>	<b>53</b>	<b>53</b>	<b>51</b>		
24-hour		58	82	48	59	55	53			
Leq day	D	60								
Leq eve	E	56								
Leq night	N	56								
CNEL		63								
Leq day	D	59								
Leq night	N	56								
LDN		63								

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
16:52	D10	58	71	50	61	56	53	0	N1
17:52	D11	59	78	49	62	56	52	1	N2
18:52	D12	58	72	50	61	55	53	2	N3
19:52	E1	56	72	48	58	53	52	3	N4
20:52	E2	56	69	51	58	53	53	4	N5
21:52	E3	55	68	51	57	53	53	5	N6
22:52	N8	55	77	52	56	54	53	6	N7
23:52	N9	54	66	52	55	54	54	7	D1
00:52	N1	56	70	52	56	55	55	8	D2
01:52	N2	54	65	52	54	54	53	9	D3
02:52	N3	55	72	52	55	54	54	10	D4
03:52	N4	55	73	52	56	53	53	11	D5
04:52	N5	56	70	52	58	54	54	12	D6
05:52	N6	61	82	53	62	57	55	13	D7
06:52	N7	60	77	52	63	57	55	14	D8
07:52	D1	59	76	49	61	56	53	15	D9
08:52	D2	57	73	48	59	54	51	16	D10
09:52	D3	57	78	48	60	54	51	17	D11
10:52	D4	59	80	47	61	54	51	18	D12
11:52	D5	57	70	48	60	55	52	19	E1
12:52	D6	62	78	51	63	59	56	20	E2
13:52	D7	59	74	53	61	58	56	21	E3
14:52	D8	60	73	50	62	58	55	22	N8
15:52	D9	64	87	50	64	59	56	23	N9
	<b>largest</b>	<b>64</b>	<b>87</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>56</b>		
	<b>smallest</b>	<b>54</b>	<b>65</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>51</b>		
24-hour		58	87	47	59	55	53		
Leq day	D	60							
Leq eve	E	56							
Leq night	N	57							
CNEL		64							
Leq day	D	59							
Leq night	N	57							
LDN		64							

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
17:37	D11	61	88	52	62	58	56	0	N1	
18:37	D12	58	75	51	61	56	54	1	N2	
19:37	E1	57	74	52	60	55	53	2	N3	
20:37	E2	56	69	50	58	53	52	3	N4	
21:37	E3	56	77	50	57	53	52	4	N5	
22:37	N8	55	67	51	57	54	53	5	N6	
23:37	N9	56	75	52	56	54	54	6	N7	
00:37	N1	55	69	53	56	55	54	7	D1	
01:37	N2	55	67	52	55	54	54	8	D2	
02:37	N3	55	73	52	55	54	53	9	D3	
03:37	N4	54	73	51	55	53	52	10	D4	
04:37	N5	56	77	52	57	53	53	11	D5	
05:37	N6	58	71	52	61	56	54	12	D6	
06:37	N7	61	82	52	64	58	55	13	D7	
07:37	D1	61	77	51	63	57	54	14	D8	
08:37	D2	60	72	51	62	58	56	15	D9	
09:37	D3	61	75	51	63	58	56	16	D10	
10:37	D4	60	78	52	62	58	55	17	D11	
11:37	D5	58	72	50	60	56	53	18	D12	
12:37	D6	60	75	50	62	57	55	19	E1	
13:37	D7	60	83	50	62	57	54	20	E2	
14:37	D8	60	79	49	62	57	54	21	E3	
15:37	D9	61	73	52	63	59	57	22	N8	
16:37	D10	59	68	51	62	58	55	23	N9	
		<b>largest</b>	<b>61</b>	<b>88</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>57</b>		
		<b>smallest</b>	<b>54</b>	<b>67</b>	<b>49</b>	<b>55</b>	<b>53</b>	<b>52</b>		
24-hour		59	88	49	60	56	54			
Leq day D		60								
Leq eve E		56								
Leq night N		57								
CNEL		64								
Leq day D		59								
Leq night N		57								
LDN		64								

		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
17:09	D11	60	75	53	62	59	57	0	N1	
18:15	D12	63	82	52	64	59	57	1	N2	
19:15	E1	57	76	48	60	54	52	2	N3	
20:15	E2	56	70	49	59	53	51	3	N4	
21:15	E3	56	71	50	58	53	52	4	N5	
22:15	N8	56	72	50	57	53	53	5	N6	
23:15	N9	59	88	53	57	54	54	6	N7	
00:15	N1	55	70	52	56	54	54	7	D1	
01:15	N2	54	66	52	55	54	54	8	D2	
02:15	N3	54	74	52	55	54	53	9	D3	
03:15	N4	56	74	52	57	55	55	10	D4	
04:15	N5	56	71	52	57	55	54	11	D5	
05:15	N6	61	88	53	61	56	55	12	D6	
06:15	N7	61	82	52	63	58	56	13	D7	
07:15	D1	60	73	49	62	58	55	14	D8	
08:15	D2	61	72	53	63	59	57	15	D9	
09:15	D3	59	73	49	60	56	54	16	D10	
10:15	D4	58	73	48	61	56	53	17	D11	
11:15	D5	58	69	50	60	56	53	18	D12	
12:15	D6	61	80	50	62	58	56	19	E1	
13:15	D7	59	75	48	61	56	52	20	E2	
14:15	D8	61	78	49	62	58	55	21	E3	
15:15	D9	61	81	52	64	59	56	22	N8	
16:15	D10	59	71	50	62	57	54	23	N9	
		<b>largest</b>	<b>63</b>	<b>88</b>	<b>53</b>	<b>64</b>	<b>59</b>	<b>57</b>		
		<b>smallest</b>	<b>54</b>	<b>66</b>	<b>48</b>	<b>55</b>	<b>53</b>	<b>51</b>		
24-hour		59	88	48	60	56	54			
Leq day	D	60								
Leq eve	E	56								
Leq night	N	58								
CNEL		65								
Leq day	D	60								
Leq night	N	58								
LDN		64								

		LAeq	ASmax	LASmin	LA10	LA50	LA90				
CNEL	DNL							CNEL	DNL		
16:58	D10	59	76	49	61	56	54	0	N1		
17:58	D11	58	73	48	61	55	52	1	N2		
18:58	D12	56	74	47	59	53	50	2	N3		
19:58	E1	56	71	49	59	53	51	3	N4		
20:58	E2	56	75	50	59	53	51	4	N5		
21:58	E3	56	79	51	58	54	53	5	N6		
22:58	N8	55	70	51	56	53	53	6	N7		
23:58	N9	55	71	51	57	54	53	7	D1		
00:58	N1	54	72	48	55	52	51	8	D2		
01:58	N2	54	68	49	55	53	52	9	D3		
02:58	N3	54	69	51	54	53	52	10	D4		
03:58	N4	55	74	52	55	53	53	11	D5		
04:58	N5	57	77	52	58	54	53	12	D6		
05:58	N6	61	86	52	61	56	55	13	D7		
07:01	D1	66	76	55	68	65	63	14	D8		
08:01	D2	64	78	55	65	62	60	15	D9		
09:01	D3	58	81	46	60	54	52	16	D10		
10:01	D4	58	76	48	60	55	52	17	D11		
11:01	D5	56	69	48	59	53	51	18	D12		
12:01	D6	57	73	47	60	54	51	19	E1		
13:01	D7	58	72	49	61	56	53	20	E2		
14:01	D8	58	77	49	60	54	52	21	E3		
15:01	D9	57	75	46	60	53	50	22	N8		
16:01	D10	57	74	47	60	54	51	23	N9		
		<b>largest</b>	<b>66</b>	<b>86</b>	<b>55</b>	<b>68</b>	<b>65</b>	<b>63</b>			
		<b>smallest</b>	<b>54</b>	<b>68</b>	<b>46</b>	<b>54</b>	<b>52</b>	<b>50</b>			
		1									
24-hour		59	86	46	59	55	53				
Leq day D		60									
Leq eve E		56									
Leq night N		#N/A									
CNEL		#N/A									
Leq day D		59									
Leq night N		#N/A									
LDN		#N/A									



		LAeq	ASmax	LASmin	LA10	LA50	LA90			
CNEL	DNL							CNEL	DNL	
16:56	D10	D10	57	69	47	60	54	51	0 N1	N1
17:56	D11	D11	58	72	47	61	55	52	1 N2	N2
18:56	D12	D12	56	79	47	59	51	49	2 N3	N3
19:56	E1	D13	57	76	47	60	53	50	3 N4	N4
20:56	E2	D14	63	93	49	59	53	52	4 N5	N5
21:56	E3	D15	57	76	51	59	54	53	5 N6	N6
22:56	N8	N8	55	69	51	57	53	52	6 N7	N7
23:56	N9	N9	57	85	52	57	54	53	7 D1	D1
00:56	N1	N1	55	73	51	55	53	53	8 D2	D2
01:56	N2	N2	54	70	52	55	53	53	9 D3	D3
02:56	N3	N3	54	67	51	54	53	53	10 D4	D4
03:56	N4	N4	54	70	52	54	53	53	11 D5	D5
04:56	N5	N5	55	72	51	56	53	53	12 D6	D6
05:56	N6	N6	56	69	51	57	54	53	13 D7	D7
06:56	N7	N7	61	79	52	62	57	55	14 D8	D8
07:56	D1	D1	60	77	48	61	56	54	15 D9	D9
08:56	D2	D2	58	75	46	60	55	52	16 D10	D10
09:56	D3	D3	57	73	46	59	53	51	17 D11	D11
10:56	D4	D4	58	75	48	60	55	52	18 D12	D12
11:56	D5	D5	57	73	49	60	55	52	19 E1	D13
12:56	D6	D6	57	72	49	60	54	52	20 E2	D14
13:56	D7	D7	58	75	49	60	55	52	21 E3	D15
14:56	D8	D8	58	77	46	60	54	51	22 N8	N8
15:56	D9	D9	59	82	46	61	55	52	23 N9	N9
	<b>largest</b>		<b>63</b>	<b>93</b>	<b>52</b>	<b>62</b>	<b>57</b>	<b>55</b>		
	<b>smallest</b>		<b>54</b>	<b>67</b>	<b>46</b>	<b>54</b>	<b>51</b>	<b>49</b>		
	1									
24-hour			58	93	46	59	54	52		
Leq day	D		58							
Leq eve	E		60							
Leq night	N		56							
CNEL			64							
Leq day	D		58							
Leq night	N		56							
LDN			63							

		LAeq	ASmax	LASmin	LA10	LA50	LA90		
CNEL	DNL							CNEL	DNL
16:59	D10	57	70	46	59	54	51	0	N1
17:59	D11	57	75	45	59	53	50	1	N2
18:59	D12	56	70	47	59	52	50	2	N3
19:59	E1	56	71	46	59	52	50	3	N4
20:59	E2	56	75	49	58	52	51	4	N5
21:59	E3	56	72	50	58	54	53	5	N6
22:59	N8	56	75	52	57	54	54	6	N7
23:59	N9	53	68	49	54	52	52	7	D1
00:59	N1	53	68	51	54	52	52	8	D2
01:59	N2	53	70	52	54	53	52	9	D3
02:59	N3	54	74	52	55	53	53	10	D4
03:59	N4	55	69	52	56	54	53	11	D5
04:59	N5	57	72	52	58	54	53	12	D6
05:59	N6	61	81	51	63	57	54	13	D7
06:59	N7	62	77	51	64	59	56	14	D8
08:00	D2	62	82	50	64	58	55	15	D9
09:00	D3	60	79	47	62	56	53	16	D10
10:01	D4	58	78	48	60	53	51	17	D11
00:00	N1	53	68	49	54	52	52	18	D12
00:00	N1	53	68	49	54	52	52	19	E1
00:00	N1	53	68	49	54	52	52	20	E2
00:00	N1	53	68	49	54	52	52	21	E3
00:00	N1	53	68	49	54	52	52	22	N8
00:00	N1	53	68	49	54	52	52	23	N9
		<b>largest</b>	<b>62</b>	<b>82</b>	<b>52</b>	<b>64</b>	<b>59</b>	<b>56</b>	
		<b>smallest</b>	<b>53</b>	<b>68</b>	<b>45</b>	<b>54</b>	<b>52</b>	<b>50</b>	
24-hour		57	82	45	58	54	52		
Leq day	D	#N/A							
Leq eve	E	56							
Leq night	N	57							
CNEL		#N/A							
Leq day	D	#N/A							
Leq night	N	57							
LDN		#N/A							

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per FTA guidance = 80  
allowable hours over which Leq is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted)  
= Barrier of input height inserted between source and receptor

Table with columns: Project Phase No., Project Phase Description, Construction Equipment Type, Quantity, AUF % (from FHWA RCNM), Reference Lmax @ 50 ft. from RCNM, Client Equipment Description, Data Source and/or Notes, Source to NSR Distance (ft.), Insertion Loss (dB), Reduction, Allowable Operation Time, Allowable Operation Time. It lists various construction phases like Subsurface Exploration, Existing Project Site Demo, Site Preparation, Foundations, Trenching, etc., with associated equipment and noise level calculations.







To User: bordered cells are inputs, unbordered cells have formulas

noise level magnitude for construction at residence exterior, per FTA guidance = 80  
allowable hours over which Leq is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted  
= Barrier of input height inserted between source and receptor

Project Phase No.	Project Phase Description	Construction Equipment Type	Quantity	Reference Lmax @ 50 ft. from FHWA RCNM	Reference RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Insertion Loss (dB)	Reduction	Allowable Operation Time	Allowable Operation Time	Noise Level and Exposure Metrics																	
												LAeq	LAmax	LAmin	LA90	LA50	LA10	LA5	LA1	LA0.1	LA0.01	LA0.001	LA0.0001						
1	Subsurface Exploration (Site Preparation)	backhoe	1	40	78	tractors/loaders/backhoes	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		compressor (air)	1	40	78	air compressors	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		dump truck	1	40	76	off-highway trucks	360	13		41.1	8	480	37	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		front end loader	1	40	79	tractors/loaders/backhoes	360	13		44.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		boom jack power unit	1	50	80	boom/drill rigs	360	13		45.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase																													
												51																	
2	Existing Project Site Demo (Demolition A)	concrete saw	1	20	90	concrete/industrial saws	360	13		55.1	8	480	48	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		backhoe	1	40	78	tractors/loaders/backhoes	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		compressor (air)	1	40	78	air compressors	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		dump truck	1	40	76	off-highway trucks	360	13		41.1	8	480	37	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		front end loader	1	40	79	tractors/loaders/backhoes	360	13		44.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
skidsteer	1	40	80	skid steer loaders	360	13		45.1	8	480	41	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2		
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase																													
												51																	
3	Site Preparation / Rough Grading (Grading)	excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		backhoe	1	40	78	tractors/loaders/backhoes	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		compressor (air)	1	40	78	air compressors	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		dump truck	1	40	76	off-highway trucks	360	13		41.1	8	480	37	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
Total Aggregate Noise Exposure from Site Preparation / Rough Grading (Grading) Phase																													
												46																	
4	Foundations (Building Construction 1)	compressor (air)	1	40	78	air compressors	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		crane	1	16	81	cranes	360	13		46.1	8	480	38	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	1	20	75	forklifts	360	13		40.1	8	480	33	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	1	20	75	forklifts	360	13		40.1	8	480	33	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		generator	4	50	72	generator sets	360	13		37.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		dump truck	1	40	76	off-highway trucks	360	13		41.1	8	480	37	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		door	1	40	76	rubber lined doors	360	13		41.1	8	480	37	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		front end loader	1	40	79	tractors/loaders/backhoes	360	13		44.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		front end loader	1	40	79	tractors/loaders/backhoes	360	13		44.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		backhoe	2	40	78	tractors/loaders/backhoes	360	13		43.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		welder / torch	4	40	73	welders	360	13		38.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		Total Aggregate Noise Exposure from Foundations (Building Construction 1) Phase																											
												51																	
5	Trenching / Undergrounds (Trenching)	pumps	4	50	77	pumps	360	13		42.1	8	480	45	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
Total Aggregate Noise Exposure from Trenching / Undergrounds (Trenching) Phase																													
												47																	
6	Equipment, Structural Steel & Walling Erection, Piping (Building Construction 2)	man lift	1	20	75	aerial lifts	360	13		40.1	8	480	33	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	2	20	75	aerial lifts	360	13		40.1	8	480	36	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	5	20	75	aerial lifts	360	13		40.1	8	480	40	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		compressor (air)	1	40	78	air compressors	360	13		43.1	8	480	39	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		compressor (air)	2	40	78	air compressors	360	13		43.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		crane	1	16	81	cranes	360	13		46.1	8	480	38	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		crane	2	16	81	cranes	360	13		46.1	8	480	41	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	1	20	75	forklifts	360	13		40.1	8	480	33	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		excavator	1	40	81	excavators	360	13		46.1	8	480	42	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	1	20	75	forklifts	360	13		40.1	8	480	33	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		gradall	1	40	83	forklifts	360	13		48.1	8	480	44	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		man lift	2	20	75	forklifts	360	13		40.1	8	480	36	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		generator	5	50	72	generator sets	360	13		37.1	8	480	41	5	5	12	358	2	360	358.1	7.3	360.0	5.35	15.0	17.0	5.0	0.4	0.7	13.2
		dump truck	1	40	76	off-highway trucks																							

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per ETA guidance = **80**  
 allowable hours over which Leq is to be averaged = **8**

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted)  
 = Barrier of input height inserted between source and receptor

Project Phase No.	Project Phase Description	Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Insertion Loss (dB)	Reduction	Allowable Operation Time	Allowable Operation Time																		
1	Subsurface Exploration (Site Preparation)	backhoe	0	40	78	tractors/loaders/backhoes	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	1	40	81	excavators	50	15		66.0	8	480	62	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		dump truck	0	40	76	off-highway trucks	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		front end loader	1	40	79	tractors/loaders/backhoes	50	15		64.0	8	480	60	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		boom jack power unit	0	50	80	boom/drill rigs	50	15		65.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>63</b>																	
2	Existing Project Site Demo (Demolition A)	concrete saw	1	20	90	concrete/industrial saws	50	15		75.0	8	480	68	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		backhoe	0	40	78	tractors/loaders/backhoes	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	0	40	81	excavators	50	15		66.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		dump truck	0	40	76	off-highway trucks	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		skidsteer	0	40	80	skid steer loaders	50	15		65.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>68</b>																	
3	Site Preparation / Rough Grading (Grading)	excavator	1	40	81	excavators	50	15		66.0	8	480	62	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		backhoe	1	40	78	tractors/loaders/backhoes	50	15		63.0	8	480	59	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		dump truck	0	40	76	off-highway trucks	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
Total Aggregate Noise Exposure from Site Preparation / Rough Grading (Grading) Phase												<b>64</b>																	
4	Foundations (Building Construction 1)	compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		crane	1	16	81	cranes	50	15		66.0	8	480	58	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	0	40	81	excavators	50	15		66.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	0	40	81	excavators	50	15		66.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	forklifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	forklifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		generator	0	50	72	generator sets	50	15		57.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		dump truck	0	40	76	off-highway trucks	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		door	0	40	75	rubber lined doors	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		front end loader	0	40	79	tractors/loaders/backhoes	50	15		64.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		front end loader	1	40	79	tractors/loaders/backhoes	50	15		64.0	8	480	60	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		backhoe	0	40	78	tractors/loaders/backhoes	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		welder / torch	0	40	73	welders	50	15		58.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		Total Aggregate Noise Exposure from Foundations (Building Construction 1) Phase												<b>62</b>															
5	Trenching / Undergrounds (Trenching)	pumps	1	50	77	pumps	50	15		62.0	8	480	59	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	1	40	81	excavators	50	15		66.0	8	480	62	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
Total Aggregate Noise Exposure from Trenching / Undergrounds (Trenching) Phase												<b>64</b>																	
6	Equipment, Structural Steel & framing erection, piping (building construction)	man lift	0	20	75	aerial lifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	aerial lifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	aerial lifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		compressor (air)	0	40	78	air compressors	50	15		63.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		crane	0	16	81	cranes	50	15		66.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		crane	1	16	81	cranes	50	15		66.0	8	480	58	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		excavator	0	40	81	excavators	50	15		66.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	forklifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		gradall	1	40	83	forklifts	50	15		68.0	8	480	64	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		man lift	0	20	75	forklifts	50	15		60.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		generator	0	50	72	generator sets	50	15		57.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		dump truck	0	40	76	off-highway trucks	50	15		61.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		front end loader	0	40	79	tractors/loaders/backhoes	50	15		64.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		welder / torch	0	40	73	welders	50	15		58.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
		welder / torch	0	40	73	welders	50	15		58.0	8	480	0	5	5	12	48	2	50	48.5	7.3	50.0	5.79	15.0	17.0	5.0	0.4	0.7	15.0
Total Aggregate Noise Exposure from Equipment, Structural Steel & Building Erection, Piping (Building Construction 2) Phase												<b>65</b>																	







To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per FTA guidance = 80  
allowable hours over which Leq is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted)  
= Barrier of input height inserted between source and receptor

Project Phase No.	Project Phase Description	Construction Equipment Type	Quantity	Reference Lmax @ 50 ft. from FHWA RCNM	Reference Lmax @ 50 ft. from RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Insertion Loss (dB)	Reduction	Allowable																			
										Operation Time	Operation Time																		
1	Subsurface Exploration (Site Preparation)	backhoe	1	40	78	tractors/loaders/backhoes	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		compressor (air)	1	40	78	air compressors	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		dump truck	1	40	76	off-highway trucks	400	0		53.2	8	480	49	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		front end loader	1	40	79	tractors/loaders/backhoes	400	0		56.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		boom jack power unit	1	50	80	boom/drill rigs	400	0		57.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>63</b>																	
2	Existing Project Site Demo (Demolition A)	concrete saw	1	20	90	concrete/industrial saws	400	0		67.2	8	480	60	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		backhoe	1	40	78	tractors/loaders/backhoes	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		compressor (air)	1	40	78	air compressors	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		dump truck	1	40	76	off-highway trucks	400	0		53.2	8	480	49	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		front end loader	1	40	79	tractors/loaders/backhoes	400	0		56.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		skidsteer*	1	40	80	skid steer loaders	400	0		57.2	8	480	53	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>63</b>																	
3	Site Preparation / Rough Grading (Grading)	excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		backhoe	1	40	78	tractors/loaders/backhoes	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		compressor (air)	1	40	78	air compressors	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		dump truck	1	40	76	off-highway trucks	400	0		53.2	8	480	49	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Aggregate Noise Exposure from Site Preparation / Rough Grading (Grading) Phase												<b>58</b>																	
4	Foundations (Building Construction 1)	compressor (air)	1	40	78	air compressors	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		crane	1	16	81	cranes	400	0		58.2	8	480	50	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	1	20	75	forklifts	400	0		52.2	8	480	45	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	1	20	75	forklifts	400	0		52.2	8	480	45	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		generator	4	50	72	generator sets	400	0		49.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		dump truck	1	40	76	off-highway trucks	400	0		53.2	8	480	49	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		door	1	40	82	rubber lined doors	400	0		59.2	8	480	40	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		front end loader	1	40	79	tractors/loaders/backhoes	400	0		56.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		front end loader	1	40	79	tractors/loaders/backhoes	400	0		56.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
				backhoe	2	40	78	tractors/loaders/backhoes	400	0		55.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7
		welder / torch	4	40	73	welders	400	0		50.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Aggregate Noise Exposure from Foundations (Building Construction 1) Phase												<b>63</b>																	
5	Trenching / Undergrounds (Trenching)	pumps	4	50	77	pumps	400	0		54.2	8	480	57	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Aggregate Noise Exposure from Trenching / Undergrounds (Trenching) Phase												<b>58</b>																	
6	Equipment, Structural Steel & Building Erection, Piping (Building Construction 2)	man lift	1	20	75	aerial lifts	400	0		52.2	8	480	45	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	2	20	75	aerial lifts	400	0		52.2	8	480	48	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	5	20	75	aerial lifts	400	0		52.2	8	480	52	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		compressor (air)	1	40	78	air compressors	400	0		55.2	8	480	51	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		compressor (air)	2	40	78	air compressors	400	0		55.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		crane	1	16	81	cranes	400	0		58.2	8	480	50	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		crane	2	16	81	cranes	400	0		58.2	8	480	53	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		excavator	1	40	81	excavators	400	0		58.2	8	480	54	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	1	20	75	forklifts	400	0		52.2	8	480	45	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		gradall	1	40	83	forklifts	400	0		60.2	8	480	56	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		man lift	2	20	75	forklifts	400	0		52.2	8	480	48	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		generator	5	50	72	generator sets	400	0		49.2	8	480	53	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		dump truck	1	40	76	off-highway trucks	400	0		53.2	8	480	49	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
		front end loader	2	40	79	tractors/loaders/backhoes	400	0		56.2	8	480	55	5	5	0	300	100	400	300.0	100.1	400.0	0.00	0.1	5				







To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per ETA guidance = 80  
allowable hours over which Leq is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted)  
= Barrier of input height inserted between source and receptor

Project Phase No.	Project Phase Description	Construction Equipment Type	Quantity	Reference Lmax @ 50 ft. from FHWA RCNM	Source to NSR Distance (ft.)	Insertion Loss (dB)	Reduction	Allowable Operation Time	Allowable Operation Time																		
1	Subsurface Exploration (Site Preparation)	backhoe	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		dump truck	1	40	76			53.0	8	480	49	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		front end loader	1	40	79			56.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		boom jack power unit	1	50	80			57.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase										<b>63</b>																	
2	Existing Project Site Demo (Demolition A)	concrete saw	1	20	90			67.0	8	480	60	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		backhoe	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		dump truck	1	40	76			53.0	8	480	49	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		skidsteer	1	40	80			57.0	8	480	53	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase										<b>63</b>																	
3	Site Preparation / Rough Grading (Grading)	excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		backhoe	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		dump truck	1	40	76			53.0	8	480	49	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
Total Aggregate Noise Exposure from Site Preparation / Rough Grading (Grading) Phase										<b>58</b>																	
4	Foundations (Building Construction 1)	compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		crane	1	16	81			58.0	8	480	50	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	1	20	75			52.0	8	480	45	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	1	20	75			52.0	8	480	45	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		generator	4	50	72			49.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		dump truck	1	40	76			53.0	8	480	49	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		door	1	40	82			59.0	8	480	56	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		front end loader	1	40	79			56.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		front end loader	1	40	79			56.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		backhoe	2	40	78			55.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		welder / torch	4	40	73			50.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
Total Aggregate Noise Exposure from Foundations (Building Construction 1) Phase										<b>63</b>																	
5	Trenching / Undergrounds (Trenching)	pumps	4	50	77			54.0	8	480	57	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
Total Aggregate Noise Exposure from Trenching / Undergrounds (Trenching) Phase										<b>58</b>																	
6	Equipment, Structural Steel & trussing erection, piping (including)	man lift	1	20	75			52.0	8	480	45	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	2	20	75			52.0	8	480	48	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	5	20	75			52.0	8	480	52	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	2	40	78			55.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		crane	1	16	81			58.0	8	480	50	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		crane	2	16	81			58.0	8	480	53	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		excavator	1	40	81			58.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	1	20	75			52.0	8	480	45	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		gradall	1	40	83			60.0	8	480	56	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		man lift	2	20	75			52.0	8	480	48	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		generator	5	50	72			49.0	8	480	53	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		dump truck	1	40	76			53.0	8	480	49	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
front end loader	2	40	79			56.0	8	480	55	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1		
welder / torch	3	40	73			50.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1		
welder / torch	5	40	73			50.0	8	480	53	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1		
Total Aggregate Noise Exposure from Equipment, Structural Steel & Building Erection, Piping (Building Construction 2) Phase										<b>64</b>																	
7	Electrical & Instrumentation (Building Construction 3)	man lift	4	20	75			52.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	1	40	78			55.0	8	480	51	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		compressor (air)	2	40	78			55.0	8	480	54	5	5	8	250	80	330	250.0	80.1	330.0	0.07	3.2	13.0	5.0	0.5	0.7	2.1
		crane	1	16	81			58.0	8	480	50	5	5	8	250	80	330	250.0	80.1	330.0	0.07						

To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per ETA guidance = 80  
allowable hours over which Leq is to be averaged = 8

Source, receptor, and barrier all share same reference grade elevation, unless otherwise noted  
= Barrier of input height inserted between source and receptor

Project Phase No.	Project Phase Description	Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from RCNM	Client Equipment Description, Data Source and/or Notes	Source to NR Distance (ft.)	Insertion Loss (dB)	Reduction	Allowable Operation Time	Allowable Operation Time																		
1	Subsurface Exploration (Site Preparation)	backhoe	0	40	78	tractors/loaders/backhoes	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	1	40	81	excavators	125	5		65.2	8	480	61	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		dump truck	0	40	76	off-highway trucks	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		front end loader	1	40	79	tractors/loaders/backhoes	125	5		63.2	8	480	59	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		boom jack power unit	0	50	80	boom/drill rigs	125	5		64.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>68</b>																	
2	Existing Project Site Demo (Demolition A)	concrete saw	1	20	90	concrete/industrial saws	125	5		74.2	8	480	67	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		backhoe	0	40	78	tractors/loaders/backhoes	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	0	40	81	excavators	125	5		65.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		dump truck	0	40	76	off-highway trucks	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		front end loader	1	40	79	tractors/loaders/backhoes	125	5		63.2	8	480	59	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
Total Aggregate Noise Exposure from Existing Project Site Demo (Demolition A) Phase												<b>68</b>																	
3	Site Preparation / Rough Grading (Grading)	excavator	1	40	81	excavators	125	5		65.2	8	480	61	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		backhoe	1	40	78	tractors/loaders/backhoes	125	5		62.2	8	480	58	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		dump truck	0	40	76	off-highway trucks	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
Total Aggregate Noise Exposure from Site Preparation / Rough Grading (Grading) Phase												<b>63</b>																	
4	Foundations (Building Construction 1)	compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		crane	1	16	81	cranes	125	5		65.2	8	480	57	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	0	40	81	excavators	125	5		65.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	0	40	81	excavators	125	5		65.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	forklifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	forklifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		generator	0	50	72	generator sets	125	5		56.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		dump truck	0	40	76	off-highway trucks	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		door	0	40	72	rubber lined doors	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		front end loader	0	40	79	tractors/loaders/backhoes	125	5		63.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		backhoe	0	40	78	tractors/loaders/backhoes	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
welder / torch	0	40	73	welders	125	5		57.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9		
Total Aggregate Noise Exposure from Foundations (Building Construction 1) Phase												<b>61</b>																	
5	Trenching / Undergrounds (Trenching)	pumps	1	50	77	pumps	125	5		61.2	8	480	58	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	1	40	81	excavators	125	5		65.2	8	480	61	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
Total Aggregate Noise Exposure from Trenching / Undergrounds (Trenching) Phase												<b>63</b>																	
6	Equipment, Structural Steel & Trussing Erection, Piping (Building Construction 2)	man lift	0	20	75	aerial lifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	aerial lifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	aerial lifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		compressor (air)	0	40	78	air compressors	125	5		62.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		crane	0	16	81	cranes	125	5		65.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		crane	1	16	81	cranes	125	5		65.2	8	480	57	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		excavator	0	40	81	excavators	125	5		65.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	forklifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		gradall	1	40	83	forklifts	125	5		67.2	8	480	63	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		man lift	0	20	75	forklifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		generator	0	50	72	generator sets	125	5		56.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		dump truck	0	40	76	off-highway trucks	125	5		60.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		front end loader	0	40	79	tractors/loaders/backhoes	125	5		63.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		welder / torch	0	40	73	welders	125	5		57.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
		welder / torch	0	40	73	welders	125	5		57.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5	0.7	4.9
Total Aggregate Noise Exposure from Equipment, Structural Steel & Building Erection, Piping (Building Construction 2) Phase												<b>64</b>																	
7	Electrical & Instrumentation (Building Construction 3)	man lift	0	20	75	aerial lifts	125	5		59.2	8	480	0	5	5	8	45	80	125	45.1	80.1	125.0	0.16	5.4	13.0	5.0	0.5		







To User: bordered cells are inputs, unbordered cells have formulae

noise level limit magnitude for construction at residence exterior, per FTA guidance =	80
allowable hours over which Leq is to be averaged =	1

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)  
  = Barrier of input height inserted between source and receptor

Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Temporary Barrier Insertion Loss (dB)	Additional Noise Reduction	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 1-hour Leq	Source	Receiver	Barrier	Source to	Rcvr. to	Source to	"A" (ft)	"B" (ft)	"C" (ft)	Path Length	Abarr (dB)					
												Elevation (ft)	Elevation (ft)	Height (ft)	Barr. ("A") Horiz. (ft)	Barr. ("B") Horiz. (ft)	Rcvr. ("C") Horiz. (ft)	Diff. "P" (ft)									
<b>EPFES</b>																											
crane	1	16	81		770	1		50.8	0.5	30	40	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
man lift	1	20	75		770	1		44.8	0.5	30	35	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
dump truck	1	40	76		770	1		45.8	0.5	30	39	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
flat bed truck	1	40	74		770	1		43.8	0.5	30	37	5	5	8	690	80	770	690.0	80.1	770.0	0.06	2.8	13.0	5.0	0.5	0.7	1.1
Total Noise from Staging Area at EPFES =												<b>44.0</b>															
<b>181WMD</b>																											
crane	1	16	81		880	0		50.6	0.5	30	40	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
man lift	1	20	75		880	0		44.6	0.5	30	35	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
dump truck	1	40	76		880	0		45.6	0.5	30	39	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
flat bed truck	1	40	74		880	0		43.6	0.5	30	37	5	5	0	780	100	880	780.0	100.1	880.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Noise from Staging Area at 181WMD =												<b>43.7 #</b>															
<b>1675NOS</b>																											
crane	1	16	81		790	12		39.2	0.5	30	28	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
man lift	1	20	75		790	12		33.2	0.5	30	23	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
dump truck	1	40	76		790	12		34.2	0.5	30	27	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
flat bed truck	1	40	74		790	12		32.2	0.5	30	25	5	5	12	788	2	790	788.0	7.3	790.0	5.31	15.0	17.0	5.0	0.4	0.7	12.4
Total Noise from Staging Area at 1675NOS =												<b>32.4 #</b>															
<b>186FL</b>																											
crane	1	16	81		800	0		51.5	0.5	30	41	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
man lift	1	20	75		800	0		45.5	0.5	30	35	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
dump truck	1	40	76		800	0		46.5	0.5	30	39	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
flat bed truck	1	40	74		800	0		44.5	0.5	30	37	5	5	0	700	100	800	700.0	100.1	800.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1
Total Noise from Staging Area at 186FL =												<b>44.7 #</b>															



(A-weighted)	69	85	98	108	111	111	109	106	101	117
Engine casing (L7044SG)	85	105	106	100	100	98	98	95	87	110
(A-weighted)	46	79	90	91	97	98	99	96	86	104
Engine casing (L7044SG)	85	105	106	100	100	98	98	95	87	110
(A-weighted)	46	79	90	91	97	98	99	96	86	104
Electric motor for e-driven compressor	1865	88	90	92	93	93	98	88	81	102
(A-weighted)	79	81	83	84	84	84	89	79	72	93
Electric motor for e-driven compressor	1865	88	90	92	93	93	98	88	81	102
(A-weighted)	79	81	83	84	84	84	89	79	72	93
total interior sound power level (dBA)	83	92	104	114	117	117	115	112	107	123

	ft
94.1	3.28
85.0	3.28
94.1	3.28
85.0	3.28

Atten.	
	9.1
	9.1

ENC, 2nd ed., Table 11.24 (1200 rpm)  
client says should be 85 dBA "(API 541 max limit)", so adjust w/ Atten  
ENC, 2nd ed., Table 11.24 (1200 rpm)  
client says should be 85 dBA "(API 541 max limit)", so adjust w/ Atten in CadnaA

	ft <sup>3</sup>									
room volume, with absorption	475200	15	15	15	15	15	15	15	15	15
		2	5	8	8	12	9	7	7	4
		17	20	23	23	27	24	22	22	19

building dimensions (ft)		
L	W	H
180	60	44

Table 6.2, EEI EPPENG, pick level for 10' distance from source to wall for "A"  
Additional acoustical absorption added per "MCSbldg\_int\_abs" worksheet calculation  
Total absorption value ("A")

**Transmission Losses (TL) of building shell elements**

	<i>(values in italics are estimates, regular text are from noted data source)</i>									
wall panel	1	7	13	20	30	41	49	51	53	
roof panel	1	7	13	20	30	41	49	51	53	
personnel access door	13	19	26	26	28	32	32	40	42	
roll-up door	10	16	22	23	24	31	44	50	52	
window	15	21	27	31	34	36	37	49	51	
ventilation fan port	4	10	11	14	19	25	24	21	18	
ridge vent (linear slot)	3	3	5	4	6	5	5	4	3	

	3	8
	14	14
	16	4
	4	4
174		0.1

assumes wall insulation complies with metal bldg. specification (STC32 min.), resembling the NAIMA B315 roof assembly rated for STC32; also appears to have an R19 consistent with 6" wall thickness and sound spec for NRC 0.85 on 60% of walls  
ENC, 2nd ed., Table 8.1, "2-skin metal door"  
based on Alpine Insul-Sound STC30 test report (100096189CRT-001a)  
Picked Viracon 3/8" overall - 3/16" glass, .030" PVB, 3/16" glass, reasonably consistent with Specs section 2.8.B.2  
NR from Rincon report Table 3  
assumes insulation within "acoustic ridge vent" behaves like room interior absorptive lining--see "ARVestNR" worksheet calculation--plus line of sight block (3 dB)

**Calculated area sound power levels (PWL)**

	ft <sup>2</sup>									
long wall area	7920	29	29	29	29	29	29	29	29	
(dBA)		88	88	92	94	83	75	67	63	97
short wall area	2640	24	24	24	24	24	24	24	24	
(dBA)		83	84	87	89	78	71	62	58	93
roof area	10800	30	30	30	30	30	30	30	30	
(dBA)		89	90	93	95	85	77	68	64	99
personnel access door area	24	4	4	4	4	4	4	4	4	
(dBA)		51	51	53	63	60	59	59	49	67
roll-up door area	196	13	13	13	13	13	13	13	13	
(dBA)		63	63	67	75	73	69	56	48	78
window area	64	8	8	8	8	8	8	8	8	
(dBA)		53	53	57	62	58	59	58	44	67
ventilation fan port area	16	2	2	2	2	2	2	2	2	
(dBA)		58	58	67	73	67	64	65	66	77
ridge vent slot area	17.4	2	2	2	2	2	2	2	2	
(dBA)		59	66	73	83	81	85	85	83	91

Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG  
Table 6.4, EEI EPPENG  
Eq. 6.1, EEI EPPENG

-----

[ ]

[ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ]

Blower for Gas Compressor electric motor inlet (A-weighted)	89	89	87	93	86	84	84	82	74	97	89.1	[ 3.28 ]	client-supplied data; you picked 1" SP (loudest levels on client-provided table) from 225 CPS & CPA 1550 rpm per client direction (but client didn't specify SP)
	50	63	71	84	83	84	85	83	73	91	83	[ 3.28 ]	
Blower for Gas Compressor electric motor outlet (A-weighted)	96	96	91	96	90	88	85	83	74	102	93.9	[ 3.28 ]	client-supplied data; you picked 1" SP (loudest levels on client-provided table) from 225 CPS & CPA 1550 rpm per client direction (but client didn't specify SP)
	57	70	75	87	87	88	86	84	73	94	86	[ 3.28 ]	
Vapor Recovery Unit													client says "90 dBA" each
Trane 5-ton HVAC unit for Office													client says "87 dBA" each (per 2/21/23 RC email)
Gas Engine Exhaust (A-weighted)	76	94	95	97	93	93	93	91	81	103	94.6	[ 3.28 ]	client-supplied data
	37	68	79	88	90	93	94	92	80	99	91	[ 3.28 ]	

**Scenario A: EPPENG default ("hard") % cover**

Square Feet (SF)	room dimensions in feet			Vol. (m)
	L	W	H	
	180	60	44	13448

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000

NRC Notes

0%	0	
100%	21120	
0%	0	
100%	10800	
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	10800
Total Square Footage TREATED	0%	0
Total Square Footage UNTREATED	100%	42720
TOTAL SQUARE FOOTAGE		42720

	$\alpha$					
	125	250	500	1000	2000	4000
	0.01	0.05	0.1	0.2	0.45	0.65
	0.01	0.01	0.02	0.02	0.02	0.02

0.20	n/a
0.02	III

Abs. Coeff - walls, treated	
Abs. Coeff - walls, untreated	
Abs. Coeff - ceiling, treated	
Abs. Coeff - ceiling, untreated	
Abs. Coeff - floor, untreated	
Total Sabins per OBCF	

	Sabins (A)					
	125	250	500	1000	2000	4000
	0	0	0	0	0	0
	2112	1056	1267	1478	1901	1690
	0	0	0	0	0	0
	540	1080	108	1080	756	216
	108	108	216	216	216	216
	2760	2244	1591	2774	2873	2122

0.06 average absorption coefficient

Notes:

- I painted concrete block (Egan, p. 52, #4)
  - II steel (Egan, p. 52, #15)
  - III concrete floor (Egan, p. 52, #15)
- NRC = noise reduction coefficient

**"60% of the internal surfaces = NRC 0.85" % cover**

Square Feet (SF)	room dimensions in feet			Vol. (m)
	L	W	H	
	180	60	44	

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000

NRC Notes

Abs. Coeff - walls, treated	80%	17000
Abs. Coeff - walls, untreated	20%	4120
Abs. Coeff - ceiling, treated	79%	8500
Abs. Coeff - ceiling, untreated	21%	2300
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	10800
Total Square Footage TREATED	60%	25500
Total Square Footage UNTREATED	40%	17220
TOTAL SF		42720

	Acoustical Absorption Coefficients ( $\alpha$ )					
	125	250	500	1000	2000	4000
	0.63	0.56	0.95	0.79	0.60	0.35
	0.1	0.05	0.06	0.07	0.09	0.08
	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.01	0.05	0.1	0.2	0.45	0.65
	0.01	0.01	0.02	0.02	0.02	0.02

0.73	NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)
0.07	I
0.73	NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)
0.07	II
0.20	n/a
0.02	III

Abs. Coeff - walls, treated	
Abs. Coeff - walls, untreated	
Abs. Coeff - ceiling, treated	
Abs. Coeff - ceiling, untreated	
Abs. Coeff - floor, treated	
Abs. Coeff - floor, untreated	
Total Sabins per OBCF	

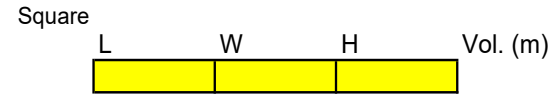
	Sabins (A)					
	125	250	500	1000	2000	4000
	10710	9520	16150	13430	10200	5950
	412	206	247	288	371	330
	5355	4760	8075	6715	5100	2975
	115	230	23	230	161	46
	0	0	0	0	0	0
	108	108	216	216	216	216
	16700	14824	24711	20879	16048	9517

0.45 average absorption coefficient

estimated noise reduction (difference between Scenarios A & B in NR, dB)

7.8	8.2	11.9	8.8	7.5	6.5
-----	-----	------	-----	-----	-----

**Scenario A: no insulation % cover**



	% cover	Square Feet (SF)
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	348
Total Square Footage TREATED	0%	0
Total Square Footage UNTREATED	100%	1400
TOTAL SQUARE FOOTAGE		1400

Abs. Coeff - walls, treated	0%	0
Abs. Coeff - walls, untreated	100%	704
Abs. Coeff - ceiling, treated	0%	0
Abs. Coeff - ceiling, untreated	100%	348
Abs. Coeff - floor, untreated	100%	348
Total Sabins per OBCF		401

Notes:

- I painted concrete block (Egan, p. 52, #4)
  - II steel (Egan, p. 52, #15)
  - III open
- NRC = noise reduction coefficient

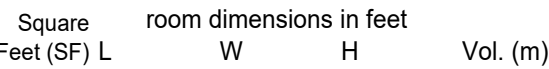
	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>						
	0.01	0.05	0.1	0.2	0.45	0.65
	1	1	1	1	1	1

NRC Notes

0.20 n/a  
1.00 III

0.30 average absorption coefficient

**Scenario B: with insulation % cover**



	% cover	Square Feet (SF)
Abs. Coeff - walls, treated	0%	0
Abs. Coeff - walls, untreated	100%	704
Abs. Coeff - ceiling, treated	100%	348
Abs. Coeff - ceiling, untreated	0%	0
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	348
Total Square Footage TREATED	25%	348
Total Square Footage UNTREATED	75%	1052
TOTAL SF		1400

Abs. Coeff - walls, treated	0%	0
Abs. Coeff - walls, untreated	100%	704
Abs. Coeff - ceiling, treated	100%	348
Abs. Coeff - ceiling, untreated	0%	0
Abs. Coeff - floor, treated	0%	0
Abs. Coeff - floor, untreated	100%	348
Total Sabins per OBCF		602

estimated noise reduction (difference between Scenarios A & B in NR, dB)

	Octave Band Center Frequency (Hz)					
	125	250	500	1000	2000	4000
<i>Acoustical Absorption Coefficients (α)</i>						
	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.63	0.56	0.95	0.79	0.60	0.35
	0.05	0.1	0.01	0.1	0.07	0.02
	0.01	0.05	0.1	0.2	0.45	0.65
	1	1	1	1	1	1

NRC Notes

0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 II  
0.73 NAIMA MB315 "PSK Standard Duty Facing" (NRC=0.85)  
0.07 II  
0.20 n/a  
1.00 III

0.46 average absorption coefficient

<i>Sabins (A)</i>						
Abs. Coeff - walls, treated	0	0	0	0	0	0
Abs. Coeff - walls, untreated	35	70	7	70	49	14
Abs. Coeff - ceiling, treated	219	195	331	275	209	122
Abs. Coeff - ceiling, untreated	0	0	0	0	0	0
Abs. Coeff - floor, treated	0	0	0	0	0	0
Abs. Coeff - floor, untreated	348	348	348	348	348	348
Total Sabins per OBCF	602	613	686	693	606	484



Sound Levels (local)

Name	ID	Type	Oktave Spectrum (dB)										Source		
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000 A	lin		
new compressor bldg long wall panel	NCLWLP	Lw	A	88	88	92	94	83	75	67	63	59	97.5	127.7	calcd
new compressor bldg short wall panel	NCLSWP	Lw	A	83	84	87	89	78	71	62	58	54	92.6	122.7	calcd
new compressor bldg roof panel	NCLRP	Lw	A	89	90	93	95	85	77	68	64	60	98.6	128.7	calcd
new compressor bldg pers access door	NCLPAD	Lw	A	51	51	53	63	60	59	59	49	44	67.1	90.7	calcd
new compressor bldg roll-up door	NCLRUD	Lw	A	63	63	67	75	73	69	56	48	43	78.4	102.7	calcd
new compressor bldg window	NCLWIN	Lw	A	53	53	57	62	58	59	58	44	40	66.6	92.7	calcd
new compressor bldg vent fan port	NCLVFP	Lw	A	58	58	67	73	67	64	65	66	67	76.6	97.9	calcd
new compressor bldg acoustic ridge vent	NCLBARV	Lw	A	59	66	73	83	81	85	85	83	82	91.3	100.8	calcd
substation transformer	SUBT	Lw	A	43	62	74	76	82	79	75	70	61	85.4	94.1	EEI EPPENG 4.2.5
discharge gas air cooler	DGAC	Lw	A	46	72	80	84	87	87	85	81	74	92.6	101.7	client data
comp electric motor blower inlet	CEMBI	Lw	A	50	63	71	84	83	84	85	83	73	91	97.1	client data
comp electric motor blower outlet	CEMBO	Lw	A	57	70	75	87	87	88	86	84	73	93.7	101.9	client data
gas engine exhaust (silenced)	GEXH	Lw	A	37	68	79	88	90	93	94	92	80	99	102.5	client data
gas engine jacket water cooler	GEIWC	Lw	A	83	96	94	91	88	85	82	78	73	90.7	99.6	client data
air-cooled condenser (chiller) 5-ton	ACC5	Lw		61.7	61.7	61.7	65.6	68.1	65.8	59.8	58.4	56.1	69.9	73.1	Bryant BH16-060 no sound blanket

Point Sources

Name	M.	ID	Result. PWL			Lw / Li	Value	norm. dB(A)	Correction dB(A)	Sound Reduction			Attenuatio R	Operating Time			K0 (dB)	Freq. (Hz)	Direct.	Height (ft)	Coordinates		
			Day (dBA)	Evening (dBA)	Night (dBA)					Day Type	Evening dB(A)	Night dB(A)		Day (min)	Special (min)	Night (min)					X (ft)	Y (ft)	Z (ft)
gas engine exhaust stack terminus		GEXT	99	99	99	Lw	GEXH		0	0	0					0		Chimney (l)	0.25	g	1071.58	929.65	60.25
gas engine exhaust stack terminus		GEXT	99	99	99	Lw	GEXH		0	0	0					0		Chimney (l)	0.25	g	1064.69	895.2	60.25
Trane 5-ton HVAC unit		ACC1	87	87	87	Lw	ACC5		0	0	0			-17.1			Chimney (l)	5	r	1341.5	797.71	5	
Trane 5-ton HVAC unit		ACC2	87	87	87	Lw	ACC5		0	0	0			-17.1			Chimney (l)	5	r	1338.79	787.89	5	

Area Sources

Name	M.	ID	Result. PWL			Lw / Li	Value	norm. dB(A)	Correction dB(A)	Sound Reduction			Attenuatio R	Operating Time			K0 (dB)	Freq. (Hz)	Direct.	Moving Pt. Src Number				
			Day (dBA)	Evening (dBA)	Night (dBA)					Day Type	Evening dB(A)	Night dB(A)		Day (min)	Special (min)	Night (min)				Day	Evening	Night		
new comp bldg roof		NCLRP	98.6	98.6	98.6		69.2		0	0	0							(none)						
new comp bldg ridge vent		NCLBRV	91.3	91.3	91.3		74.7		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
filter separation area		FSA	80	80	80		60.9		0	0	0							(none)						
VRU area		VRUA	90	90	90		74.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
new comp bldg fan port		NCLBFP	76.6	76.6	76.6		76.1		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
gas discharge cooler		GDC	92.6	92.6	92.6		81.2		0	0	0							(none)						
VFD building		VFDB	85	85	85		69.1		0	0	0							(none)						
electric motor and blower inlet and outlet		EMBIO	95.6	95.6	95.6		85.8		0	0	0							(none)						
electric motor and blower inlet and outlet		EMBIO	95.6	95.6	95.6		85.8		0	0	0							(none)						
transformer		XMFR	85.4	85.4	85.4		74.9		0	0	0							(none)						
transformer		XMFR	85.4	85.4	85.4		74.9		0	0	0							(none)						
new comp gas engine air intake (silenced)		NCGEAI	91	91	91		90.5		0	0	0							(none)						
new comp gas engine air intake (silenced)		NCGEAI	91	91	91		90.5		0	0	0							(none)						
gas compressor engine cooler		GCEC	90.7	90.7	90.7		82.6		0	0	0							(none)						
gas compressor engine cooler		GCEC	90.7	90.7	90.7		82.6		0	0	0							(none)						

Vertical Area Sources

Name	M.	ID	Result. PWL			Lw / Li	Value	norm. dB(A)	Correction dB(A)	Sound Reduction			Attenuatio R	Operating Time			K0 (dB)	Freq. (Hz)	Direct.
			Day (dBA)	Evening (dBA)	Night (dBA)					Day Type	Evening dB(A)	Night dB(A)		Day (min)	Special (min)	Night (min)			
new comp bldg roll-up door		NCLRUD	78.4	78.4	78.4		65		0	0	0							(none)	
new comp bldg pers door		NCLRPD	67.1	67.1	67.1		61.9		0	0	0							(none)	
new comp bldg pers door on stairs		NCLRPDOS	67.1	67.1	67.1		61.9		0	0	0							(none)	
new comp bldg pers door on stairs		NCLRPDOS	67.1	67.1	67.1		61.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg window		NCLBW	66.6	66.6	66.6		58.9		0	0	0							(none)	
new comp bldg long wall		NCLWL	97.5	97.5	97.5		69		0	0	0							(none)	
new comp bldg long wall		NCLWL	97.5	97.5	97.5		69		0	0	0							(none)	
new comp bldg short wall		NCLSW	92.6	92.6	92.6		68.5		0	0	0							(none)	
new comp bldg short wall		NCLSW	92.6	92.6	92.6		68.4		0	0	0							(none)	
new comp bldg pers door on stairs		NCLRPDOS	67.1	67.1	67.1		61.9		0	0	0							(none)	
new comp bldg pers door on stairs		NCLRPDOS	67.1	67.1	67.1		61.9		0	0	0							(none)	

**Barrier**

Name	M.	ID	Absorption left	right	Z-Ext. (ft)	Cantilever horz. (ft)	vert. (ft)	Height Begin (ft)	End (ft)
new south wall 8ft		NSW8	0.1	0.1				8 r	
new west wall 11ft		NWW11	0.1	0.1				11 r	
existing north wall 10ft		ENW10	0.1	0.1				10 r	
existing north wall 8ft		ENW8	0.1	0.1				8 r	
existing east wall 12ft		EEW12						12 r	
existing east wall 8ft north leg		EEW8NL						8 r	
existing east wall 8ft central leg		EEW8CL						8 r	
existing east wall 8ft south leg		EEW8SL						8 r	

**Building**

Name	M.	ID	RB	Residents	Absorption	Height Begin (ft)
old compressor house west	-	OCHW		0	0.1	0 r
old compressor house east	-	OCHE		0	0.1	0 r
old gas metering house	-	OGMH		0	0.1	0 r
new compressor building	+	NCBLDG		0	0.1	53 r
new warehouse building		NWBLDG		0	0.1	25 r
new office building		NOBLDG		0	0.1	14 r
PDC building		PDCBLDG		0	0.1	20 r

**Cylinder**

Name	M.	ID	Absorption Center		Radius	Height	
			x (ft)	y (ft)	(ft)	(ft)	
gas engine exhaust stack		GEES	0.1	1071.84	929.6	3.12	60 r
gas engine exhaust stack		GEES	0.1	1064.73	895.15	3.12	60 r
blowdown stack		BDS	0.1	1195.87	1103.58	4.5	62 r

**3D-Reflector**

Name	M.	ID	Absorption left	right	Height Begin (???)
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r
fan port hood		FPH	0.1	0.1	12.25 r

MEMORANDUM

SUBJECT: VENTURA COMPRESSOR STATION MODERNIZATION PROJECT – APPENDIX M TO PROJECT PEA NOISE SECTION 5.13

**Baseline Noise Level Methodology**

Outdoor Ambient Sound Level Survey

Outdoor ambient sound pressure levels (SPL) were collected at successive one-minute intervals with a deployed stationary American National Standards Institute (ANSI) Type 2 sound level meter (SLM) at each of two Ventura Compressor Station (VCS) onsite locations as depicted in Figure M-1. The SLM at the northern monitoring location (NML) was a SoftdB “Piccolo II” model integrating SLM (with last four digits of serial number [SN] = 2101); and, the SLM at the southern monitoring location (SML) was also a Piccolo II model (SN=2203). Exhibit M-5.1 displays a sample photograph of the SLM deployed at the NML position.



**Exhibit M-5.1** – Sample photograph, looking north, of the deployed sound level meter (encircled with yellow dashes) at the northern monitoring location (NML) onsite near the Ventura Compressor Station (VCS) access gate during the June 2021 field survey

The collection of SPL data, with its corresponding acoustical metrics (e.g.,  $L_{eq}$ ,  $L_{max}$ ,  $L_{min}$ ) and statistical values (e.g.,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ , etc.), was performed at one-minute intervals to help provide analysis granularity and help

## MEMORANDUM

### SUBJECT: VENTURA COMPRESSOR STATION MODERNIZATION PROJECT – APPENDIX M TO PROJECT PEA NOISE SECTION 5.13

identify particular noise-producing events, such as distinguishing a short-duration onsite operational valve blowdown from onsite construction activities. Values from these intervals were then mathematically consolidated to arrive at hourly values as depicted in the summarized data tables appearing in this Appendix M. These tables present the hourly results (the aforementioned three acoustical metrics and three statistical values) of the identified 24-hour period that was monitored, as well as largest and smallest values of each.

Because onsite construction activity did not occur during nighttime hours, the smallest hourly  $L_{eq}$  value over the course of a monitored 24-hour period, typically occurring a nighttime hour (i.e., associated with a timeframe tagged as one of the nine nighttime hours “N1” through “N9” in the summary table), would identify a period of time during which generally steady-state or continuous operation noise from the Ventura Compressor Station compressor systems would be—in the absence of construction noise and roadway traffic noise that reflects heavier volumes during daytime hours—the dominant contributor to the measurable outdoor ambient sound environment. Such  $L_{eq}$  values during these nighttime hours are also, within 3 dB or less and as shown in Table 5.13-1 of the PEA, very comparable to the “low”  $L_{90}$  values, which further supports that these low  $L_{eq}$  values during these nighttime periods indeed represent operating VCS compressor systems. In other words, small differences between  $L_{eq}$  and  $L_{90}$  values mean that measured noise varies only slightly over a period of time, which is characteristic of a steady-state or continuously operating electro-mechanical equipment such as the compressors.

#### Correction to Full Load Operations

Compressor load data was provided by SoCal Gas at hourly intervals for each of the three operating compressors during the June 21, 2021 through June 28, 2021 baseline outdoor ambient sound level survey. During this period, only up to two of the three compressors were active at any one time during the 192 successive hours and each active compressor operated at a load averaging at 87%. Aside from only two hours on June 24<sup>th</sup> (12 noon to 2 p.m.) when just one compressor was active, and thirteen hours on June 28<sup>th</sup> (11 a.m. to 12 a.m.) when no compressors were active, two compressors were active and operating at these 87% average loads for a total of 177 hours (or 92% of the survey period).

SoCal Gas also provided data for a more recent operation period, two years after that of the preceding survey: June 21, 2023 to June 28, 2023. During this later time, it was documented that up to all three compressors were operating and each at a load averaging 91%. Aside from nine hours when only two compressors were active, three hours when just one compressor was active, and three hours when no compressors were active, three compressors were active and operating at these 91% average loads for a total of 177 hours (or 92% of the survey period).

The preceding subsection has established that low measured  $L_{eq}$  values during nighttime hours that are comparable to statistically low  $L_{90}$  values from the outdoor ambient sound level survey measurement data represent existing VCS operations noise. Therefore, since compressor activity logs during the survey period indicate that only two of three VCS compressors were operating at nearly full load, then one would reasonably expect that operation of all three VCS compressors at similar load conditions would result in higher  $L_{eq}$  values at the survey locations and offsite as sound propagates beyond the VCS boundary into the surrounding commercial and residential neighborhoods. This higher  $L_{eq}$  value can be reasonably estimated based on the following acoustical principles and mathematical derivation:

MEMORANDUM

SUBJECT: VENTURA COMPRESSOR STATION MODERNIZATION PROJECT – APPENDIX M TO PROJECT PEA  
NOISE SECTION 5.13

- Operation noise generated by a VCS compressor includes not only the compressor machinery housed within the existing station building but associated indoor and outdoor acoustical contributors such as air intakes, exhausts, and so on that in aggregate represents a noise-producing system. The aggregate noise level from such an operating compressor system would thus depend on its load conditions, resulting in some net sound level “X” dBA associated with that load condition.
- If there are two operating compressor systems sharing the same equipment and other features, and are operating under comparable load conditions, then one can reasonably conclude that each system would yield X dBA. In acoustical combination and with respect to a receiver position in the same direction and distance from these two sound-emitting systems, the result would be X+3 dBA on the basis of logarithmically adding two identical sound sources:  $X+10*\text{LOG}(2)$ .
- Since the  $L_{eq}$  values represent the noise level of two VCS compressors operating at nearly full load conditions and thus with a net noise level of X+3 dBA, one can estimate the effect of logarithmically adding noise of a third compressor system, which has the same features as the other two and operating at comparable load conditions, with the following expressions:
  - Noise level from two compressors =  $X+10*\text{LOG}(2) = X+3$
  - Noise level from three compressors =  $X+10*\text{LOG}(3) = X+4.8$
  - The dB difference between three operating compressors and two operating compressors is thus  $4.8-3 = 1.8$  dB.

Hence, to accurately estimate the  $L_{eq}$  value for three operating existing VCS compressor systems, and thus better represent “full load” operating conditions from the facility, one adds 1.8 dB to the empirically based result for two operating systems. This upward adjustment is reflected in PEA Section 5.13 and informs the noise assessment.



SOURCE: Google 2023; Dudek 2023

**DUDEK**

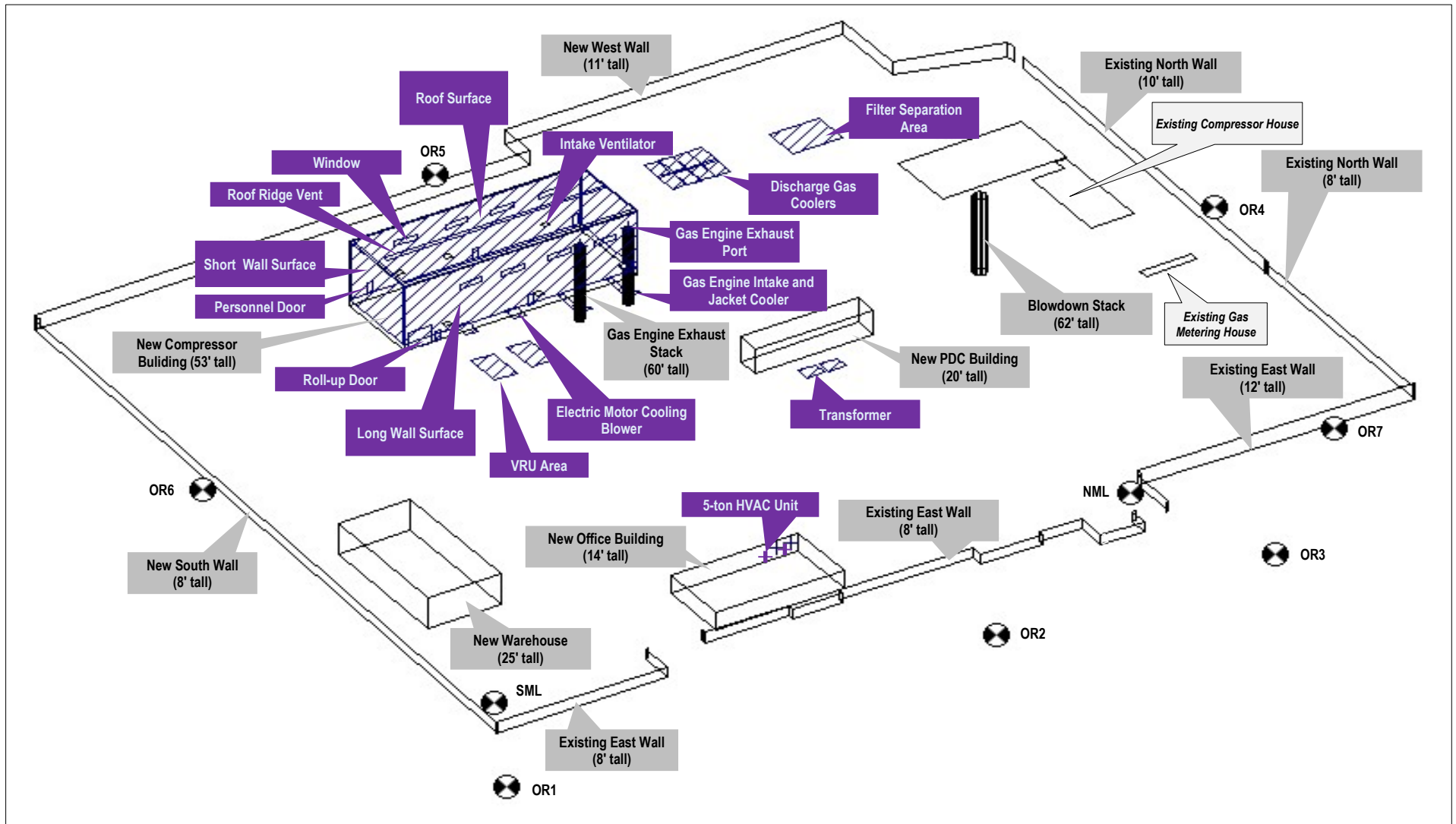


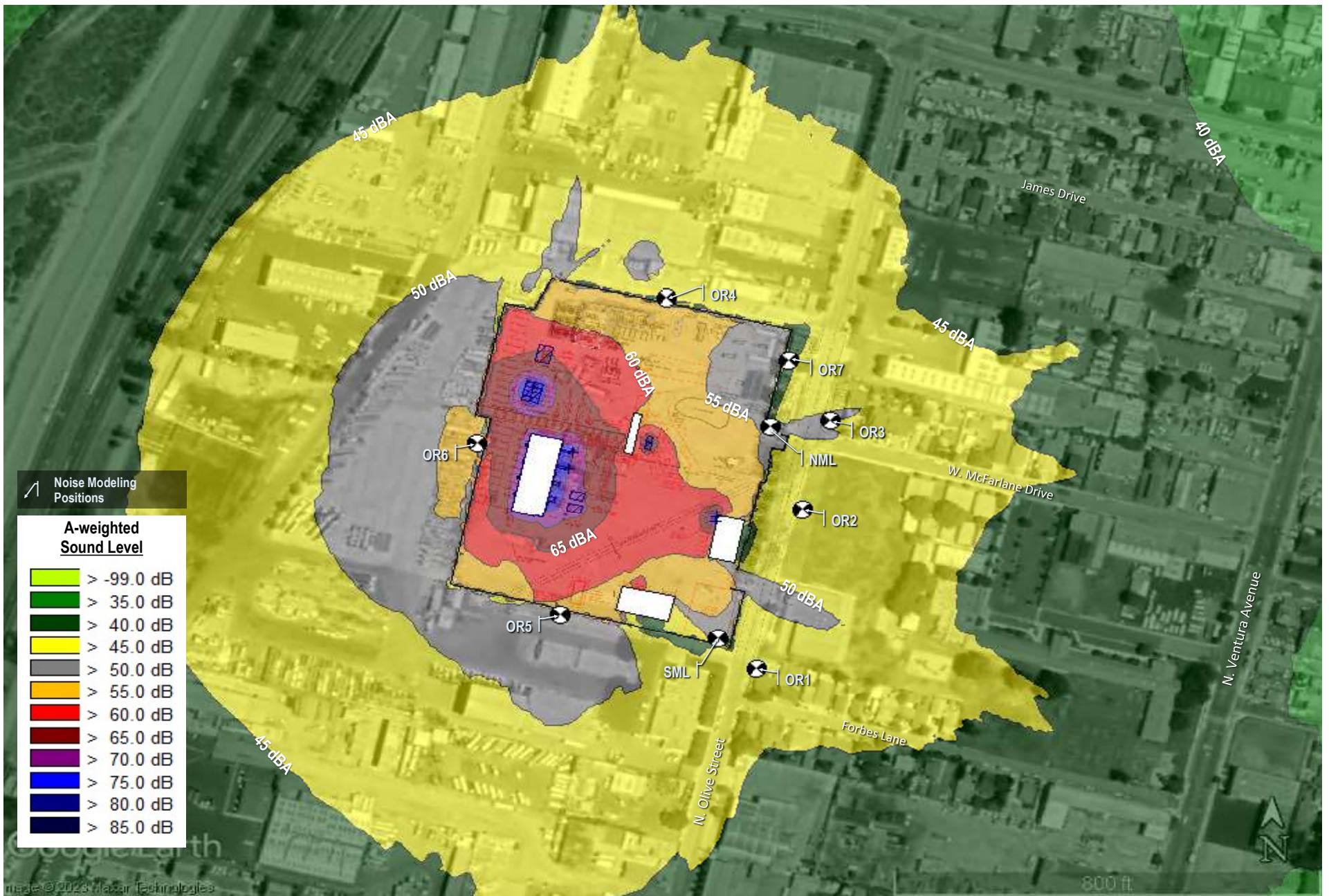
0 102.5 205 Feet

**FIGURE M1**

**Locations of Baseline Outdoor Ambient Sound Level Survey**

SoCal Gas - Ventura Compressor Station Modernization Project PEAs





SOURCE: Google 2023; Dudek 2023



FIGURE M3

Predicted Stationary Source Operation Noise from Proposed Project -- All Four Compressors Active

SoCal Gas - Ventura Compressor Station Modernization Project PEAs