

# Appendix F

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Noise

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/21/2020  
 Case Description: Fire Station No. 9 Construction

\*\*\*\* Receptor #1 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Residences	Residential	90.0	80.0	65.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	125.0	0.0
Excavator	No	40		80.7	125.0	0.0
Front End Loader	No	40		79.1	125.0	0.0

Results

Noise Limit Exceedance (dBA)										Noise Limits (dBA)	
Night	Day		Calculated (dBA)		Day Night		Evening		Night		
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Dozer	N/A	N/A	73.7	69.7	N/A	N/A	N/A	N/A	N/A	N/A	
Excavator	N/A	N/A	72.8	68.8	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader	N/A	N/A	71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	
Total			73.7	73.5	N/A	N/A	N/A	N/A	N/A	N/A	

\*\*\*\* Receptor #2 \*\*\*\*

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residences	Residential	90.0	80.0	65.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225.0	0.0
Excavator	No	40		80.7	225.0	0.0
Front End Loader	No	40		79.1	225.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Equipment	Leq	Lmax	Calculated (dBA)		Day		Evening		Lmax
			Day	Evening	Day	Night	Lmax	Leq	
Dozer	N/A	N/A	68.6	64.6	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	67.6	63.7	N/A	N/A	N/A	N/A	N/A
Front End Loader	N/A	N/A	66.0	62.1	N/A	N/A	N/A	N/A	N/A
Total			68.6	68.3	N/A	N/A	N/A	N/A	N/A

\*\*\*\* Receptor #3 \*\*\*\*

Description	Land Use	Daytime	Baselines (dBA)	
			Evening	Night
Residences	Residential	90.0	80.0	65.0

Equipment

Impact	Usage	Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
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Description	Device	(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	325.0	0.0
Excavator	No	40		80.7	325.0	0.0
Front End Loader	No	40		79.1	325.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Night	Calculated (dBA)				Day		Evening		Lmax
	Day	Evening		Night	Night	Evening	Evening		
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	N/A	N/A	65.4	61.4	N/A	N/A	N/A	N/A	N/A
Excavator	N/A	N/A	64.5	60.5	N/A	N/A	N/A	N/A	N/A
Front End Loader	N/A	N/A	62.9	58.9	N/A	N/A	N/A	N/A	N/A
			Total	65.4	65.2	N/A	N/A	N/A	N/A

\*\*\*\* Receptor #4 \*\*\*\*

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Oakwood Academy	Residential	90.0	80.0	65.0

  

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	425.0	0.0
Excavator	No	40		80.7	425.0	0.0
Front End Loader	No	40		79.1	425.0	0.0

Results



Freq Weight : A  
Time Weight : SLOW  
Level Range : 40-100  
Max dB : 67.0 - 2019/11/25 17:09:42  
Level Range : 40-100  
SEL : 84.7  
Leq : 55.2

No. s	Date Time	(dB)
1	2019/11/25 16:55:10	59.7
2	2019/11/25 16:55:13	53.5
3	2019/11/25 16:55:16	53.1
4	2019/11/25 16:55:19	54.3
5	2019/11/25 16:55:22	52.8
6	2019/11/25 16:55:25	51.7
7	2019/11/25 16:55:28	52.3
8	2019/11/25 16:55:31	51.9
9	2019/11/25 16:55:34	52.0
10	2019/11/25 16:55:37	52.1
11	2019/11/25 16:55:40	51.9
12	2019/11/25 16:55:43	51.5
13	2019/11/25 16:55:46	52.0
14	2019/11/25 16:55:49	55.0
15	2019/11/25 16:55:52	63.3
16	2019/11/25 16:55:55	55.2
17	2019/11/25 16:55:58	52.4
18	2019/11/25 16:56:01	49.9
19	2019/11/25 16:56:04	49.0
20	2019/11/25 16:56:07	48.9
21	2019/11/25 16:56:10	48.5
22	2019/11/25 16:56:13	49.4
23	2019/11/25 16:56:16	50.7
24	2019/11/25 16:56:19	50.5
25	2019/11/25 16:56:22	51.8
26	2019/11/25 16:56:25	48.9
27	2019/11/25 16:56:28	47.8
28	2019/11/25 16:56:31	48.9
29	2019/11/25 16:56:34	49.3
30	2019/11/25 16:56:37	50.6
31	2019/11/25 16:56:40	49.7
32	2019/11/25 16:56:43	49.4
33	2019/11/25 16:56:46	49.8
34	2019/11/25 16:56:49	50.2
35	2019/11/25 16:56:52	50.5
36	2019/11/25 16:56:55	51.5
37	2019/11/25 16:56:58	51.9
38	2019/11/25 16:57:01	51.5
39	2019/11/25 16:57:04	54.7
40	2019/11/25 16:57:07	57.4
41	2019/11/25 16:57:10	54.1
42	2019/11/25 16:57:13	51.3
43	2019/11/25 16:57:16	54.0
44	2019/11/25 16:57:19	49.7
45	2019/11/25 16:57:22	48.8
46	2019/11/25 16:57:25	50.7
47	2019/11/25 16:57:28	53.2
48	2019/11/25 16:57:31	52.0
49	2019/11/25 16:57:34	51.3
50	2019/11/25 16:57:37	52.6
51	2019/11/25 16:57:40	52.4
52	2019/11/25 16:57:43	50.8
53	2019/11/25 16:57:46	50.5
54	2019/11/25 16:57:49	51.7
55	2019/11/25 16:57:52	51.2
56	2019/11/25 16:57:55	51.7
57	2019/11/25 16:57:58	51.4
58	2019/11/25 16:58:01	51.8
59	2019/11/25 16:58:04	51.1
60	2019/11/25 16:58:07	50.4
61	2019/11/25 16:58:10	51.3
62	2019/11/25 16:58:13	52.4
63	2019/11/25 16:58:16	61.2
64	2019/11/25 16:58:19	59.9
65	2019/11/25 16:58:22	53.6
66	2019/11/25 16:58:25	51.0
67	2019/11/25 16:58:28	48.5
68	2019/11/25 16:58:31	50.4
69	2019/11/25 16:58:34	52.8
70	2019/11/25 16:58:37	57.2
71	2019/11/25 16:58:40	64.2
72	2019/11/25 16:58:43	58.8
73	2019/11/25 16:58:46	53.3
74	2019/11/25 16:58:49	51.7
75	2019/11/25 16:58:52	50.7
76	2019/11/25 16:58:55	50.6
77	2019/11/25 16:58:58	50.4
78	2019/11/25 16:59:01	50.1
79	2019/11/25 16:59:04	50.6
80	2019/11/25 16:59:07	50.3
81	2019/11/25 16:59:10	50.4
82	2019/11/25 16:59:13	50.1
83	2019/11/25 16:59:16	50.4
84	2019/11/25 16:59:19	51.6
85	2019/11/25 16:59:22	54.7

86	2019/11/25	16:59:25	60.9
87	2019/11/25	16:59:28	56.0
88	2019/11/25	16:59:31	60.4
89	2019/11/25	16:59:34	56.2
90	2019/11/25	16:59:37	52.7
91	2019/11/25	16:59:40	53.5
92	2019/11/25	16:59:43	53.7
93	2019/11/25	16:59:46	51.6
94	2019/11/25	16:59:49	49.3
95	2019/11/25	16:59:52	49.9
96	2019/11/25	16:59:55	52.8
97	2019/11/25	16:59:58	61.4
98	2019/11/25	17:00:01	56.6
99	2019/11/25	17:00:04	52.3
100	2019/11/25	17:00:07	52.3
101	2019/11/25	17:00:10	51.5
102	2019/11/25	17:00:13	52.5
103	2019/11/25	17:00:16	63.7
104	2019/11/25	17:00:19	61.0
105	2019/11/25	17:00:22	54.4
106	2019/11/25	17:00:25	52.2
107	2019/11/25	17:00:28	52.1
108	2019/11/25	17:00:31	51.7
109	2019/11/25	17:00:34	52.3
110	2019/11/25	17:00:37	51.7
111	2019/11/25	17:00:40	51.6
112	2019/11/25	17:00:43	52.5
113	2019/11/25	17:00:46	52.3
114	2019/11/25	17:00:49	52.5
115	2019/11/25	17:00:52	59.9
116	2019/11/25	17:00:55	55.8
117	2019/11/25	17:00:58	53.0
118	2019/11/25	17:01:01	53.7
119	2019/11/25	17:01:04	50.2
120	2019/11/25	17:01:07	50.6
121	2019/11/25	17:01:10	51.4
122	2019/11/25	17:01:13	55.2
123	2019/11/25	17:01:16	52.3
124	2019/11/25	17:01:19	58.5
125	2019/11/25	17:01:22	59.3
126	2019/11/25	17:01:25	64.8
127	2019/11/25	17:01:28	57.6
128	2019/11/25	17:01:31	57.7
129	2019/11/25	17:01:34	58.2
130	2019/11/25	17:01:37	57.2
131	2019/11/25	17:01:40	55.5
132	2019/11/25	17:01:43	55.6
133	2019/11/25	17:01:46	56.5
134	2019/11/25	17:01:49	56.6
135	2019/11/25	17:01:52	56.5
136	2019/11/25	17:01:55	55.4
137	2019/11/25	17:01:58	53.6
138	2019/11/25	17:02:01	58.4
139	2019/11/25	17:02:04	61.0
140	2019/11/25	17:02:07	59.2
141	2019/11/25	17:02:10	57.7
142	2019/11/25	17:02:13	57.0
143	2019/11/25	17:02:16	55.0
144	2019/11/25	17:02:19	55.1
145	2019/11/25	17:02:22	54.3
146	2019/11/25	17:02:25	52.2
147	2019/11/25	17:02:28	55.0
148	2019/11/25	17:02:31	60.5
149	2019/11/25	17:02:34	54.3
150	2019/11/25	17:02:37	50.6
151	2019/11/25	17:02:40	50.6
152	2019/11/25	17:02:43	49.7
153	2019/11/25	17:02:46	50.3
154	2019/11/25	17:02:49	51.5
155	2019/11/25	17:02:52	53.4
156	2019/11/25	17:02:55	53.6
157	2019/11/25	17:02:58	52.7
158	2019/11/25	17:03:01	53.4
159	2019/11/25	17:03:04	52.7
160	2019/11/25	17:03:07	51.5
161	2019/11/25	17:03:10	51.0
162	2019/11/25	17:03:13	51.6
163	2019/11/25	17:03:16	52.2
164	2019/11/25	17:03:19	51.1
165	2019/11/25	17:03:22	52.9
166	2019/11/25	17:03:25	54.6
167	2019/11/25	17:03:28	53.9
168	2019/11/25	17:03:31	57.6
169	2019/11/25	17:03:34	51.6
170	2019/11/25	17:03:37	48.4
171	2019/11/25	17:03:40	48.2
172	2019/11/25	17:03:43	49.5
173	2019/11/25	17:03:46	50.5
174	2019/11/25	17:03:49	48.6
175	2019/11/25	17:03:52	49.4
176	2019/11/25	17:03:55	55.7
177	2019/11/25	17:03:58	58.7
178	2019/11/25	17:04:01	58.4
179	2019/11/25	17:04:04	53.3
180	2019/11/25	17:04:07	49.4
181	2019/11/25	17:04:10	52.7
182	2019/11/25	17:04:13	60.1
183	2019/11/25	17:04:16	55.5
184	2019/11/25	17:04:19	51.4

185	2019/11/25	17:04:22	51.8
186	2019/11/25	17:04:25	54.5
187	2019/11/25	17:04:28	64.7
188	2019/11/25	17:04:31	59.1
189	2019/11/25	17:04:34	52.7
190	2019/11/25	17:04:37	49.4
191	2019/11/25	17:04:40	49.2
192	2019/11/25	17:04:43	49.0
193	2019/11/25	17:04:46	48.8
194	2019/11/25	17:04:49	49.1
195	2019/11/25	17:04:52	50.8
196	2019/11/25	17:04:55	60.5
197	2019/11/25	17:04:58	56.9
198	2019/11/25	17:05:01	52.5
199	2019/11/25	17:05:04	51.5
200	2019/11/25	17:05:07	50.5
201	2019/11/25	17:05:10	50.6
202	2019/11/25	17:05:13	51.1
203	2019/11/25	17:05:16	51.8
204	2019/11/25	17:05:19	51.9
205	2019/11/25	17:05:22	51.7
206	2019/11/25	17:05:25	52.2
207	2019/11/25	17:05:28	51.8
208	2019/11/25	17:05:31	52.5
209	2019/11/25	17:05:34	52.3
210	2019/11/25	17:05:37	51.8
211	2019/11/25	17:05:40	50.9
212	2019/11/25	17:05:43	55.3
213	2019/11/25	17:05:46	59.8
214	2019/11/25	17:05:49	56.7
215	2019/11/25	17:05:52	52.6
216	2019/11/25	17:05:55	52.6
217	2019/11/25	17:05:58	49.2
218	2019/11/25	17:06:01	47.3
219	2019/11/25	17:06:04	47.1
220	2019/11/25	17:06:07	47.3
221	2019/11/25	17:06:10	47.4
222	2019/11/25	17:06:13	47.8
223	2019/11/25	17:06:16	48.6
224	2019/11/25	17:06:19	47.2
225	2019/11/25	17:06:22	47.2
226	2019/11/25	17:06:25	47.8
227	2019/11/25	17:06:28	47.1
228	2019/11/25	17:06:31	48.4
229	2019/11/25	17:06:34	50.8
230	2019/11/25	17:06:37	49.7
231	2019/11/25	17:06:40	50.1
232	2019/11/25	17:06:43	53.0
233	2019/11/25	17:06:46	53.2
234	2019/11/25	17:06:49	52.9
235	2019/11/25	17:06:52	52.2
236	2019/11/25	17:06:55	53.7
237	2019/11/25	17:06:58	60.6
238	2019/11/25	17:07:01	57.4
239	2019/11/25	17:07:04	56.1
240	2019/11/25	17:07:07	55.9
241	2019/11/25	17:07:10	56.6
242	2019/11/25	17:07:13	62.7
243	2019/11/25	17:07:16	65.7
244	2019/11/25	17:07:19	59.2
245	2019/11/25	17:07:22	54.2
246	2019/11/25	17:07:25	52.1
247	2019/11/25	17:07:28	53.4
248	2019/11/25	17:07:31	51.5
249	2019/11/25	17:07:34	51.1
250	2019/11/25	17:07:37	50.9
251	2019/11/25	17:07:40	50.4
252	2019/11/25	17:07:43	51.5
253	2019/11/25	17:07:46	49.7
254	2019/11/25	17:07:49	49.7
255	2019/11/25	17:07:52	50.2
256	2019/11/25	17:07:55	51.4
257	2019/11/25	17:07:58	51.6
258	2019/11/25	17:08:01	51.7
259	2019/11/25	17:08:04	54.0
260	2019/11/25	17:08:07	55.3
261	2019/11/25	17:08:10	54.7
262	2019/11/25	17:08:13	51.7
263	2019/11/25	17:08:16	50.7
264	2019/11/25	17:08:19	51.8
265	2019/11/25	17:08:22	54.4
266	2019/11/25	17:08:25	63.1
267	2019/11/25	17:08:28	60.2
268	2019/11/25	17:08:31	55.0
269	2019/11/25	17:08:34	55.3
270	2019/11/25	17:08:37	64.2
271	2019/11/25	17:08:40	56.7
272	2019/11/25	17:08:43	53.2
273	2019/11/25	17:08:46	55.5
274	2019/11/25	17:08:49	53.0
275	2019/11/25	17:08:52	53.8
276	2019/11/25	17:08:55	53.7
277	2019/11/25	17:08:58	53.2
278	2019/11/25	17:09:01	54.1
279	2019/11/25	17:09:04	53.9
280	2019/11/25	17:09:07	53.8
281	2019/11/25	17:09:10	56.2
282	2019/11/25	17:09:13	53.3
283	2019/11/25	17:09:16	54.2



284	2019/11/25	17: 09: 19	57. 6
285	2019/11/25	17: 09: 22	56. 4
286	2019/11/25	17: 09: 25	53. 5
287	2019/11/25	17: 09: 28	55. 9
288	2019/11/25	17: 09: 31	52. 5
289	2019/11/25	17: 09: 34	52. 1
290	2019/11/25	17: 09: 37	50. 8
291	2019/11/25	17: 09: 40	66. 9
292	2019/11/25	17: 09: 43	55. 4
293	2019/11/25	17: 09: 46	49. 3
294	2019/11/25	17: 09: 49	49. 0
295	2019/11/25	17: 09: 52	48. 1
296	2019/11/25	17: 09: 55	48. 4
297	2019/11/25	17: 09: 58	51. 4
298	2019/11/25	17: 10: 01	49. 1
299	2019/11/25	17: 10: 04	47. 3
300	2019/11/25	17: 10: 07	47. 5

## Groundborne Noise and Vibration Modeling

### Notes

The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

Equipment	Reference Level Inputs			
	PPV <sub>ref</sub> (in/sec)	Lv <sub>ref</sub> (VdB)	RMS <sub>ref</sub> (in/sec)	Reference Distance
Vibratory Roller	0.21	94	0.050	25
Large bulldozer	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

Equipment	Vibration Level at Receiver			
	Distance (feet)	PPV <sub>x</sub> (in/sec)	Lv <sub>x</sub> (VdB)	RMS <sub>x</sub> (in/sec)
Vibratory Roller	25	0.2100	94	0.050
Large bulldozer	25	0.0890	87	0.022
Loaded trucks	25	0.0760	83	0.014
Jack hammer	25	0.0350	79	0.009
Small bulldozer	25	0.0030	58	0.001

### Source

California Department of Transportation (Caltrans). 2013. Transportation and Construction  
Last Updated: 4/11/2019

## Groundborne Noise and Vibration Modeling

### Notes

The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

Equipment	Reference Level Inputs			
	PPV <sub>ref</sub> (in/sec)	Lv <sub>ref</sub> (VdB)	RMS <sub>ref</sub> (in/sec)	Reference Distance
Vibratory Roller	0.21	94	0.050	25
Large bulldozer	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

Equipment	Vibration Level at Receiver			
	Distance (feet)	PPV <sub>x</sub> (in/sec)	Lv <sub>x</sub> (VdB)	RMS <sub>x</sub> (in/sec)
Vibratory Roller	100	0.0457	81	0.011
Large bulldozer	100	0.0194	74	0.005
Loaded trucks	100	0.0165	70	0.003
Jack hammer	100	0.0076	66	0.002
Small bulldozer	100	0.0007	45	0.000

### Source

California Department of Transportation (Caltrans). 2013. Transportation and Construction  
Last Updated: 4/11/2019