

Appendix F-2

Noise Assessment

Freq Weight : A
 Time Weight : FAST
 Level Range : 40-100
 Max dB : 62.8 - 2018/01/09 10: 43: 07
 Level Range : 40-100
 SEL : 70.9
 Leq : 41.4

No. s	Date Time	(dB)				
1	2018/01/09 10: 43: 03	52.8	42.5	39.6	39.5	46.2
6	2018/01/09 10: 43: 18	40.6	42.7	41.1	40.3	40.4
11	2018/01/09 10: 43: 33	40.2	40.9	44.8	42.4	42.8
16	2018/01/09 10: 43: 48	42.6	41.5	40.0	41.7	41.9
21	2018/01/09 10: 44: 03	39.9	41.8	39.6	42.2	40.9
26	2018/01/09 10: 44: 18	42.3	40.4	40.9	49.4	51.4
31	2018/01/09 10: 44: 33	40.4	39.8	40.7	39.9	37.9
36	2018/01/09 10: 44: 48	40.6	39.8	56.2	43.2	43.6
41	2018/01/09 10: 45: 03	41.0	40.3	41.2	39.9	40.7
46	2018/01/09 10: 45: 18	40.3	40.3	40.7	40.0	43.4
51	2018/01/09 10: 45: 33	40.7	39.8	41.7	42.1	42.0
56	2018/01/09 10: 45: 48	44.8	41.7	41.8	42.3	42.1
61	2018/01/09 10: 46: 03	42.5	46.2	45.2	43.3	43.3
66	2018/01/09 10: 46: 18	42.2	43.0	45.4	41.9	47.1
71	2018/01/09 10: 46: 33	42.3	42.5	42.6	41.9	48.0
76	2018/01/09 10: 46: 48	42.3	42.1	41.9	41.5	41.8
81	2018/01/09 10: 47: 03	43.0	41.0	40.8	40.1	40.0
86	2018/01/09 10: 47: 18	41.0	39.4	43.4	40.2	38.6
91	2018/01/09 10: 47: 33	39.7	40.8	39.6	40.5	42.5
96	2018/01/09 10: 47: 48	44.5	44.4	41.6	46.7	40.7
101	2018/01/09 10: 48: 03	41.0	41.0	41.0	41.4	41.4
106	2018/01/09 10: 48: 18	43.3	45.4	40.4	41.0	39.0
111	2018/01/09 10: 48: 33	40.8	40.7	42.0	39.9	49.8
116	2018/01/09 10: 48: 48	39.3	38.2	38.6	39.1	38.0
121	2018/01/09 10: 49: 03	38.8	39.7	39.3	41.0	40.7
126	2018/01/09 10: 49: 18	39.4	39.8	38.2	38.8	39.7
131	2018/01/09 10: 49: 33	39.5	38.6	39.4	39.2	39.5
136	2018/01/09 10: 49: 48	38.3	40.1	40.7	40.5	38.8
141	2018/01/09 10: 50: 03	38.5	39.4	39.0	38.6	37.9
146	2018/01/09 10: 50: 18	38.0	38.7	38.7	39.8	39.9
151	2018/01/09 10: 50: 33	39.8	40.3	39.6	41.1	39.8
156	2018/01/09 10: 50: 48	41.8	41.8	41.0	40.3	41.2
161	2018/01/09 10: 51: 03	39.3	39.9	40.4	40.9	42.0
166	2018/01/09 10: 51: 18	41.7	39.9	42.5	40.6	40.7
171	2018/01/09 10: 51: 33	43.5	40.6	40.2	41.3	39.9
176	2018/01/09 10: 51: 48	40.3	42.4	39.4	40.9	40.4
181	2018/01/09 10: 52: 03	41.4	39.9	40.8	40.3	41.0
186	2018/01/09 10: 52: 18	41.1	40.5	40.2	39.2	39.3
191	2018/01/09 10: 52: 33	41.6	41.2	42.2	41.1	40.0
196	2018/01/09 10: 52: 48	39.7	39.0	41.5	38.1	39.6
201	2018/01/09 10: 53: 03	38.8	41.1	38.4	39.2	40.3
206	2018/01/09 10: 53: 18	39.2	39.4	40.6	39.1	39.4
211	2018/01/09 10: 53: 33	39.6	40.0	39.8	41.2	39.8
216	2018/01/09 10: 53: 48	39.6	38.6	39.9	39.8	39.7
221	2018/01/09 10: 54: 03	39.9	39.2	38.8	38.6	38.8
226	2018/01/09 10: 54: 18	38.7	40.6	39.0	42.1	39.4
231	2018/01/09 10: 54: 33	42.0	40.0	40.6	40.4	39.4
236	2018/01/09 10: 54: 48	39.4	39.6	41.0	40.1	40.3
241	2018/01/09 10: 55: 03	47.0	41.2	39.7	38.8	38.7
246	2018/01/09 10: 55: 18	38.7	39.1	39.7	39.6	39.3
251	2018/01/09 10: 55: 33	39.3	38.6	38.7	40.2	40.2
256	2018/01/09 10: 55: 48	41.2	38.5	41.0	40.1	39.1
261	2018/01/09 10: 56: 03	38.9	38.9	39.5	40.4	40.0
266	2018/01/09 10: 56: 18	39.9	40.8	40.1	40.8	40.6
271	2018/01/09 10: 56: 33	39.9	40.6	41.5	40.7	39.2
276	2018/01/09 10: 56: 48	40.0	40.3	41.3	41.3	39.6
281	2018/01/09 10: 57: 03	39.8	40.4	40.0	39.2	39.6
286	2018/01/09 10: 57: 18	42.0	40.8	39.1	39.6	40.4
291	2018/01/09 10: 57: 33	39.3	40.4	40.9	39.8	39.0
296	2018/01/09 10: 57: 48	40.5	40.1	39.4	39.8	38.8

Site Preparation
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/26/2018
Case Description: Site Preparation

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		Night
		Daytime	Evening	
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Grader	No	40	85.0		75.0	0.0
Tractor	No	40	84.0		75.0	0.0

Results

Noise Limit Exceedance (dBA)					Noise Limits (dBA)				
Night	Day		Calculated (dBA) Evening		Day Night		Evening		
	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader	N/A	N/A	81.5	77.5	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	80.5	76.5	N/A	N/A	N/A	N/A	N/A
		Total	81.5	80.0	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A			

**** Receptor #2 ****

Description	Land Use	Baselines (dBA)		Night
		Daytime	Evening	
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Grader	No	40	85.0		430.0	0.0
Tractor	No	40	84.0		430.0	0.0

Results

Site Preparation

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night		Calculated (dBA)			Day		Evening		
		Evening			Night				
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	N/A	N/A	66.3	62.3	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	65.3	61.3	N/A	N/A	N/A	N/A	N/A
			Total	66.3	64.9	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA)	Daytime	Evening	Night
Single Family Residence	Residential		55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Grader	No	40	85.0		600.0	0.0
Tractor	No	40	84.0		600.0	0.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night		Calculated (dBA)			Day		Evening		
		Evening			Night				
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	N/A	N/A	63.4	59.4	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	62.4	58.4	N/A	N/A	N/A	N/A	N/A
			Total	63.4	62.0	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Grading
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/26/2018
Case Description: Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	75.0	0.0
Dozer	No	40		81.7	75.0	0.0
Tractor	No	40	84.0		75.0	0.0
Front End Loader	No	40		79.1	75.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Equipment	Day	Calculated (dBA)		Day Night		Evening		
		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Saw		86.1	79.1	N/A	N/A	N/A	N/A	N/A
N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		78.1	74.2	N/A	N/A	N/A	N/A	N/A
N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		80.5	76.5	N/A	N/A	N/A	N/A	N/A
N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		75.6	71.6	N/A	N/A	N/A	N/A	N/A
N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	86.1	82.2	N/A	N/A	N/A	N/A	N/A
N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

				Grading		
Concrete Saw	No	20		89.6	430.0	0.0
Dozer	No	40		81.7	430.0	0.0
Tractor	No	40	84.0		430.0	0.0
Front End Loader	No	40		79.1	430.0	0.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night	Day	Calculated (dBA)			Day Night		Evening			
		Lmax	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	
Concrete Saw	N/A	N/A	N/A	70.9	63.9	N/A	N/A	N/A	N/A	N/A
Dozer	N/A	N/A	N/A	63.0	59.0	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	N/A	65.3	61.3	N/A	N/A	N/A	N/A	N/A
Front End Loader	N/A	N/A	N/A	60.4	56.4	N/A	N/A	N/A	N/A	N/A
		Total		70.9	67.0	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA)		Night
		Daytime	Evening	
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Concrete Saw	No	20		89.6	600.0	0.0
Dozer	No	40		81.7	600.0	0.0
Tractor	No	40	84.0		600.0	0.0
Front End Loader	No	40		79.1	600.0	0.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night	Day	Calculated (dBA)			Day Night		Evening		
		Lmax	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax

Leq	Lmax	Leq	Lmax	Grading		Leq			
				Leq	Lmax				
Concrete Saw			68.0	61.0	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer			60.1	56.1	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor			62.4	58.4	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader			57.5	53.5	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Total	68.0	64.1	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Building Construction
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/26/2018
Case Description: Building Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		Night		
		Daytime	Evening			
Single Family Residence	Residential	55.0	55.0	55.0		
Equipment						
Estimated	Impact	Usage	Spec Lmax	Actual Lmax	Receptor Distance	(dBA)
Shielding Description	Device	(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane 0.0	No	16		80.6	75.0	
All Other Equipment > 5 HP 0.0	No	50	85.0		75.0	
All Other Equipment > 5 HP 0.0	No	50	85.0		75.0	
Front End Loader 0.0	No	40		79.1	75.0	
Tractor 0.0	No	40	84.0		75.0	

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Equipment	Calculated (dBA)				Day Night		Evening	
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	N/A	N/A	77.0	69.1	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	N/A	N/A	81.5	78.5	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	N/A	N/A	81.5	78.5	N/A	N/A	N/A	N/A
Front End Loader	N/A	N/A	75.6	71.6	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	80.5	76.5	N/A	N/A	N/A	N/A
Total	N/A	N/A	81.5	83.2	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Building Construction		Baselines (dBA)		Night
	Land Use		Daytime	Evening	
Single Family Residence	Residential		55.0	55.0	55.0
Equipment					
Estimated	Impact	Usage	Spec	Actual	Receptor
Shelding Description	Device	(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)
					(dBA)
Crane 0.0	No	16		80.6	430.0
All Other Equipment > 5 HP 0.0	No	50	85.0		430.0
All Other Equipment > 5 HP 0.0	No	50	85.0		430.0
Front End Loader 0.0	No	40		79.1	430.0
Tractor 0.0	No	40	84.0		430.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night	Day	Calculated (dBA)			Day		Evening	
		Evening			Night			
Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Crane			61.9	53.9				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
All Other Equipment > 5 HP			66.3	63.3				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
All Other Equipment > 5 HP			66.3	63.3				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader			60.4	56.4				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Tractor			65.3	61.3				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		Total	66.3	68.0				
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

**** Receptor #3 ****

Description	Building Construction		Baselines (dBA)		Night
	Land Use		Daytime	Evening	
Single Family Residence	Residential		55.0	55.0	55.0

Equipment

Estimated Shelding Description	Building Construction Spec			Actual	Receptor	(dBA)
	Impact Device	Usage (%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	
Crane 0.0	No	16		80.6	600.0	
All Other Equipment > 5 HP 0.0	No	50	85.0		600.0	
All Other Equipment > 5 HP 0.0	No	50	85.0		600.0	
Front End Loader 0.0	No	40		79.1	600.0	
Tractor 0.0	No	40	84.0		600.0	

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night	Day	Calculated (dBA) Evening				Day Night		Evening	
		Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane N/A	N/A	N/A	N/A	59.0	51.0	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP N/A	N/A	N/A	N/A	63.4	60.4	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP N/A	N/A	N/A	N/A	63.4	60.4	N/A	N/A	N/A	N/A
Front End Loader N/A	N/A	N/A	N/A	57.5	53.5	N/A	N/A	N/A	N/A
Tractor N/A	N/A	N/A	N/A	62.4	58.4	N/A	N/A	N/A	N/A
		Total		63.4	65.1	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Paving
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/26/2018
Case Description: Paving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Single Family Residence	Residential	55.0	55.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	75.0	0.0
Concrete Mixer Truck	No	40		78.8	75.0	0.0
Drum Mixer	No	50		80.0	75.0	0.0
Drum Mixer	No	50		80.0	75.0	0.0
Paver	No	50		77.2	75.0	0.0
Roller	No	20		80.0	75.0	0.0
Tractor	No	40	84.0		75.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Equipment	Leq	Lmax	Leq	Calculated (dBA)		Day		Evening		
				Day	Evening	Day	Night	Lmax	Leq	Lmax
Concrete Mixer Truck	N/A	N/A	N/A	75.3	71.3	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	N/A	N/A	N/A	75.3	71.3	N/A	N/A	N/A	N/A	N/A
Drum Mixer	N/A	N/A	N/A	76.5	73.5	N/A	N/A	N/A	N/A	N/A
Drum Mixer	N/A	N/A	N/A	76.5	73.5	N/A	N/A	N/A	N/A	N/A
Paver	N/A	N/A	N/A	73.7	70.7	N/A	N/A	N/A	N/A	N/A
Roller	N/A	N/A	N/A	76.5	69.5	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	N/A	80.5	76.5	N/A	N/A	N/A	N/A	N/A
			Total	80.5	81.4	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night

				Paving			
Concrete Mixer Truck	No	40		78.8	600.0	0.0	
Concrete Mixer Truck	No	40		78.8	600.0	0.0	
Drum Mixer	No	50		80.0	600.0	0.0	
Drum Mixer	No	50		80.0	600.0	0.0	
Paver	No	50		77.2	600.0	0.0	
Roller	No	20		80.0	600.0	0.0	
Tractor	No	40	84.0		600.0	0.0	

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night		Calculated (dBA)			Day		Evening			
		Day	Evening		Night					
Equipment	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Mixer Truck	N/A	N/A	N/A	57.2	53.2	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	N/A	N/A	N/A	57.2	53.2	N/A	N/A	N/A	N/A	N/A
Drum Mixer	N/A	N/A	N/A	58.4	55.4	N/A	N/A	N/A	N/A	N/A
Drum Mixer	N/A	N/A	N/A	58.4	55.4	N/A	N/A	N/A	N/A	N/A
Paver	N/A	N/A	N/A	55.6	52.6	N/A	N/A	N/A	N/A	N/A
Roller	N/A	N/A	N/A	58.4	51.4	N/A	N/A	N/A	N/A	N/A
Tractor	N/A	N/A	N/A	62.4	58.4	N/A	N/A	N/A	N/A	N/A
			Total	62.4	63.3	N/A	N/A	N/A	N/A	N/A
				N/A	N/A	N/A	N/A	N/A	N/A	N/A

Architectural Coating
Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 01/26/2018
Case Description: Architectural Coating

**** Receptor #1 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	75.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Night	Day	Calculated (dBA)			Day Night	Evening			
		Leq	Lmax	Leq		Lmax	Leq	Lmax	
Equipment Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compressor (air)	N/A	N/A	74.1	70.2	N/A	N/A	N/A	N/A	N/A
N/A	N/A	Total	74.1	70.2	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Single Family Residence	Residential	55.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	430.0	0.0

Results

Noise Limit Exceedance (dBA) Noise Limits (dBA)

Architectural Coating

Night	Day		Calculated (dBA) Evening		Day Night		Evening		
	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compressor (air)	N/A	N/A	59.0	55.0	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	59.0	55.0	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA)		Receptor Distance (feet)	Estimated Shielding (dBA)
		Daytime	Evening		
Single Family Residence	Residential	55.0	55.0	600.0	0.0

Description	Impact Device	Usage (%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Compressor (air)	No	40		77.7	600.0	0.0

Results

Noise Limit Exceedance (dBA)

Noise Limits (dBA)

Night	Day		Calculated (dBA) Evening		Day Night		Evening		
	Leq	Lmax	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compressor (air)	N/A	N/A	56.1	52.1	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	56.1	52.1	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Vibration Analysis

$$PPV \text{ (in/sec)} = PPV \{ref\} * (25/D)^{1.5}$$

Where PPV = Peak Particle Velocity
 {ref} = PPV at the reference distance of 25 feet
 D = distance to the receptor

Equipment = Roller

$$PPV\{ref\} = 0.21 \text{ in/sec}$$

$$D = 75 \text{ feet}$$

$$PPV \text{ at receptor} = 0.040 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.010 \text{ in/sec}$$

$$Lv = 80 \text{ VdB}$$

Equipment = Roller

$$PPV\{ref\} = 0.21 \text{ in/sec}$$

$$D = 430 \text{ feet}$$

$$PPV \text{ at receptor} = 0.003 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.001 \text{ in/sec}$$

$$Lv = 57 \text{ VdB}$$

Equipment = Roller

$$PPV\{ref\} = 0.21 \text{ in/sec}$$

$$D = 600 \text{ feet}$$

$$PPV \text{ at receptor} = 0.002 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.000 \text{ in/sec}$$

$$Lv = 53 \text{ VdB}$$

Source: Chapter 12 Noise and Vibration During Construction in
 Transit Noise and Vibration Assessment, April 1995
 Harris Miller Miller & Hanson, Inc.
 Prepared For: USDOT Federal Transit Administration

Vibration Source Levels For Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver	upper range	1.518	112
	typical	0.644	104
Sonic Pile Driver	upper range	0.734	105
	typical	0.17	93
Clam shovel drop (slurry wall construction)		0.202	94
Hydromill (slurry wall construction)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.21	94
Hoe Ram		0.089	87
	large	0.089	87
Bulldozer	small	0.003	58
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~

Criterion

US Bureau of Mines, 1971	
PPV, in/sec	Degree of Damage
<2	Safe
2 - 4	Plaster Cracking
4 - 7	Minor Damage
>7	Major Damage

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontal Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA		Human Response
	Low freq (30Hz)	Hi Freq (60 Hz)	
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping Approx. dividing line between barely perceptible and clearly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Vibration acceptable only if no more than 2 events/day for residential uses. Low-freq annoying in sleeping areas; mid-freq unacceptable for sensitive uses, including schools and churches. Difficulty with tasks such as reading computer screens. Generally annoying for commercial uses.
75	35	50	
85	45	60	
90	50	65	

Impact Criteria

Land Use	Lv in VdB		
	Frequent Events (70+/day)	Occasional Events (30-70)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive			
Concert Halls	65	65	65
TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only	75	78	83

Vibration Analysis

$$PPV \text{ (in/sec)} = PPV \{ref\} * (25/D)^{1.5}$$

Where PPV = Peak Particle Velocity
 {ref} = PPV at the reference distance of 25 feet
 D = distance to the receptor

Equipment = Large bulldozer

$$PPV\{ref\} = 0.089 \text{ in/sec}$$

$$D = 75 \text{ feet}$$

$$PPV \text{ at receptor} = 0.017 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.004 \text{ in/sec}$$

$$Lv = 73 \text{ VdB}$$

Equipment = Large bulldozer

$$PPV\{ref\} = 0.089 \text{ in/sec}$$

$$D = 430 \text{ feet}$$

$$PPV \text{ at receptor} = 0.001 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.000 \text{ in/sec}$$

$$Lv = 50 \text{ VdB}$$

Equipment = Large bulldozer

$$PPV\{ref\} = 0.089 \text{ in/sec}$$

$$D = 600 \text{ feet}$$

$$PPV \text{ at receptor} = 0.001 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.000 \text{ in/sec}$$

$$Lv = 46 \text{ VdB}$$

Vibration Source Levels For Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver	upper range	1.518	112
	typical	0.644	104
Sonic Pile Driver	upper range	0.734	105
	typical	0.17	93
Clam shovel drop (slurry wall construction)		0.202	94
Hydromill (slurry wall construction)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.21	94
Hoe Ram		0.089	87
Bulldozer	large	0.089	87
	small	0.003	58
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~4

Source: Chapter 12 Noise and Vibration During Construction in
 Transit Noise and Vibration Assessment, April 1995
 Harris Miller Miller & Hanson, Inc.
 Prepared For: USDOT Federal Transit Administration

Criterion

US Bureau of Mines, 1971	
PPV, in/sec	Degree of Damage
<2	Safe
2 - 4	Plaster Cracking
4 - 7	Minor Damage
>7	Major Damage

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontal Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA		Human Response
	Low freq (30Hz)	Hi Freq (60 Hz)	
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping Approx. dividing line between barely perceptible and clearly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Vibration acceptable only if no more than 2 events/day for residential uses. Low-freq annoying in sleeping areas; mid-freq unacceptable for sensitive uses, including schools and churches. Difficulty with tasks such as reading computer screens. Generally annoying for commercial uses.
75	35	50	
85	45	60	
90	50	65	

Impact Criteria

Land Use	Lv in VdB		
	Frequent Events (70+/day)	Occasional Events (30-70)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive			
Concert Halls	65	65	65
TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only	75	78	83

Vibration Analysis

$$PPV \text{ (in/sec)} = PPV \{ref\} * (25/D)^{1.5}$$

Where PPV = Peak Particle Velocity
 {ref} = PPV at the reference distance of 25 feet
 D = distance to the receptor

Equipment = Truck

$$PPV\{ref\} = 0.076 \text{ in/sec}$$

$$D = 75 \text{ feet}$$

$$PPV \text{ at receptor} = 0.015 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.004 \text{ in/sec}$$

$$Lv = 71 \text{ VdB}$$

Equipment = Ruck

$$PPV\{ref\} = 0.076 \text{ in/sec}$$

$$D = 430 \text{ feet}$$

$$PPV \text{ at receptor} = 0.001 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.000 \text{ in/sec}$$

$$Lv = 49 \text{ VdB}$$

Equipment = Ruck

$$PPV\{ref\} = 0.076 \text{ in/sec}$$

$$D = 600 \text{ feet}$$

$$PPV \text{ at receptor} = 0.001 \text{ in/sec}$$

PPV is 1.7x to 6x larger than RMS velocity
 Assume typical conversion factor of 4 PPV:RMS

$$\text{Therefore estimated RMS velocity} = 0.000 \text{ in/sec}$$

$$Lv = 44 \text{ VdB}$$

Source: Chapter 12 Noise and Vibration During Construction in
 Transit Noise and Vibration Assessment, April 1995
 Harris Miller Miller & Hanson, Inc.
 Prepared For: USDOT Federal Transit Administration

Vibration Source Levels For Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver	upper range	1.518	112
	typical	0.644	104
Sonic Pile Driver	upper range	0.734	105
	typical	0.17	93
Clam shovel drop (slurry wall construction)		0.202	94
Hydromill (slurry wall construction)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.21	94
Hoe Ram		0.089	87
	large	0.089	87
Bulldozer	small	0.003	58
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~

Criterion

US Bureau of Mines, 1971	
PPV, in/sec	Degree of Damage
<2	Safe
2 - 4	Plaster Cracking
4 - 7	Minor Damage
>7	Major Damage

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontal Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA		Human Response
	Low freq (30Hz)	Hi Freq (60 Hz)	
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping Approx. dividing line between barely perceptible and clearly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Vibration acceptable only if no more than 2 events/day for residential uses. Low-freq annoying in sleeping areas; mid-freq unacceptable for sensitive uses, including schools and churches. Difficulty with tasks such as reading computer screens. Generally annoying for commercial uses.
75	35	50	
85	45	60	
90	50	65	

Impact Criteria

Land Use	Lv in VdB		
	Frequent Events (70+/day)	Occasional Events (30-70)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive			
Concert Halls	65	65	65
TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only	75	78	83