

Appendix F

Noise Calculations

Table A
Construction Noise by Phase - Residential to the North

A	B	C	D	E	F	G	H	I
Equipment Type	# of Equipment	Equipment Lmax at 50 feet, dBA ^{1,2}	Distance to Receptor ³	Equipment Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Noise Level Leq (dBA) at Receptor
Site Preparation/Excavation								
Excavator	1	81	68	40	0.40	-2.7	-4.0	74.3
Tractors/Loaders/Backhoes	1	79	68	40	0.40	-2.7	-4.0	72.3
							Log Sum	76.5
Grading								
Graders	1	85	68	40	0.40	-2.7	-4.0	78.3
Rubber Tired Dozers	1	82	68	40	0.40	-2.7	-4.0	75.3
Tractors/Loaders/Backhoes	1	79	68	40	0.40	-2.7	-4.0	72.3
							Log Sum	80.1
Foundation and Building Construction								
Cranes	1	81	68	16	0.16	-2.7	-8.0	70.4
Forklifts	2	64	68	50	1.00	-2.7	0.0	61.3
Concrete Pumps	2	81	68	20	0.40	-2.7	-4.0	74.3
Concrete Mixer Truck	2	79	68	40	0.80	-2.7	-1.0	75.4
Bore/Drill Rig	1	79	68	20	0.20	-2.7	-7.0	69.3
Tractors/Loaders/Backhoes	2	79	68	40	0.80	-2.7	-1.0	75.4
							Log Sum	76.7
Architectural Coating								
Aerial Lift	1	75	68	20	0.20	-2.7	-7.0	65.3
							Log Sum	65.3

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).

(2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKkoEKUjv5VZMOTw_KO977Em1A

(3) Distance to receptor calculated from center of construction activity. Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use. The noise reduction due to the elevation of the receptor/berm attenuation would be at least 10 dBA.

Table B
Construction Noise by Phase - Residential Receptors to the East

A	B	C	D	E	F	G	H	I
Equipment Type	# of Equipment	Equipment Lmax at 50 feet, dBA ^{1,2}	Distance to Receptor ³	Equipment Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Noise Level Leq (dBA) at Receptor
Site Preparation/Excavation								
Excavator	1	81	83	40	0.40	-4.4	-4.0	72.6
Tractors/Loaders/Backhoes	1	79	83	40	0.40	-4.4	-4.0	70.6
							Log Sum	74.7
Grading								
Graders	1	85	83	40	0.40	-4.4	-4.0	76.6
Rubber Tired Dozers	1	82	83	40	0.40	-4.4	-4.0	73.6
Tractors/Loaders/Backhoes	1	79	83	40	0.40	-4.4	-4.0	70.6
							Log Sum	78.4
Foundation and Building Construction								
Cranes	1	81	83	16	0.16	-4.4	-8.0	68.6
Forklifts	2	64	83	50	1.00	-4.4	0.0	59.6
Concrete Pumps	2	81	83	20	0.40	-4.4	-4.0	72.6
Concrete Mixer Truck	2	79	83	40	0.80	-4.4	-1.0	73.6
Bore/Drill Rig	1	79	83	20	0.20	-4.4	-7.0	67.6
Tractors/Loaders/Backhoes	2	79	83	40	0.80	-4.4	-1.0	73.6
							Log Sum	75.0
Architectural Coating								
Aerial Lift	1	75	83	20	0.20	-4.4	-7.0	63.6
							Log Sum	63.6

Notes:

- (1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).
- (2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKkoEKUjv5VZMOtw_KO977Em1A
- (3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use.

Table C
Construction Noise by Phase - Residential Receptors South of the Project Site

A	B	C	D	E	F	G	H	I
Equipment Type	# of Equipment	Equipment Lmax at 50 feet, dBA ^{1,2}	Distance to Receptor ³	Equipment Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Noise Level Leq (dBA) at Receptor
Site Preparation/Excavation								
Excavator	1	81	75	40	0.40	-3.5	-4.0	73.5
Tractors/Loaders/Backhoes	1	79	75	40	0.40	-3.5	-4.0	71.5
							Log Sum	75.6
Grading								
Graders	1	85	75	40	0.40	-3.5	-4.0	77.5
Rubber Tired Dozers	1	82	75	40	0.40	-3.5	-4.0	74.5
Tractors/Loaders/Backhoes	1	79	75	40	0.40	-3.5	-4.0	71.5
							Log Sum	79.3
Foundation and Building Construction								
Cranes	1	81	75	16	0.16	-3.5	-8.0	69.5
Forklifts	2	64	75	50	1.00	-3.5	0.0	60.5
Concrete Pumps	2	81	75	20	0.40	-3.5	-4.0	73.5
Concrete Mixer Truck	2	79	75	40	0.80	-3.5	-1.0	74.5
Bore/Drill Rig	1	79	75	20	0.20	-3.5	-7.0	68.5
Tractors/Loaders/Backhoes	2	79	75	40	0.80	-3.5	-1.0	74.5
							Log Sum	75.8
Architectural Coating								
Aerial Lift	1	75	75	20	0.20	-3.5	-7.0	64.5
							Log Sum	64.5

Notes:

- (1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).
- (2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKkoEKUjv5VZMOtw_KO977Em1A
- (3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use.

Table D
Construction Noise by Phase - Marmot Manor Receptors to the West and Southwest of the Project Site

A	B	C	D	E	F	G	H	I
Equipment Type	# of Equipment	Equipment Lmax at 50 feet, dBA ^{1,2}	Distance to Receptor ³	Equipment Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Noise Level Leq (dBA) at Receptor
Site Preparation/Excavation								
Excavator	1	81	145	40	0.40	-9.2	-4.0	67.8
Tractors/Loaders/Backhoes	1	79	145	40	0.40	-9.2	-4.0	65.8
							Log Sum	69.9
Grading								
Graders	1	85	145	40	0.40	-9.2	-4.0	71.8
Rubber Tired Dozers	1	82	145	40	0.40	-9.2	-4.0	68.8
Tractors/Loaders/Backhoes	1	79	145	40	0.40	-9.2	-4.0	65.8
							Log Sum	73.5
Foundation and Building Construction								
Cranes	1	81	145	16	0.16	-9.2	-8.0	63.8
Forklifts	2	64	145	50	1.00	-9.2	0.0	54.8
Concrete Pumps	2	81	145	20	0.40	-9.2	-4.0	67.8
Concrete Mixer Truck	2	79	145	40	0.80	-9.2	-1.0	68.8
Bore/Drill Rig	1	79	145	20	0.20	-9.2	-7.0	62.8
Tractors/Loaders/Backhoes	2	79	145	40	0.80	-9.2	-1.0	68.8
							Log Sum	70.1
Architectural Coating								
Aerial Lift	1	75	145	20	0.20	-9.2	-7.0	58.8
							Log Sum	58.8

Notes:

- (1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).
- (2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKkoEKUjv5VZMOtw_KO977Em1A
- (3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to the structural façade of the nearest sensitive use.

Table E
Construction Noise Levels (L_{eq})

Construction Phase	Receptor Location	Unmitigated Construction Noise Levels (dBA Leq) ¹	Noise Level Where Construction Impacts Would Be Significant?	Increase Over Threshold Levels (dBA)	Noise Levels with BMPs ² (dBA)
Site Prep/Excavation	Adjacent residential receptor to the north	66.5	75.0	-8.5	-
	Residential receptor to the east	74.7	75.0	-0.3	69.7
	Residential receptors to the South	75.6	75.0	0.6	70.6
	Marmot Manor Residential Receptor to the West	69.9	75.0	-5.1	-
Grading	Adjacent residential receptor to the north	70.1	75.0	-4.9	-
	Residential receptor to the east	78.4	75.0	3.4	73.4
	Residential receptors to the South	79.3	75.0	4.3	74.3
	Marmot Manor Residential Receptor to the West	73.5	75.0	-1.5	-
Foundation and Building Construction	Adjacent residential receptor to the north	66.7	75.0	-8.3	-
	Residential receptor to the east	75.0	75.0	0.0	70.0
	Residential receptors to the South	75.8	75.0	0.8	70.8
	Marmot Manor Residential Receptor to the West	70.1	75.0	-4.9	-
Architectural Coating	Adjacent residential receptor to the north	55.3	75.0	-19.7	-
	Residential receptor to the east	63.6	75.0	-11.4	58.6
	Residential receptors to the South	64.5	75.0	-10.5	59.5
	Marmot Manor Residential Receptor to the West	58.8	75.0	-16.2	-

Notes:

(1) Construction noise calculated in Tables A through D.

(2) Noise level reduction with incorporation of BMPs which requires a 5 dBA noise reduction from mufflers and/or shielding.

VdB Calculations

Based on reference equation 7-3 from Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, 2018, pg 185

$$Lv(\text{distance}) = Lv(\text{ref}) - 30 * \log(D/25)$$

large bulldozer @ 17 feet

Lv 92.02

large bulldozer @ 80 feet

Lv 71.85

GROUNDBORNE VIBRATION ANALYSIS

Project: Marlay Date: 1/24/23
Source: Large Bulldozer or Caisson drill
Scenario: Unmitigated
Location: Project Site
Address: Offsite historic building
PPV = $PPV_{ref}(25/D)^n$ (in/sec)

INPUT

Equipment = 2 Large Bulldozer INPUT SECTION IN GREEN
Type
PPVref = 0.089 Reference PPV (in/sec) at 25 ft.
D = 17.00 Distance from Equipment to Receiver (ft)
n = 1.50 Vibration attenuation rate through the ground

Note: Based on reference equation 7-2 from Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, 2018, pg 185.

RESULTS

PPV = 0.159 IN/SEC OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project: Marlay Date: 1/24/23
Source: Large Bulldozer or Caisson Drill
Scenario: Mitigated
Location: Project Site
Address: Offsite historic
PPV = $PPV_{ref}(25/D)^n$ (in/sec)

INPUT

Equipment = 2 Large Bulldozer INPUT SECTION IN GREEN
Type
PPVref = 0.089 Reference PPV (in/sec) at 25 ft.
D = 21.00 Distance from Equipment to Receiver (ft)
n = 1.50 Vibration attenuation rate through the ground

Note: Based on reference equation 7-2 from Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, 2018, pg 185.

RESULTS

PPV = 0.116 IN/SEC OUTPUT IN BLUE