

Sound Levels - Little League Drive

The Planning Center

1-Aug-09

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN: MEL-01
 BARRIER DESIGN: Little League Drive

ATMOSPHERICS: 68 deg F, 50% RH

	LAeq1h dBA			Change in Noise Levels	
	Existing	Future No Project	Future With Project	From Existing	Due to Project
no Kendall_East	59.4	67.3	n/a	7.9	0.0
no Kendall_West	59.4	67.3		7.9	-67.3
no Frontage_East	62.2	68.3		6.1	-68.3
no Frontage_West	61.3	67.4		6.1	-67.4
no Belmont_East	55.8	65.6		9.8	-65.6
no Belmont_West	55.9	65.7		9.8	-65.7
no Meyers_East	48.2	65.0		16.8	-65.0
no Meyers_West	48.2	65.0		16.8	-65.0

Receivers - Little League Drive

The Planning Center

1-Aug-09
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT:
RUN:

MEL-01
Little League Drive

Receiver
Name

	Coordinates (ground)			Height above Ground ft
	X ft	Y ft	Z ft	
no Kendall_East	50.0	-	0	4.92
no Kendall_West	-50.0	-	0	4.92
no Frontage_East	50.0	1,000.0	0	4.92
no Frontage_West	-50.0	1,000.0	0	4.92
no Belmont_East	50.0	2,000.0	0	4.92
no Belmont_West	-50.0	2,000.0	0	4.92
no Meyers_East	50.0	3,000.0	0	4.92
no Meyers_West	-50.0	3,000.0	0	4.92

Roadway - Little League Drive

The Planning Center

1-Aug-09
TNM 2.5

INPUT: ROADWAYS

PROJECT/CONTRACT:

MEL-01

RUN:

Little League Drive

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with the approval of FHWA

Roadway
Name

	Width	Points Name	Coordinates (pavement)			Segment Pvmt Type
			X ft	Y ft	Z ft	
no Kendall NB	20.0	Point 4	10.0	-500.0	0	Average
		Point 5	10.0	500.0	0	
no Kendall SB	20.0	Point 6	-10.0	500.0	0	Average
		Point 7	-10.0	-500.0	0	
no Frontage NB	30.0	Point 14	15.0	500.1	0	Average
		Point 15	15.0	1,500.0	0	
no Frontage SB	12.0	Point 16	-6.0	1,500.0	0	Average
		Point 17	-6.0	500.1	0	
no Belmont NB	20.0	Point 18	10.0	1500.1	0	Average
		Point 19	10.0	2500	0	
no Belmont SB	22.0	Point 20	-11.0	2500	0	Average
		Point 21	-11.0	1500.1	0	
no Meyers NB	9.0	Point 22	4.5	2500.1	0	Average
		Point 23	4.5	3500	0	
no Meyers SB	9.0	Point 24	-4.5	3500	0	Average
		Point 25	-4.5	2500.1	0	

Construction Generated Average Noise - Spring Trails

Construction Noise at 50 Feet (dBA Leq)			50	hard or soft	0
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	83	83			
Excavation	88	75			
Foundation Construction	81	81			
Building Construction	81	65			
Finishing and Site Cleanup	88	72			
Construction Noise at 199 Feet (dBA Leq)			Receptor Location 1	1210	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Grading	55	55			
Excavation	60	47			
Foundation Construction	53	53			
Building Construction	53	37			
Finishing and Site Cleanup	60	44			
Construction Noise at 151 Feet (dBA Leq)			Receptor Location 2	1382	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Grading	54	54			
Excavation	59	46			
Foundation Construction	52	52			
Building Construction	52	36			
Finishing and Site Cleanup	59	43			
Construction Noise at 25 Feet (dBA Leq)			Receptor Location 3	710	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	60	60			
Excavation	65	52			
Foundation Construction	58	58			
Building Construction	58	42			
Finishing and Site Cleanup	65	49			
Construction Noise at 783 Feet (dBA Leq)			Receptor Location 4	1321	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	55	55			
Excavation	60	47			
Foundation Construction	53	53			
Building Construction	53	37			
Finishing and Site Cleanup	60	44			
Construction Noise at 783 Feet (dBA Leq)			Receptor Location 6	2507	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	49	49			
Excavation	54	41			
Foundation Construction	47	47			
Building Construction	47	31			
Finishing and Site Cleanup	54	38			
Construction Noise at 783 Feet (dBA Leq)			Receptor Location 8	2332	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	50	50			
Excavation	55	42			
Foundation Construction	48	48			
Building Construction	48	32			
Finishing and Site Cleanup	55	39			
Construction Noise at 783 Feet (dBA Leq)			Receptor Location 11	2507	
Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1			
Ground Clearing/Demolition	49	49			
Excavation	54	41			
Foundation Construction	47	47			
Building Construction	47	31			
Finishing and Site Cleanup	54	38			

Construction Noise at 783 Feet (dBA Leq) Receptor Location 12 3577

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	46	46
Excavation	51	38
Foundation Construction	44	44
Building Construction	44	28
Finishing and Site Cleanup	51	35

Construction Noise at 783 Feet (dBA Leq) Receptor Location 15 4538

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	44	44
Excavation	49	36
Foundation Construction	42	42
Building Construction	42	26
Finishing and Site Cleanup	49	33

Construction Noise at 783 Feet (dBA Leq) Receptor Location 18 4478

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	44	44
Excavation	49	36
Foundation Construction	42	42
Building Construction	42	26
Finishing and Site Cleanup	49	33

Construction Noise at 783 Feet (dBA Leq) Receptor Location 19 6880

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	40	40
Excavation	45	32
Foundation Construction	38	38
Building Construction	38	22
Finishing and Site Cleanup	45	29

Construction Noise at 783 Feet (dBA Leq) North Vermont Elementary School 7105

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	40	40
Excavation	45	32
Foundation Construction	38	38
Building Construction	38	22
Finishing and Site Cleanup	45	29

Construction Noise at 783 Feet (dBA Leq) Existing On-Site Residence 1272

Construction Phase	All Applicable Equipment in Use 1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	55	55
Excavation	60	47
Foundation Construction	53	53
Building Construction	53	37
Finishing and Site Cleanup	60	44

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

Construction Generated Maximum Noise - Spring Trails

hard or soft

Construction Noise at 50 Feet (dBA Leq)

50 0

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	83	83
Excavation	88	75
Foundation Construction	81	81
Building Construction	81	65
Finishing and Site Cleanup	88	72

Construction Noise at 199 Feet (dBA Leq)

Receptor Location 1

38

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Grading	85	85
Excavation	90	77
Foundation Construction	83	83
Building Construction	83	67
Finishing and Site Cleanup	90	74

Construction Noise at 151 Feet (dBA Leq)

Receptor Location 2

176

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Grading	72	72
Excavation	77	64
Foundation Construction	70	70
Building Construction	70	54
Finishing and Site Cleanup	77	61

Construction Noise at 25 Feet (dBA Leq)

Receptor Location 3

57

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	82	82
Excavation	87	74
Foundation Construction	80	80
Building Construction	80	64
Finishing and Site Cleanup	87	71

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 4

372

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	66	66
Excavation	71	58
Foundation Construction	64	64
Building Construction	64	48
Finishing and Site Cleanup	71	55

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 6

467

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	64	64
Excavation	69	56
Foundation Construction	62	62
Building Construction	62	46
Finishing and Site Cleanup	69	53

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 8

295

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	68	68
Excavation	73	60
Foundation Construction	66	66
Building Construction	66	50
Finishing and Site Cleanup	73	57

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 11

88

Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1
Ground Clearing/Demolition	78	78
Excavation	83	70
Foundation Construction	76	76
Building Construction	76	60
Finishing and Site Cleanup	83	67

Construction Generated Maximum Noise - Spring Trails

Construction Noise at 783 Feet (dBA Leq)		Receptor Location 12		255
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	69	69		
Excavation	74	61		
Foundation Construction	67	67		
Building Construction	67	51		
Finishing and Site Cleanup	74	58		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 15		609
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	61	61		
Excavation	66	53		
Foundation Construction	59	59		
Building Construction	59	43		
Finishing and Site Cleanup	66	50		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 18		3140
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	47	47		
Excavation	52	39		
Foundation Construction	45	45		
Building Construction	45	29		
Finishing and Site Cleanup	52	36		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 19		2864
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	48	48		
Excavation	53	40		
Foundation Construction	46	46		
Building Construction	46	30		
Finishing and Site Cleanup	53	37		
Construction Noise at 783 Feet (dBA Leq)		North Vermont Elementary School		3013
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	47	47		
Excavation	52	39		
Foundation Construction	45	45		
Building Construction	45	29		
Finishing and Site Cleanup	52	36		
Construction Noise at 783 Feet (dBA Leq)		Existing On-Site Residence		133
Construction Phase	All Applicable Equipment in Use1	Minimum Required Equipment in Use 1		
Ground Clearing/Demolition	75	75		
Excavation	80	67		
Foundation Construction	73	73		
Building Construction	73	57		
Finishing and Site Cleanup	80	64		

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

Roadway Construction Generated Average Noise - Spring Trails

Construction Noise at 50 Feet (dBA Leq)

50

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	84	84
Excavation	88	78
Foundation Construction	88	88
Building Construction	79	78
Finishing and Site Cleanup	84	84

Construction Noise at 199 Feet (dBA Leq)

Receptor Location 1

3174

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Grading	48	48
Excavation	52	42
Foundation Construction	52	52

Construction Noise at 151 Feet (dBA Leq)

Receptor Location 2

3056

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Grading	48	48
Excavation	52	42
Foundation Construction	52	52

Construction Noise at 25 Feet (dBA Leq)

Receptor Location 3

3274

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	48	48
Excavation	52	42
Foundation Construction	52	52

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 4

2500

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	50	50
Excavation	54	44
Foundation Construction	54	54

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 5

2091

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	52	52
Excavation	56	46
Foundation Construction	56	56

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 6

1320

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	56	56
Excavation	60	50
Foundation Construction	60	60

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 7

1461

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	55	55
Excavation	59	49
Foundation Construction	59	59

Construction Noise at 783 Feet (dBA Leq)

Receptor Location 10

715

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	61	61
Excavation	65	55
Foundation Construction	65	65

Construction Noise at 783 Feet (dBA Leq)		Receptor Location 13		152
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	74	74		
Excavation	78	68		
Foundation Construction	78	78		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 15		2057
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	52	52		
Excavation	56	46		
Foundation Construction	56	56		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 16		1660
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	54	54		
Excavation	58	48		
Foundation Construction	58	58		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 17		1678
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	53	53		
Excavation	57	47		
Foundation Construction	57	57		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 19		4342
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	45	45		
Excavation	49	39		
Foundation Construction	49	49		
Construction Noise at 783 Feet (dBA Leq)		Receptor Location 20		3496
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	47	47		
Excavation	51	41		
Foundation Construction	51	51		
Construction Noise at 783 Feet (dBA Leq)		North Vermont Elementary School		5114
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹		
Ground Clearing/Demolition	44	44		
Excavation	48	38		
Foundation Construction	48	48		

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

Roadway Construction Generated Maximum Noise - Spring Trails

Construction Noise at 50 Feet (dBA Leq) 50

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	84	84
Excavation	88	78
Foundation Construction	88	88
Building Construction	79	78
Finishing and Site Cleanup	84	84

Construction Noise at 25 Feet (dBA Leq) **Receptor Location 1** 25

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Grading	90	90
Excavation	94	84
Foundation Construction	94	94

Construction Noise at 40 Feet (dBA Leq) **Receptor Location 2** 40

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Grading	86	86
Excavation	90	80
Foundation Construction	90	90

Construction Noise at 255 Feet (dBA Leq) **Receptor Location 3** 255

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	70	70
Excavation	74	64
Foundation Construction	74	74

Construction Noise at 36 Feet (dBA Leq) **Receptor Location 4** 36

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	87	87
Excavation	91	81
Foundation Construction	91	91

Construction Noise at 200 Feet (dBA Leq) **Receptor Location 5** 200

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	72	72
Excavation	76	66
Foundation Construction	76	76

Construction Noise at 100 Feet (dBA Leq) **Receptor Location 6** 100

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	78	78
Excavation	82	72
Foundation Construction	82	82

Construction Noise at 450 Feet (dBA Leq) **Receptor Location 7** 450

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	65	65
Excavation	69	59
Foundation Construction	69	69

Construction Noise at 173 Feet (dBA Leq) **Receptor Location 10** 173

Construction Phase	All Applicable Equipment in Use ¹	Minimum Required Equipment in Use ¹
Ground Clearing/Demolition	73	73
Excavation	77	67
Foundation Construction	77	77

Construction Noise at 110 Feet (dBA Leq)		Receptor Location 13	110
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	77	77	
Excavation	81	71	
Foundation Construction	81	81	
Construction Noise at 722 Feet (dBA Leq)		Receptor Location 15	722
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	61	61	
Excavation	65	55	
Foundation Construction	65	65	
Construction Noise at 215 Feet (dBA Leq)		Receptor Location 16	215
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	71	71	
Excavation	75	65	
Foundation Construction	75	75	
Construction Noise at 1,407 Feet (dBA Leq)		Receptor Location 17	1407
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	55	55	
Excavation	59	49	
Foundation Construction	59	59	
Construction Noise at 2,226 Feet (dBA Leq)		Receptor Location 19	2226
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	51	51	
Excavation	55	45	
Foundation Construction	55	55	
Construction Noise at 805 Feet (dBA Leq)		Receptor Location 20	805
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	60	60	
Excavation	64	54	
Foundation Construction	64	64	
Construction Noise at 2,180 Feet (dBA Leq)		North Vermont Elementary School	2180
Construction Phase	All Applicable Equipment in Use¹	Minimum Required Equipment in Use¹	
Ground Clearing/Demolition	51	51	
Excavation	55	45	
Foundation Construction	55	55	

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Domestic Housing.

Construction Generated Vibration at Nearest Structures

Vibration Annoyance Criteria

Receptor: Average Vibration Level - Existing On-Site Residence Average Distance (feet): 1272

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Caisson Drill	87	53
Large bulldozer	87	53
Small bulldozer	58	24
Jackhammer	79	45
Loaded trucks	86	52
Criteria		78

Receptor: Maximum Vibration Levels - Existing On-Site Residence Closest Distance (feet): 133

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Caisson Drill	87	72
Large bulldozer	87	72
Small bulldozer	58	43
Jackhammer	79	64
Loaded trucks	86	71
Criteria		78

Receptor: Average Vibration Level - Receptor Location 1 Average Distance (feet): 1248

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	53
Small bulldozer	58	24
Jackhammer	79	45
Loaded trucks	86	52
Criteria		78

Receptor: Maximum Vibration Levels -Receptor Location 1 Closest Distance (feet): 65

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	79
Small bulldozer	58	50
Jackhammer	79	71
Loaded trucks	86	78
Criteria		78

Receptor: Average Vibration Level - Receptor Location 3 Closest Distance (feet): 761

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	57
Small bulldozer	58	28
Jackhammer	79	49
Loaded trucks	86	56
Criteria		78

Receptor: Maximum Vibration Levels -Receptor Location 3 Average Distance (feet): 75

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	77
Small bulldozer	58	48
Jackhammer	79	69
Loaded trucks	86	76
Criteria		78

Construction Generated Vibration at Nearest Structures
Structural Damage Criteria

Receptor:	Maximum Vibration Levels -Receptor Location 1	Closest Distance (feet):	65
Equipment	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second	
Large bulldozer	0.089	0.021	
Small bulldozer	0.003	0.001	
Jackhammer	0.035	0.008	
Loaded trucks	0.076	0.018	
	Criteria	0.500	

Receptor:	Maximum Vibration Levels - On-Site Existing Residence	Closest Distance (feet):	133
Equipment	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second	
Large bulldozer	0.089	0.007	
Small bulldozer	0.003	0.0002	
Jackhammer	0.035	0.003	
Loaded trucks	0.076	0.006	
	Criteria	0.500	

¹. Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).

Construction Generated Vibration at Off-ste Receptors from Roadways

Vibration Annoyance Criteria

Receptor: Average Vibration Level - Receptor Location 1 **Average Distance (feet):** 3174

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	45
Small bulldozer	58	16
Jackhammer	79	37
Loaded trucks	86	44
Criteria		78

Receptor: Maximum Vibration Levels - Receptor Location 1 **Closest Distance (feet):** 55

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	80
Small bulldozer	58	51
Jackhammer	79	72
Loaded trucks	86	79
Criteria		78

Receptor: Average Vibration Level - Receptor Location 2 **Closest Distance (feet):** 3056

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	45
Small bulldozer	58	16
Jackhammer	79	37
Loaded trucks	86	44
Criteria		78

Receptor: Maximum Vibration Levels - Receptor Location 2 **Average Distance (feet):** 188

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	69
Small bulldozer	58	40
Jackhammer	79	61
Loaded trucks	86	68
Criteria		78

Receptor: Average Vibration Level - Receptor Location 3 **Average Distance (feet):** 3274

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	45
Small bulldozer	58	16
Jackhammer	79	37
Loaded trucks	86	44
Criteria		78

Receptor: Maximum Vibration Levels - Receptor Location 3 **Closest Distance (feet):** 180

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	70
Small bulldozer	58	41
Jackhammer	79	62
Loaded trucks	86	69
Criteria		78

Receptor: Average Vibration Level - Receptor Location 4 **Closest Distance (feet):** 2500

Construction Generated Vibration at Off-site Receptors from Roadways

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	47
Small bulldozer	58	18
Jackhammer	79	39
Loaded trucks	86	46
Criteria		78

Receptor: Maximum Vibration Levels - Receptor Location 4 **Average Distance (feet):** 70

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	78
Small bulldozer	58	49
Jackhammer	79	70
Loaded trucks	86	77
Criteria		78

Receptor: Average Vibration Level - Receptor Location 13 **Closest Distance (feet):** 152

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	71
Small bulldozer	58	42
Jackhammer	79	63
Loaded trucks	86	70
Criteria		78

Receptor: Maximum Vibration Levels - Receptor Location 13 **Average Distance (feet):** 134

Equipment	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB
Large bulldozer	87	72
Small bulldozer	58	43
Jackhammer	79	64
Loaded trucks	86	71
Criteria		78

Structural Damage Criteria

Receptor: Maximum Vibration Levels - Receptor Location 1 **Closest Distance (feet):** 55

Equipment	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Large bulldozer	0.089	0.027
Small bulldozer	0.003	0.001
Jackhammer	0.035	0.011
Loaded trucks	0.076	0.023
Criteria		0.200

Receptor: Maximum Vibration Levels - Receptor Location 4 **Closest Distance (feet):** 70

Equipment	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Large bulldozer	0.089	0.019
Small bulldozer	0.003	0.001
Jackhammer	0.035	0.007
Loaded trucks	0.076	0.016
Criteria		0.200

Receptor: Maximum Vibration Levels - Receptor Location 3 **Closest Distance (feet):** 0

Equipment	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second
Caisson Drill	0.089	#DIV/0!
Large bulldozer	0.089	#DIV/0!
Small bulldozer	0.003	#DIV/0!
Jackhammer	0.035	#DIV/0!
Loaded trucks	0.076	#DIV/0!
Criteria		0.200

¹. Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).