APPENDIX H

NOISE MEASUREMENT AND CALCULATION RESULTS

Project: Parcel 1

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	800	0	E
2	Residence 2	1,050	0	NE
3	Residence 3	560	0	SE
4	Residence 4	390	0	S
5	Residence 5	1,040	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Grader	1	40%	85	60.9	56.9	58.6	54.6	64.0	60.0	67.2	63.2	58.6	54.7
	Scraper	1	40%	84	59.5	55.5	57.2	53.2	62.6	58.6	65.8	61.8	57.2	53.3
	Tractor	1	40%	84	59.9	55.9	57.6	53.6	63.0	59.0	66.2	62.2	57.6	53.7
Combined LEQ						**61.0**		**58.6**		**64.0**		**67.2**		**58.7**
Grading														
	Grader	1	40%	85	60.9	56.9	58.6	54.6	64.0	60.0	67.2	63.2	58.6	54.7
	Dozer	1	40%	82	57.6	53.6	55.3	51.3	60.7	56.7	63.9	59.9	55.3	51.4
	Tractor	2	40%	84	62.9	58.9	60.6	56.6	66.0	62.0	69.2	65.2	60.6	56.7
Combined LEQ						**61.8**		**59.4**		**64.9**		**68.0**		**59.5**
Building Construction														
	Crane	1	16%	81	56.5	48.6	54.2	46.2	59.6	51.7	62.8	54.8	54.2	46.3
	Man Lift	2	20%	75	53.6	46.6	51.3	44.3	56.7	49.7	59.9	52.9	51.3	44.4
	Generator	1	50%	81	56.5	53.5	54.2	51.1	59.6	56.6	62.8	59.7	54.2	51.2
	Tractor	1	40%	84	59.9	55.9	57.6	53.6	63.0	59.0	66.2	62.2	57.6	53.7
	Welder/Torch	3	40%	74	54.7	50.7	52.3	48.3	57.8	53.8	60.9	56.9	52.4	48.4
Combined LEQ						**59.3**		**56.9**		**62.4**		**65.5**		**57.0**
Paving														
	Concrete Mixer Truck	1	40%	79	54.7	50.7	52.4	48.4	57.8	53.8	61.0	57.0	52.4	48.5
	Paver	1	50%	77	53.1	50.1	50.8	47.7	56.2	53.2	59.4	56.3	50.8	47.8
	Pavement Scarafier	1	20%	90	65.4	58.4	63.1	56.1	68.5	61.5	71.7	64.7	63.1	56.1
	Roller	2	20%	80	58.9	51.9	56.6	49.6	62.0	55.0	65.2	58.2	56.6	49.7
	Tractor	1	40%	84	59.9	55.9	57.6	53.6	63.0	59.0	66.2	62.2	57.6	53.7
Combined LEQ						**61.7**		**59.3**		**64.8**		**67.9**		**59.4**
Architectural Coating														
	Compressor (air)	1	40%	78	53.6	49.6	51.3	47.3	56.7	52.7	59.9	55.9	51.3	47.4
Combined LEQ						**49.6**		**47.3**		**52.7**		**55.9**		**47.4**

Project: Parcel 2

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	320	0	E
2	Residence 2	890	0	NE
3	Residence 3	280	0	S
4	Residence 4	320	0	SW
5	Residence 5	1,160	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Dozer	3	40%	82	70.3	66.4	61.5	57.5	71.5	67.5	70.3	66.4	59.2	55.2
	Tractor	4	40%	84	73.9	69.9	65.0	61.0	75.1	71.1	73.9	69.9	62.7	58.7
Combined LEQ						**71.5**		**62.6**		**72.7**		**71.5**		**60.3**
Grading														
	Excavator	1	40%	81	64.6	60.6	55.7	51.7	65.7	61.8	64.6	60.6	53.4	49.4
	Grader	1	40%	85	68.9	64.9	60.0	56.0	70.0	66.1	68.9	64.9	57.7	53.7
	Dozer	1	40%	82	65.6	61.6	56.7	52.7	66.7	62.8	65.6	61.6	54.4	50.4
	Tractor	3	40%	84	72.6	68.7	63.8	59.8	73.8	69.8	72.6	68.7	61.5	57.5
Combined LEQ						**71.2**		**62.3**		**72.3**		**71.2**		**60.0**
Building Construction														
	Crane	1	16%	81	64.5	56.5	55.6	47.6	65.6	57.7	64.5	56.5	53.3	45.3
	Man Lift	3	20%	75	63.3	56.4	54.5	47.5	64.5	57.5	63.3	56.4	52.2	45.2
	Generator	1	50%	81	64.5	61.5	55.6	52.6	65.6	62.6	64.5	61.5	53.3	50.3
	Tractor	3	40%	84	72.6	68.7	63.8	59.8	73.8	69.8	72.6	68.7	61.5	57.5
	Welder/Torch	1	40%	74	57.9	53.9	49.0	45.0	59.0	55.1	57.9	53.9	46.7	42.7
Combined LEQ						**70.0**		**61.1**		**71.1**		**70.0**		**58.8**
Paving														
	Concrete Mixer Truck	2	40%	79	65.7	61.7	56.8	52.8	66.8	62.9	65.7	61.7	54.5	50.5
	Paver	1	50%	77	61.1	58.1	52.2	49.2	62.2	59.2	61.1	58.1	49.9	46.9
	Pavement Scarafier	2	20%	90	76.4	69.4	67.5	60.5	77.5	70.6	76.4	69.4	65.2	58.2
	Roller	2	20%	80	66.9	59.9	58.0	51.0	68.0	61.1	66.9	59.9	55.7	48.7
	Tractor	1	40%	84	67.9	63.9	59.0	55.0	69.0	65.1	67.9	63.9	56.7	52.7
Combined LEQ						**71.5**		**62.7**		**72.7**		**71.5**		**60.4**
Architectural Coating														
	Compressor (air)	1	40%	78	61.6	57.6	52.7	48.7	62.7	58.8	61.6	57.6	50.4	46.4
Combined LEQ						**57.6**		**48.7**		**58.8**		**57.6**		**46.4**

Project: Parcel 3

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	140	0	E
2	Residence 2	710	0	NE
3	Residence 3	390	0	S
4	Residence 4	550	0	SW
5	Residence 5	1,040	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Tractor	4	40%	84	81.1	77.1	67.0	63.0	72.2	68.2	69.2	65.2	63.7	59.7
	Dozer	3	40%	82	77.5	73.5	63.4	59.4	68.6	64.6	65.6	61.7	60.1	56.1
Combined LEQ						**78.7**		**64.6**		**69.8**		**66.8**		**61.3**
Grading														
	Grader	1	40%	85	76.1	72.1	62.0	58.0	67.2	63.2	64.2	60.2	58.6	54.7
	Dozer	1	40%	82	72.8	68.8	58.7	54.7	63.9	59.9	60.9	56.9	55.3	51.4
	Tractor	3	40%	84	79.8	75.8	65.7	61.7	70.9	66.9	67.9	64.0	62.4	58.4
	Excavator	1	40%	81	71.8	67.8	57.7	53.7	62.9	58.9	59.9	55.9	54.3	50.4
Combined LEQ						**78.3**		**64.2**		**69.4**		**66.4**		**60.9**
Building Construction														
	Crane	1	16%	81	71.7	63.7	57.6	49.6	62.8	54.8	59.8	51.8	54.2	46.3
	Man Lift	3	20%	75	70.5	63.5	56.4	49.4	61.6	54.6	58.6	51.7	53.1	46.1
	Generator	1	50%	81	71.7	68.6	57.6	54.5	62.8	59.7	59.8	56.8	54.2	51.2
	Tractor	3	40%	84	79.8	75.8	65.7	61.7	70.9	66.9	67.9	64.0	62.4	58.4
	Welder/Torch	1	40%	74	65.1	61.1	51.0	47.0	56.2	52.2	53.2	49.2	47.6	43.7
Combined LEQ						**77.1**		**63.0**		**68.2**		**65.2**		**59.7**
Paving														
	Concrete Mixer Truck	2	40%	79	72.9	68.9	58.8	54.8	64.0	60.0	61.0	57.0	55.4	51.5
	Paver	1	50%	77	68.3	65.2	54.2	51.1	59.4	56.3	56.4	53.4	50.8	47.8
	Pavement Scarafier	2	20%	90	83.6	76.6	69.5	62.5	74.7	67.7	71.7	64.7	66.1	59.2
	Roller	2	20%	80	74.1	67.1	60.0	53.0	65.2	58.2	62.2	55.2	56.6	49.7
	Tractor	1	40%	84	75.1	71.1	61.0	57.0	66.2	62.2	63.2	59.2	57.6	53.7
Combined LEQ						**78.7**		**64.6**		**69.8**		**66.8**		**61.3**
Architectural Coating														
	Compressor (air)	1	40%	78	68.8	64.8	54.7	50.7	59.9	55.9	56.9	52.9	51.3	47.4
Combined LEQ						**64.8**		**50.7**		**55.9**		**52.9**		**47.4**

Project: Parcel 4

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	220	0	E
2	Residence 2	210	0	NE
3	Residence 3	880	0	S
4	Residence 4	1,150	0	SW
5	Residence 5	560	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Tractor	1	40%	84	71.1	67.2	71.5	67.6	59.1	55.1	56.8	52.8	63.0	59.0
	Grader	1	40%	85	72.1	68.2	72.5	68.6	60.1	56.1	57.8	53.8	64.0	60.0
	Scraper	1	40%	84	70.7	66.8	71.1	67.2	58.7	54.7	56.4	52.4	62.6	58.6
Combined LEQ						**72.2**		**72.6**		**60.1**		**57.8**		**64.0**
Grading														
	Grader	1	40%	85	72.1	68.2	72.5	68.6	60.1	56.1	57.8	53.8	64.0	60.0
	Dozer	1	40%	82	68.8	64.9	69.2	65.3	56.8	52.8	54.5	50.5	60.7	56.7
	Tractor	1	40%	84	71.1	67.2	71.5	67.6	59.1	55.1	56.8	52.8	63.0	59.0
Combined LEQ						**71.7**		**72.1**		**59.7**		**57.3**		**63.6**
Building Construction														
	Crane	1	16%	81	67.7	59.8	68.1	60.2	55.7	47.7	53.4	45.4	59.6	51.7
	Man Lift	2	20%	75	64.8	57.9	65.2	58.3	52.8	45.8	50.5	43.5	56.7	49.7
	Generator	1	50%	81	67.7	64.7	68.1	65.1	55.7	52.7	53.4	50.4	59.6	56.6
	Tractor	1	40%	84	71.1	67.2	71.5	67.6	59.1	55.1	56.8	52.8	63.0	59.0
	Welder/Torch	3	40%	74	65.9	61.9	66.3	62.3	53.9	49.9	51.5	47.6	57.8	53.8
Combined LEQ						**70.5**		**70.9**		**58.5**		**56.2**		**62.4**
Paving														
	Concrete Mixer Truck	1	40%	79	65.9	62.0	66.3	62.4	53.9	49.9	51.6	47.6	57.8	53.8
	Paver	1	50%	77	64.3	61.3	64.7	61.7	52.3	49.3	50.0	47.0	56.2	53.2
	Pavement Scarafier	1	20%	90	76.6	69.6	77.0	70.0	64.6	57.6	62.3	55.3	68.5	61.5
	Roller	2	20%	80	70.1	63.2	70.5	63.6	58.1	51.1	55.8	48.8	62.0	55.0
	Tractor	1	40%	84	71.1	67.2	71.5	67.6	59.1	55.1	56.8	52.8	63.0	59.0
Combined LEQ						**72.9**		**73.3**		**60.8**		**58.5**		**64.8**
Architectural Coating														
	Compressor (air)	1	40%	78	64.8	60.9	65.2	61.3	52.8	48.8	50.5	46.5	56.7	52.7
Combined LEQ						**60.9**		**61.3**		**48.8**		**46.5**		**52.7**

Project: Parcel 5

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	320	0	E
2	Residence 2	610	0	NE
3	Residence 3	580	0	S
4	Residence 4	720	0	SW
5	Residence 5	870	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Grader	1	40%	85	68.9	64.9	63.3	59.3	63.7	59.7	61.8	57.9	60.2	56.2
	Dozer	1	40%	82	65.6	61.6	60.0	56.0	60.4	56.4	58.5	54.6	56.9	52.9
	Tractor	1	40%	84	67.9	63.9	62.3	58.3	62.7	58.7	60.8	56.9	59.2	55.2
Combined LEQ						**68.4**		**62.8**		**63.3**		**61.4**		**59.8**
Grading														
	Grader	1	40%	85	68.9	64.9	63.3	59.3	63.7	59.7	61.8	57.9	60.2	56.2
	Dozer	1	40%	82	65.6	61.6	60.0	56.0	60.4	56.4	58.5	54.6	56.9	52.9
	Tractor	2	40%	84	70.9	66.9	65.3	61.3	65.7	61.7	63.8	59.9	62.2	58.2
Combined LEQ						**69.7**		**64.1**		**64.6**		**62.7**		**61.1**
Building Construction														
	Crane	1	16%	81	64.5	56.5	58.9	50.9	59.3	51.4	57.4	49.5	55.8	47.8
	Man Lift	1	20%	75	58.6	51.6	53.0	46.0	53.4	46.4	51.5	44.5	49.9	42.9
	Generator	1	50%	81	64.5	61.5	58.9	55.9	59.3	56.3	57.4	54.4	55.8	52.8
	Tractor	1	40%	84	67.9	63.9	62.3	58.3	62.7	58.7	60.8	56.9	59.2	55.2
	Welder/Torch	3	40%	74	62.6	58.7	57.0	53.1	57.5	53.5	55.6	51.6	54.0	50.0
Combined LEQ						**67.1**		**61.5**		**62.0**		**60.1**		**58.5**
Paving														
	Concrete Mixer Truck	1	40%	79	62.7	58.7	57.1	53.1	57.5	53.5	55.6	51.7	54.0	50.0
	Paver	1	50%	77	61.1	58.1	55.5	52.5	55.9	52.9	54.0	51.0	52.4	49.4
	Pavement Scarafier	1	20%	90	73.4	66.4	67.8	60.8	68.2	61.2	66.3	59.3	64.7	57.7
	Roller	1	20%	80	63.9	56.9	58.3	51.3	58.7	51.7	56.8	49.8	55.2	48.2
	Tractor	1	40%	84	67.9	63.9	62.3	58.3	62.7	58.7	60.8	56.9	59.2	55.2
Combined LEQ						**69.4**		**63.8**		**64.2**		**62.3**		**60.7**
Architectural Coating														
	Compressor (air)	1	40%	78	61.6	57.6	56.0	52.0	56.4	52.4	54.5	50.6	52.9	48.9
Combined LEQ						**57.6**		**52.0**		**52.4**		**50.6**		**48.9**

Project: 27th Street

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 7 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	680	0	E
2	Residence 2	970	0	NE
3	Residence 3	470	0	SE
4	Residence 4	420	0	SW
5	Residence 5	1030	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Tractor	1	40%	84	61.3	57.3	58.2	54.3	64.5	60.6	65.5	61.5	57.7	53.7
	Excavator	1	40%	81	58.0	54.0	54.9	51.0	61.2	57.3	62.2	58.2	54.4	50.4
Combined LEQ						**59.0**		**55.9**		**62.2**		**63.2**		**55.4**
Grading														
	Grader	1	40%	85	62.3	58.3	59.2	55.3	65.5	61.6	66.5	62.5	58.7	54.7
	Roller	2	20%	80	60.3	53.3	57.3	50.3	63.5	56.6	64.5	57.5	56.7	49.7
	Tractor	1	40%	84	61.3	57.3	58.2	54.3	64.5	60.6	65.5	61.5	57.7	53.7
Combined LEQ						**61.6**		**58.5**		**64.8**		**65.8**		**58.0**
Drainage/Utilities/Subgrade														
	Grader	1	40%	85	62.3	58.3	59.2	55.3	65.5	61.6	66.5	62.5	58.7	54.7
	Compactor (ground)	1	20%	83	60.5	53.5	57.4	50.5	63.7	56.7	64.7	57.7	56.9	49.9
	Generator	1	50%	81	57.9	54.9	54.8	51.8	61.1	58.1	62.1	59.1	54.3	51.3
	Pumps	1	50%	81	58.2	55.2	55.1	52.1	61.4	58.4	62.4	59.4	54.6	51.6
	Man Lift	1	20%	75	52.0	45.0	48.9	42.0	55.2	48.2	56.2	49.2	48.4	41.4
	Scraper	1	40%	84	60.9	56.9	57.8	53.9	64.1	60.2	65.1	61.1	57.3	53.3
	Tractor	2	40%	84	64.3	60.4	61.3	57.3	67.5	63.6	68.5	64.5	60.7	56.8
Combined LEQ						**65.0**		**61.9**		**68.2**		**69.2**		**61.4**
Paving														
	Paver	1	50%	77	54.5	51.5	51.4	48.4	57.7	54.7	58.7	55.7	50.9	47.9
	Pavement Scarafier	1	20%	90	66.8	59.8	63.7	56.8	70.0	63.0	71.0	64.0	63.2	56.2
	Roller	1	20%	80	57.3	50.3	54.2	47.3	60.5	53.5	61.5	54.5	53.7	46.7
	Tractor	1	40%	84	61.3	57.3	58.2	54.3	64.5	60.6	65.5	61.5	57.7	53.7
Combined LEQ						**62.4**		**59.4**		**65.7**		**66.6**		**58.8**

Project: 28th Street

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	260	0	E
2	Residence 2	660	0	NE
3	Residence 3	543	0	S
4	Residence 4	743	0	SW
5	Residence 5	807	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Tractor	1	40%	84	69.7	65.7	61.6	57.6	63.3	59.3	60.6	56.6	59.8	55.9
	Excavator	1	40%	81	66.4	62.4	58.3	54.3	60.0	56.0	57.3	53.3	56.5	52.6
Combined LEQ						**67.4**		**59.3**		**61.0**		**58.2**		**57.5**
Grading														
	Grader	1	40%	85	70.7	66.7	62.6	58.6	64.3	60.3	61.6	57.6	60.8	56.9
	Roller	1	20%	80	65.7	58.7	57.6	50.6	59.3	52.3	56.6	49.6	55.8	48.9
	Tractor	1	40%	84	69.7	65.7	61.6	57.6	63.3	59.3	60.6	56.6	59.8	55.9
Combined LEQ						**69.6**		**61.5**		**63.2**		**60.5**		**59.8**
Drainage/Utilities/Subgrade														
	Grader	1	40%	85	70.7	66.7	62.6	58.6	64.3	60.3	61.6	57.6	60.8	56.9
	Man Lift	1	20%	75	60.4	53.4	52.3	45.3	54.0	47.0	51.3	44.3	50.5	43.6
	Compactor (ground)	1	20%	83	68.9	61.9	60.8	53.8	62.5	55.5	59.8	52.8	59.0	52.1
	Tractor	2	40%	84	72.7	68.7	64.6	60.6	66.3	62.3	63.6	59.6	62.9	58.9
	Generator	1	50%	81	66.3	63.3	58.2	55.2	59.9	56.9	57.2	54.1	56.4	53.4
	Pumps	1	50%	81	66.6	63.6	58.5	55.5	60.2	57.2	57.5	54.4	56.7	53.7
	Scraper	1	40%	84	69.3	65.3	61.2	57.2	62.9	58.9	60.2	56.2	59.4	55.5
Combined LEQ						**73.4**		**65.3**		**67.0**		**64.2**		**63.5**
Paving														
	Paver	1	50%	77	62.9	59.9	54.8	51.8	56.5	53.5	53.8	50.7	53.0	50.0
	Roller	1	20%	80	65.7	58.7	57.6	50.6	59.3	52.3	56.6	49.6	55.8	48.9
	Pavement Scarafier	1	20%	90	75.2	68.2	67.1	60.1	68.8	61.8	66.1	59.1	65.3	58.4
	Tractor	1	40%	84	69.7	65.7	61.6	57.6	63.3	59.3	60.6	56.6	59.8	55.9
Combined LEQ						**70.8**		**62.7**		**64.4**		**61.7**		**61.0**

Project: R9, R10

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residence 1	350	0	E
2	Residence 2	710	0	NE
3	Residence 3	420	0	S
4	Residence 4	600	0	SW
5	Residence 5	1020	0	N

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3		RECEPTOR 4		RECEPTOR 5	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Site Preparation														
	Tractor	1	40%	84	67.1	63.1	61.0	57.0	65.5	61.5	62.4	58.4	57.8	53.8
	Excavator	1	40%	81	63.8	59.8	57.7	53.7	62.2	58.2	59.1	55.1	54.5	50.5
Combined LEQ						**64.8**		**58.6**		**63.2**		**60.1**		**55.5**
Grading														
	Grader	1	40%	85	68.1	64.1	62.0	58.0	66.5	62.5	63.4	59.4	58.8	54.8
	Roller	1	20%	80	63.1	56.1	57.0	50.0	61.5	54.5	58.4	51.4	53.8	46.8
	Tractor	1	40%	84	67.1	63.1	61.0	57.0	65.5	61.5	62.4	58.4	57.8	53.8
Combined LEQ						**67.0**		**60.9**		**65.4**		**62.3**		**57.7**
Drainage/Utilities/Subgrade														
	Grader	1	40%	85	68.1	64.1	62.0	58.0	66.5	62.5	63.4	59.4	58.8	54.8
	Man Lift	1	20%	75	57.8	50.8	51.7	44.7	56.2	49.2	53.1	46.1	48.5	41.5
	Compactor (ground)	1	20%	83	66.3	59.3	60.2	53.2	64.7	57.7	61.6	54.6	57.0	50.0
	Tractor	2	40%	84	70.1	66.1	64.0	60.0	68.5	64.5	65.4	61.4	60.8	56.8
	Generator	1	50%	81	63.7	60.7	57.6	54.5	62.1	59.1	59.0	56.0	54.4	51.4
	Pumps	1	50%	81	64.0	61.0	57.9	54.8	62.4	59.4	59.3	56.3	54.7	51.7
	Scraper	1	40%	84	66.7	62.7	60.6	56.6	65.1	61.1	62.0	58.0	57.4	53.4
Combined LEQ						**70.8**		**64.6**		**69.2**		**66.1**		**61.5**
Paving														
	Paver	1	50%	77	60.3	57.3	54.2	51.1	58.7	55.7	55.6	52.6	51.0	48.0
	Roller	1	20%	80	63.1	56.1	57.0	50.0	61.5	54.5	58.4	51.4	53.8	46.8
	Pavement Scarafier	1	20%	90	72.6	65.6	66.5	59.5	71.0	64.0	67.9	60.9	63.3	56.3
	Tractor	1	40%	84	67.1	63.1	61.0	57.0	65.5	61.5	62.4	58.4	57.8	53.8
Combined LEQ						**68.2**		**62.1**		**66.6**		**63.5**		**58.9**

Project:

Open Space Noise Calculation

Park					
Category	**# of Individuals (estimated capacity)**	**# of Individuals Speaking (half of estimated capacity)**	**Reference Distance (ft)[1]**	**Reference Noise Level (dBA)[1]**	**Combined Noise Level (dBA)**
Total Capacity	581				
Females (Adult)	194	97	3	63	82.9
Males (Adult)	194	97	3	65	84.9
Children	194	194	3	58	80.9
Total	**582**	**388**	-	-	**87.0**

Source:

[1] American Journal of Audiology Vol. 7, p. 3 (1998)

Receptor	Reference Level (dBA)	Reference Distance (feet)	Distance to Receptor (feet)	Level at Receptor (dBA)[4]	Daytime Threshold	Significant (Day)?
Sensitive Receptor 1	87	3	200	50.5	60	No
Sensitive Receptor 2	87	3	620	40.7	60	No
Sensitive Receptor 3	87	3	500	42.6	60	No
Sensitive Receptor 4	87	3	530	42.0	60	No
Sensitive Receptor 5	87	3	520	42.2	60	No

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name:
Project Number:
Scenario: Existing Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

									Vehicle Mix		Distance from Centerline of Roadway			
					Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment		Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	30th Street East	E Ave R 8 to E Ave R 12		4	24	9,740	45	0	2.0%	1.0%	63.2	-	66	208	659
2	27th St E	Project Site to E Ave R		2	10	1,060	35	0	2.0%	1.0%	50.9	-	-	-	39
3	29th St E	E Ave R 10 to E Ave R 12		2	17	770	25	0	2.0%	1.0%	47.2	-	-	-	-
4	25th St E	E Ave R to E Ave S		4	27	17,020	55	0	2.0%	1.0%	67.7	59	187	592	1,871
5	E Ave R 10	Project Site to 30th Street East		2	13	790	25	0	2.0%	1.0%	47.3	-	-	-	-
6	E Ave R 12	Project Site to 30th Street East		2	13	3,660	45	0	2.0%	1.0%	58.8	-	-	75	238

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name:
Project Number:
Scenario: Horizon Year Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

									Vehicle Mix		Distance from Centerline of Roadway			
					Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment		Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	30th Street East	E Ave R 8 to E Ave R 12		4	24	10,380	45	0	2.0%	1.0%	63.5	-	70	222	702
2	27th St E	Project Site to E Ave R		2	10	1,130	35	0	2.0%	1.0%	51.2	-	-	-	42
3	29th St E	E Ave R 10 to E Ave R 12		2	17	820	25	0	2.0%	1.0%	47.5	-	-	-	-
4	25th St E	E Ave R to E Ave S		4	27	18,230	55	0	2.0%	1.0%	68.0	63	200	634	2,005
5	E Ave R 10	Project Site to 30th Street East		2	13	800	25	0	2.0%	1.0%	47.4	-	-	-	-
6	E Ave R 12	Project Site to 30th Street East		2	13	3,860	45	0	2.0%	1.0%	59.0	-	-	79	251

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

Equipment		PPV at 25 feet (in/sec)	Calculated distance (feet) 20	Approximate L_v (VdB) at 25 feet	Calculated distance (feet) 20
Pile Driver (impact)	upper range	1.518	2.1215	112	115
	typical	0.644	0.9000	104	107
Pile Driver (sonic)	upper range	0.734	1.0258	105	108
	typical	0.17	0.2376	93	96
Clam shovel drop (slurry wall)		0.202	0.2823	94	97
Hydromill (slurry wall)	in soil	0.008	0.0112	66	69
	in rock	0.017	0.0238	75	78
Vibratory Roller		0.21	0.2935	94	97
Hoe Ram		0.089	0.1244	87	90
Large bulldozer		0.089	0.1244	87	90
Caisson drilling		0.089	0.1244	87	90
Loaded trucks		0.076	0.1062	86	89
Jackhammer		0.035	0.0489	79	82
Small bulldozer		0.003	0.0042	58	61
Rock Breaker		0.059	0.0825		

$L_v(D) = L_v(25 \text{ feet}) - (30 \times \log_{10}(D/25 \text{ feet}))$

Source: FTA, Noise and Vibration Manual, 2006. Page 12-11.

	PPV at 50 ft	
Blasting	0.4	1.5811

Notes:
1. Calculated using the following formula:
PPV equip = PPVref x (25/D)1.5

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA Transit Noise and Vibration Impact Assessment Guidelines
D = the distance from the equipment to the receiver

Custom

Equipment	PPV at 25 feet (in/sec)	Calculated distance (feet) 20	Calculated distance (feet) 45	Calculated distance (feet) 77
Large bulldozer	0.089	0.124	0.037	0.016
Loaded trucks	0.076	0.106	0.031	0.014
Small bulldozer	0.003	0.004	0.001	0.001
Jackhammer	0.035	0.049	0.014	0.006
Vibratory compactor/roller	0.21	0.293	0.087	0.039