

Appendix D

Noise

Noise Appendix A
FHWA Roadway Construction Noise Model
Modeling Results

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/3/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	65	0
Blasting	Yes	1	94		65	0
Dump Truck	No	40		76.5	65	0
Excavator	No	40		80.7	65	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Backhoe	75.3	74.3	85	75.7	85	75.7	80	73.7	None	None	None	None	None	0.6
Blasting	91.7	74.7	90 Exempt		85	75.7	80	73.7	1.7 Exempt	None	6.7	None	11.7	1
Dump Truck	74.2	73.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Excavator	78.4	77.5	85	75.7	85	75.7	80	73.7	None	1.8	None	1.8	None	3.8
Total	91.7	81.2	85	75.7	85	75.7	80	73.7	6.7	5.5	6.7	5.5	11.7	7.5

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	75	0
Blasting	Yes	1	94		75	0
Dump Truck	No	40		76.5	75	0
Excavator	No	40		80.7	75	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Backhoe	74	73.1	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Blasting	90.5	73.5	90 Exempt		85	73.7	80	73.7	0.5 Exempt	None	5.5	None	10.5	None
Dump Truck	72.9	71.9	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Excavator	77.2	76.2	85	75	85	73.7	80	73.7	None	1.2	None	2.5	None	2.5
Total	90.5	80	85	75	85	73.7	80	73.7	5.5	5	5.5	6.3	10.5	6.3

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	100	0
Blasting	Yes	1	94		100	0
Dump Truck	No	40		76.5	100	0
Excavator	No	40		80.7	100	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	71.5	70.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Blasting	88	71	90	Exempt	85	74.8	80	74.8	None	Exempt	3	None	None	8
Dump Truck	70.4	69.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Excavator	74.7	73.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Total	88	77.5	85	75	85	74.8	80	74.8	3	2.5	3	2.7	8	2.7

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	90	0
Blasting	Yes	1	94		90	0
Dump Truck	No	40		76.5	90	0
Excavator	No	40		80.7	90	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	72.5	71.5	85	75	85	70.5	80	70.5	None	None	None	1	None	1
Blasting	88.9	71.9	90	Exempt	85	70.5	80	70.5	None	Exempt	3.9	1.4	8.9	1.4
Dump Truck	71.3	70.4	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Excavator	75.6	74.6	85	75	85	70.5	80	70.5	None	None	None	4.1	None	4.1
Total	88.9	78.4	85	75	85	70.5	80	70.5	3.9	3.4	3.9	7.9	8.9	7.9

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	75	0
Blasting	Yes	1	94		75	0
Dump Truck	No	40		76.5	75	0
Excavator	No	40		80.7	75	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	74	73.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Blasting	90.5	73.5	90	Exempt	85	76.7	80	74.7	0.5	Exempt	5.5	None	10.5	None
Dump Truck	72.9	71.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Excavator	77.2	76.2	85	76.7	85	76.7	80	74.7	None	None	None	None	None	1.5
Total	90.5	80	85	76.7	85	76.7	80	74.7	5.5	3.3	5.5	3.3	10.5	5.3

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	140	0
Blasting	Yes	1	94		140	0
Dump Truck	No	40		76.5	140	0
Excavator	No	40		80.7	140	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	68.6	67.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Blasting	85.1	68.1	N/A	Exempt	N/A	N/A	N/A	N/A	N/A	Exempt	N/A	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A		80	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Excavator	71.8	70.8	N/A		80	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Total	85.1	74.6	N/A		80	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/9/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Street	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	65	0	
Dump Truck	No	40	76.5	65	0	
Dozer	No	40	81.7	65	0	
Excavator	No	40	80.7	65	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	Evening Lmax	Night Lmax	L10		
Backhoe	75.3	74.3	85	75.7	85	75.7	80	73.7	None	None	None	None	0.6	
Dump Truck	74.2	73.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	
Dozer	79.4	78.4	85	75.7	85	75.7	80	73.7	None	2.7	None	2.7	None	4.7
Excavator	78.4	77.5	85	75.7	85	75.7	80	73.7	None	1.8	None	1.8	None	3.8
Total	79.4	82.4	85	75.7	85	75.7	80	73.7	None	6.7	None	6.7	None	8.7

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	75	0	
Dump Truck	No	40	76.5	75	0	
Dozer	No	40	81.7	75	0	
Excavator	No	40	80.7	75	0	

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	Evening Lmax	Night Lmax	L10		
Backhoe	74	73.1	85	75	85	73.7	80	73.7	None	None	None	None	None	
Dump Truck	72.9	71.9	85	75	85	73.7	80	73.7	None	None	None	None	None	
Dozer	78.1	77.2	85	75	85	73.7	80	73.7	None	2.2	None	3.5	None	3.5
Excavator	77.2	76.2	85	75	85	73.7	80	73.7	None	1.2	None	2.5	None	2.5
Total	78.1	81.1	85	75	85	73.7	80	73.7	None	6.1	None	7.4	None	7.4

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	100	0
Dump Truck	No	40		76.5	100	0
Dozer	No	40		81.7	100	0
Excavator	No	40		80.7	100	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	71.5	70.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Dump Truck	70.4	69.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Dozer	75.6	74.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Excavator	74.7	73.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Total	75.6	78.6	85	75	85	74.8	80	74.8	None	3.6	None	3.8	None	3.8

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	90	0
Dump Truck	No	40		76.5	90	0
Dozer	No	40		81.7	90	0
Excavator	No	40		80.7	90	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	72.5	71.5	85	75	85	70.5	80	70.5	None	None	None	1	None	1
Dump Truck	71.3	70.4	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Dozer	76.6	75.6	85	75	85	70.5	80	70.5	None	0.6	None	5.1	None	5.1
Excavator	75.6	74.6	85	75	85	70.5	80	70.5	None	None	None	4.1	None	4.1
Total	76.6	79.5	85	75	85	70.5	80	70.5	None	4.5	None	9	None	9

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	75	0	
Dump Truck	No	40	76.5	75	0	
Dozer	No	40	81.7	75	0	
Excavator	No	40	80.7	75	0	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	74	73.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dump Truck	72.9	71.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dozer	78.1	77.2	85	76.7	85	76.7	80	74.7	None	0.5	None	0.5	None	2.5
Excavator	77.2	76.2	85	76.7	85	76.7	80	74.7	None	None	None	None	None	1.5
Total	78.1	81.1	85	76.7	85	76.7	80	74.7	None	4.4	None	4.4	None	6.4

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	140	0	
Dump Truck	No	40	76.5	140	0	
Dozer	No	40	81.7	140	0	
Excavator	No	40	80.7	140	0	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	68.6	67.6	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Dozer	72.7	71.7	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Excavator	71.8	70.8	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Total	72.7	75.7	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/9/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40	78.8	65	0	
Crane	No	16	80.6	65	0	
Dump Truck	No	40	76.5	65	0	
Paver	No	50	77.2	65	0	
Roller	No	20	80	65	0	

Results

Equipment	Calculated (dBA)				Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
	Day		Evening		Night		Day		Evening		Night		L10	
	*Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10		
Concrete Mixer Truck	76.5	75.5	85	75.7	85	75.7	80	73.7	None	None	None	None	1.8	
Crane	78.3	73.3	85	75.7	85	75.7	80	73.7	None	None	None	None	None	
Dump Truck	74.2	73.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	
Paver	74.9	74.9	85	75.7	85	75.7	80	73.7	None	None	None	None	1.2	
Roller	77.7	73.7	85	75.7	85	75.7	80	73.7	None	None	None	None	0	
Total	78.3	81.2	85	75.7	85	75.7	80	73.7	None	5.5	None	5.5	None	7.5

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40	78.8	75	0	
Crane	No	16	80.6	75	0	
Dump Truck	No	40	76.5	75	0	
Paver	No	50	77.2	75	0	
Roller	No	20	80	75	0	

Results

Equipment	Calculated (dBA)				Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
	Day		Evening		Night		Day		Evening		Night		L10	
	*Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10		
Concrete Mixer Truck	75.3	74.3	85	75	85	73.7	80	73.7	None	None	0.6	None	0.6	
Crane	77	72.1	85	75	85	73.7	80	73.7	None	None	None	None	None	
Dump Truck	72.9	71.9	85	75	85	73.7	80	73.7	None	None	None	None	None	
Paver	73.7	73.7	85	75	85	73.7	80	73.7	None	None	None	None	None	
Roller	76.5	72.5	85	75	85	73.7	80	73.7	None	None	None	None	None	
Total	77	80	85	75	85	73.7	80	73.7	None	5	None	6.3	None	6.3

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40	78.8	100	0	
Crane	No	16	80.6	100	0	
Dump Truck	No	40	76.5	100	0	
Paver	No	50	77.2	100	0	
Roller	No	20	80	100	0	

Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax
Concrete Mixer Truck	72.8	71.8	85	75	85	74.8	80	74.8	None	None	None	None	None
Crane	74.5	69.6	85	75	85	74.8	80	74.8	None	None	None	None	None
Dump Truck	70.4	69.5	85	75	85	74.8	80	74.8	None	None	None	None	None
Paver	71.2	71.2	85	75	85	74.8	80	74.8	None	None	None	None	None
Roller	74	70	85	75	85	74.8	80	74.8	None	None	None	None	None
Total	74.5	77.5	85	75	85	74.8	80	74.8	2.5	None	2.7	None	2.7

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40	78.8	90	0	
Crane	No	16	80.6	90	0	
Dump Truck	No	40	76.5	90	0	
Paver	No	50	77.2	90	0	
Roller	No	20	80	90	0	

Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax
Concrete Mixer Truck	73.7	72.7	85	75	85	70.5	80	70.5	None	None	None	2.2	None
Crane	75.4	70.5	85	75	85	70.5	80	70.5	None	None	None	None	None
Dump Truck	71.3	70.4	85	75	85	70.5	80	70.5	None	None	None	None	None
Paver	72.1	72.1	85	75	85	70.5	80	70.5	None	None	None	1.6	None
Roller	74.9	70.9	85	75	85	70.5	80	70.5	None	None	None	0.4	None
Total	75.4	78.4	85	75	85	70.5	80	70.5	3.4	None	7.9	None	7.9

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	75	0
Crane	No	16		80.6	75	0
Dump Truck	No	40		76.5	75	0
Paver	No	50		77.2	75	0
Roller	No	20		80	75	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	75.3	74.3	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Crane	77	72.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dump Truck	72.9	71.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Paver	73.7	73.7	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Roller	76.5	72.5	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Total	77	80	85	76.7	85	76.7	80	74.7	None	3.3	None	3.3	None	5.3

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	140	0
Crane	No	16		80.6	140	0
Dump Truck	No	40		76.5	140	0
Paver	No	50		77.2	140	0
Roller	No	20		80	140	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	69.9	68.9	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Crane	71.6	66.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Paver	68.3	68.3	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Roller	71.1	67.1	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Total	71.6	74.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.0

Report date: 8/18/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Impact Pile Driver	Yes	20	101.3	905	0		

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
	Impact Pile Driver	76.1	72.1	90 Exempt	85	75.7	80	73.7	None	Exempt	None	None	None	None
Total	76.1	72.1	90 Exempt	85	75.7	80	73.7	None	Exempt	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Impact Pile Driver	Yes	20	101.3	1140	0		

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
	Impact Pile Driver	74.1	70.1	90 Exempt	85	73.7	80	73.7	None	Exempt	None	None	None	None
Total	74.1	70.1	90 Exempt	85	73.7	80	73.7	None	Exempt	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Impact Pile Driver	Yes	20	101.3	400	5		

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
	Pile Driving	74.1	70.1	90 Exempt	85	73.7	80	73.7	None	Exempt	None	None	None	None

*Calculated Lmax is the Loudest value.

Impact Pile Driver		78.2	74.2	90 Exempt	85	74.8	80	74.8	None	Exempt	None	None	None	None
Total		78.2	74.2	90 Exempt	85	74.8	80	74.8	None	Exempt	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

		Equipment				
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	515	3

		Results																												
		Calculated (dBA)					Noise Limits (dBA)					Noise Limit Exceedance (dBA)																		
		*Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10		
Equipment	Impact Pile Driver	78	74	74	74	90 Exempt	85	70.5	80	70.5	80	70.5	None	Exempt	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5
Total		78	74	74	74	90 Exempt	85	70.5	80	70.5	80	70.5	None	Exempt	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5	None	3.5

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

		Equipment				
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	1150	0

		Results																												
		Calculated (dBA)					Noise Limits (dBA)					Noise Limit Exceedance (dBA)																		
		*Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10		
Equipment	Impact Pile Driver	74	70	70	70	90 Exempt	85	67.3	80	67.3	80	67.3	None	Exempt	None	2.7	None	2.7	None	2.7	None	2.7	None	2.7	None	2.7	None	2.7	None	2.7
Total		0	0	0	0	0	85	67.3	80	67.3	80	67.3	None	Exempt	None	0	None	0	None	0	None	0	None	0	None	0	None	0	None	0

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

		Equipment				
Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Impact Pile Driver	Yes	20		101.3	620	0

		Results																											
		Calculated (dBA)					Noise Limits (dBA)					Noise Limit Exceedance (dBA)																	
		*Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10		Day Lmax		L10		Evening Lmax		L10		Night Lmax		L10	
Equipment	Impact Pile Driver	79.4	75.4	N/A	N/A	Exempt	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	N/A	N/A	N/A	N/A	N/A

Pile Driving

Total	79.4	75.4	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
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*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/9/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment Spec		Receptor Distance (feet)	Estimated Shielding (dBA)
			Lmax (dBA)	Actual Lmax (dBA)		
Backhoe	No	40	77.6	77.6	65	8
Blasting	Yes	1	94	94	65	8
Dump Truck	No	40	76.5	76.5	65	8
Excavator	No	40	80.7	80.7	65	8

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	Evening Lmax	Night Lmax	L10
Backhoe	67.3	66.3	85	75.7	85	75.7	80	73.7	None	None	None	None
Blasting	83.7	66.7	90 Exempt	90	85	75.7	80	73.7	None	Exempt	None	3.7
Dump Truck	66.2	65.2	85	75.7	85	75.7	80	73.7	None	None	None	None
Excavator	70.4	69.5	85	75.7	85	75.7	80	73.7	None	None	None	None
Total	83.7	73.2	85	75.7	85	75.7	80	73.7	None	None	None	3.7

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment Spec		Receptor Distance (feet)	Estimated Shielding (dBA)
			Lmax (dBA)	Actual Lmax (dBA)		
Backhoe	No	40	77.6	77.6	75	8
Blasting	Yes	1	94	94	75	8
Dump Truck	No	40	76.5	76.5	75	8
Excavator	No	40	80.7	80.7	75	8

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)					
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	Evening Lmax	Night Lmax	L10
Backhoe	66	65.1	85	75	85	73.7	80	73.7	None	None	None	None
Blasting	82.5	65.5	90 Exempt	90	85	73.7	80	73.7	None	Exempt	None	2.5
Dump Truck	64.9	63.9	85	75	85	73.7	80	73.7	None	None	None	None
Excavator	69.2	68.2	85	75	85	73.7	80	73.7	None	None	None	None
Total	82.5	72	85	75	85	73.7	80	73.7	None	None	None	2.5

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	100	5
Blasting	Yes	1	94		100	5
Dump Truck	No	40		76.5	100	5
Excavator	No	40		80.7	100	5

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day Lmax	Evening Lmax	Night Lmax	L10	L10	L10
			Lmax	L10	Lmax	L10	Lmax	L10						
Backhoe	66.5	65.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Blasting	83	66	90	Exempt	85	74.8	80	74.8	None	Exempt	None	None	None	3 None
Dump Truck	65.4	64.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Excavator	69.7	68.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Total	83	72.5	85	75	85	74.8	80	74.8	None	None	None	None	None	3 None

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	90	5
Blasting	Yes	1	94		90	5
Dump Truck	No	40		76.5	90	5
Excavator	No	40		80.7	90	5

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day Lmax	Evening Lmax	Night Lmax	L10	L10	L10
			Lmax	L10	Lmax	L10	Lmax	L10						
Backhoe	67.5	66.5	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Blasting	83.9	66.9	90	Exempt	85	70.5	80	70.5	None	Exempt	None	None	None	3.9 None
Dump Truck	66.3	65.4	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Excavator	70.6	69.6	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Total	83.9	73.4	85	75	85	70.5	80	70.5	None	None	None	2.9	3.9	2.9

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	75	8
Blasting	Yes	1	94		75	8
Dump Truck	No	40		76.5	75	8
Excavator	No	40		80.7	75	8

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	66	65.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Blasting	82.5	65.5	90	Exempt	85	76.7	80	74.7	None	Exempt	None	None	2.5	None
Dump Truck	64.9	63.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Excavator	69.2	68.2	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Total	82.5	72	85	76.7	85	76.7	80	74.7	None	None	None	None	2.5	None

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	140	0
Blasting	Yes	1	94		140	0
Dump Truck	No	40		76.5	140	0
Excavator	No	40		80.7	140	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	68.6	67.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Blasting	85.1	68.1	N/A	Exempt	N/A	N/A	N/A	N/A	N/A	Exempt	N/A	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Excavator	71.8	70.8	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Total	85.1	74.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/3/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	65	8	
Dump Truck	No	40	76.5	65	8	
Dozer	No	40	81.7	65	8	
Excavator	No	40	80.7	65	8	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Backhoe	67.3	66.3	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Dump Truck	66.2	65.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Dozer	71.4	70.4	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Excavator	70.4	69.5	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Total	71.4	74.4	85	75.7	85	75.7	80	73.7	None	None	None	None	None	0.7

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	75	8	
Dump Truck	No	40	76.5	75	8	
Dozer	No	40	81.7	75	8	
Excavator	No	40	80.7	75	8	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Backhoe	66	65.1	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Dump Truck	64.9	63.9	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Dozer	70.1	69.2	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Excavator	69.2	68.2	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Total	70.1	73.1	85	75	85	73.7	80	73.7	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	100	5	
Dump Truck	No	40	76.5	100	5	
Dozer	No	40	81.7	100	5	
Excavator	No	40	80.7	100	5	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	66.5	65.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Dump Truck	65.4	64.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Dozer	70.6	69.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Excavator	69.7	68.7	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Total	70.6	73.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	90	5	
Dump Truck	No	40	76.5	90	5	
Dozer	No	40	81.7	90	5	
Excavator	No	40	80.7	90	5	

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	67.5	66.5	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Dump Truck	66.3	65.4	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Dozer	71.6	70.6	85	75	85	70.5	80	70.5	None	None	None	0.1	None	0.1
Excavator	70.6	69.6	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Total	71.6	74.5	85	75	85	70.5	80	70.5	None	None	None	4	None	4

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	75	8	
Dump Truck	No	40	76.5	75	8	
Dozer	No	40	81.7	75	8	
Excavator	No	40	80.7	75	8	

Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	66	65.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dump Truck	64.9	63.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dozer	70.1	69.2	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Excavator	69.2	68.2	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Total	70.1	73.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40	77.6	140	0	
Dump Truck	No	40	76.5	140	0	
Dozer	No	40	81.7	140	0	
Excavator	No	40	80.7	140	0	

Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Backhoe	68.6	67.6	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Dozer	72.7	71.7	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Excavator	71.8	70.8	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A
Total	72.7	75.7	N/A	80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 4/3/2009

Case Description: Methuen Rotary - Pile Driving Uncontrolled

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
27 Smith Avenue	Residential	70.7	70.7	70.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	65	8
Crane	No	16		80.6	65	8
Dump Truck	No	40		76.5	65	8
Paver	No	50		77.2	65	8
Roller	No	20		80	65	8

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Concrete Mixer Truck	68.5	67.5	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Crane	70.3	65.3	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Dump Truck	66.2	65.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Paver	66.9	66.9	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Roller	69.7	65.7	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None
Total	70.3	73.2	85	75.7	85	75.7	80	73.7	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
1 Heather Drive	Residential	68.7	68.7	68.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	75	8
Crane	No	16		80.6	75	8
Dump Truck	No	40		76.5	75	8
Paver	No	50		77.2	75	8
Roller	No	20		80	75	8

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10	Day Lmax	L10	Evening Lmax	L10	Night Lmax	L10
Concrete Mixer Truck	67.3	66.3	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Crane	69	64.1	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Dump Truck	64.9	63.9	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Paver	65.7	65.7	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Roller	68.5	64.5	85	75	85	73.7	80	73.7	None	None	None	None	None	None
Total	69	72	85	75	85	73.7	80	73.7	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
4 Noyes Street	Residential	69.8	69.8	69.8

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	100	5
Crane	No	16		80.6	100	5
Dump Truck	No	40		76.5	100	5
Paver	No	50		77.2	100	5
Roller	No	20		80	100	5

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	67.8	66.8	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Crane	69.5	64.6	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Dump Truck	65.4	64.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Paver	66.2	66.2	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Roller	69	65	85	75	85	74.8	80	74.8	None	None	None	None	None	None
Total	69.5	72.5	85	75	85	74.8	80	74.8	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
16 Allen	Residential	65.5	65.5	65.5

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	90	5
Crane	No	16		80.6	90	5
Dump Truck	No	40		76.5	90	5
Paver	No	50		77.2	90	5
Roller	No	20		80	90	5

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	68.7	67.7	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Crane	70.4	65.5	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Dump Truck	66.3	65.4	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Paver	67.1	67.1	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Roller	69.9	65.9	85	75	85	70.5	80	70.5	None	None	None	None	None	None
Total	70.4	73.4	85	75	85	70.5	80	70.5	None	None	2.9	None	None	2.9

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
447 Lowell Street	Residential	71.7	71.7	71.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	75	8
Crane	No	16		80.6	75	8
Dump Truck	No	40		76.5	75	8
Paver	No	50		77.2	75	8
Roller	No	20		80	75	8

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	67.3	66.3	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Crane	69	64.1	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Dump Truck	64.9	63.9	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Paver	65.7	65.7	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Roller	68.5	64.5	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None
Total	69	72	85	76.7	85	76.7	80	74.7	None	None	None	None	None	None

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
13 Branch Street	Commercial	62.3	62.3	62.3

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	140	0
Crane	No	16		80.6	140	0
Dump Truck	No	40		76.5	140	0
Paver	No	50		77.2	140	0
Roller	No	20		80	140	0

Equipment	Calculated (dBA)		Noise Limits (dBA)				Noise Limit Exceedance (dBA)							
	*Lmax	L10	Day		Evening		Night		Day		Evening		Night	
			Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10	Lmax	L10
Concrete Mixer Truck	69.9	68.9	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Crane	71.6	66.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Dump Truck	67.5	66.5	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Paver	68.3	68.3	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Roller	71.1	67.1	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Total	71.6	74.6	N/A		80	N/A	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Noise Appendix B
FHWA TNM Model
Modeling Results

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Existing Condition
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
1 Bolduc St.	41	1	0	61.7	66	61.7	10 ----	61.7	0	8	-8	
1 Branch St."	42	1	0	63.4	66	63.4	10 ----	63.4	0	8	-8	
6 Bolduc St."	43	1	0	58.9	66	58.9	10 ----	58.9	0	8	-8	
10 Bolduc St."	44	1	0	58.9	66	58.9	10 ----	58.9	0	8	-8	
11 Branch St."	45	1	0	64.4	66	64.4	10 ----	64.4	0	8	-8	
14 Rt. 113"	46	1	0	62.5	66	62.5	10 ----	62.5	0	8	-8	
14 Bolduc St."	47	1	0	61.8	66	61.8	10 ----	61.8	0	8	-8	
18 Bolduc St."	48	1	0	64.8	66	64.8	10 ----	64.8	0	8	-8	
447 Rt. 110"	49	1	0	62.2	66	62.2	10 ----	62.2	0	8	-8	
451 Rt. 110"	50	1	0	60.3	66	60.3	10 ----	60.3	0	8	-8	
453 Rt. 110"	51	1	0	62.5	66	62.5	10 ----	62.5	0	8	-8	
9-12 Branch St."	54	1	0	63.1	66	63.1	10 ----	63.1	0	8	-8	
Little Sprouts"	55	1	0	63	66	63	10 ----	63	0	8	-8	
1070 Riverside Drive	1	1	0	68.3	66	68.3	10 Snd Lvl	68.3	0	8	-8	
1068 Riverside Drive"	2	1	0	70.1	66	70.1	10 Snd Lvl	70.1	0	8	-8	
1073 Riverside Drive"	3	1	0	71.7	66	71.7	10 Snd Lvl	71.7	0	8	-8	
27 Noyes Street"	4	1	0	70.6	66	70.6	10 Snd Lvl	70.6	0	8	-8	
25 Noyes Street"	5	1	0	69.9	66	69.9	10 Snd Lvl	69.9	0	8	-8	
21 Noyes Street"	6	1	0	70.3	66	70.3	10 Snd Lvl	70.3	0	8	-8	
19 Noyes Street"	7	1	0	71.5	66	71.5	10 Snd Lvl	71.5	0	8	-8	
17 Noyes Street"	8	1	0	72	66	72	10 Snd Lvl	72	0	8	-8	
15 Noyes Street"	9	1	0	73	66	73	10 Snd Lvl	73	0	8	-8	
13 Noyes Street"	10	1	0	73.4	66	73.4	10 Snd Lvl	73.4	0	8	-8	
11 Noyes Street"	11	1	0	73.7	66	73.7	10 Snd Lvl	73.7	0	8	-8	
9 Noyes Street"	12	1	0	73.5	66	73.5	10 Snd Lvl	73.5	0	8	-8	
7 Noyes Street"	13	1	0	73.5	66	73.5	10 Snd Lvl	73.5	0	8	-8	
5 Noyes Street"	14	1	0	73.1	66	73.1	10 Snd Lvl	73.1	0	8	-8	
4 Noyes Street"	15	1	0	69.9	66	69.9	10 Snd Lvl	69.9	0	8	-8	
8 Noyes Street"	16	1	0	70.1	66	70.1	10 Snd Lvl	70.1	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Existing Condition
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
10 Noyes Street"	17	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
12 Noyes Street"	18	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
16 Noyes Street"	19	1	0	70.3	66	70.3		10 Snd Lvl	70.3	0	8	-8
18 Noyes Street"	20	1	0	70	66	70		10 Snd Lvl	70	0	8	-8
20 Noyes Street"	21	1	0	70	66	70		10 Snd Lvl	70	0	8	-8
22 Noyes Street"	22	1	0	69.7	66	69.7		10 Snd Lvl	69.7	0	8	-8
24 Noyes Street"	23	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
26 Noyes Street"	24	1	0	68.9	66	68.9		10 Snd Lvl	68.9	0	8	-8
28 Noyes Street"	25	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
30 Noyes Street"	26	1	0	68.8	66	68.8		10 Snd Lvl	68.8	0	8	-8
34 Noyes Street"	27	1	0	68.7	66	68.7		10 Snd Lvl	68.7	0	8	-8
Aster Street"	28	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
27 Lincoln Street"	29	1	0	66	66	66		10 Snd Lvl	66	0	8	-8
19 Lincoln Street"	30	1	0	66	66	66		10 Snd Lvl	66	0	8	-8
17 Lincoln Street"	31	1	0	65.8	66	65.8		10 ----	65.8	0	8	-8
15 Lincoln Street"	32	1	0	66.2	66	66.2		10 Snd Lvl	66.2	0	8	-8
11 Lincoln Street"	33	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
10 Lincoln Street"	34	1	0	66.2	66	66.2		10 Snd Lvl	66.2	0	8	-8
12 Lincoln Street"	35	1	0	65.5	66	65.5		10 ----	65.5	0	8	-8
14 Lincoln Street"	36	1	0	65.1	66	65.1		10 ----	65.1	0	8	-8
16 Lincoln Street"	37	1	0	64.6	66	64.6		10 ----	64.6	0	8	-8
18 Lincoln Street"	38	1	0	64.5	66	64.5		10 ----	64.5	0	8	-8
1095 Riverside Drive	41	1	0	69.8	66	69.8		10 Snd Lvl	69.8	0	8	-8
17 Griffin Street"	42	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
15 Griffin Street"	43	1	0	71.3	66	71.3		10 Snd Lvl	71.3	0	8	-8
11 Griffin Street"	44	1	0	72.3	66	72.3		10 Snd Lvl	72.3	0	8	-8
9 Griffin Street"	45	1	0	71.8	66	71.8		10 Snd Lvl	71.8	0	8	-8
1097 Riverside Drive"	46	1	0	68.5	66	68.5		10 Snd Lvl	68.5	0	8	-8
26 Allen Street"	47	1	0	68.6	66	68.6		10 Snd Lvl	68.6	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Existing Condition
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
20 Allen Street"	48	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
18 Allen Street"	49	1	0	69.2	66	69.2		10 Snd Lvl	69.2	0	8	-8
14 Allen Street"	50	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
19 Allen Street"	51	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
23 Allen Street"	52	1	0	67.5	66	67.5		10 Snd Lvl	67.5	0	8	-8
27 Allen Street"	53	1	0	66.9	66	66.9		10 Snd Lvl	66.9	0	8	-8
387 Lowell Street	1	1	0	65.9	66	65.9		10 ----	65.9	0	8	-8
379 Lowell Street"	2	1	0	65.7	66	65.7		10 ----	65.7	0	8	-8
377 Lowell Street"	3	1	0	64.7	66	64.7		10 ----	64.7	0	8	-8
375 Lowell Street"	4	1	0	64.8	66	64.8		10 ----	64.8	0	8	-8
3 Smith Avenue"	5	1	0	63.6	66	63.6		10 ----	63.6	0	8	-8
5 Smith Avenue"	6	1	0	63.5	66	63.5		10 ----	63.5	0	8	-8
7 Smith Avenue"	7	1	0	63.9	66	63.9		10 ----	63.9	0	8	-8
9 Smith Avenue"	8	1	0	64.5	66	64.5		10 ----	64.5	0	8	-8
11 Smith Avenue"	9	1	0	65.4	66	65.4		10 ----	65.4	0	8	-8
13 Smith Avenue"	10	1	0	67.1	66	67.1		10 Snd Lvl	67.1	0	8	-8
15 Smith Avenue"	11	1	0	68.3	66	68.3		10 Snd Lvl	68.3	0	8	-8
19 Smith Avenue"	12	1	0	70.3	66	70.3		10 Snd Lvl	70.3	0	8	-8
27 Smith Avenue"	13	1	0	74	66	74		10 Snd Lvl	74	0	8	-8
26 Smith Avenue"	14	1	0	68.9	66	68.9		10 Snd Lvl	68.9	0	8	-8
24 Smith Avenue"	15	1	0	66.9	66	66.9		10 Snd Lvl	66.9	0	8	-8
20 Smith Avenue"	16	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
16 Smith Avenue"	17	1	0	65.5	66	65.5		10 ----	65.5	0	8	-8
12 Smith Avenue"	18	1	0	64.8	66	64.8		10 ----	64.8	0	8	-8
8 Smith Avenue"	19	1	0	64	66	64		10 ----	64	0	8	-8
4 Smith Avenue"	20	1	0	64	66	64		10 ----	64	0	8	-8
2 Cherry Hill Circle"	21	1	0	64.6	66	64.6		10 ----	64.6	0	8	-8
6 Cherry Hill Circle"	22	1	0	65.5	66	65.5		10 ----	65.5	0	8	-8
10 Cherry Hill Circle"	23	1	0	66.8	66	66.8		10 Snd Lvl	66.8	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Existing Condition
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
14 Cherry Hill Circle"	24	1	0	68.3	66	68.3	10 Snd Lvl	68.3	0	8	-8	
18 Cherry Hill Circle"	25	1	0	69.7	66	69.7	10 Snd Lvl	69.7	0	8	-8	
22 Cherry Hill Circle"	26	1	0	71.4	66	71.4	10 Snd Lvl	71.4	0	8	-8	
26 Cherry Hill Circle"	27	1	0	73.4	66	73.4	10 Snd Lvl	73.4	0	8	-8	
30 Cherry Hill Circle"	28	1	0	73.1	66	73.1	10 Snd Lvl	73.1	0	8	-8	
34 Cherry Hill Circle"	29	1	0	72.5	66	72.5	10 Snd Lvl	72.5	0	8	-8	
40 Cherry Hill Circle"	30	1	0	72.3	66	72.3	10 Snd Lvl	72.3	0	8	-8	
1 Cherry Hill Circle"	31	1	0	65.8	66	65.8	10 ----	65.8	0	8	-8	
5 Cherry Hill Circle"	32	1	0	67.1	66	67.1	10 Snd Lvl	67.1	0	8	-8	
9 Cherry Hill Circle"	33	1	0	68.6	66	68.6	10 Snd Lvl	68.6	0	8	-8	
15 Cherry Hill Circle"	34	1	0	70.3	66	70.3	10 Snd Lvl	70.3	0	8	-8	
17 Cherry Hill Circle"	35	1	0	70.1	66	70.1	10 Snd Lvl	70.1	0	8	-8	
21 Cherry Hill Circle"	36	1	0	70	66	70	10 Snd Lvl	70	0	8	-8	
66 Forest Street"	37	1	0	69.3	66	69.3	10 Snd Lvl	69.3	0	8	-8	
84 Forest Street"	38	1	0	71.9	66	71.9	10 Snd Lvl	71.9	0	8	-8	
88 Forest Street"	39	1	0	74.2	66	74.2	10 Snd Lvl	74.2	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. No Build 2030
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction Calculated	Goal	
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA					
1 Bolduc St.	41	1	0	63.4	66	63.4	10 ----	63.4	0	8	-8	
1 Branch St."	42	1	0	65.1	66	65.1	10 ----	65.1	0	8	-8	
6 Bolduc St."	43	1	0	60.7	66	60.7	10 ----	60.7	0	8	-8	
10 Bolduc St."	44	1	0	60.9	66	60.9	10 ----	60.9	0	8	-8	
11 Branch St."	45	1	0	66.1	66	66.1	10 Snd Lvl	66.1	0	8	-8	
14 Rt. 113"	46	1	0	64.5	66	64.5	10 ----	64.5	0	8	-8	
14 Bolduc St."	47	1	0	63.5	66	63.5	10 ----	63.5	0	8	-8	
18 Bolduc St."	48	1	0	66.7	66	66.7	10 Snd Lvl	66.7	0	8	-8	
447 Rt. 110"	49	1	0	63.8	66	63.8	10 ----	63.8	0	8	-8	
451 Rt. 110"	50	1	0	62.3	66	62.3	10 ----	62.3	0	8	-8	
453 Rt. 110"	51	1	0	64.5	66	64.5	10 ----	64.5	0	8	-8	
9-12 Branch St."	54	1	0	64.3	66	64.3	10 ----	64.3	0	8	-8	
Little Sprouts"	55	1	0	64.3	66	64.3	10 ----	64.3	0	8	-8	
1070 Riverside Drive	1	1	0	69	66	69	10 Snd Lvl	69	0	8	-8	
1068 Riverside Drive	2	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
1073 Riverside Drive	3	1	0	72.4	66	72.4	10 Snd Lvl	72.4	0	8	-8	
27 Noyes Street"	4	1	0	71.3	66	71.3	10 Snd Lvl	71.3	0	8	-8	
25 Noyes Street"	5	1	0	70.6	66	70.6	10 Snd Lvl	70.6	0	8	-8	
21 Noyes Street"	6	1	0	70.9	66	70.9	10 Snd Lvl	70.9	0	8	-8	
19 Noyes Street"	7	1	0	72.3	66	72.3	10 Snd Lvl	72.3	0	8	-8	
17 Noyes Street"	8	1	0	72.8	66	72.8	10 Snd Lvl	72.8	0	8	-8	
15 Noyes Street"	9	1	0	73.8	66	73.8	10 Snd Lvl	73.8	0	8	-8	
13 Noyes Street"	10	1	0	74.2	66	74.2	10 Snd Lvl	74.2	0	8	-8	
11 Noyes Street"	11	1	0	74.4	66	74.4	10 Snd Lvl	74.4	0	8	-8	
9 Noyes Street"	12	1	0	74.3	66	74.3	10 Snd Lvl	74.3	0	8	-8	
7 Noyes Street"	13	1	0	74.2	66	74.2	10 Snd Lvl	74.2	0	8	-8	
5 Noyes Street"	14	1	0	73.9	66	73.9	10 Snd Lvl	73.9	0	8	-8	
4 Noyes Street"	15	1	0	70.8	66	70.8	10 Snd Lvl	70.8	0	8	-8	
8 Noyes Street"	16	1	0	70.9	66	70.9	10 Snd Lvl	70.9	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. No Build 2030
Atomospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

			No Barrier					With Barrier				
Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	Laeq 1hr		Increase over existing		Type Impact	Calculated	Noise Reduction		Calculated minus goal
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
10 Noyes Street"	17	1	0	71.6	66	71.6		10 Snd Lvl	71.6	0	8	-8
12 Noyes Street"	18	1	0	71.7	66	71.7		10 Snd Lvl	71.7	0	8	-8
16 Noyes Street"	19	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
18 Noyes Street"	20	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
20 Noyes Street"	21	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
22 Noyes Street"	22	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
24 Noyes Street"	23	1	0	69.8	66	69.8		10 Snd Lvl	69.8	0	8	-8
26 Noyes Street"	24	1	0	69.7	66	69.7		10 Snd Lvl	69.7	0	8	-8
28 Noyes Street"	25	1	0	69.7	66	69.7		10 Snd Lvl	69.7	0	8	-8
30 Noyes Street"	26	1	0	69.6	66	69.6		10 Snd Lvl	69.6	0	8	-8
34 Noyes Street"	27	1	0	69.5	66	69.5		10 Snd Lvl	69.5	0	8	-8
Aster Street"	28	1	0	68.8	66	68.8		10 Snd Lvl	68.8	0	8	-8
27 Lincoln Street"	29	1	0	66.8	66	66.8		10 Snd Lvl	66.8	0	8	-8
19 Lincoln Street"	30	1	0	66.9	66	66.9		10 Snd Lvl	66.9	0	8	-8
17 Lincoln Street"	31	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
15 Lincoln Street"	32	1	0	67.1	66	67.1		10 Snd Lvl	67.1	0	8	-8
11 Lincoln Street"	33	1	0	67.6	66	67.6		10 Snd Lvl	67.6	0	8	-8
10 Lincoln Street"	34	1	0	67	66	67		10 Snd Lvl	67	0	8	-8
12 Lincoln Street"	35	1	0	66.4	66	66.4		10 Snd Lvl	66.4	0	8	-8
14 Lincoln Street"	36	1	0	65.9	66	65.9		10 ----	65.9	0	8	-8
16 Lincoln Street"	37	1	0	65.5	66	65.5		10 ----	65.5	0	8	-8
18 Lincoln Street"	38	1	0	65.3	66	65.3		10 ----	65.3	0	8	-8
1095 Riverside Drive	41	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
17 Griffin Street"	42	1	0	72	66	72		10 Snd Lvl	72	0	8	-8
15 Griffin Street"	43	1	0	72.2	66	72.2		10 Snd Lvl	72.2	0	8	-8
11 Griffin Street"	44	1	0	73.3	66	73.3		10 Snd Lvl	73.3	0	8	-8
9 Griffin Street"	45	1	0	72.8	66	72.8		10 Snd Lvl	72.8	0	8	-8
1097 Riverside Drive	46	1	0	69.4	66	69.4		10 Snd Lvl	69.4	0	8	-8
26 Allen Street"	47	1	0	69.5	66	69.5		10 Snd Lvl	69.5	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. No Build 2030
Atomospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
20 Allen Street"	48	1	0	69.9	66	69.9		10 Snd Lvl	69.9	0	8	-8
18 Allen Street"	49	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
14 Allen Street"	50	1	0	70.1	66	70.1		10 Snd Lvl	70.1	0	8	-8
19 Allen Street"	51	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
23 Allen Street"	52	1	0	68.5	66	68.5		10 Snd Lvl	68.5	0	8	-8
27 Allen Street"	53	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
387 Lowell Street	1	1	0	66.9	66	66.9		10 Snd Lvl	66.9	0	8	-8
379 Lowell Street"	2	1	0	66.6	66	66.6		10 Snd Lvl	66.6	0	8	-8
377 Lowell Street"	3	1	0	65.6	66	65.6		10 ----	65.6	0	8	-8
375 Lowell Street"	4	1	0	65.7	66	65.7		10 ----	65.7	0	8	-8
3 Smith Avenue"	5	1	0	64.4	66	64.4		10 ----	64.4	0	8	-8
5 Smith Avenue"	6	1	0	64.3	66	64.3		10 ----	64.3	0	8	-8
7 Smith Avenue"	7	1	0	64.7	66	64.7		10 ----	64.7	0	8	-8
9 Smith Avenue"	8	1	0	65.3	66	65.3		10 ----	65.3	0	8	-8
11 Smith Avenue"	9	1	0	66.2	66	66.2		10 Snd Lvl	66.2	0	8	-8
13 Smith Avenue"	10	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
15 Smith Avenue"	11	1	0	69.1	66	69.1		10 Snd Lvl	69.1	0	8	-8
19 Smith Avenue"	12	1	0	71.2	66	71.2		10 Snd Lvl	71.2	0	8	-8
27 Smith Avenue"	13	1	0	74.8	66	74.8		10 Snd Lvl	74.8	0	8	-8
26 Smith Avenue"	14	1	0	69.7	66	69.7		10 Snd Lvl	69.7	0	8	-8
24 Smith Avenue"	15	1	0	67.7	66	67.7		10 Snd Lvl	67.7	0	8	-8
20 Smith Avenue"	16	1	0	67.5	66	67.5		10 Snd Lvl	67.5	0	8	-8
16 Smith Avenue"	17	1	0	66.4	66	66.4		10 Snd Lvl	66.4	0	8	-8
12 Smith Avenue"	18	1	0	65.7	66	65.7		10 ----	65.7	0	8	-8
8 Smith Avenue"	19	1	0	64.8	66	64.8		10 ----	64.8	0	8	-8
4 Smith Avenue"	20	1	0	64.8	66	64.8		10 ----	64.8	0	8	-8
2 Cherry Hill Circle"	21	1	0	65.4	66	65.4		10 ----	65.4	0	8	-8
6 Cherry Hill Circle"	22	1	0	66.3	66	66.3		10 Snd Lvl	66.3	0	8	-8
10 Cherry Hill Circle'	23	1	0	67.7	66	67.7		10 Snd Lvl	67.7	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. No Build 2030
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
14 Cherry Hill Circle'	24	1	0	69.1	66	69.1		10 Snd Lvl	69.1	0	8	-8
18 Cherry Hill Circle'	25	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
22 Cherry Hill Circle'	26	1	0	72.2	66	72.2		10 Snd Lvl	72.2	0	8	-8
26 Cherry Hill Circle'	27	1	0	74.2	66	74.2		10 Snd Lvl	74.2	0	8	-8
30 Cherry Hill Circle'	28	1	0	73.9	66	73.9		10 Snd Lvl	73.9	0	8	-8
34 Cherry Hill Circle'	29	1	0	73.3	66	73.3		10 Snd Lvl	73.3	0	8	-8
40 Cherry Hill Circle'	30	1	0	73.1	66	73.1		10 Snd Lvl	73.1	0	8	-8
1 Cherry Hill Circle"	31	1	0	66.6	66	66.6		10 Snd Lvl	66.6	0	8	-8
5 Cherry Hill Circle"	32	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
9 Cherry Hill Circle"	33	1	0	69.4	66	69.4		10 Snd Lvl	69.4	0	8	-8
15 Cherry Hill Circle'	34	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
17 Cherry Hill Circle'	35	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
21 Cherry Hill Circle'	36	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
66 Forest Street"	37	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
84 Forest Street"	38	1	0	72.7	66	72.7		10 Snd Lvl	72.7	0	8	-8
88 Forest Street"	39	1	0	75	66	75		10 Snd Lvl	75	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 2B
Atomospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
1 Bolduc St.	41	1	0	66	66	66	10 Snd Lvl	66	0	8	-8	
1 Branch St."	42	1	0	66.3	66	66.3	10 Snd Lvl	66.3	0	8	-8	
6 Bolduc St."	43	1	0	62.4	66	62.4	10 ----	62.4	0	8	-8	
10 Bolduc St."	44	1	0	63.1	66	63.1	10 ----	63.1	0	8	-8	
11 Branch St."	45	1	0	68.5	66	68.5	10 Snd Lvl	68.5	0	8	-8	
14 Rt. 113"	46	1	0	69.2	66	69.2	10 Snd Lvl	69.2	0	8	-8	
14 Bolduc St."	47	1	0	64.6	66	64.6	10 ----	64.6	0	8	-8	
18 Bolduc St."	48	1	0	68.7	66	68.7	10 Snd Lvl	68.7	0	8	-8	
447 Rt. 110"	49	1	0	68.9	66	68.9	10 Snd Lvl	68.9	0	8	-8	
451 Rt. 110"	50	1	0	65.7	66	65.7	10 ----	65.7	0	8	-8	
453 Rt. 110"	51	1	0	67.8	66	67.8	10 Snd Lvl	67.8	0	8	-8	
9-12 Branch St."	54	1	0	64.7	66	64.7	10 ----	64.7	0	8	-8	
Little Sprouts"	55	1	0	64.7	66	64.7	10 ----	64.7	0	8	-8	
1070 Riverside Drive	1	1	0	68.8	66	68.8	10 Snd Lvl	68.8	0	8	-8	
1068 Riverside Drive	2	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
1073 Riverside Drive	3	1	0	73.2	66	73.2	10 Snd Lvl	73.2	0	8	-8	
27 Noyes Street"	4	1	0	72.2	66	72.2	10 Snd Lvl	72.2	0	8	-8	
25 Noyes Street"	5	1	0	71.9	66	71.9	10 Snd Lvl	71.9	0	8	-8	
21 Noyes Street"	6	1	0	72.1	66	72.1	10 Snd Lvl	72.1	0	8	-8	
19 Noyes Street"	7	1	0	72.7	66	72.7	10 Snd Lvl	72.7	0	8	-8	
17 Noyes Street"	8	1	0	72.9	66	72.9	10 Snd Lvl	72.9	0	8	-8	
15 Noyes Street"	9	1	0	73.6	66	73.6	10 Snd Lvl	73.6	0	8	-8	
13 Noyes Street"	10	1	0	74	66	74	10 Snd Lvl	74	0	8	-8	
11 Noyes Street"	11	1	0	74.2	66	74.2	10 Snd Lvl	74.2	0	8	-8	
9 Noyes Street"	12	1	0	73.9	66	73.9	10 Snd Lvl	73.9	0	8	-8	
7 Noyes Street"	13	1	0	73.7	66	73.7	10 Snd Lvl	73.7	0	8	-8	
5 Noyes Street"	14	1	0	73	66	73	10 Snd Lvl	73	0	8	-8	
4 Noyes Street"	15	1	0	69.8	66	69.8	10 Snd Lvl	69.8	0	8	-8	
8 Noyes Street"	16	1	0	70.2	66	70.2	10 Snd Lvl	70.2	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 2B
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
10 Noyes Street"	17	1	0	71	66	71	10 Snd Lvl	71	0	8	-8	
12 Noyes Street"	18	1	0	71.3	66	71.3	10 Snd Lvl	71.3	0	8	-8	
16 Noyes Street"	19	1	0	70.9	66	70.9	10 Snd Lvl	70.9	0	8	-8	
18 Noyes Street"	20	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
20 Noyes Street"	21	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
22 Noyes Street"	22	1	0	70.4	66	70.4	10 Snd Lvl	70.4	0	8	-8	
24 Noyes Street"	23	1	0	69.7	66	69.7	10 Snd Lvl	69.7	0	8	-8	
26 Noyes Street"	24	1	0	69.6	66	69.6	10 Snd Lvl	69.6	0	8	-8	
28 Noyes Street"	25	1	0	69.7	66	69.7	10 Snd Lvl	69.7	0	8	-8	
30 Noyes Street"	26	1	0	69.6	66	69.6	10 Snd Lvl	69.6	0	8	-8	
34 Noyes Street"	27	1	0	69.5	66	69.5	10 Snd Lvl	69.5	0	8	-8	
Aster Street"	28	1	0	68.5	66	68.5	10 Snd Lvl	68.5	0	8	-8	
27 Lincoln Street"	29	1	0	66.6	66	66.6	10 Snd Lvl	66.6	0	8	-8	
19 Lincoln Street"	30	1	0	66.7	66	66.7	10 Snd Lvl	66.7	0	8	-8	
17 Lincoln Street"	31	1	0	66.5	66	66.5	10 Snd Lvl	66.5	0	8	-8	
15 Lincoln Street"	32	1	0	67	66	67	10 Snd Lvl	67	0	8	-8	
11 Lincoln Street"	33	1	0	67.6	66	67.6	10 Snd Lvl	67.6	0	8	-8	
10 Lincoln Street"	34	1	0	67.1	66	67.1	10 Snd Lvl	67.1	0	8	-8	
12 Lincoln Street"	35	1	0	66.3	66	66.3	10 Snd Lvl	66.3	0	8	-8	
14 Lincoln Street"	36	1	0	65.9	66	65.9	10 ----	65.9	0	8	-8	
16 Lincoln Street"	37	1	0	65.4	66	65.4	10 ----	65.4	0	8	-8	
18 Lincoln Street"	38	1	0	65.3	66	65.3	10 ----	65.3	0	8	-8	
1095 Riverside Drive	41	1	0	70.9	66	70.9	10 Snd Lvl	70.9	0	8	-8	
17 Griffin Street"	42	1	0	72.7	66	72.7	10 Snd Lvl	72.7	0	8	-8	
15 Griffin Street"	43	1	0	72.6	66	72.6	10 Snd Lvl	72.6	0	8	-8	
11 Griffin Street"	44	1	0	73.4	66	73.4	10 Snd Lvl	73.4	0	8	-8	
9 Griffin Street"	45	1	0	72.9	66	72.9	10 Snd Lvl	72.9	0	8	-8	
1097 Riverside Drive	46	1	0	69.5	66	69.5	10 Snd Lvl	69.5	0	8	-8	
26 Allen Street"	47	1	0	70	66	70	10 Snd Lvl	70	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 2B
Atomospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

			No Barrier					With Barrier				
Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	Laeq 1hr		Increase over existing		Type Impact	Calculated	Noise Reduction		Calculated minus goal
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
20 Allen Street"	48	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
18 Allen Street"	49	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
14 Allen Street"	50	1	0	70	66	70		10 Snd Lvl	70	0	8	-8
19 Allen Street"	51	1	0	68.8	66	68.8		10 Snd Lvl	68.8	0	8	-8
23 Allen Street"	52	1	0	68.8	66	68.8		10 Snd Lvl	68.8	0	8	-8
27 Allen Street"	53	1	0	68.2	66	68.2		10 Snd Lvl	68.2	0	8	-8
387 Lowell Street	1	1	0	67.6	66	67.6		10 Snd Lvl	67.6	0	8	-8
379 Lowell Street"	2	1	0	66.8	66	66.8		10 Snd Lvl	66.8	0	8	-8
377 Lowell Street"	3	1	0	66.1	66	66.1		10 Snd Lvl	66.1	0	8	-8
375 Lowell Street"	4	1	0	66.6	66	66.6		10 Snd Lvl	66.6	0	8	-8
3 Smith Avenue"	5	1	0	65	66	65		10 ---	65	0	8	-8
5 Smith Avenue"	6	1	0	64.8	66	64.8		10 ---	64.8	0	8	-8
7 Smith Avenue"	7	1	0	65.2	66	65.2		10 ---	65.2	0	8	-8
9 Smith Avenue"	8	1	0	65.8	66	65.8		10 ---	65.8	0	8	-8
11 Smith Avenue"	9	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
13 Smith Avenue"	10	1	0	68.2	66	68.2		10 Snd Lvl	68.2	0	8	-8
15 Smith Avenue"	11	1	0	69.3	66	69.3		10 Snd Lvl	69.3	0	8	-8
19 Smith Avenue"	12	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
27 Smith Avenue"	13	1	0	74.8	66	74.8		10 Snd Lvl	74.8	0	8	-8
26 Smith Avenue"	14	1	0	70	66	70		10 Snd Lvl	70	0	8	-8
24 Smith Avenue"	15	1	0	68.1	66	68.1		10 Snd Lvl	68.1	0	8	-8
20 Smith Avenue"	16	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
16 Smith Avenue"	17	1	0	66.9	66	66.9		10 Snd Lvl	66.9	0	8	-8
12 Smith Avenue"	18	1	0	66.2	66	66.2		10 Snd Lvl	66.2	0	8	-8
8 Smith Avenue"	19	1	0	65.4	66	65.4		10 ---	65.4	0	8	-8
4 Smith Avenue"	20	1	0	65.4	66	65.4		10 ---	65.4	0	8	-8
2 Cherry Hill Circle"	21	1	0	65.6	66	65.6		10 ---	65.6	0	8	-8
6 Cherry Hill Circle"	22	1	0	66.5	66	66.5		10 Snd Lvl	66.5	0	8	-8
10 Cherry Hill Circle'	23	1	0	67.8	66	67.8		10 Snd Lvl	67.8	0	8	-8

Tech Environmental, Inc.

**9/8/2009
TNM 2.5**

Project Name Methuen Rotary
Run I.D. Alternative 2B
Atmospherics 68 deg, 50% RH

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
14 Cherry Hill Circle'	24	1	0	69.1	66	69.1		10 Snd Lvl	69.1	0	8	-8
18 Cherry Hill Circle'	25	1	0	70.4	66	70.4		10 Snd Lvl	70.4	0	8	-8
22 Cherry Hill Circle'	26	1	0	72.1	66	72.1		10 Snd Lvl	72.1	0	8	-8
26 Cherry Hill Circle'	27	1	0	74.1	66	74.1		10 Snd Lvl	74.1	0	8	-8
30 Cherry Hill Circle'	28	1	0	73.8	66	73.8		10 Snd Lvl	73.8	0	8	-8
34 Cherry Hill Circle'	29	1	0	73.3	66	73.3		10 Snd Lvl	73.3	0	8	-8
40 Cherry Hill Circle'	30	1	0	73.1	66	73.1		10 Snd Lvl	73.1	0	8	-8
1 Cherry Hill Circle"	31	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
5 Cherry Hill Circle"	32	1	0	68	66	68		10 Snd Lvl	68	0	8	-8
9 Cherry Hill Circle"	33	1	0	69.4	66	69.4		10 Snd Lvl	69.4	0	8	-8
15 Cherry Hill Circle'	34	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
17 Cherry Hill Circle'	35	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
21 Cherry Hill Circle'	36	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
66 Forest Street"	37	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
84 Forest Street"	38	1	0	72.7	66	72.7		10 Snd Lvl	72.7	0	8	-8
88 Forest Street"	39	1	0	74.9	66	74.9		10 Snd Lvl	74.9	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 3A
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
1 Bolduc St.	41	1	0	65.3	66	65.3	10 ----	65.3	0	8	-8	
1 Branch St."	42	1	0	66.2	66	66.2	10 Snd Lvl	66.2	0	8	-8	
6 Bolduc St."	43	1	0	62.3	66	62.3	10 ----	62.3	0	8	-8	
10 Bolduc St."	44	1	0	62.9	66	62.9	10 ----	62.9	0	8	-8	
11 Branch St."	45	1	0	67.9	66	67.9	10 Snd Lvl	67.9	0	8	-8	
14 Rt. 113"	46	1	0	67.9	66	67.9	10 Snd Lvl	67.9	0	8	-8	
14 Bolduc St."	47	1	0	64.3	66	64.3	10 ----	64.3	0	8	-8	
18 Bolduc St."	48	1	0	68.8	66	68.8	10 Snd Lvl	68.8	0	8	-8	
447 Rt. 110"	49	1	0	66.9	66	66.9	10 Snd Lvl	66.9	0	8	-8	
451 Rt. 110"	50	1	0	65.4	66	65.4	10 ----	65.4	0	8	-8	
453 Rt. 110"	51	1	0	67.6	66	67.6	10 Snd Lvl	67.6	0	8	-8	
9-12 Branch St."	54	1	0	65.1	66	65.1	10 ----	65.1	0	8	-8	
Little Sprouts"	55	1	0	65.3	66	65.3	10 ----	65.3	0	8	-8	
1070 Riverside Drive	1	1	0	68.9	66	68.9	10 Snd Lvl	68.9	0	8	-8	
1068 Riverside Drive	2	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
1073 Riverside Drive	3	1	0	72.6	66	72.6	10 Snd Lvl	72.6	0	8	-8	
27 Noyes Street"	4	1	0	71.5	66	71.5	10 Snd Lvl	71.5	0	8	-8	
25 Noyes Street"	5	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
21 Noyes Street"	6	1	0	70.7	66	70.7	10 Snd Lvl	70.7	0	8	-8	
19 Noyes Street"	7	1	0	71.8	66	71.8	10 Snd Lvl	71.8	0	8	-8	
17 Noyes Street"	8	1	0	72	66	72	10 Snd Lvl	72	0	8	-8	
15 Noyes Street"	9	1	0	73.6	66	73.6	10 Snd Lvl	73.6	0	8	-8	
13 Noyes Street"	10	1	0	73.9	66	73.9	10 Snd Lvl	73.9	0	8	-8	
11 Noyes Street"	11	1	0	74.1	66	74.1	10 Snd Lvl	74.1	0	8	-8	
9 Noyes Street"	12	1	0	73.8	66	73.8	10 Snd Lvl	73.8	0	8	-8	
7 Noyes Street"	13	1	0	73.5	66	73.5	10 Snd Lvl	73.5	0	8	-8	
5 Noyes Street"	14	1	0	72.8	66	72.8	10 Snd Lvl	72.8	0	8	-8	
4 Noyes Street"	15	1	0	69.8	66	69.8	10 Snd Lvl	69.8	0	8	-8	
8 Noyes Street"	16	1	0	70.1	66	70.1	10 Snd Lvl	70.1	0	8	-8	

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 3A
Atmospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

			No Barrier					With Barrier				
Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	Laeq 1hr		Increase over existing		Type Impact	Calculated	Noise Reduction		Calculated minus goal
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
10 Noyes Street"	17	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
12 Noyes Street"	18	1	0	71.2	66	71.2		10 Snd Lvl	71.2	0	8	-8
16 Noyes Street"	19	1	0	70.8	66	70.8		10 Snd Lvl	70.8	0	8	-8
18 Noyes Street"	20	1	0	70.6	66	70.6		10 Snd Lvl	70.6	0	8	-8
20 Noyes Street"	21	1	0	70.6	66	70.6		10 Snd Lvl	70.6	0	8	-8
22 Noyes Street"	22	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
24 Noyes Street"	23	1	0	69.8	66	69.8		10 Snd Lvl	69.8	0	8	-8
26 Noyes Street"	24	1	0	69.6	66	69.6		10 Snd Lvl	69.6	0	8	-8
28 Noyes Street"	25	1	0	69.5	66	69.5		10 Snd Lvl	69.5	0	8	-8
30 Noyes Street"	26	1	0	69.4	66	69.4		10 Snd Lvl	69.4	0	8	-8
34 Noyes Street"	27	1	0	69.3	66	69.3		10 Snd Lvl	69.3	0	8	-8
Aster Street"	28	1	0	68.4	66	68.4		10 Snd Lvl	68.4	0	8	-8
27 Lincoln Street"	29	1	0	66.5	66	66.5		10 Snd Lvl	66.5	0	8	-8
19 Lincoln Street"	30	1	0	66.5	66	66.5		10 Snd Lvl	66.5	0	8	-8
17 Lincoln Street"	31	1	0	66.4	66	66.4		10 Snd Lvl	66.4	0	8	-8
15 Lincoln Street"	32	1	0	67	66	67		10 Snd Lvl	67	0	8	-8
11 Lincoln Street"	33	1	0	67.6	66	67.6		10 Snd Lvl	67.6	0	8	-8
10 Lincoln Street"	34	1	0	67.2	66	67.2		10 Snd Lvl	67.2	0	8	-8
12 Lincoln Street"	35	1	0	66.3	66	66.3		10 Snd Lvl	66.3	0	8	-8
14 Lincoln Street"	36	1	0	65.8	66	65.8		10 ----	65.8	0	8	-8
16 Lincoln Street"	37	1	0	65.2	66	65.2		10 ----	65.2	0	8	-8
18 Lincoln Street"	38	1	0	65.1	66	65.1		10 ----	65.1	0	8	-8
1095 Riverside Drive	41	1	0	70	66	70		10 Snd Lvl	70	0	8	-8
17 Griffin Street"	42	1	0	72.4	66	72.4		10 Snd Lvl	72.4	0	8	-8
15 Griffin Street"	43	1	0	72	66	72		10 Snd Lvl	72	0	8	-8
11 Griffin Street"	44	1	0	73	66	73		10 Snd Lvl	73	0	8	-8
9 Griffin Street"	45	1	0	72.4	66	72.4		10 Snd Lvl	72.4	0	8	-8
1097 Riverside Drive	46	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
26 Allen Street"	47	1	0	69.7	66	69.7		10 Snd Lvl	69.7	0	8	-8

Tech Environmental, Inc.

Project Name Methuen Rotary
Run I.D. Alternative 3A
Atomospherics 68 deg, 50% RH

9/8/2009
TNM 2.5

Reciever Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
20 Allen Street"	48	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
18 Allen Street"	49	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
14 Allen Street"	50	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
19 Allen Street"	51	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
23 Allen Street"	52	1	0	68.5	66	68.5		10 Snd Lvl	68.5	0	8	-8
27 Allen Street"	53	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
387 Lowell Street	1	1	0	67.6	66	67.6		10 Snd Lvl	67.6	0	8	-8
379 Lowell Street"	2	1	0	66.5	66	66.5		10 Snd Lvl	66.5	0	8	-8
377 Lowell Street"	3	1	0	65.8	66	65.8		10 ----	65.8	0	8	-8
375 Lowell Street"	4	1	0	66.1	66	66.1		10 Snd Lvl	66.1	0	8	-8
3 Smith Avenue"	5	1	0	64.7	66	64.7		10 ----	64.7	0	8	-8
5 Smith Avenue"	6	1	0	64.6	66	64.6		10 ----	64.6	0	8	-8
7 Smith Avenue"	7	1	0	65	66	65		10 ----	65	0	8	-8
9 Smith Avenue"	8	1	0	65.5	66	65.5		10 ----	65.5	0	8	-8
11 Smith Avenue"	9	1	0	66.4	66	66.4		10 Snd Lvl	66.4	0	8	-8
13 Smith Avenue"	10	1	0	68	66	68		10 Snd Lvl	68	0	8	-8
15 Smith Avenue"	11	1	0	69.2	66	69.2		10 Snd Lvl	69.2	0	8	-8
19 Smith Avenue"	12	1	0	71.2	66	71.2		10 Snd Lvl	71.2	0	8	-8
27 Smith Avenue"	13	1	0	74.8	66	74.8		10 Snd Lvl	74.8	0	8	-8
26 Smith Avenue"	14	1	0	70.2	66	70.2		10 Snd Lvl	70.2	0	8	-8
24 Smith Avenue"	15	1	0	68.1	66	68.1		10 Snd Lvl	68.1	0	8	-8
20 Smith Avenue"	16	1	0	67.8	66	67.8		10 Snd Lvl	67.8	0	8	-8
16 Smith Avenue"	17	1	0	66.7	66	66.7		10 Snd Lvl	66.7	0	8	-8
12 Smith Avenue"	18	1	0	66	66	66		10 Snd Lvl	66	0	8	-8
8 Smith Avenue"	19	1	0	65.1	66	65.1		10 ----	65.1	0	8	-8
4 Smith Avenue"	20	1	0	65.1	66	65.1		10 ----	65.1	0	8	-8
2 Cherry Hill Circle"	21	1	0	65.4	66	65.4		10 ----	65.4	0	8	-8
6 Cherry Hill Circle"	22	1	0	66.4	66	66.4		10 Snd Lvl	66.4	0	8	-8
10 Cherry Hill Circle'	23	1	0	67.7	66	67.7		10 Snd Lvl	67.7	0	8	-8

Tech Environmental, Inc.

**9/8/2009
TNM 2.5**

Project Name Methuen Rotary
Run I.D. Alternative 3A
Atmospherics 68 deg, 50% RH

Receiver Name	No.	# DU's	Existing Laeq 1hr dBA	No Barrier				Type Impact	With Barrier			Calculated minus goal
				Laeq 1hr		Increase over existing			Calculated	Noise Reduction		
				Calculated dBA	Crit'n dBA	Calculated dBA	Crit'n Sub'l Inc dBA			Calculated	Goal	
14 Cherry Hill Circle'	24	1	0	69	66	69		10 Snd Lvl	69	0	8	-8
18 Cherry Hill Circle'	25	1	0	70.5	66	70.5		10 Snd Lvl	70.5	0	8	-8
22 Cherry Hill Circle'	26	1	0	72.2	66	72.2		10 Snd Lvl	72.2	0	8	-8
26 Cherry Hill Circle'	27	1	0	74.2	66	74.2		10 Snd Lvl	74.2	0	8	-8
30 Cherry Hill Circle'	28	1	0	73.8	66	73.8		10 Snd Lvl	73.8	0	8	-8
34 Cherry Hill Circle'	29	1	0	73.3	66	73.3		10 Snd Lvl	73.3	0	8	-8
40 Cherry Hill Circle'	30	1	0	73.1	66	73.1		10 Snd Lvl	73.1	0	8	-8
1 Cherry Hill Circle"	31	1	0	66.6	66	66.6		10 Snd Lvl	66.6	0	8	-8
5 Cherry Hill Circle"	32	1	0	67.9	66	67.9		10 Snd Lvl	67.9	0	8	-8
9 Cherry Hill Circle"	33	1	0	69.4	66	69.4		10 Snd Lvl	69.4	0	8	-8
15 Cherry Hill Circle'	34	1	0	71.1	66	71.1		10 Snd Lvl	71.1	0	8	-8
17 Cherry Hill Circle'	35	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
21 Cherry Hill Circle'	36	1	0	70.9	66	70.9		10 Snd Lvl	70.9	0	8	-8
66 Forest Street"	37	1	0	70.3	66	70.3		10 Snd Lvl	70.3	0	8	-8
84 Forest Street"	38	1	0	72.7	66	72.7		10 Snd Lvl	72.7	0	8	-8
88 Forest Street"	39	1	0	74.9	66	74.9		10 Snd Lvl	74.9	0	8	-8

Noise Appendix C
TNM Modeling Results for the
Noise Barrier Analysis

Noise Appendix C

Northeast Quadrant Noise Barrier Analysis Results (Alternative 3A)

Receiver Name	No Barrier (dBA)	B/B C1 -25 (dBA)	Reduction (dBA)	C1-25 (dBA)	Reduction (dBA)	C1-22/25 (dBA)	Reduction (dBA)	B/B C2-25 (dBA)	Reduction (dBA)	C2-25 (dBA)	Reduction (dBA)	C2-22/25 (dBA)	Reduction (dBA)										
3 Smith Avenue"	64.7	62.6	-2.1	62.4	-2.3	62.5	-2.2	63	-1.7	63	-1.7	63.1	-1.6										
5 Smith Avenue"	64.6	61.9	-2.7	61.6	-3	61.8	-2.8	62	-2.6	62	-2.6	62.1	-2.5										
7 Smith Avenue"	65	62	-3	61.4	-3.6	61.8	-3.2	60.9	-4.1	61	-4	61.2	-3.8										
8 Smith Avenue"	65.1	61.8	-3.3	61.6	-3.5	61.8	-3.3	62.8	-2.3	62.8	-2.3	62.8	-2.3										
9 Smith Avenue"	65.5	62.2	-3.3	61.4	-4.1	62	-3.5	60.8	-4.7	60.9	-4.6	61.2	-4.3										
11 Smith Avenue"	66.4	62.1	-4.3	61.4	-5	62.2	-4.2	60.6	-5.8	60.6	-5.8	61.1	-5.3										
12 Smith Avenue"	66	61.8	-4.2	61.6	-4.4	61.8	-4.2	61.1	-4.9	61.2	-4.8	61.3	-4.7										
13 Smith Avenue"	68	61.5	-6.5	61.3	-6.7	62.7	-5.3	60.7	-7.3	60.7	-7.3	61.6	-6.4										
15 Smith Avenue"	69.2	61	-8.2	60.9	-8.3	61.7	-7.5	60.6	-8.6	60.6	-8.6	61.6	-7.6										
16 Smith Avenue"	66.7	61.7	-5	61.3	-5.4	61.6	-5.1	59.4	-7.3	59.4	-7.3	59.7	-7										
19 Smith Avenue"	71.2	60.4	-10.8	60.3	-10.9	61.1	-10.1	59.9	-11.3	60.3	-10.9	61.3	-9.9										
20 Smith Avenue"	67.8	61.3	-6.5	60.8	-7	61.2	-6.6	58.6	-9.2	58.8	-9	59.2	-8.6										
24 Smith Avenue"	68.1	59.9	-8.2	59.8	-8.3	60.3	-7.8	58.2	-9.9	58.3	-9.8	58.8	-9.3										
26 Smith Avenue"	70.2	59.5	-10.7	59.5	-10.7	60.2	-10	58.6	-11.6	58.7	-11.5	59.6	-10.6										
27 Smith Avenue"	74.8	59.5	-15.3	59.7	-15.1	60.7	-14.1	59.4	-15.4	59.3	-15.5	60.3	-14.5										
1 Cherry Hill Circle"	66.6	62.6	-4	62.4	-4.2	63	-3.6	62.5	-4.1	62.4	-4.2	62.9	-3.7										
2 Cherry Hill Circle"	65.4	61.7	-3.7	61.5	-3.9	62.1	-3.3	61.3	-4.1	61.3	-4.1	61.6	-3.8										
5 Cherry Hill Circle"	67.9	62.4	-5.5	62.3	-5.6	62.7	-5.2	62.3	-5.6	62.3	-5.6	62.7	-5.2										
6 Cherry Hill Circle"	66.4	61.9	-4.5	61.7	-4.7	62.6	-3.8	61.5	-4.9	61.4	-5	61.9	-4.5										
9 Cherry Hill Circle"	69.4	62.9	-6.5	62.7	-6.7	63.1	-6.3	62.7	-6.7	62.8	-6.6	63.2	-6.2										
10 Cherry Hill Circle"	67.7	61.8	-5.9	61.6	-6.1	62.6	-5.1	61.5	-6.2	61.4	-6.3	62.2	-5.5										
14 Cherry Hill Circle"	69	61.5	-7.5	61.4	-7.6	62	-7	61.4	-7.6	61.4	-7.6	62.2	-6.8										
15 Cherry Hill Circle"	71.1	63.6	-7.5	63.3	-7.8	63.8	-7.3	63.2	-7.9	63.3	-7.8	64.2	-6.9										
17 Cherry Hill Circle"	70.9	65.6	-5.3	65.4	-5.5	65.9	-5	65.4	-5.5	65.4	-5.5	65.8	-5.1										
18 Cherry Hill Circle"	70.5	61.5	-9	61.4	-9.1	62.1	-8.4	61.2	-9.3	61.4	-9.1	62.3	-8.2										
21 Cherry Hill Circle"	70.9	66.7	-4.2	66.8	-4.1	66.9	-4	66.8	-4.1	66.7	-4.2	66.9	-4										
22 Cherry Hill Circle"	72.2	62.1	-10.1	61.6	-10.6	62.7	-9.5	61.2	-11	61.6	-10.6	62.7	-9.5										
26 Cherry Hill Circle"	74.2	62.7	-11.5	62.8	-11.4	64.4	-9.8	62.3	-11.9	62.5	-11.7	64.1	-10.1										
30 Cherry Hill Circle"	73.8	63.4	-10.4	63.8	-10	64.4	-9.4	63.2	-10.6	63.3	-10.5	64.3	-9.5										
34 Cherry Hill Circle"	73.3	65.4	-7.9	65.5	-7.8	66	-7.3	65.5	-7.8	65.4	-7.9	66	-7.3										
40 Cherry Hill Circle"	73.1	68.3	-4.8	68.4	-4.7	68.5	-4.6	68.4	-4.7	68.3	-4.8	68.5	-4.6										
66 Forest Street"	70.3	67.7	-2.6	67.8	-2.5	67.9	-2.4	67.8	-2.5	67.8	-2.5	67.9	-2.4										
84 Forest Street"	72.7	71.1	-1.6	71.1	-1.6	71.2	-1.5	71.1	-1.6	71.1	-1.6	71.2	-1.5										
88 Forest Street"	74.9	74.6	-0.3	74.6	-0.3	74.6	-0.3	74.6	-0.3	74.6	-0.3	74.6	-0.3										
Average Insertion Loss			-8.0	Avg. IL			-8.0	Avg. IL			-7.6	Avg. IL			-8.2	Avg. IL			-8.1	Avg. IL			-7.5
Number Protected			21	No. Protected			22	No. Protected			20	No. Protected			24	No. Protected			24	No. Protected			23

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix C

Southeast Quadrant Noise Barrier Analysis Results (Alternative 3A)

Receiver Name	No Barrier (dBA)	D1-18 (dBA)	Reduction (dBA)	D1-20 (dBA)	Reduction (dBA)	D1-24 (dBA)	Reduction (dBA)	D1-25 (dBA)	Reduction (dBA)	D2-18 (dBA)	Reduction (dBA)	D2-20 (dBA)	Reduction (dBA)	D2-24 (dBA)	Reduction (dBA)	D2-25 (dBA)	Reduction (dBA)
1068 Riverside Drive**	70.7	70.1	-0.6	70.1	-0.6	70.1	-0.6	70.1	-0.6	70.1	-0.6	70.1	-0.6	70.1	-0.6	70.1	-0.6
1070 Riverside Drive	68.9	68.9	0	68.9	0	68.9	0	68.9	0	68.9	0	68.9	0	68.9	0	68.9	0
1073 Riverside Drive**	72.6	69.3	-3.3	69.1	-3.5	68.8	-3.8	68.8	-3.8	69.3	-3.3	69.1	-3.5	68.8	-3.8	68.8	-3.8
4 Noyes Street**	69.8	64.4	-5.4	63.9	-5.9	62.8	-7	62.6	-7.2	63.1	-6.7	62.2	-7.6	60.5	-9.3	60	-9.8
5 Noyes Street**	72.8	64.7	-8.1	63.6	-9.2	61.8	-11	61.6	-11.2	64.6	-8.2	63.3	-9.5	61.4	-11.4	61.1	-11.7
7 Noyes Street**	73.5	65.2	-8.3	64.1	-9.4	62.3	-11.2	61.9	-11.6	65.1	-8.4	63.9	-9.6	62.1	-11.4	61.6	-11.9
8 Noyes Street**	70.1	65.1	-5	64.2	-5.9	62.6	-7.5	62.3	-7.8	64.6	-5.5	63.6	-6.5	61.5	-8.6	61.1	-9
9 Noyes Street**	73.8	64.9	-8.9	63.9	-9.9	62.3	-11.5	61.9	-11.9	64.8	-9	63.8	-10	62	-11.8	61.7	-12.1
10 Noyes Street**	70.9	67.6	-3.3	66.2	-4.7	63.6	-7.3	63.1	-7.8	67.4	-3.5	66	-4.9	63.2	-7.7	62.6	-8.3
11 Noyes Street**	74.1	65.3	-8.8	64.2	-9.9	62.7	-11.4	62.1	-12	65.2	-8.9	64	-10.1	62.5	-11.6	61.9	-12.2
12 Noyes Street**	71.2	66.9	-4.3	66	-5.2	63.5	-7.7	63	-8.2	66.8	-4.4	65.8	-5.4	63.2	-8	62.7	-8.5
13 Noyes Street**	73.9	64.3	-9.6	63.4	-10.5	62	-11.9	61.8	-12.1	64.2	-9.7	63.2	-10.7	61.8	-12.1	61.6	-12.3
15 Noyes Street**	73.6	63.7	-9.9	62.9	-10.7	61.8	-11.8	61.5	-12.1	63.6	-10	62.8	-10.8	61.7	-11.9	61.4	-12.2
16 Noyes Street**	70.8	65.1	-5.7	64.3	-6.5	62.4	-8.4	61.9	-8.9	65	-5.8	64.2	-6.6	62.1	-8.7	61.6	-9.2
17 Noyes Street**	72	63.5	-8.5	62.8	-9.2	61.7	-10.3	61.5	-10.5	63.5	-8.5	62.8	-9.2	61.6	-10.4	61.4	-10.6
18 Noyes Street**	70.6	64.6	-6	64	-6.6	62.2	-8.4	61.8	-8.8	64.5	-6.1	63.9	-6.7	61.9	-8.7	61.5	-9.1
19 Noyes Street**	71.8	64	-7.8	63.4	-8.4	62.4	-9.4	62.2	-9.6	63.9	-7.9	63.3	-8.5	62.3	-9.5	62.1	-9.7
20 Noyes Street**	70.6	64.8	-5.8	64	-6.6	62.3	-8.3	62	-8.6	64.7	-5.9	63.9	-6.7	62.2	-8.4	61.9	-8.7
21 Noyes Street**	70.7	64.5	-6.2	63.9	-6.8	63.1	-7.6	63	-7.7	64.5	-6.2	63.8	-6.9	63.1	-7.6	62.9	-7.8
22 Noyes Street**	70.5	64.7	-5.8	63.8	-6.7	62.3	-8.2	62.1	-8.4	64.6	-5.9	63.7	-6.8	62.2	-8.3	62	-8.5
24 Noyes Street**	69.8	64.1	-5.7	63.4	-6.4	62.2	-7.6	62	-7.8	64	-5.8	63.3	-6.5	62.1	-7.7	61.9	-7.9
25 Noyes Street**	70.7	66.1	-4.6	65.6	-5.1	64.8	-5.9	64.7	-6	66.1	-4.8	65.6	-5.1	64.8	-5.9	64.7	-6
26 Noyes Street**	69.6	64.8	-4.8	64.2	-5.4	63.2	-6.4	63	-6.6	64.8	-4.8	64.1	-5.5	63.2	-6.4	63	-6.6
27 Noyes Street**	71.5	68.7	-2.8	68.3	-3.2	67.9	-3.6	67.9	-3.6	68.7	-2.8	68.3	-3.2	67.9	-3.6	67.9	-3.6
28 Noyes Street**	69.5	65.7	-3.8	65.3	-4.2	64.4	-5.1	64.2	-5.3	65.6	-3.9	65.2	-4.3	64.3	-5.2	64.2	-5.3
30 Noyes Street**	69.4	66.1	-3.3	65.7	-3.7	64.9	-4.5	64.8	-4.6	66.1	-3.3	65.6	-3.8	64.9	-4.5	64.8	-4.6
34 Noyes Street**	69.3	67.2	-2.1	66.9	-2.4	66.5	-2.8	66.4	-2.9	67.2	-2.1	66.9	-2.4	66.5	-2.8	66.4	-2.9
Aster Street**	68.4	64.7	-3.7	63.7	-4.7	62.9	-5.5	62.7	-5.7	63.4	-5	61.9	-6.5	60.3	-8.1	60	-8.4
10 Lincoln Street**	67.2	66.6	-0.6	66.5	-0.7	66.4	-0.8	66.3	-0.9	63.5	-3.7	63.1	-4.1	62.7	-4.5	62.6	-4.6
11 Lincoln Street**	67.6	66.8	-0.8	66.7	-0.9	66.6	-1	66.6	-1	61.1	-6.5	60.5	-7.1	59.6	-8	59.3	-8.3
12 Lincoln Street**	66.3	65.4	-0.9	65.3	-1	65.1	-1.2	65.1	-1.2	62.3	-4	61.6	-4.7	61	-5.3	60.9	-5.4
14 Lincoln Street**	65.8	64.6	-1.2	64.4	-1.4	64.2	-1.6	64.1	-1.7	61.8	-4	61	-4.8	60.2	-5.6	60	-5.8
15 Lincoln Street**	67	65.6	-1.4	65.5	-1.5	65.3	-1.7	65.3	-1.7	61.1	-5.9	60.5	-6.5	59.5	-7.5	59.3	-7.7
16 Lincoln Street**	65.2	63.8	-1.4	63.5	-1.7	63.2	-2	63.1	-2.1	61.5	-3.7	60.7	-4.5	59.7	-5.5	59.5	-5.7
17 Lincoln Street**	66.4	64.3	-2.1	64.1	-2.3	63.7	-2.7	63.6	-2.8	61.3	-5.1	60.5	-5.9	59.3	-7.1	59.1	-7.3
18 Lincoln Street**	65.1	63.3	-1.8	62.9	-2.2	62.4	-2.7	62.3	-2.8	61.4	-3.7	60.5	-4.6	59.4	-5.7	59.1	-6
19 Lincoln Street**	66.5	64	-2.5	63.5	-3	63	-3.5	62.9	-3.6	61.9	-4.6	60.8	-5.7	59.6	-6.9	59.2	-7.3
27 Lincoln Street**	66.5	63.6	-2.9	63.1	-3.4	62.2	-4.3	62.1	-4.4	62.6	-3.9	61.6	-4.9	59.9	-6.6	59.6	-6.9
Average Insertion Loss		-6.9		Avg. IL	-7.3	Avg. IL	-8.4	Avg. IL	-8.7	Avg. IL	-6.7	Avg. IL	-7.0	Avg. IL	-8.1	Avg. IL	-8.3
Number Protected		18		No. Protected	21	No. Protected	23	No. Protected	23	No. Protected	23	No. Protected	30	No. Protected	33	No. Protected	33

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix C

Southwest Quadrant Noise Barrier Analysis Results (Alternative 3A)

Receiver Name	No Barrier (dBA)	B1-16 (dBA)	Reduction (dBA)	B1-12/18 (dBA)	Reduction (dBA)	B1-18 (dBA)	Reduction (dBA)	B1-20 (dBA)	Reduction (dBA)	B2-18 (dBA)	Reduction (dBA)				
1095 Riverside Drive	70	64.4	-5.6	64.1	-5.9	64.1	-5.9	63.8	-6.2	64.1	-5.9				
1097 Riverside Drive"	69	63.9	-5.1	63.5	-5.5	63.4	-5.6	63.1	-5.9	63.5	-5.5				
9 Griffin Street"	72.4	65.5	-6.9	65.5	-6.9	64.6	-7.8	63.9	-8.5	66.7	-5.7				
11 Griffin Street"	73	66.1	-6.9	65.6	-7.4	65.1	-7.9	64.3	-8.7	66.1	-6.9				
15 Griffin Street"	72	65.2	-6.8	64.8	-7.2	64.6	-7.4	63.9	-8.1	65.2	-6.8				
17 Griffin Street"	72.4	65.1	-7.3	64.5	-7.9	64.4	-8	64	-8.4	64.6	-7.8				
14 Allen Street"	70.2	64.3	-5.9	64.6	-5.6	63.7	-6.5	63.4	-6.8	68.1	-2.1				
18 Allen Street"	70.2	64.4	-5.8	64.7	-5.5	63.7	-6.5	63.2	-7	65.9	-4.3				
19 Allen Street"	69	65.2	-3.8	65.4	-3.6	64.9	-4.1	64.7	-4.3	67.4	-1.6				
20 Allen Street"	70.2	64.5	-5.7	64.2	-6	63.9	-6.3	63.4	-6.8	64.7	-5.5				
23 Allen Street"	68.5	64	-4.5	64.6	-3.9	63.4	-5.1	63	-5.5	65.5	-3				
26 Allen Street"	69.7	63.8	-5.9	63.4	-6.3	63.2	-6.5	62.9	-6.8	63.7	-6				
27 Allen Street"	67.9	63.1	-4.8	63.1	-4.8	62.5	-5.4	62	-5.9	64	-3.9				
Average Insertion Loss			-5.9	Avg. IL		-6.3	Avg. IL		-6.6	Avg. IL		-7.1	Avg. IL		-6.3
Number Protected			12	No. Protected		11	No. Protected		12	No. Protected		12	No. Protected		8

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix C

Northeast Quadrant Noise Barrier Analysis Results (Alternative 2B)

Receiver Name	No Barrier (dBA)	C1-25 (dBA)	Reduction (dBA)	C2-25 (dBA)	Reduction (dBA)
3 Smith Avenue"	65	62.9	-2.1	63.5	-1.5
5 Smith Avenue"	64.8	62	-2.8	62.5	-2.3
7 Smith Avenue"	65.2	61.8	-3.4	61.4	-3.8
8 Smith Avenue"	65.4	62	-3.4	63.1	-2.3
9 Smith Avenue"	65.8	61.7	-4.1	61.2	-4.6
11 Smith Avenue"	66.7	61.6	-5.1	61	-5.7
12 Smith Avenue"	66.2	61.7	-4.5	61.4	-4.8
13 Smith Avenue"	68.2	61.4	-6.8	61	-7.2
15 Smith Avenue"	69.3	61	-8.3	60.8	-8.5
16 Smith Avenue"	66.9	61.5	-5.4	59.8	-7.1
19 Smith Avenue"	71.1	60.5	-10.6	60.6	-10.5
20 Smith Avenue"	67.9	60.9	-7	59.1	-8.8
24 Smith Avenue"	68.1	60	-8.1	58.6	-9.5
26 Smith Avenue"	70	59.4	-10.6	59.1	-10.9
27 Smith Avenue"	74.8	59.7	-15.1	59.8	-15
1 Cherry Hill Circle"	66.7	62.4	-4.3	62.4	-4.3
2 Cherry Hill Circle"	65.6	61.7	-3.9	61.5	-4.1
5 Cherry Hill Circle"	68	62.3	-5.7	62.3	-5.7
6 Cherry Hill Circle"	66.5	61.8	-4.7	61.5	-5
9 Cherry Hill Circle"	69.4	62.6	-6.8	62.6	-6.8
10 Cherry Hill Circle"	67.8	61.7	-6.1	61.6	-6.2
14 Cherry Hill Circle"	69.1	61.5	-7.6	61.6	-7.5
15 Cherry Hill Circle"	71.1	63.2	-7.9	63.3	-7.8
17 Cherry Hill Circle"	70.9	65.4	-5.5	65.4	-5.5
18 Cherry Hill Circle"	70.4	61.4	-9	61.5	-8.9
21 Cherry Hill Circle"	70.9	66.8	-4.1	66.7	-4.2
22 Cherry Hill Circle"	72.1	61.6	-10.5	61.8	-10.3
26 Cherry Hill Circle"	74.1	62.8	-11.3	62.7	-11.4
30 Cherry Hill Circle"	73.8	63.7	-10.1	63.4	-10.4
34 Cherry Hill Circle"	73.3	65.5	-7.8	65.5	-7.8
40 Cherry Hill Circle"	73.1	68.4	-4.7	68.4	-4.7
66 Forest Street"	70.2	67.7	-2.5	67.7	-2.5
84 Forest Street"	72.7	71.2	-1.5	71.2	-1.5
88 Forest Street"	74.9	74.5	-0.4	74.5	-0.4

Average Insertion Loss **-7.8** Avg. IL **-7.9**

Number Protected **23** No. Protected **24**

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix C

Southeast Quadrant Noise Barrier Analysis Results (Alternative 2B)

Receiver Name	No Barrier (dBA)	D1-24 (dBA)	Reduction (dBA)	D2-24 (dBA)	Reduction (dBA)
1068 Riverside Drive"	70.7	70.1	-0.6	70.1	-0.6
1070 Riverside Drive	68.8	68.8	0	68.8	0
1073 Riverside Drive"	73.2	68.9	-4.3	68.9	-4.3
4 Noyes Street"	69.8	62.6	-7.2	60.6	-9.2
5 Noyes Street"	73	61.9	-11.1	61.5	-11.5
7 Noyes Street"	73.7	62.5	-11.2	62.2	-11.5
8 Noyes Street"	70.2	62.5	-7.7	61.6	-8.6
9 Noyes Street"	73.9	62.4	-11.5	62.2	-11.7
10 Noyes Street"	71	63.6	-7.4	63.2	-7.8
11 Noyes Street"	74.2	62.7	-11.5	62.6	-11.6
12 Noyes Street"	71.3	63.6	-7.7	63.3	-8
13 Noyes Street"	74	62.1	-11.9	62	-12
15 Noyes Street"	73.6	61.8	-11.8	61.7	-11.9
16 Noyes Street"	70.9	62.4	-8.5	62.2	-8.7
17 Noyes Street"	72.9	61.8	-11.1	61.7	-11.2
18 Noyes Street"	70.7	62.2	-8.5	62	-8.7
19 Noyes Street"	72.7	62.4	-10.3	62.3	-10.4
20 Noyes Street"	70.7	62.4	-8.3	62.3	-8.4
21 Noyes Street"	72.1	63.1	-9	63.1	-9
22 Noyes Street"	70.4	62.4	-8	62.3	-8.1
24 Noyes Street"	69.7	62.3	-7.4	62.2	-7.5
25 Noyes Street"	71.9	64.9	-7	64.9	-7
26 Noyes Street"	69.6	63.3	-6.3	63.2	-6.4
27 Noyes Street"	72.2	68	-4.2	68	-4.2
28 Noyes Street"	69.7	64.4	-5.3	64.4	-5.3
30 Noyes Street"	69.6	64.9	-4.7	64.9	-4.7
34 Noyes Street"	69.5	66.5	-3	66.5	-3
Aster Street"	68.5	62.9	-5.6	60.5	-8
10 Lincoln Street"	67.1	66.2	-0.9	62.7	-4.4
11 Lincoln Street"	67.6	66.6	-1	59.7	-7.9
12 Lincoln Street"	66.3	65.1	-1.2	61.2	-5.1
14 Lincoln Street"	65.9	64.3	-1.6	60.5	-5.4
15 Lincoln Street"	67	65.3	-1.7	59.6	-7.4
16 Lincoln Street"	65.4	63.3	-2.1	59.9	-5.5
17 Lincoln Street"	66.5	63.8	-2.7	59.5	-7
18 Lincoln Street"	65.3	62.5	-2.8	59.6	-5.7
19 Lincoln Street"	66.7	63.1	-3.6	59.7	-7
27 Lincoln Street"	66.6	62.4	-4.2	60.2	-6.4
Average Insertion Loss			-8.7	Avg. IL	-8.2
Number Protected			23	No. Protected	33

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix C

Southwest Quadrant Noise Barrier Analysis Results (Alternative 2B)

Receiver Name	No Barrier (dBA)	B1-12/18 (dBA)	Reduction (dBA)	B2-18 (dBA)	Reduction (dBA)
1095 Riverside Drive	70.9	64.1	-6.8	64.1	-6.8
1097 Riverside Drive"	69.5	63.3	-6.2	63.4	-6.1
9 Griffin Street"	72.9	65.3	-7.6	66.7	-6.2
11 Griffin Street"	73.4	65.5	-7.9	66	-7.4
15 Griffin Street"	72.6	64.8	-7.8	65.2	-7.4
17 Griffin Street"	72.7	64.7	-8	64.7	-8
14 Allen Street"	70	64.3	-5.7	67.2	-2.8
18 Allen Street"	70.5	64.7	-5.8	65.8	-4.7
19 Allen Street"	68.8	64.9	-3.9	66.8	-2
20 Allen Street"	70.5	64.3	-6.2	64.9	-5.6
23 Allen Street"	68.8	64.7	-4.1	65.5	-3.3
26 Allen Street"	70	63.8	-6.2	64.2	-5.8
27 Allen Street"	68.2	63.4	-4.8	64.4	-3.8
Average Insertion Loss			-6.6	Avg. IL	
Number Protected			11	No. Protected	
				9	

Bold Shaded Values represent benefitted receptors (4.5 or greater noise reduction)

Noise Appendix D
Noise Barrier Design Details

NOISE BARRIER DESIGN DETAILS
BARRIER D1-24

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	10	10	56	80	24
	13	13	72	96	24
2	13	13	72	96	24
	14	14	75	99	24
3	14	14	75	99	24
	15	15	76	100	24
4	15	15	76	100	24
	16	16	77	101	24
5	16	16	77	101	24
	17	17	77	101	24
6	17	17	77	101	24
	18	18	77	101	24
7	18	18	77	101	24
	19	19	75	99	24
8	19	19	75	99	24
	20	20	76	100	24
9	20	20	76	100	24
	21.5	21.5	80	104	24

NOISE BARRIER DESIGN DETAILS
BARRIER D2-24

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	10	10	56	80	24
	13	13	72	96	24
2	13	13	72	96	24
	14	14	75	99	24
3	14	14	75	99	24
	15	15	76	100	24
4	15	15	76	100	24
	16	16	77	101	24
5	16	16	77	101	24
	17	17	77	101	24
6	17	17	77	101	24
	18	18	77	101	24
7	18	18	77	101	24
	19	19	75	99	24
8	19	19	75	99	24
	20	20	76	100	24
9	20	20	76	100	24
	21.5	21.5	80	104	24
10	21.5	21.5	80	104	24
	32	32	85	109	24
11	32	32	85	109	24
	33.5	33.5	90	114	24

NOISE BARRIER DESIGN DETAILS
BARRIER C1-25

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	24.5	25.75	176	201	25
	21.75	23	152	177	25
2	21.75	23	152	177	25
	21	22.25	140	165	25
3	21	22.25	140	165	25
	19.75	21	129	154	25
4	19.75	21	129	154	25
	18.5	19.75	119	144	25
5	18.5	19.75	119	144	25
	17.5	19	114	139	25
6	17.5	19	114	139	25
	16.5	18	114	139	25
7	16.5	18	114	139	25
	15.5	17	107	132	25
8	15.5	17	107	132	25
	14.5	16	104	129	25
9	14.5	16	104	129	25
	13.5	15	101	126	25
10	13.5	15	101	126	25
	12.5	14	98	123	25

NOISE BARRIER DESIGN DETAILS
BARRIER C2-25

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	24.5	25.75	176	201	25
	21.75	23	152	177	25
2	21.75	23	152	177	25
	21	22.25	140	165	25
3	21	22.25	140	165	25
	19.75	21	129	154	25
4	19.75	21	129	154	25
	18.5	19.75	119	144	25
5	18.5	19.75	119	144	25
	17.25	18.5	113	138	25
6	17.25	18.5	113	138	25
	17	17.5	110	135	25
7	17	17.5	110	135	25
	16	17	108	133	25
8	16	17	108	133	25
	15.5	16.5	110	135	25
9	15.5	16.5	110	135	25
	12 Smith Ave. ¹		110	135	25

¹ This location is on the south property line of #12 Smith Avenue.

Noise Appendix E
Noise Barrier Options – Alternative 2B

Barrier Options for NE Quadrant – 2030 Build Alternative 2B

The barrier designs which are feasible and reasonable for Alternative 2B are identical to those evaluated for Alternative 3A because the dominant noise source, the I-93 mainline, is the same in both alternatives and the nearest new ramps and roadway segments are essentially the same between the two alternatives with identical traffic volumes. For this reason, the presentation of the noise mitigation results for Alternative 2B centers on the most cost-effective barrier alternatives. Please refer to the Section 6.5.2 of the EA/DEIR for a discussion of why these barrier options are the most cost effective for the NE Quadrant.

There are two recommended noise barrier options for the NE Quadrant for Alternative 2B that are feasible and reasonable: Barrier C1-25 and Barrier C2-25, see Table 15 at the end of this section. Barrier C1-25 is 25 feet above grade along its entire length, is 1,185 feet long, will protect 23 homes and will provide an average Insertion Loss (IL) of 7.8 dBA. Barrier C1-25 has a reasonable CEI of \$2,642/dBA/unit. Barrier C2-25 is 25 feet above grade its entire length, is 1,240 feet long, will protect 24 homes and will provide an average IL of 7.9 dBA. Barrier C2-25 has a reasonable CEI of \$2,616/dBA/unit. Details of the predicted sound levels for each barrier option at each residence are provided in this Appendix D. The barrier wall design details are given in Tables 18 and 19 at the end of this section for Barriers C1-25 and C2-25, respectively.

In summary Barrier C1-25 for Alternative 2B will protect 23 homes: 11, 12, 13, 15, 16, 19, 20, 24, 26 and 27 Smith Avenue; and 5, 6, 9, 10, 14, 15, 17, 18, 22, 26, 30, 34 and 40 Cherry Hill Circle. Barrier C2-25 will protect 24 homes, consisting of the 23 homes listed above and in addition 9 Smith Avenue. While Barrier C2-25 protects one additional home for Alternative 2B, it will require more tree removal near existing homes on Smith Avenue, and it will have a greater visual impact than Barrier C1-25 because of its closer proximity to the homes on the south side of Smith Avenue. Other homes behind the noise barrier may benefit from a reduction in sound levels, but are not listed here because the reduction is less than 5 dBA or the residence is more than 500 feet from a proposed barrier.

Barrier Options for SE Quadrant – 2030 Build Alternative 2B

The barrier designs which are feasible and reasonable for Alternative 2B are identical to those evaluated for Alternative 3A because the dominant noise source, the I-93 mainline, is the same in both alternatives and the nearest new ramps and roadway segments are essentially the same between the two alternatives with identical traffic volumes. For this reason, the presentation of the noise mitigation results for Alternative 2B centers on the most cost-effective barrier alternatives. Please refer to Section 6.5.3 of the EA/DEIR for a discussion of why these barrier options are the most cost effective for the SE Quadrant.

There are two recommended noise barrier options for the SE Quadrant for Alternative 2B that are feasible and reasonable: Barrier D1-24 and Barrier D2-24, see Table 16 at the end of this section. Barrier D1-24 is 24 feet above grade along its entire length, is 1,115 feet long, will protect 23 homes and will provide an average Insertion Loss (IL) of 8.7 dBA. Barrier D1-24 has a reasonable CEI of \$2,140/dBA/unit. Barrier D2-24 is 24 feet above grade its entire length, is 1,540 feet long, will protect 33 homes and will provide an average IL of 8.2 dBA. Barrier D2-24 has a reasonable CEI of \$2,185/dBA/unit. Details of the predicted sound levels for each barrier

option at each residence are provided in Appendix D. The barrier wall design details are given in Tables 20 and 21 for Barriers D1-24 and D2-24, respectively.

In summary, as shown in Figure 8, Barrier D1-24 will protect 23 homes: 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 28 and 30 Noyes Street; and the home on Aster Street. Barrier D2-24 will protect 33 homes, consisting of the 23 homes listed above and in addition 10, 11, 12, 14, 15, 16, 17, 18, 19 and 27 Lincoln Street. While Barrier D2-24 protects 10 additional homes, it will have a greater visual impact than Barrier D1-24 because of its longer length. Other homes behind the noise barrier may benefit from a reduction in sound levels, but are not listed here because the reduction is less than 5 dBA or the residence is more than 500 feet from a proposed barrier.

Barrier Options for SW Quadrant – 2030 Build Alternative 2B

The barrier designs which are feasible and most cost effective for Alternative 2B are identical to those evaluated for Alternative 3A because the dominant noise source, the I-93 mainline, is the same in both alternatives and the nearest new ramps and roadway segments are essentially the same between the two alternatives with identical traffic volumes. For this reason, the presentation of the noise mitigation results for Alternative 2B centers on the most cost-effective barrier alternatives. Please refer to Section 6.5.4 in the EA/DEIR for a discussion of why these barrier options are the most cost effective for the SW Quadrant.

The two most cost-effective noise barrier options for the SW Quadrant for Alternative 2B are: Barrier B1-12/18 and Barrier B2-18, see Table 17. Barrier B1-12/18 has sections at two heights (12 and 18 feet) and has a weighted-average height of 15.6 feet above grade along its length of 985 feet; it will protect 11 homes and will provide an average Insertion Loss (IL) of 6.6 dBA. Barrier B1-12/18 has an unreasonable CEI of \$3,386/dBA/unit. Barrier B2-18 is 18 feet above grade its entire length, is 690 feet long, will protect 9 homes and will provide an average IL of 6.4 dBA. Barrier B2-18 has an unreasonable CEI of \$3,450/dBA/unit. Details of the predicted sound levels for each barrier option at each residence are provided in this Appendix D. Unfortunately, the most cost-effective barrier options have a CEI that is still more than 25% above the reasonable threshold of \$2,700/dBA/unit and no refinements to length, height or segmentation will provide the large percentage reduction in the CEI to make Barrier B1 or B2 reasonable with regard to cost-effectiveness.

In summary, there are no feasible and reasonable noise barriers for the SW Quadrant due to the fact there are fewer residences to be protected than in the NE and SE Quadrants, they are more widely spaced, and roadway noise impacts the SW Quadrant from more than two directions.

Table 15
Northeast Quadrant Noise Barrier Analysis (Alternative 2B)

Barrier	Barrier Feasible?	Barrier Information		Estimated MHD Cost Based on \$16/sf	Construction Cost Based on \$65/sf (2009 Actual)	Average Insertion Loss (dBA)	Number of Protected Homes	MHD Cost Effective Index (\$/dB/unit)	Reasonable?
		Average Height (ft)	Approx. Length (ft)						
								(Limit \$2,700/dB/unit)	
Barrier C1-25									
Barrier Adjacent to Ramp F2	Yes	25	1185	\$474,000	\$1,925,625	7.8	23	\$2,642	Yes
Top of Barrier is 25' Tall Along Entire Length									
Barrier C2-25									
Barrier Parallel to Smith Ave	Yes	25	1240	\$496,000	\$1,269,645	7.9	24	\$2,616	Yes
Top of Barrier is 25' Tall Along Entire Length									

Table 16
Southeast Quadrant Noise Barrier Analysis (Alternative 2B)

Barrier	Barrier Feasible?	Barrier Information		Estimated MHD Cost Based on \$16/sf	Construction Cost Based on \$65/sf (2009 Actual)	Average Insertion Loss (dBA)	Number of Protected Homes	MHD Cost Effective Index (\$/dB/unit) (Limit \$2,700/dB/unit)	Reasonable?
		Average Height (ft)	Approx. Length (ft)						
Barrier D1-24									
Barrier Adjacent to Ramp D Top of Barrier is 24' Along Entire Length	Yes	24	1115	\$428,160	\$1,739,400	8.7	23	\$2,140	Yes
Barrier D2-24									
Barrier Adjacent to Ramp D, Extending Further Top of Barrier is 24' Tall Along Entire Length	Yes	24	1540	\$591,360	\$2,402,400	8.2	33	\$2,185	Yes
Barrier E	No ¹	-	-	-	-	-	-	-	-
Barrier F	No ¹	-	-	-	-	-	-	-	-
Barrier G	No ¹	-	-	-	-	-	-	-	-

¹ Barrier fails to provide a minimum of 45 dBA insertion loss at any receiver.

Table 17
Southwest Quadrant Noise Barrier Analysis (Alternative 2B)

Barrier	Barrier Feasible?	Barrier Information		Estimated MHD Cost Based on \$16/sf	Construction Cost Based on \$65/sf (2009 Actual)	Average Insertion Loss (dBA)	Number of Protected Homes	MHD Cost Effective Index (\$/dB/unit)	Reasonable?
		Average Height (ft)	Approx. Length (ft)						
								(Limit \$2,700/dB/unit)	
Barrier B1-12/18									
Barrier Adjacent to Ramp A Top of Barrier varies from 12' to 18' tall	Yes	15.6	985	\$245,856	\$998,790	6.6	11	\$3,386	No
Barrier B2-18									
Barrier Adjacent to Ramp A Top of Barrier is 18' Tall Along Entire Length	Yes	18	690	\$198,720	\$807,300	6.4	9	\$3,450	No
Barrier A	No ¹	-	-	-	-	-	-	-	-
Barrier B3	No ¹	-	-	-	-	-	-	-	-

¹ Barrier fails to provide a minimum of 5 dBA insertion loss at any receiver.

Table 18
NOISE BARRIER DESIGN DETAILS
BARRIER D1-24

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	10	10	56	80	24
	13	13	72	96	24
2	13	13	72	96	24
	14	14	75	99	24
3	14	14	75	99	24
	15	15	76	100	24
4	15	15	76	100	24
	16	16	77	101	24
5	16	16	77	101	24
	17	17	77	101	24
6	17	17	77	101	24
	18	18	77	101	24
7	18	18	77	101	24
	19	19	75	99	24
8	19	19	75	99	24
	20	20	76	100	24
9	20	20	76	100	24
	21.5	21.5	80	104	24

Table 19
NOISE BARRIER DESIGN DETAILS
BARRIER D2-24

Segment No.	Station Number Endpoints		Elevation (ft.)		Approx. Barrier Height (ft.)
	<i>Alt. 3A</i>	<i>Alt. 2B</i>	<i>Est. Ground</i>	<i>Top of Barrier</i>	
1	10	10	56	80	24
	13	13	72	96	24
2	13	13	72	96	24
	14	14	75	99	24
3	14	14	75	99	24
	15	15	76	100	24
4	15	15	76	100	24
	16	16	77	101	24
5	16	16	77	101	24
	17	17	77	101	24
6	17	17	77	101	24
	18	18	77	101	24
7	18	18	77	101	24
	19	19	75	99	24
8	19	19	75	99	24
	20	20	76	100	24
9	20	20	76	100	24
	21.5	21.5	80	104	24
10	21.5	21.5	80	104	24
	32	32	85	109	24
11	32	32	85	109	24
	33.5	33.5	90	114	24

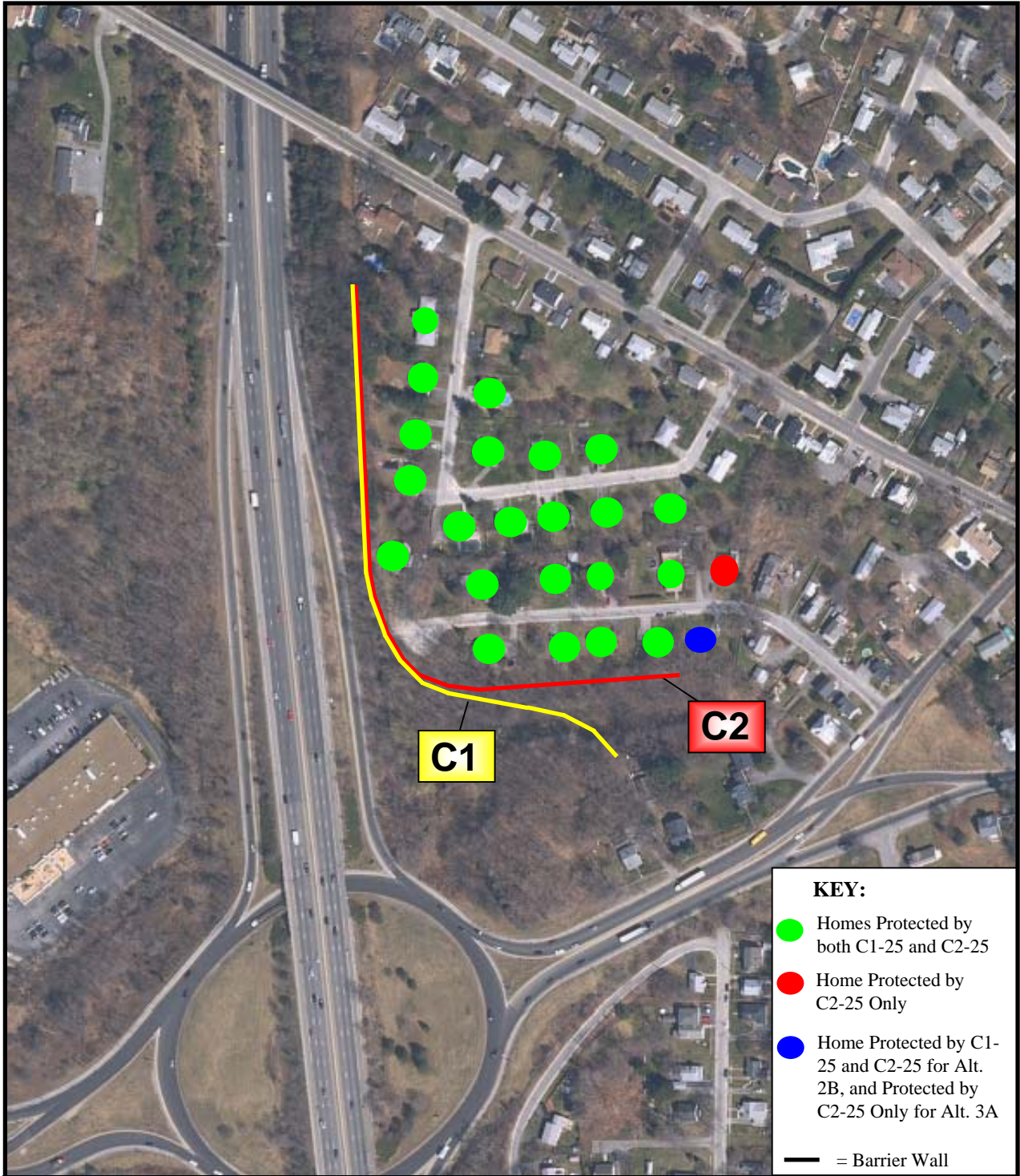


Figure 7

NE Quadrant Homes Protected By Barriers C1-25 and C2-25

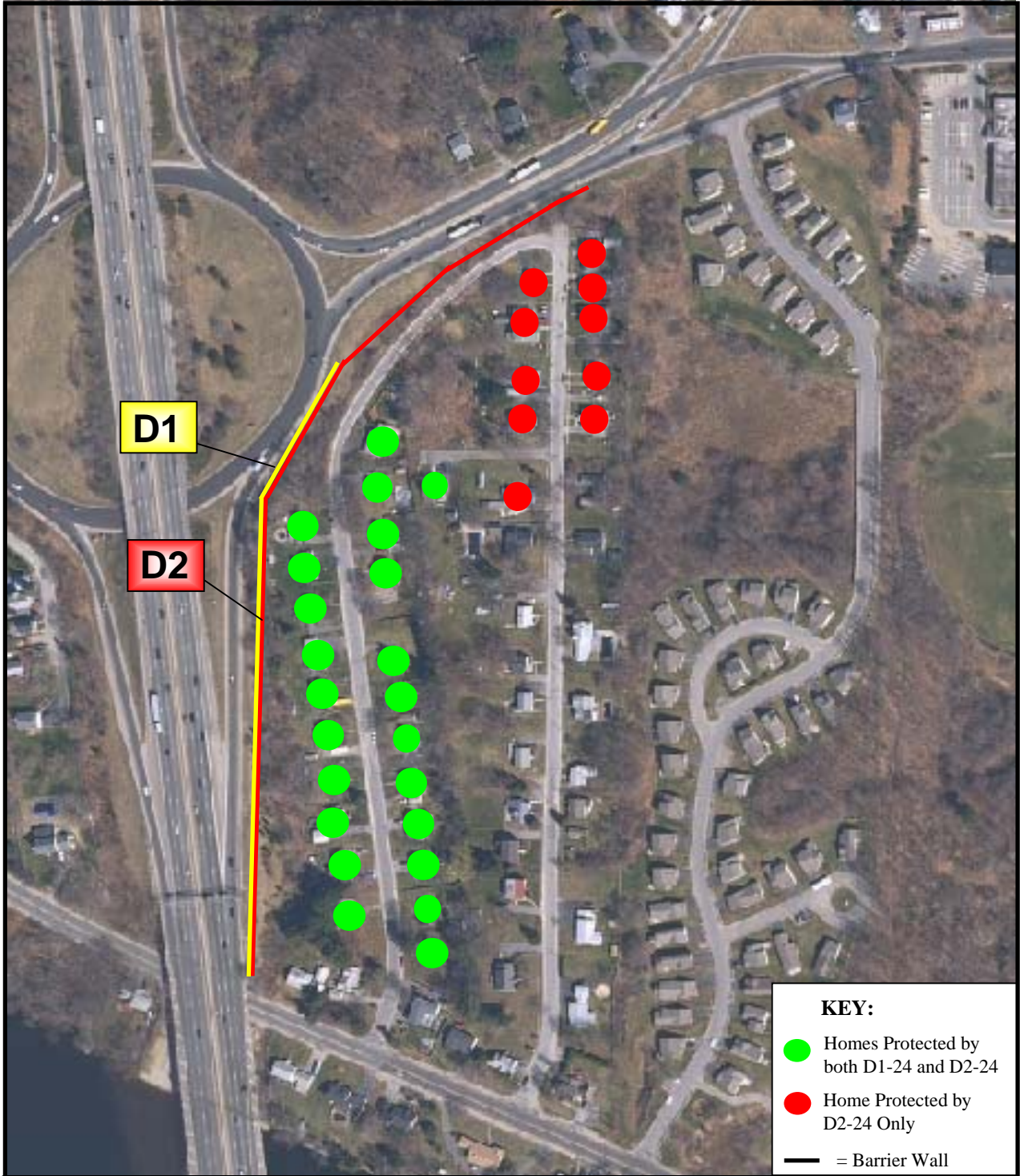


Figure 8

SE Quadrant Homes Protected By Barriers D1-24 and D2-24