

Exponent[®]

**Rhode Island Reliability
Project: Electric and
Magnetic Field Modeling**

Addendum to Report





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Electric and Magnetic Field
Modeling**

Addendum to Report

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Acronyms and Abbreviations

AAL	Annual Average Loading
AN	Audible Noise
APL	Annual Peak Loading
dBA	Decibels on the A-weighted Scale
EMF	Electric and Magnetic Fields
Hz	Hertz
NEEWS	New England East West Solutions
RIRP	Rhode Island Reliability Project
ROW	Right of Way

Introduction

Exponent modeled 60 Hertz (Hz) electric and magnetic fields (EMF) and audible noise (AN) along transects perpendicular to the route of the proposed 345-kV transmission line between the West Farnum Substation and the Kent County Substation. Since the original modeling was performed, modifications to the proposed transmission lines have been proposed by National Grid. This report summarizes the modifications and modeling results.

Changes to Configuration

Exponent was provided data regarding changes to the configuration of proposed transmission and distribution lines by National Grid and its subcontractors. The changes are summarized as follows:

XS-3: The attachment arm configuration for the circuit 2227 was moved higher up the T-172N steel pole.

XS-5: Circuit 2230 is no longer proposed to share the steel pole supporting T-172S. Instead, it will be kept on the same structure as in the existing configuration, which will not be removed. To allow for room for the existing structure supporting circuit 2227, T-172S will be moved 10 feet towards the east edge of ROW.

XS-6: Circuit 2230 is no longer proposed to share the steel pole supporting T-172S. Instead, it will be kept on the same structure as in the existing configuration, which will be moved towards the east edge of ROW.

XS-7: Circuit 2230 is no longer proposed to share the steel pole supporting T-172S. Instead, it will be kept on the same structure as in the existing configuration, which will not be moved.

These changes have been incorporate in the profiles and tables that follow in the appendices.

Appendix A. Cross section diagrams and magnetic field profiles at Annual Average Loading

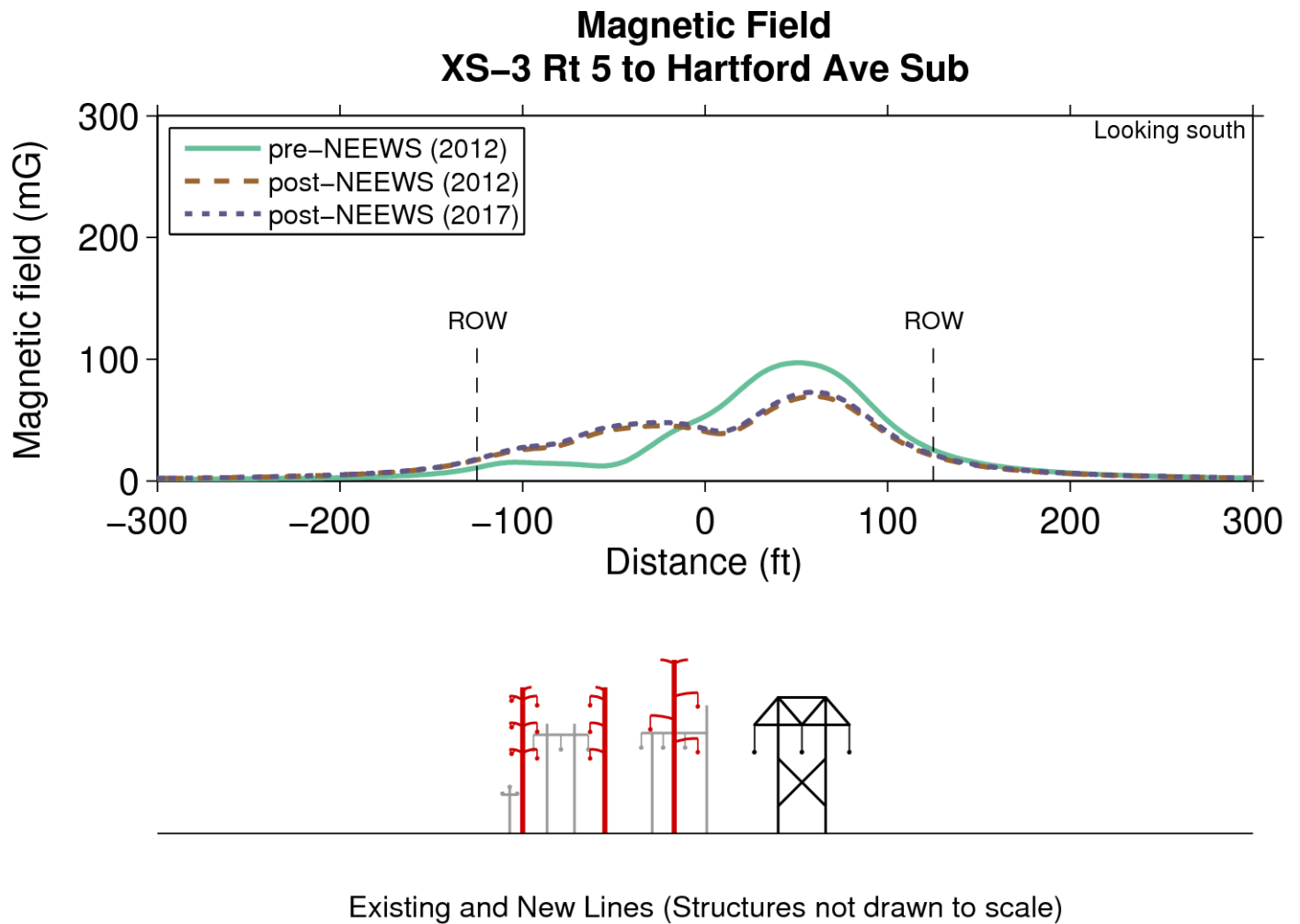


Figure 1. Profile XS-3: State Highway Route 5 to Hartford Avenue Substation under pre-NEEWS (2012), post-NEEWS (2012), and post-NEEWS (2017) conditions at AAL (Johnston, RI). Distribution circuit not modeled.

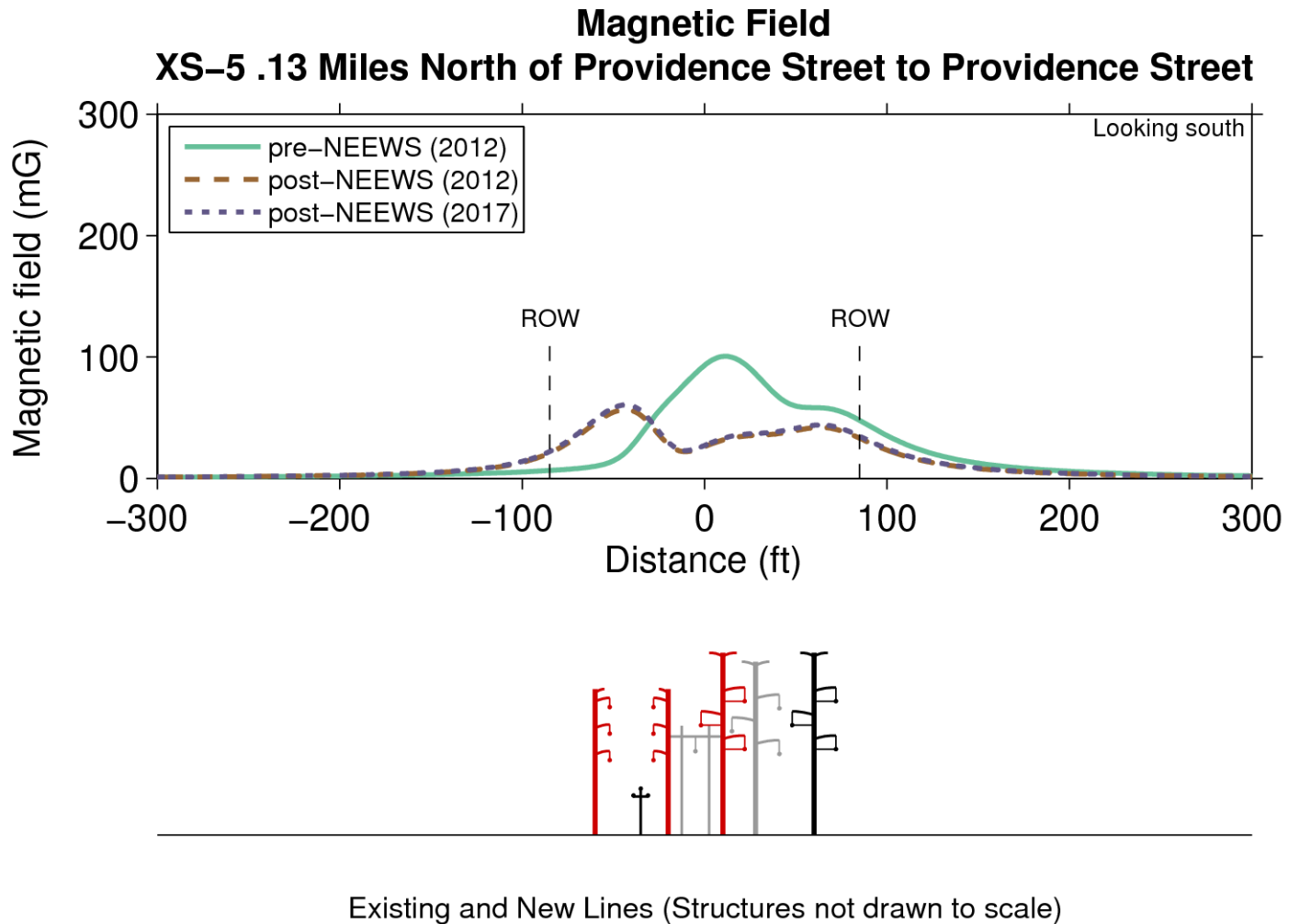


Figure 2. Profile XS-5: 0.13 Miles North of Providence St to Providence St under pre-NEEWS (2012), post-NEEWS (2012), and post-NEEWS (2017) conditions at AAL (West Warwick, RI). Distribution circuit not modeled.

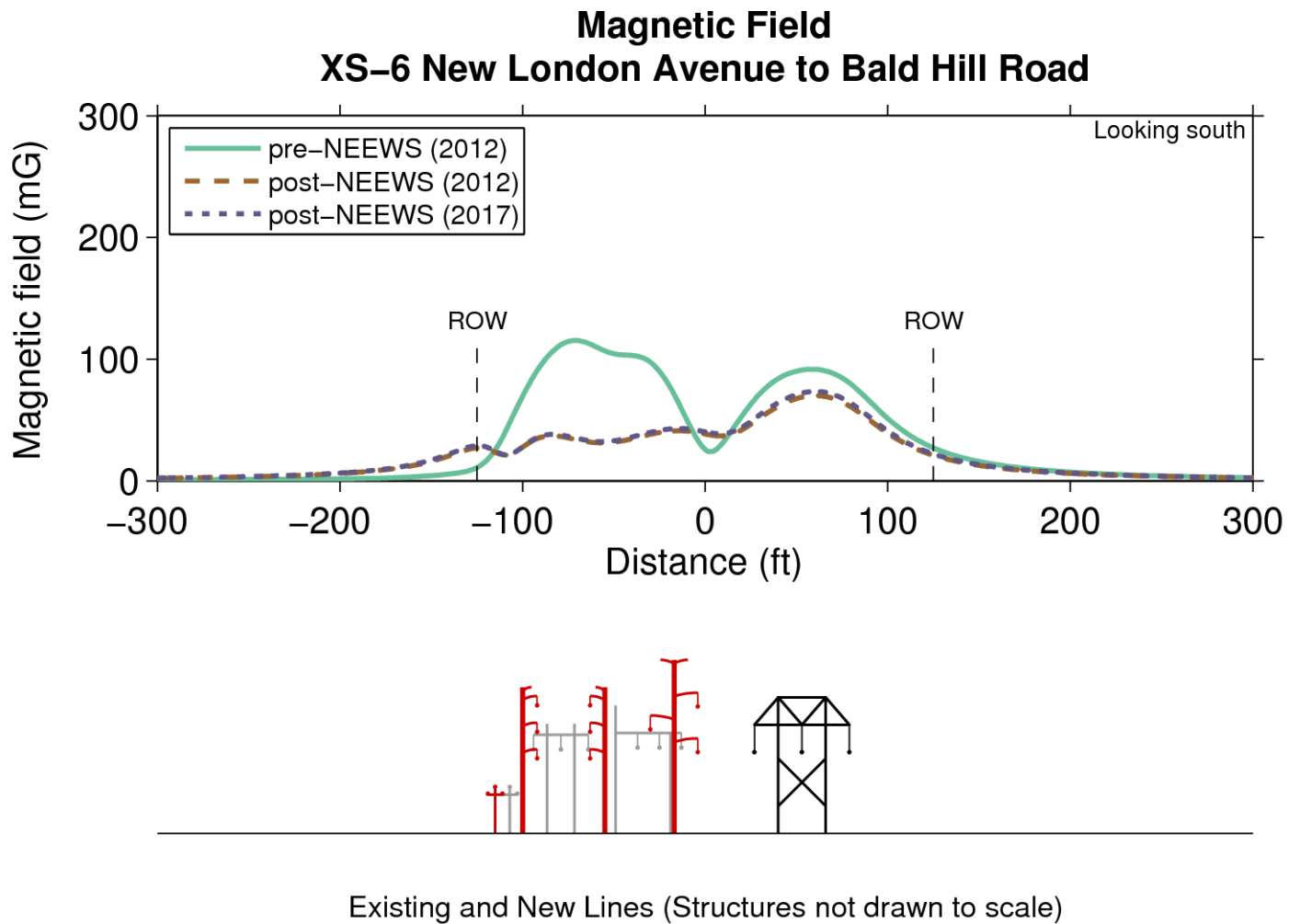


Figure 3. Profile XS-6: New London Ave to Bald Hill Rd under pre-NEEWS (2012), post-NEEWS (2012), and post-NEEWS (2017) conditions at AAL (Warwick, RI). Distribution circuit not modeled.

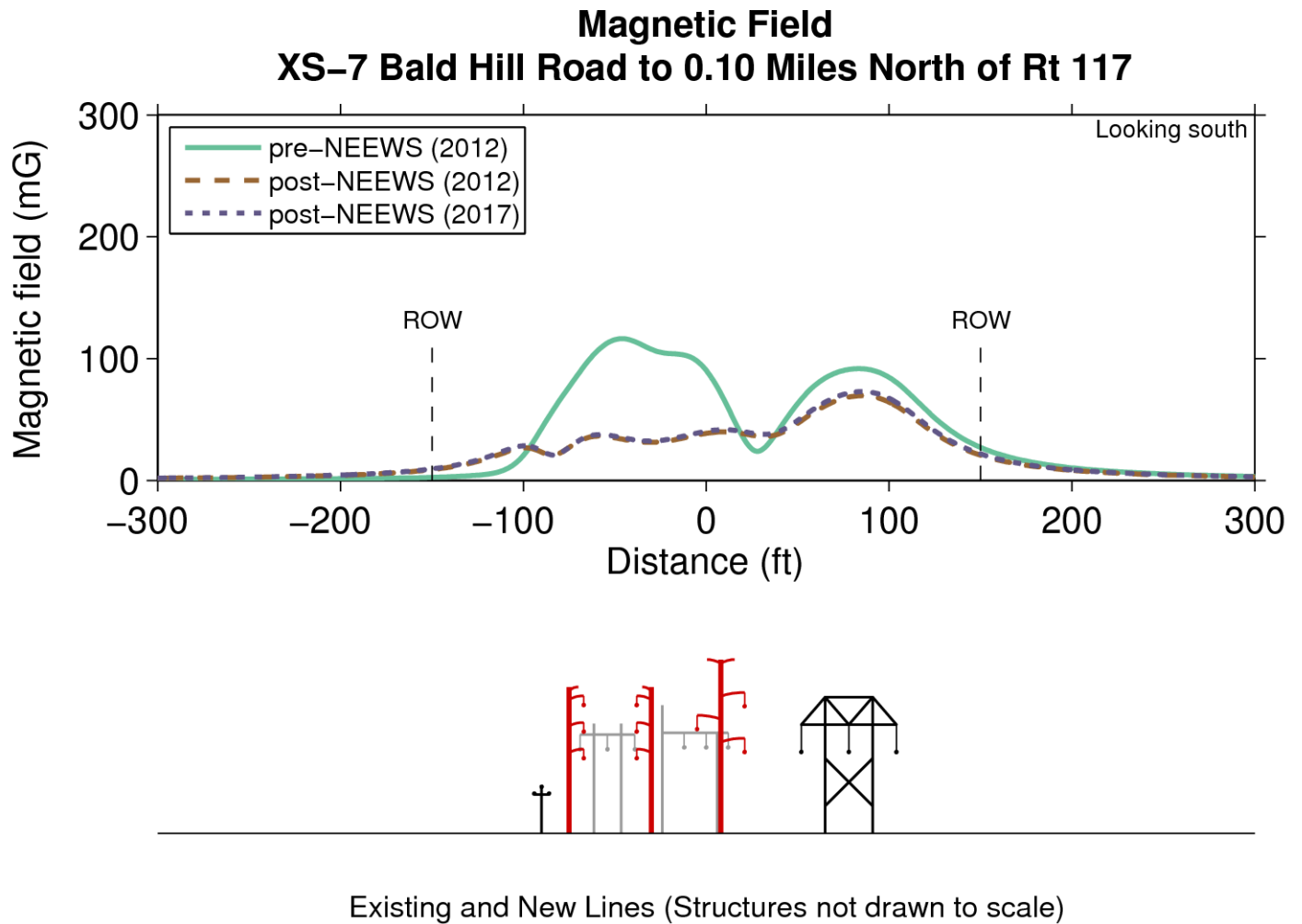


Figure 4. Profile XS-7: Bald Hill Rd to 0.10 Miles north of Route 117 under pre-NEEWS (2012), post-NEEWS (2012), and post-NEEWS (2017) conditions at AAL (Warwick, RI). Distribution circuit not modeled.

**Appendix B. Tables of Audible Noise, Electric and
Magnetic Field at Average Annual Loading and Annual
Peak Loading**

Table 1. Summary of pre-NEEWS (2012), post-NEEWS (2017), and post-NEEWS (2017) magnetic field levels at AAL

Line Section	Configuration	MAGNETIC FIELD (mG) AT LOCATION				
		-100 ft beyond ROW* edge	-ROW* edge	Maximum on ROW*	+ROW* edge	+100 ft beyond ROW* edge
XS-3 Rt 5 to Hartford Ave Sub	pre-NEEWS (2012)	2.0	10.8	96.9	25.4	4.7
	post-NEEWS (2012)	3.7	17.2	69.3	20.4	4.4
	post-NEEWS (2017)	3.7	17.8	72.8	21.4	4.6
XS-5 .13 Miles North of Providence Street to Providence Street	pre-NEEWS (2012)	2.3	6.6	100.6	47.9	7.3
	post-NEEWS (2012)	2.9	20.9	56.7	33.2	4.8
	post-NEEWS (2017)	3.1	22.2	60.6	34.8	5.0
XS-6 New London Avenue to Bald Hill Road	pre-NEEWS (2012)	1.2	10.8	115.3	27.1	5.3
	post-NEEWS (2012)	4.3	27.0	69.9	21.0	4.6
	post-NEEWS (2017)	4.5	28.8	73.4	22.1	4.8
XS-7 Bald Hill Road to 0.10 Miles North of Rt 117	pre-NEEWS (2012)	1.0	2.5	116.3	27.1	5.3
	post-NEEWS (2012)	2.5	8.8	69.5	20.7	4.4
	post-NEEWS (2017)	2.6	9.4	72.9	21.7	4.6

Table 2. Summary of pre-NEEWS (2012), post-NEEWS (2017), and post-NEEWS (2017) magnetic field levels at APL

Line Section	Configuration	MAGNETIC FIELD (mG) AT LOCATION				
		-100 ft beyond ROW* edge	-ROW* edge	Maximum on ROW*	+ROW* edge	+100 ft beyond ROW* edge
XS-3 Rt 5 to Hartford Ave Sub	pre-NEEWS (2012)	1.1	14.8	138.7	31.8	5.2
	post-NEEWS (2012)	5.8	36.5	87.0	23.9	5.3
	post-NEEWS (2017)	5.6	32.5	95.4	27.6	6.0
XS-5 .13 Miles North of Providence Street to Providence Street	pre-NEEWS (2012)	3.6	12.2	194.9	65.0	10.3
	post-NEEWS (2012)	3.8	35.5	101.0	39.6	5.8
	post-NEEWS (2017)	4.2	36.7	102.3	45.3	6.6
XS-6 New London Avenue to Bald Hill Road	pre-NEEWS (2012)	0.9	30.0	227.5	37.1	7.2
	post-NEEWS (2012)	5.5	39.4	85.6	25.6	5.6
	post-NEEWS (2017)	6.1	40.7	96.7	29.1	6.3
XS-7 Bald Hill Road to 0.10 Miles North of Rt 117	pre-NEEWS (2012)	0.5	4.1	228.5	37.1	7.2
	post-NEEWS (2012)	3.1	12.0	85.1	25.1	5.4
	post-NEEWS (2017)	3.5	12.9	96.0	28.6	6.1

Table 3. Summary of pre-NEEWS (2012), post-NEEWS (2017), and post-NEEWS (2017) electric field levels.

Line Section	Configuration	ELECTRIC FIELD (kV/m) AT LOCATION				
		-100 ft beyond ROW edge	-ROW edge	Maximum on ROW	+ROW edge	+100 ft beyond ROW edge
XS-3 Rt 5 to Hartford Ave Sub	pre-NEEWS (2012)	0.04	0.28	4.88	1.79	0.18
	post-NEEWS (2012)	0.07	0.25	5.02	1.93	0.25
	post-NEEWS (2017)	0.07	0.25	5.02	1.93	0.25
XS-5 .13 Miles North of Providence Street to Providence Street	pre-NEEWS (2012)	0.03	0.05	4.49	3.84	0.30
	post-NEEWS (2012)	0.03	0.33	4.27	3.80	0.30
	post-NEEWS (2017)	0.03	0.33	4.27	3.80	0.30
XS-6 New London Avenue to Bald Hill Road	pre-NEEWS (2012)	0.02	0.34	4.94	1.81	0.18
	post-NEEWS (2012)	0.06	0.20	5.02	1.92	0.24
	post-NEEWS (2017)	0.06	0.20	5.02	1.92	0.24
XS-7 Bald Hill Road to 0.10 Miles North of Rt 117	pre-NEEWS (2012)	0.01	0.07	4.94	1.81	0.18
	post-NEEWS (2012)	0.05	0.11	5.02	1.93	0.25
	post-NEEWS (2017)	0.05	0.11	5.02	1.93	0.25

Table 4. Summary of pre-NEEWS (2012), post-NEEWS (2017), and post-NEEWS (2017) audible noise levels.

Line Section	Configuration	AUDIBLE NOISE (dBA)			
		FAIR WEATHER		FOUL WEATHER	
		-ROW edge	+ROW edge	-ROW edge	+ROW edge
XS-3 Rt 5 to Hartford Ave Sub	pre-NEEWS (2012)	16.2	20.4	41.2	45.4
	post-NEEWS (2012)	21.7	23.2	46.7	48.2
	post-NEEWS (2017)	21.7	23.2	46.7	48.2
XS-5 .13 Miles North of Providence Street to Providence Street	pre-NEEWS (2012)	18.9	24.6	43.9	49.6
	post-NEEWS (2012)	24.1	27.5	49.1	52.5
	post-NEEWS (2017)	24.1	27.5	49.1	52.5
XS-6 New London Avenue to Bald Hill Road	pre-NEEWS (2012)	16.5	20.6	41.5	45.6
	post-NEEWS (2012)	21.7	23.3	46.7	48.3
	post-NEEWS (2017)	21.7	23.3	46.7	48.3
XS-7 Bald Hill Road to 0.10 Miles North of Rt 117	pre-NEEWS (2012)	15.2	20.6	40.2	45.6
	post-NEEWS (2012)	20.9	23.5	45.9	48.5
	post-NEEWS (2017)	20.9	23.5	45.9	48.5