# APPENDIX L ENBRIDGE'S NOISE ASSESSMENT OF BLASTING AND HORIZONTAL DIRECTIONAL DRILLING

# Enbridge Line 5 Wisconsin Segment Relocation Project

# Noise Assessment of Blasting and Horizontal Directional Drilling

## **Construction Noise Impact**

Construction related sound levels are highly variable due to the locations of the equipment on site, how and when the equipment is being operated, and the specific phase of construction (e.g., clearing, grading, trenching, restoration). As discussed in the Project's Environmental Impact Report, the Project will result in an intermittent and localized increase in perceptible noise during the construction phase, but the effect will be temporary. Enbridge will minimize temporary construction noise increases to the extent practicable by requiring construction equipment to be fitted with standard muffler systems, working to complete construction near homes quickly, and by minimizing idling times near residences for equipment that is not in active use.

Enbridge reviewed construction activities that can result in elevated noise levels above standard construction activities (i.e., operation of excavators, grading equipment, mobile generators, and similar equipment). The two construction activities identified that could result in elevated noise levels above standard construction activities are rock blasting and use of the Horizontal Directional Drilling (HDD)/Direct Pipe installation techniques, which requires stationary equipment operation for an extended time at a specific location.

#### **Blasting**

Blasting activities result in a localized short duration (< 1 min) increase in Project-related noise during the detonation process. Due to the short duration, no noise abatement between blasting locations and noise receptors is proposed. Enbridge will implement blasting mitigation measures as discussed in the Blasting Plan. These measures include use of blasting mats near residences, conducting blasting only during daylight hours, and notification to nearby residents of the scheduled blasting activities.

#### HDD/Direct Pipe

Currently, HDD's and Direct Pipe installations are planned to be completed during daytime hours, except during the HDD pipe pullback (installation) process when 24-hour operation may be required. The Project's overall schedule will be determined by the timing of applicable permit receipt. Individual HDD progress may also alter the planned work hours at specific HDD locations. Either situation could require a modification to the planned work schedule, resulting in 24-hour construction at the HDD locations.

Enbridge conducted an acoustic analysis of the HDD/Direct Pipe locations to determine where noise abatement may be required should HDD drilling operation hours be extended beyond the planned daylight hours and limited timeframe for the pipe pull back. The assessment was based on the typical construction equipment used at an HDD site and the distance to the nearest residence from the HDD site. Enbridge conservatively used the closest residence to either the HDD entry or exit and conservatively assumed that the noise levels would be the same at either the entry or exit. Enbridge used a calculated Ldn (average noise level over a 24-hour period-dB) value above 55 dBA as the basis for identifying where noise abatement would be implemented if 24-hour construction at the HDD/Direct Pipe locations becomes necessary. The following information provides a detailed explanation of what equipment is assumed to be in

operation during a typical daily HDD operation and how the construction sound power levels are determined. The equipment for an HDD 24-hour operation does not change, so the Ld (average noise level during daylight hours- dB) and Ln (average noise level during nighttime hours – dB) are the same.

## **Construction Operation Sound Power Level Estimate**

Table 1 provides the distance to the nearest residence at each HDD location. Appendix A provides the anticipated equipment list and operation for daytime construction activities at the HDD/Direct Pipe locations. If nighttime work is required, the same equipment would be used. These tables include for each equipment item: the number that may be in operation, the anticipated A-weighted sound pressure level at 50 feet, the utilization factor (UF), and the anticipated octave band and A-weighted sound emission level (Lw).

HDD/Direct Pipe Site	Distance from Entry (feet)	Distance from Exit (feet)
White River	2,352	1,698
Deer Creek	1,516	927
Marengo River	1,513	480
Brunsweiler River	445	568
Highway 13	470	1,686
Trout Brook	155	398ª
Billy Creek	585	1,410 <sup>a</sup>
Silver Creek	1,008ª	1,140 <sup>b</sup>
Krause Creek	938	407
Bad River	512ª	398
Tyler Forks	>3,000	>3,000
Potato River	>3,000	1,960
Vaughn Creek	2,510	763
<sup>a</sup> Excludes non-occupied structur	es	
<sup>b</sup> Excludes commercial facilities		

Table 1: Distance to Nearest Residence

The effective octave band sound power level for each equipment item (LwE) was computed in accordance with Equation 1.

**Equation 1:** LwE = Lw + 10 Log(UF) + 10 Log(No.)

Where:

- <u>LwE</u> is the computed effective sound power level with the utilization factor and number of sources.
- <u>Lw</u> is the individual equipment sound power level with no modifications for UF or number of equipment items.
- <u>UF</u> is the Utilization Factor or percentage of time of equipment operation.
- <u>No.</u> is the number of equipment items of that type.

The total effective octave band sound power level (LwT) shown on Line 16 of the Tables was computed by summing the individual octave band sound effective power level (LwE) as derived from Equation 1 above. A sound power level (PWL) to sound pressure level (SPL) calculation was used to calculate Ld and Ln. Equation 2 (below) was used to calculate Ldn.

### Equation 2:

$$L_{\rm dn} = 10\log_{10}\left(\frac{15}{24}10^{L_{\rm d}/10} + \frac{9}{24}10^{(L_{\rm n}+10)/10}\right)$$

Table 2 provides the Ld, Ln, and corresponding Ldn for the closest occupied residence at each HDD/Direct Pipe crossing location.

	<b>Closest Occupied</b>			
Site	Residence (feet) <sup>a</sup>	Ld	Ln	Ldn
White River	1,698	47.8	47.8	54.20978
Deer Creek	927	54.2	54.2	60.60978
Marengo River	480	60.6	60.6	67.00978
Brunsweiler River	445	61.3	61.3	67.70978
Hwy 13	470	60.8	60.8	67.20978
Trout Brook	155	70.9	70.9	77.30978
Billy Creek	585	58.7	58.7	65.10978
Silver Creek	1,008	53.3	53.3	59.70978
Krause Creek	407	62.1	62.1	68.50978
Bad River	398	62.3	62.3	68.70978
Tyler Forks <sup>a</sup>	>3,000	41.4	41.4	47.80978
Potato River	1,960	46.3	46.3	52.70978
Vaughn Creek	763	56.1	56.1	62.50978

Table 2: Noise Analysis

<sup>a</sup> Closest occupied residence to either the entry or exit. Calculations conservatively assume the same level of noise at both the entry and exit. No adjustment of sound attenuation due to factors such as topography or vegetation has been made.

<sup>b</sup> Ld, Ln, and Ldn calculated based on a distance of 3,000 feet.

If 24-hour HDD operation is required at the highlighted HDDs locations. Enbridge would consult with the closest residents and implement noise abatement, if requested, such as installation of sound barrier walls, to reduce the Ldn.

Appendix A

General Equipment List per HDD/Direct Pipeline Location

En No MF	bridge ise analysis 9 4.04 - White Riv	ver	Descrip Tag	tion	Day Co Closest	nstruction Resident	ial Impac	ts					
	Project Line 5 V	<u>NSRP</u>											
	DATE: 04/15/24												
	Sheet 43	А											
4	DESCRIPTION			31	63	125	250	500	1000	2000	4000	8000	dBA
1	PWL Davtime												
2	Hydraulic Hoe	(63 dBA at 50 ft)	Lw No =	107	104	102 Utilizatio	100 n =	97 20%	97	90	86	86	100.
3	Generator Set	(55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
	FHWA	· · · ·	No =	2		Utilizatio	n =	100%					
4	Light Plant	(55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87
_	FHWA (Front Er	nd Loader)	No =	2	440	Utilizatio	n =	100%	100	101			100
5	Mud Rig	(77.6 dBA at 50 ft)	Lw No -	106	110	110 Utilizatio	106 n –	106	106	101	89	86	109.
6	Mud Pump	(75.6 dBA at 50 ft)		99	107	107	104	100%	103	101	93	91	107
0	FHWA	(70.0 db/( dt 00 h)	No =	1	107	Utilizatio	n =	100%	100	101	50	51	107.
7	Power Unit	(79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.
	RHK estimate		No =	1		Utilizatio	n =	100%					
8	Mud Pump	(47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79.
0	FHWA		<u>No =</u>	2	101	Utilizatio	n =	100%	77	70	66	74	00
9	Fower Onit	(51.9 UBA at 50 It)	No =	102	101	Utilizatio	04 n =	100%		73	00	7 1	03.
10			Lw	0		Otinzatio		10070					
			No =			Utilizatio	n =						
11													
10													
12													
13					_								
14													
15													
16	Total PW/L with t	# Sources		113	117	113	110	109	109	105	98	95	112
10	and Source Utiliz	zation Factor		115	,	115	110	103	103	100	30	30	112.
17	Divergance to	16	98 ft	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3	
18	Atmosp. Attn to	16	98 ft	0.2	0.2	0.3	0.7	1.2	2.5	5.1	12.9	23.3	
10	Std. Day. 59 d F	• and 70% rn, L Mille	og ft	50.0	54.2	50.7	17 1	15.9	127	27.9	22.8	8.0	17
19	Sound Level at	10	90 II	50.9	54.2	50.7	47.4	45.0	43.7	57.0	22.0	0.9	47
20													
21													
~~~													
22													
23													
20													
24													
25													

En No MF	bridge ise analysis 9 6.35 Deer Creek	Descript Tag	tion	Day Cor Closest	nstruction Resident	ial Impac	ts					
	Project Line 5 WSRP											
	DATE: 04/15/24											
	Sheet 43 A											
	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA
1	DMU Deutime											
2	Hydraulic Hoe (63 dBA at 50 ft)	L w	107	104	102	100	97	97	90	86	86	100
_	FHWA (Backhoe)	No =	1	101	Utilizatio	n =	20%	01	00	00	00	100
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87
	FHWA	No =	2		Utilizatio	n =	100%					
4	Light Plant (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
	FHWA (Front End Loader)	No =	2	110	Utilizatio	n =	100%	100	101	00	00	100
b	Nud Rig (77.6 dBA at 50 it) RHK estimate		106	110	110 Litilizatio	106 n –	106	106	101	89	86	109.
6	Mud Pump (75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107
Ū	FHWA	No =	1		Utilizatio	n =	100%				0.	
7	Power Unit (79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.
	RHK estimate	No =	1		Utilizatio	n =	100%					
8	Mud Pump (47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79.
0	FHWA	No =	2	101	Utilizatio	n =	100%	77	70	66	71	02
9			102	101	92 Litilizatio	04 n –	100%	11	73	00	71	03.
10		Lw	0		Otilizatio		100 /8					
		No =			Utilizatio	n =						
11												
12												
13												
15												
14												
15												
10	T ( ) D M ( ) ( )						100					
16	I otal PWL with # Sources		113	117	113	110	109	109	105	98	95	112.
17	Divergance to	97 ft	57.0	57.0	57.0	57.0	57.0	57 0	57.0	57.0	57.0	
. /		.,	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	
18	Atmosp. Attn to 92	?7 ft	0.1	0.1	0.2	0.4	0.6	1.4	2.8	7.0	12.7	
	Std. Day. 59 d F and 70% rh, L Miller	tbl 6-1										
19	Sound Level at 92	27 ft	56.3	59.5	56.1	52.9	51.6	50.1	45.4	33.9	24.8	54
20												
21												
- 1												
22												
23												
24				_								
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									SHEET		43	٨

En No MF	bridge ise analysis P 11.40 - Marengo River Project <u>Line 5 WSRP</u>	Descrip Tag	tion	Day Cor Closest	nstruction Resident	ial Impac	ts					
	DATE: 04/15/24											
	Sheet 43 A											
_	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA
1	BW/L Doutime											
2	Hydraulic Hoe (63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100.
-	FHWA (Backhoe)	No =	1		Utilizatio	n =	20%	0.	00			
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
	FHWA	No =	2	2	Utilizatio	n =	100%					
4	Light Plant (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
_	FHWA (Front End Loader)	No =	2		Utilizatio	n =	100%					
5	Mud Rig (77.6 dBA at 50 ft)	Lw	106	110	110	106	106	106	101	89	86	109.
6			0	107	107	104	100%	103	101	02	01	107
0	FHWA		99	107	Utilizatio	n =	100%	105	101	30	91	107.4
7	Power Unit (79.4 dBA at 50 ft)		112	116	112	109	100 %	107	103	96	91	111
•	RHK estimate	No =	1		Utilizatio	n =	100%		100		01	
8	Mud Pump (47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79.3
	FHWA	No =	2	2	Utilizatio	n =	100%					
9	Power Unit (51.9 dBA at 50 ft)	Lw	102	101	92	84	78	77	73	66	71	83.
		No =	0	)	Utilizatio	n =	100%					
10		Lw										
11		No =		_	Utilizatio	n =						
12				_								
12												
13												
14												
15												
10			110	447	440	440	400	100	4.05		05	440
16	Total PVVL with # Sources		113	117	113	110	109	109	105	98	95	112.
17	Divergance to	180 ft	51 3	513	51 3	51 3	51 3	513	51 3	51 3	513	
. /		-00 IL	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	
18	Atmosp. Attn to	480 ft	0.0	0.0	0.1	0.2	0.3	0.7	1.4	3.6	6.6	
	Std. Day. 59 d F and 70% rh, L Mill	er tbl 6-1	0.0		••••	•	0.0	•		0.0	0.0	
19	Sound Level at	480 ft	62.0	65.3	61.9	58.8	57.6	56.5	52.5	43.0	36.6	60.
20												
21												
22				_								
22												
23				_								
24												
25												
												-
									SHEET		43	Α

En No MP	bridge bise analysis P 15.1 - HWY 13 Project <u>Line 5 WSRP</u>	Descrip Tag	tion	Day Cor Closest	nstruction Residenti	ial Impac	ts					
	DATE: 04/15/24											
	Sheet 43 A		31	63	125	250	500	1000	2000	4000	8000	dBA
1	DESCRIPTION		51	03	125	230	500	1000	2000	4000	0000	UDA
2	PWL Daytime Hydraulic Hoe (63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100.
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90 Utilizatio	85 n –	20% 82 100%	80	82	77	77	87.
4	Light Plant (55.3 dBA at 50 ft) EHWA (Front End Loader)	Lw No =	100	93	90 Utilizatio	85 n =	82 100%	80	82	77	77	87.
5	Mud Rig (77.6 dBA at 50 ft) RHK estimate	Lw No =	106 0	110	110 Utilizatio	106 n =	106	106	101	89	86	109.
6	Mud Pump (75.6 dBA at 50 ft) FHWA	Lw No =	99 1	107	107 Utilizatio	104 n =	103 100%	103	101	93	91	107.
7	Power Unit (79.4 dBA at 50 ft) RHK estimate	Lw No =	112 1	116	112 Utilizatio	109 n =	108 100%	107	103	96	91	111.
8	Mud Pump (47.6 dBA at 50 ft) FHWA	Lw No =	89 2	92	87 Utilizatio	79 n =	73 100%	73	71	63	71	79.
9	Power Unit (51.9 dBA at 50 ft)	Lw No =	102 0	101	92 Utilizatio	84 n =	78 100%	77	73	66	71	83
10		Lw No =			Utilizatio	n =						
11												
12												
13												
14												
15												
16	Total PWL with # Sources and Source Utilization Factor		113	117	113	110	109	109	105	98	95	112.
17	Divergance to 47	'0 ft	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	51.1	
18	Atmosp. Attn to 47 Std. Day. 59 d F and 70% rh, L Miller	′0 ft * <b>tbl 6-1</b>	0.0	0.0	0.1	0.2	0.3	0.7	1.4	3.6	6.4	
19	Sound Level at 47	′0 ft	62.2	65.5	62.1	59.0	57.8	56.7	52.7	43.3	36.9	60.
20												
21												
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24												
25												
									SHEET		43	A

En No MF	bridge ise analysis ? 14.10 - Brunswe	eiler River	Descrip	tion	Day Cor	nstruction							
	Project Line 5 V	<u>NSRP</u>	Tag		Closest	Residenti	ial Impac	ts					
	DATE: 04/15/24												
	Sheet 43	А											
	DESCRIPTION			31	63	125	250	500	1000	2000	4000	8000	dBA
1													
2	Hydraulic Hoe	(63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100.0
2	FHWA (Backhoe	$\frac{2}{5}$	<u>No =</u>	1	02	Utilizatio	n =	20%	00	00	77	77	07
3	Generator Set	(55.3 dBA at 50 ft)		100	93	90 Utilizatio	85 n –	82 100%	80	82	()	11	87.3
4	Light Plant	(55.3 dBA at 50 ft)		100	93	90	85	82	80	82	77	77	87.5
•	FHWA (Front Er	nd Loader)	No =	2	2	Utilizatio	n =	100%	00	02			01.0
5	Mud Rig	(77.6 dBA at 50 ft)	Lw	106	110	110	106	106	106	101	89	86	109.3
	RHK estimate		No =	0	)	Utilizatio	n =	100%					
6	Mud Pump FHWA	(75.6 dBA at 50 ft)	Lw <b>No =</b>	99 1	107	107 Utilizatio	104 n =	103 100%	103	101	93	91	107.4
7	Power Unit	(79.4 dBA at 50 ft)	Lw No –	112	116	112 Litilizatio	109 n –	108	107	103	96	91	111.1
8	Mud Pump	(47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79.3
Ŭ	FHWA		No =	2	2	Utilizatio	n =	100%			00		
9	Power Unit	(51.9 dBA at 50 ft)	Lw	102	101	92	84	78	77	73	66	71	83.6
			No =	0	)	Utilizatio	n =	100%					
10			Lw No -			Litilizatio	n –						
11			NO -			Otilizatio							
12					_								
12													
13													
14					-								
15													
16	Total PWL with #	# Sources		113	117	113	110	109	109	105	98	95	112 7
10	and Source Utiliz	zation Factor		110		110	110	100	100	100	00	00	112.7
17	Divergance to		445 ft	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7	
18	Atmosp. Attn to		445 ft	0.0	0.0	0.1	0.2	0.3	0.7	1.3	3.4	6.1	
19	Sound Level at	• and 70% rn, ∟ Mill	<b>er tbl 6-1</b> 445 ft	62.7	66.0	62.6	59.5	58.3	57.2	53.2	43.9	37.7	61.3
20													
21													
22													
23													
24					-								
25													
-													

En No MF	bridge ise analysis 2 15.68 - Trout Brook	Descript Tag	tion	Day Cor Closest	nstruction Residenti	ial Impac	ts					
	Project Line 5 WSRP	J										
	DATE: 04/15/24											
	Sheet 43 A											
	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA
1	PWI Dautime											
2	Hydraulic Hoe (63 dBA at 50 ft)	Lw	107	104	102 Litilizatio	100 n –	97 20%	97	90	86	86	100
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87
4	FHWA	No =	2	00	Utilizatio	n =	100%	00	00	77	77	07
4	Light Plant (55.3 dBA at 50 ft) FHWA (Front End Loader)	LW No =	100	93	90 Utilizatio	85 n =	82 100%	80	82	()	//	87
5	Mud Rig (77.6 dBA at 50 ft)	Lw	106	110	110	106	100 / 0	106	101	89	86	109
	RHK estimate	No =	0		Utilizatio	n =	100%					
6	Mud Pump (75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107
7	Power Unit (79.4 dBA at 50 ft)	<b>NO =</b>	112	116	Utilizatio	n = 109	100%	107	103	96	91	111
'	RHK estimate	No =	1	110	Utilizatio	n =	100%	107	100	50	01	
8	Mud Pump (47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79
	FHWA	No =	2	101	Utilizatio	n =	100%		70	00	74	
9	Power Unit (51.9 dBA at 50 ft)	Lw No =	102 0	101	92 Utilizatio	84 n =	78 100%	()	73	66	71	83
10		Lw			etinzatio		10070					
11		No =			Utilizatio	n =						
11												
12												
10												
13												
14												
15				_								
10												
16	Total PWL with # Sources		113	117	113	110	109	109	105	98	95	112
17	and Source Utilization Factor	5 ft	11 5	11.5	11 5	11 5	11 5	11 5	/1 5	11 5	11 5	
17	Divergance to 13	5 11	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	
18	Atmosp. Attn to 15	5 ft	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.2	2.1	
10	Std. Day. 59 d F and 70% rh, L Miller	tbl 6-1 5 ft	71 0	75.1	71.8	68.8	67.7	66.8	63.3	55.3	50.9	70
19		5 R	71.3	75.1	71.0	00.0	07.7	00.0	00.0	55.5	50.9	70
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21				-								
22				_								
23												
24												
25												
									SHEET		43	A

En No MF	bridge bise analysis P 17.25 - Billy Creek Project Line 5 WSRP	Descrip Tag	tion	Day Cor Closest	nstruction Residenti	ial Impac	ts					
	DATE: 04/15/24											
	Chaot 42 A											
<u> </u>	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA
1												
2	PWL Daytime   Hydraulic Hoe (63 dBA at 50 ft)   EHW(A (Backbac))	Lw	107	104	102	100	97	97	90	86	86	100
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90	n = 85	20% 82	80	82	77	77	87.
1	FHWA	<u>No =</u>	2	02	Utilizatio	n = 95	100%	80	00	77	77	07
4	FHWA (Front End Loader)	No =	2	93	Utilizatio	80 n =	8∠ 100%	80	82	//	//	07.
5	Mud Rig (77.6 dBA at 50 ft)	Lw	106	110	110	106	106	106	101	89	86	109.
6	Mud Pump (75.6 dBA at 50 ft)	Lw	0 	107	107	n = 104 n =	100%	103	101	93	91	107.
7	Power Unit (79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.
8	Mud Pump (47.6 dBA at 50 ft)		89	92	Otilizatio 87	n = 79	73	73	71	63	71	79.
9	FHWA Power Unit (51.9 dBA at 50 ft)	<u>No =</u> Lw	2 102	101	Utilizatio 92	n = 84	<u>100%</u> 78	77	73	66	71	83
10		No =	0	)	Utilizatio	n =	100%					
10		No =			Utilizatio	n =						
11												
12				-								
13												
4.4												
14												
15												
16	Total PWL with # Sources		113	117	113	110	109	109	105	98	95	112
17	and Source Utilization Factor	585 ft	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	
10			0.4	0.4	0.4						0.0	
18	Atmosp. Attn to Std. Day. 59 d F and 70% rh, L Mill	er tbl 6-1	0.1	0.1	0.1	0.2	0.4	0.9	1.8	4.4	8.0	
19	Sound Level at	585 ft	60.3	63.6	60.2	57.1	55.8	54.6	50.4	40.5	33.4	58
20												
21				-								
22												
23												
24												
<u> </u>												
25												

En No MP	bridge ise analysis 9 19.09 - Silver Cree	ek	Descript Tag	tion	Day Co Closest	nstruction Residenti	al Impac	ts					
	Project Line 5 WS	<u>SRP</u>											
	DATE: 04/10/24												
	Sheet 43 A	A											
	DESCRIPTION			31	63	125	250	500	1000	2000	4000	8000	dBA
1	PWI Davtime												
2	Hydraulic Hoe (	63 dBA at 50 ft)	Lw No =	107	104	102 Utilizatio	100 n =	97 20%	97	90	86	86	100.
3	Generator Set (	55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
	FHWA		No =	2		Utilizatio	n =	100%					
4	Light Plant (	55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.
5	FHVVA (Front End	Loader)	No =	106	110	Utilizatio	n = 106	100%	106	101	80	96	100
5	RHK estimate	77.0 UBA at 50 It)	No =	001	110	Utilizatio	n =	100%	100	101	09	00	109.
6	Mud Pump (	75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107.
	FHWA		No =	1		Utilizatio	n =	100%					
7	Power Unit (	79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.
8	RHK estimate	47.6 dBA at 50.ft)	NO =	1 80	02	Utilizatio	n = 79	100%	73	71	63	71	70
0	FHWA	47.0 UDA at 50 h)	No =	2	52	Utilizatio	n =	100%	75	71	05	71	73.
9	Power Unit (	51.9 dBA at 50 ft)	Lw	102	101	92	84	78	77	73	66	71	83.
			No =	0		Utilizatio	n =	100%					
10			Lw			L Hell- a dia							
11			NO =		_	Utilizatio	n =						
••													
12													
10													
13													
14					_								
15													
10	Total DW/L with # C			110	447	110	110	100	100	105	00	05	110
10	and Source Utilizat	tion Factor		113	117	113	110	109	109	105	98	95	112.
17	Divergance to	100	B ft	57.8	57.8	57.8	57.8	57.8	57.8	57.8	57.8	57.8	
	9.												
18	Atmosp. Attn to	100	B ft	0.1	0.1	0.2	0.4	0.7	1.5	3.0	7.7	13.8	
10	Std. Day. 59 d F a	nd 70% rh, L Miller	tbl 6-1		50.0	<b>EE 4</b>	52.2	50.0	40.2	44.4	22.5	22.0	50
19	Sound Level at	100	5 1	55.5	58.8	55.4	52.2	50.8	49.3	44.4	32.5	22.9	53
20					_								
21													
22													
22													
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Eni Noi MP	bridge ise analysis 22.28 - Krause Creek Project <u>Line 5 WSRP</u>	Descrip Tag	tion	Day Cor Closest	nstruction Resident	ial Impac	ts					
	DATE: 04/15/24											
	Sheet 43 A		31	63	125	250	500	1000	2000	4000	8000	dBA
1			01	00	120	200	000	1000	2000	4000	0000	UDA
2	Hydraulic Hoe (63 dBA at 50 ft)	Lw No =	107	104	102 Utilizatio	100 n –	97 20%	97	90	86	86	100.
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	90 Utilizatio	85 n –	82	80	82	77	77	87.
4	Light Plant (55.3 dBA at 50 ft)		100	93	90	85 85	82	80	82	77	77	87.
5	Mud Rig (77.6 dBA at 50 ft)		106	110	110	n = 106	100%	106	101	89	86	109.3
6	Mud Pump (75.6 dBA at 50 ft)	Lw	99	107	107	<u>n =</u> 104	100%	103	101	93	91	107.4
7	Power Unit (79.4 dBA at 50 ft)	No =	112	116	Utilizatio 112	n = 109	100%	107	103	96	91	111.
8	RHK estimateMud Pump(47.6 dBA at 50 ft)	No = Lw	1 89	92	Utilizatio 87	n = 79	<u>100%</u> 73	73	71	63	71	79.3
9	FHWAPower Unit(51.9 dBA at 50 ft)	No = Lw	2 102	101	Utilizatio 92	n = 84	<u>100%</u> 78	77	73	66	71	83.
10		No = Lw	0		Utilizatio	n =	100%					
11		No =		-	Utilizatio	n =						
12				_								
13				_								
14				-								
15												
16	Total PWL with # Sources		113	117	113	110	109	109	105	98	95	112.
17	and Source Utilization FactorDivergance to40	7 ft	49.9	49.9	49.9	49.9	49.9	49.9	49.9	49.9	49.9	
18	Atmosp. Attn to 40	7 ft	0.0	0.0	0.1	0.2	0.3	0.6	1.2	3.1	5.6	
19	Std. Day. 59 d F and 70% rh, L MillerSound Level at40	<b>tbl 6-1</b> 7 ft	63.5	66.7	63.4	60.3	59.1	58.0	54.1	45.0	39.0	62.
20												
21				-								
22												
23												
24												
25												
									SHEET		43	Δ

Eni Noi MP	bridge ise analysis 24.18 - Bad Rive	er	Descri Tag	ption	Day Co Closest	nstruction Resident	ial Impac	ts					
	Project <u>Line 5 v</u>	<u>NORP</u>											
	DATE: 04/10/24												
	Sheet 43	A											
	DESCRIPTION			31	63	125	250	500	1000	2000	4000	8000	dBA
1	DM/L Deutime												
2	Hydraulic Hoe	(63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100.
_	FHWA (Backhoe		<u>No =</u>	1	00	Utilizatio	n =	20%	00	00	77		07
3	Generator Set	(55.3 dBA at 50 π)	LW	100	93	90 Utilizatio	85	82	80	82	//	()	87.
Λ	FHVVA	(55.3 dBA at 50 ft)	<u>NO =</u>	100	03	Utilizatio	n = 85	100%	80	82	77	77	87
4	EIGHT FIAIT	(55.5 UBA at 50 It) od Loader)		2	93	Utilizatio	n –	100%	80	02	11	11	07.
5	Mud Rig	(77.6 dBA at 50 ft)		106	. 110	110	106	100 %	106	101	89	86	109
-	RHK estimate		No =	0	)	Utilizatio	n =	100%			00	00	
6	Mud Pump	(75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107.
	FHWA .	· · · · · · · · · · · · · · · · · · ·	No =	1		Utilizatio	n =	100%					
7	Power Unit	(79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.
	RHK estimate		No =	1		Utilizatio	n =	100%					
8	Mud Pump	(47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79.
	FHWA		No =	2	2	Utilizatio	n =	100%					
9	Power Unit	(51.9 dBA at 50 ft)	Lw	102	101	92	84	78	77	73	66	71	83.
10			<u>No =</u>	0	)	Utilizatio	n =	100%					
10			LW			Litilizatio	-						
11			NO =		_	Utilizatio	n =						
12					_								
13													
14													
15													
10		# Courses		440	447	440	110	400	100	105		05	110
10	and Source Litili	# Sources		113	117	113	110	109	109	105	98	95	112.
17	Divergance to		308 ft	/0.7	/ /0 7	/ /0 7	/0.7	10.7	10.7	10.7	10.7	10.7	
17	Divergance to		590 H	43.7	43.7	43.7	49.7	45.7	49.7	49.7	43.7	49.7	
18	Atmosp. Attn to		398 ft	0.0	0.0	0.1	0.2	0.3	0.6	1.2	3.0	5.5	
	Std. Day. 59 d F	and 70% rh, L Mil	ler tbl 6-1	010		••••	0.1	0.0				0.0	
19	Sound Level at		398	ft 63.6	66.9	63.6	60.5	59.3	58.2	54.3	45.2	39.4	62.
20													
0.4					_								
21													
22													
22													
23													
24													
25													

En No MF	bridge ise analysis 2 34.01 - Tyler Forks	Descrip Tag	tion	Day Cor Closest	nstruction Residenti	ial Impac	ts					
	Project Line 5 WSRP											
	DATE: 04/15/24											
	Sheet 43 A											
	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA
1	PW/L Daytime											
2	Hydraulic Hoe (63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100
3	Generator Set (55.3 dBA at 50 ft)	Lw	100	93	Utilizatio 90	n = 85	20%	80	82	77	77	87
-	FHWA	No =	2		Utilizatio	n =	100%					
4	Light Plant (55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87
5	HWA (Front End Loader)	No =	2	110	Utilizatio	n = 106	100%	106	101	80	86	100
5	RHK estimate	No =	0	110	Utilizatio	n =	100%	100	101	09	00	109
6	Mud Pump (75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107
	FHWA	No =	1		Utilizatio	n =	100%					
7	Power Unit (79.4 dBA at 50 ft)	Lw No –	112	116	112 Utilizatio	109 n –	108	107	103	96	91	111.
8	Mud Pump (47.6 dBA at 50 ft)	Lw	89	92	87	79	73	73	71	63	71	79
	FHWA	No =	2		Utilizatio	n =	100%					
9	Power Unit (51.9 dBA at 50 ft)	Lw <b>No =</b>	102 0	101	92 Utilizatio	84 n =	78 100%	77	73	66	71	83
10		Lw			1.1412-0410							
11		NO =			Utilizatio	n =						
12												
13												
14				-								
15				-								
16	Total PWI with # Sources		112	117	112	110	100	100	105	08	05	112
10	and Source Utilization Factor		115	117	115	110	109	109	105	90	90	112
17	Divergance to 30	00 ft	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2	
18	Atmosp. Attn to 30	00 ft	0.3	0.3	0.6	1.2	2.1	4.5	9.0	22.8	41.1	
19	Sound Level at 300	<b>r tbl 6-1</b> 00 ft	45.8	49.1	45.5	41.9	39.9	36.8	29.0	7.9	-13.8	41
20												
21				_								
22												
22												
23												
24												
25												
									SHEET		43	A

Enbridge Noise analysis MP 37.86 - Potato River Project Line 5 WSRP			tion	Day Construction Closest Residential Impacts									
	DATE: 04/15/24												
	Sheet 43 A												
	DESCRIPTION		31	63	125	250	500	1000	2000	4000	8000	dBA	
1	PWI Dautime												
2	Hydraulic Hoe (63 dBA at 50 ft) FHWA (Backhoe)	Lw No =	107	104	102 Utilizatio	100 n =	97 20%	97	90	86	86	100.	
3	Generator Set (55.3 dBA at 50 ft) FHWA	Lw No =	100	93	90 Utilizatio	85 n =	82 100%	80	82	77	77	87.	
4	Light Plant (55.3 dBA at 50 ft) EHWA (Front End Loader)	Lw No =	100	93	90 Utilizatio	85 n =	82 100%	80	82	77	77	87.	
5	Mud Rig (77.6 dBA at 50 ft) RHK estimate	Lw No =	106	110	110 Utilizatio	106 n =	106	106	101	89	86	109.	
6	Mud Pump (75.6 dBA at 50 ft) FHWA	Lw No =	99 1	107	107 Utilizatio	104 n =	103	103	101	93	91	107.	
7	Power Unit (79.4 dBA at 50 ft)	Lw No =	112	116	112 Utilizatio	109 n –	108	107	103	96	91	111.	
8	Mud Pump (47.6 dBA at 50 ft) EHWA	Lw No =	89	92	87 Utilizatio	79 n =	73	73	71	63	71	79.	
9	Power Unit (51.9 dBA at 50 ft)	Lw No =	102	101	92 Utilizatio	84 n =	78	77	73	66	71	83.	
10		Lw No =	0		Utilizatio	n –	10070						
11		110 -			Otilizatio								
12				-									
13													
14													
15													
16	Total PWL with # Sources		113	117	113	110	109	109	105	98	95	112.	
17	Divergance to 196	i0 ft	63.5	63.5	63.5	63.5	63.5	63.5	63.5	63.5	63.5		
18	Atmosp. Attn to 196 Std. Day, 59 d F and 70% rb. L Miller	60 ft 1 <b>tbl 6-1</b>	0.2	0.2	0.4	0.8	1.4	2.9	5.9	14.9	26.9		
19	Sound Level at 196	60 ft	49.6	52.9	49.4	46.0	44.4	42.1	35.8	19.5	4.1	46.	
20													
21													
22													
23													
24													
25													
Ĺ									SHEET		43	A	

Enbridge Noise analysis MP 39.56 - Vaughn Creek Des Tag Project Line 5 WSRP			Descrip Tag	Description Tag		Day Construction Closest Residential Impacts									
	DATE: 04/15/24														
	Sheet 43	А													
	DESCRIPTION			31	63	125	250	500	1000	2000	4000	8000	dBA		
1	DWI Doutimo														
2	Hydraulic Hoe	(63 dBA at 50 ft)	Lw	107	104	102	100	97	97	90	86	86	100.6		
	FHWA (Backhoe	e)	No =	1		Utilizatio	n =	20%							
3	Generator Set	(55.3 dBA at 50 ft)	Lw	100	93	90	85	82	80	82	77	77	87.5		
_	FHWA		No =	2		Utilizatio	n =	100%							
4	Light Plant	(55.3 dBA at 50 ft)	LW	100	93	90 Utilizatio	85	82	80	82	()	((	87.5		
5		(77.6 dBA at 50.ft)		<u> </u>	110	110	106	100%	106	101	80	86	109 3		
5	RHK estimate	(11.0 00A at 50 h)	No =	0	110	Utilizatio	n =	100%	100	101	05	00	103.0		
6	Mud Pump	(75.6 dBA at 50 ft)	Lw	99	107	107	104	103	103	101	93	91	107.4		
	FHWA	х, , , , , , , , , , , , , , , , , , ,	No =	1		Utilizatio	n =	100%							
7	Power Unit	(79.4 dBA at 50 ft)	Lw	112	116	112	109	108	107	103	96	91	111.1		
0	RHK estimate		No =	1		Utilizatio	n =	100%		74		74	70.0		
8		(47.6 dBA at 50 ft)	LW	89	92	87	79 n	100%	73	71	63	71	79.3		
a	Power Unit	(51.9 dBA at 50 ft)		<u> </u>	101	0111/2atio	n = 84	78	77	73	66	71	83.6		
Ŭ			No =	0	101	Utilizatio	n =	100%		10	00	, ,	00.0		
10			Lw												
			No =			Utilizatio	n =								
11															
10					_										
12															
13															
14															
45															
15															
16	Total PWL with #	t Sources		113	117	113	110	109	109	105	98	95	112 7		
	and Source Utiliz	zation Factor		110		110	110	100	100	100	00	00			
17	Divergance to	76	3 ft	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4			
18	Atmosp. Attn to	76 	3 ft	0.1	0.1	0.2	0.3	0.5	1.1	2.3	5.8	10.5			
10	Sound Level at	and 70% rn, L Miller	1010-1 3 ft	58.0	61.2	57.0	54.7	53 /	52.0	47.6	36.8	28.7	56 1		
13	Sound Level at		5 n	50.0	01.2	57.5	54.7	55.4	52.0	47.0	50.0	20.7	50.1		
20															
21															
00															
22															
23															
24															
25															