Appendix A: Atmospheric Environment Component Study

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List of Acronyms & Abbreviations

%HA	Highly Annoyed
µg/m^3	micrograms per cubic meter
µm	micron
APCR	Air Pollution Control Regulations, 2022
AQM	air quality monitoring
AQMS	Air Quality Management System
Braya	Braya Renewable Fuels
BV	Bureau Veritas
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CHE	Committee on Health and the Environment
CO	carbon monoxide
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels

EAR	Environmental Assessment Regulations
EAR-GWH	Environmental Assessment Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Production Projects
ECCC	Environment and Climate Change Canada
FPT	Federal-Provincial-Territorial
GHD	GHD Limited
H_2S	hydrogen sulfide
HGP	Hydrogen generation plant
HP	Hydrogenation Plant
Hz	hertz
IMN	industrial monitoring network
km	kilometre
km/h	kilometers per hour
LAA	Local Assessment Area
LA_{eq}	A-weighted, equivalent continuous sound level
L_d	Daytime sound pressure level
L_{dn}	Day-night average sound pressure level
L_{eq}	equivalent continuous sound level
LFN	low frequency noise
L_n	Nighttime sound pressure level
LOHC	Liquid Organic Hydrogen Carrier
m	metre
MCH	methylcyclohexane
MW	megawatt
NAPS	National Air Pollution Surveillance
NARL	North Atlantic Refining Limited
ND	not detected
NL	Newfoundland and Labrador
NL AQS	Newfoundland and Labrador Air Quality Standards
NL DECC	Newfoundland and Labrador Department of Environment and Climate Change
NL EPA	NL Environmental Protection Act
NO	nitric oxide
NO_2	nitrogen dioxide
North Atlantic	North Atlantic Refining Corporation
NOx	oxides of nitrogen
NPRI	National Pollutant Release Inventory
O&M	Operation and Maintenance
O_3	ozone
PA	Project Area
PASS	Passive Air Sampling System

PCBs	polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-p-dioxins
PCDFs	polychlorinated dibenzo furans
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppb	parts per billion
RAA	Regional Assessment Area
RDL	reportable detection limit
SEM	Sikumiut Environmental Management Ltd.
SO_2	sulfur dioxide
TSP	total suspended particulate
VOCs	volatile organic compounds
WHO	World Health Organization

1.0 Introduction

North Atlantic Refining Corp. (North Atlantic) is proposing to undertake the development of a Wind to Hydrogen project (the Project) on the Isthmus of Avalon Region in Newfoundland and Labrador (NL). This Project will entail the development, construction, operation and eventual decommissioning of a 324-megawatt (MW) Wind Farm consisting of 45 wind turbines on an undeveloped peninsula situated between Sunnyside and Deer Harbour. The Wind Farm will provide renewable electricity via a 138 kV transmission line to a newly developed Hydrogen Generation Plant (HGP), from where generated hydrogen will be transported to a Hydrogenation Plant (HP) for transformation into a Liquid Organic Hydrogen Carrier (LOHC), which will then be shipped from North Atlantic's port facilities to international markets for use in various decarbonization technologies.

1.1 Objectives

North Atlantic retained Sikumiut Environmental Management Ltd. (SEM) to conduct an atmospheric baseline study to assess existing air quality and noise conditions within the defined study area (Section 1.2). Baseline conditions were evaluated using a combination of desktop analyses and field studies, with results compared to applicable regulatory standards and guidelines.

This study has been prepared in accordance with the NL **Environmental Protection Act** (NL EPA) and the Environmental Assessment Regulations (EAR). The format of this submission aligns with the "Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Production Projects (EAR-GWH)".

1.2 Study Area

The atmospheric environment baseline study considered three spatial boundaries:

1. **Project Area (PA)**: defined as "the area in which Project infrastructure components and activities (e.g., construction, operation and maintenance (O&M), and decommissioning and rehabilitation) will occur, and within the boundaries of which direct environmental interactions with the Project will likely occur". The PA includes all proposed infrastructure and construction related to the Project, encompassing both the development and operation of hydrogen generation and wind energy components. The Wind Farm infrastructure, situated on Provincial Crown Lands designated as a Green Energy Reserve, includes wind turbines, access roads, collector and transmission lines, electrical substations, an O&M building, a laydown area, and a batch plant. Together, these components form an integrated system to generate and transmit renewable energy to the HGP. The HGP and HP infrastructure, located on existing North Atlantic property

within the North Atlantic Logistics Terminal, includes the HGP, the HP, an electrical substation, and existing infrastructure for storage and transportation of hydrogen. For linear features, including the transmission line and access roads, the PA is defined as a corridor extending 100 metres (m) on either side of the feature's centerline.

2. **Local Assessment Area (LAA)**: defined as “the area in which environmental interactions are detectable (and measurable) beyond the boundaries of the PA”. A minimum buffer of 1 kilometre (km) was added to the PA around the Wind Farm, HGP, and HP. A minimum buffer of 250 m was applied to the access road and transmission lines.

3. **Regional Assessment Area (RAA)**: defined as ““the spatial extent of potential indirect and cumulative environmental effects which may reach beyond the limits of the LAA”. The RAA is represented by a 30 km radius around the center of the PA.

Baseline conditions of air quality and noise were assessed within the RAA. The RAA boundary captures the area where most cumulative effects are anticipated, including additive interactions from other local industrial activities, infrastructure, and projects.

2.0 Air Quality

The air quality baseline assessment was undertaken to characterize existing air quality conditions within the RAA. This study specifically evaluated the following air contaminants:

- Total suspended particulate (TSP);
- Particulate matter less than 10 microns (µm) (PM_{10});
- Particulate matter less than 2.5 µm ($PM_{2.5}$);
- Total metals;
- Nitric oxide (NO);
- Nitrogen dioxide (NO_2);
- Carbon monoxide (CO);
- Sulfur dioxide (SO_2); and
- Ozone (O_3).

2.1 Regulatory Context

The Province of NL has established Air Pollution Control Regulations, 2022 (APCR) under the NL EPA. These regulations set maximum permissible concentrations of air contaminants and outline measures to control atmospheric emissions from various sources (Newfoundland and Labrador Regulation 11/22, 2022). The standards, referred to as the NL Air Quality Standards (NL AQS), are specified under the APCR and are presented in Table A-2.1-1 in units of parts per billion (ppb) or micrograms per cubic metre (µg/m^3).

Table A-2.1-1 Newfoundland and Labrador Air Quality Standards (NL AQS).

Contaminant	Units of Concentration	Concentration	Period of Time
Ammonia	ppb	144	24 hour
Arsenic	µg/m^3	0.3	24 hour
Cadmium	µg/m^3	2	24 hour
Carbon monoxide	ppb	30,582	1 hour
		13,107	8 hour
Copper	µg/m^3	50	24 hour
Lead	µg/m^3	2	24 hour
Mercury	µg/m^3	2	24 hour
Nickel	µg/m^3	2	24 hour
Nitrogen dioxide	ppb	213	1 hour

Contaminant	Units of Concentration	Concentration	Period of Time
		106	24 hour
		53	1 year
Ozone	ppb	82	1 hour
		44	8 hour
Particulate matter < 2.5 µm	µg/m^3	25	24 hour
		8.8	1 year
Particulate matter < 10 µm	µg/m^3	50	24 hour
Total particulate matter	µg/m^3	120	24 hour
		60	1 year
Sulfur dioxide	ppb	344	1 hour
		229	3 hour
		115	24 hour
		23	1 year
Vanadium	µg/m^3	2	24 hour
Zinc	µg/m^3	120	24 hour
Notes < = less than, ppb = parts per billion, µg/m^3 = micrograms per cubic metre			

Hydrogen sulfide (H_2S), asbestos, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), and polychlorinated dibenzo furans (PCDFs) are also regulated under the NL AQS, however, these compounds are not expected to be released in significant quantities and are not considered to be primary emissions for hydrogen production facilities and wind turbines. This is due to the nature of emissions anticipated from the Project's operational activities, which are unlikely to generate substantial amounts of these pollutants. Such air contaminants were not considered further in this assessment.

Federal regulation of air contaminant releases, also referred to as air pollutants, is governed by the Canadian Council of Ministers of the Environment (CCME). The CCME has established the Canadian Ambient Air Quality Standards (CAAQS) for air pollutants, including $PM_{2.5}$, O_3, NO_2, and SO_2. These standards were developed to promote continuous improvements in air quality in Canada as part of the Air Quality Management System (AQMS). The AQMS aims to reduce both emissions and ambient concentrations of various air pollutants of concern (Canadian Council of Ministers of the Environment, n.d.). The CAAQS for federally regulated air pollutants are detailed in Table A-2.1-2.

Table A-2.1-2 Canadian Ambient Air Quality Standards (CAAQS).

Air Pollutant	Units of Concentration	Averaging Time	Numerical Value		Statistical Form
			2020-2024	2025	
Particulate matter < 2.5 µm	µg/m^3	24-hour	27		The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations

Air Pollutant	Units of Concentration	Averaging Time	Numerical Value		Statistical Form
			2020-2024	2025	
		1-year	8.8		The 3-year average of the annual average of the daily 24-hour average concentrations
Ozone	ppb	8-hour	62	60	The 3-year average of the annual 4th highest of the daily maximum 8-hour average ozone concentrations
Nitrogen dioxide	ppb	1-hour	60	42	The 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations
		1-year	17.0	12.0	The average over a single calendar year of all 1-hour average concentrations
Sulfur dioxide	ppb	1-hour	70	65	The 3-year average of the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations
		1-year	5.0	4.0	The average over a single calendar year of all 1-hour average SO_2 concentrations

Notes
< = less than, µm = microns, ppb = parts per billion, $\mu g/m^3$ = micrograms per cubic metre

Regulatory compliance is continuously monitored through the National Air Pollutant Surveillance (NAPS) program, managed by Environment and Climate Change Canada (ECCC) in collaboration with NL Department of Environment and Climate Change (NL DECC). There are six NAPS stations in the province that form part of this network. Provincial NAPS stations are complemented by an industrial monitoring network (IMN) where major industrial operations monitor air quality for specific pollutants near their facilities. NAPS stations track long-term trends, evaluate compliance with air quality standards, and help inform public health policies and environmental regulations. IMN stations typically monitor pollutants that are most relevant to the local industrial activities, such as SO_2, NO_2, volatile organic compounds (VOCs), or other emissions linked to the industry's processes. IMN stations help ensure compliance with regulatory standards and monitor the direct impact of industrial emissions on surrounding areas. The NL DECC compiles and summarizes ambient air quality data from both the NAPS and IMN stations in its annual reports.

2.2 Methodology

Existing ambient air quality conditions within the RAA were characterized by analyzing ambient air quality data as well as results from a field survey conducted in 2024.

2.2.1 Desktop Study

Existing air quality conditions were evaluated using data from the NAPS and IMN stations, as well as air contaminant release information from the National Pollutant Release Inventory (NPRI). The proposed Project is comprised of a Wind Farm, extending from Sunnyside in the west to Deer Harbour in the east, and a HGP and HP located within the NARL Logistics Terminal boundaries. The closest IMN ambient air quality monitoring (AQM) stations are situated in Arnold's Cove, Come By Chance, Sunnyside, and the Braya Renewable Fuels (Braya) Property Boundary, all within proximity to the PA. Braya operates AQM stations in the RAA, measuring ambient levels of SO_2 and $PM_{2.5}$. Data from these air stations provide a relevant benchmark for understanding the baseline air quality in the vicinity of the Project. To ensure a comprehensive assessment, data from the NAPS station in Mount Pearl, located approximately 130 km from the PA, was used to supplement the desktop evaluation of air quality. While there are differences in local air quality conditions due to industrial activity and geographical factors, there is a lack of regional variability in NL, thus Mount Pearl was considered comparable to the PA.

2.2.2 Field Survey

Baseline ambient air quality within the RAA was evaluated through a field survey conducted at three locations: (1) Come By Chance municipal building; (2) Sunnyside community centre; and (3) Come By Chance Industrial Site fenceline (Figure A-2.2-1). These monitoring locations were selected based on their proximity to sensitive receptors and Project infrastructure. It was assumed that the air quality conditions at these monitoring locations would be indicative of those across the broader RAA, given the minimal variation in ambient air quality throughout the region.

The Come By Chance municipal building functions as the administrative center for the local town council and municipal operations and is occupied by town staff and council. The Sunnyside community centre serves as a hub for local activities, events, and public services and town residents gather for social, recreational, and educational purposes. The Sunnyside community centre site is near the proposed array of wind turbines.

The field survey consisted of measuring ambient concentrations of PM_{10}, TSP, metals, and NO_2. PM_{10} was prioritized over $PM_{2.5}$ in the field study due to the fact that Braya monitors ambient levels of $PM_{2.5}$ in Arnold's Cove, Sunnyside, Come By Chance and at the Braya Property Boundary. The field survey aims to provide a more comprehensive evaluation of air quality conditions in relation to potential emissions from the operations at Braya by supplementing air contaminants of potential concern monitored by Braya IMN ambient AQM stations.

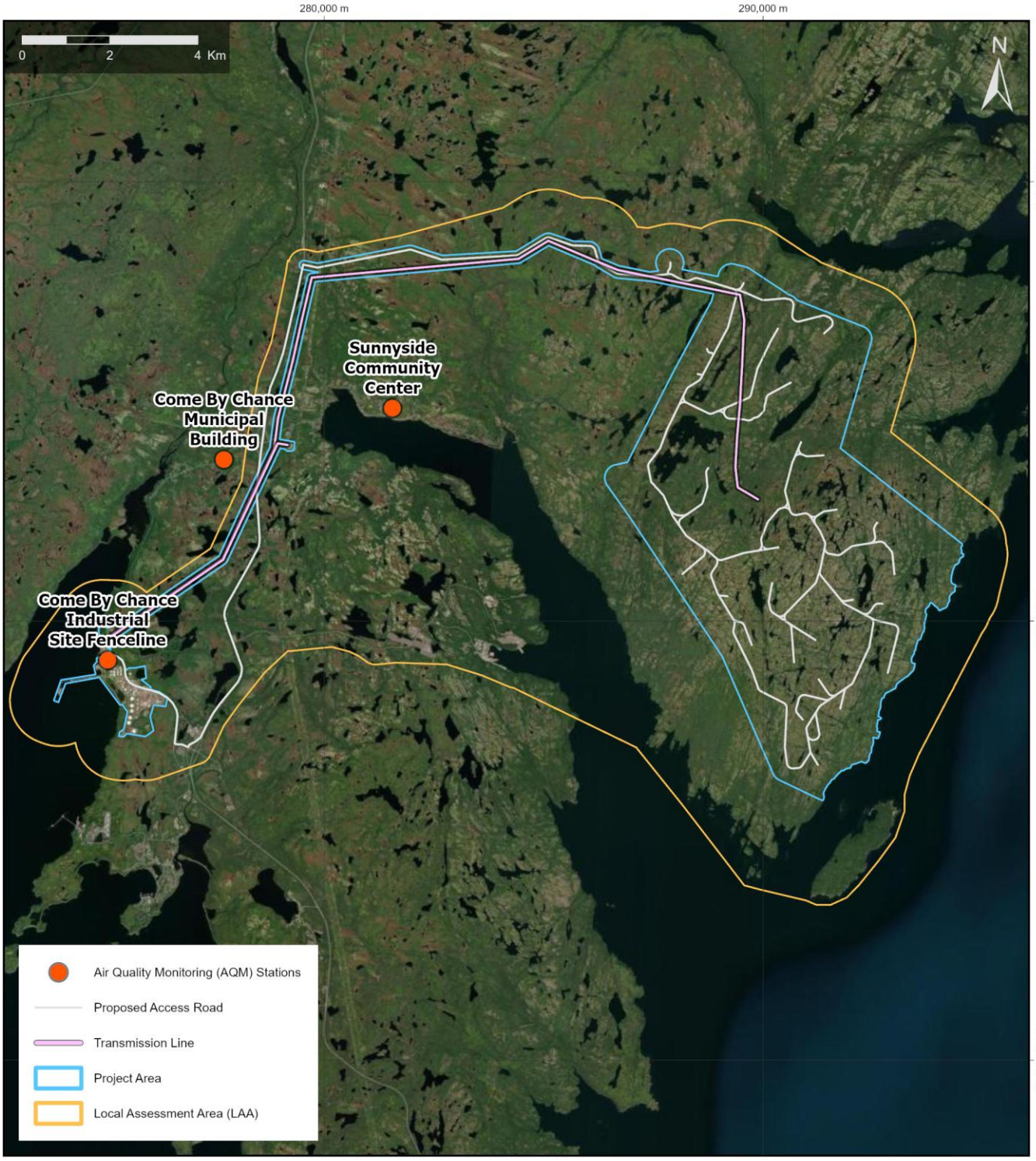

Figure A-2.2-1 Field survey AQM locations.

Figure A-2.2-2 Ambient air samplers at the Sunnyside community centre.

Figure A-2.2-3 Ambient air samplers at the Come By Chance municipal building.

Ambient concentrations of PM_{10}, TSP, and metals were determined using portable ambient air samplers (BGI PQ100). The BGI PQ100 draws ambient air through a size-selective sampling head, using an integrated pump to capture particulate onto a pre-weighed Teflon filter through impaction. Over a three-week period in August 2024, two BGI PQ100 units were deployed in tandem at the three monitoring locations, each operating for 24-hour sampling intervals. The deployment setup and equipment are shown in Figures A-2.2-2 and A-2.2-3. The BGI PQ100 units were programmed to automatically shut off after 24-hour sampling periods, ensuring consistent sampling times for each unit and deployment throughout the field survey. Post-collection filter weights and particulate concentrations were analyzed by Bureau Veritas (BV) in Mississauga, Ontario. The TSP filters were further examined using atomic spectroscopy to determine concentrations of particle-bound metals.

A passive air sampling system is a device that collects air pollutants without the need for active air movement, such as a pump. Instead, it relies on natural processes like diffusion or permeation, where gases and vapours in the ambient air move into the sampler based on concentration gradients. The pollutants are typically absorbed onto a filter or sorbent material inside the sampler. Passive air samplers provide average pollutant concentrations over extended periods, making them ideal for long-term AQM studies. Concentrations of NO_2 in ambient air were determined using BV's proprietary All-Season Passive Air Sampling System (PASS). A PASS unit was deployed at each monitoring location for a one-month exposure period, spanning August to September 2024. This duration was chosen to ensure ultra-low detection limits could be achieved, as ambient NO_2 concentrations were anticipated to be low. The PASS deployment setup is shown in Figure A-2.2-3. To maintain sample integrity, a blank (i.e., passive samplers not exposed to ambient air) was also submitted. Post-exposure analyses of NO_2 concentrations on the passive samplers were determined by BV in Edmonton, Alberta.

Figure A-2.2-4 PASS deployed at the Come By Chance refinery fenceline.

2.3 Results

2.3.1 Desktop Study

Information was obtained from multiple sources to characterize existing air quality in the RAA, including provincial ambient air monitoring reports, air quality measurements from the Mount Pearl NAPS station, air quality measurements from the Braya IMN stations, and information on pollutant releases reported by facilities to the NPRI.

The Mount Pearl NAPS station is located approximately 130 km northeast of the PA and monitors $PM_{2.5}$, PM_{10}, O_3, NO, NO_2, NOx, CO, and SO_2 (Government of Newfoundland and Labrador, n.d.). A summary of ambient air monitoring data collected at the Mount Pearl and North Atlantic Refining Limited (NARL) /

Braya stations, as presented in the 2021, 2022, and 2023 Ambient Air Monitoring Reports, are provided in Table A-2.3-1 (Newfoundland and Labrador Department of Environment and Climate Change, 2022, 2023, 2024). Provincial ambient AQM data from 2020 to 2023 indicate that air quality standards for SO_2, NO_2, and CO were consistently met, with no exceedances recorded during this period. For O_3, however, the 8-hour NL AQS was exceeded once in 2020, 13 times in 2021 (occurring seven times in March, four times in April, and two times in June), and 48 times in 2023 (occurring 26 times in March, 21 times in April, and once in October). For $PM_{2.5}$ and PM_{10}, no exceedances were reported from 2020 to 2022, indicating that particulate matter concentrations remained within the established air quality standards during this period. There were 39 hourly exceedances of the 24-hour NL AQS for $PM_{2.5}$ and 28 hourly exceedances for PM_{10} in 2023, all of which were attributable to wildfire smoke originating from northern Alberta and the Northwest Territories in September. It is important to note that the methodology for calculating 24-hour particulate concentrations have been modified. With the introduction of continuous particulate sampling monitors, 24-hour concentrations are now calculated as rolling averages, updated every hour rather than based on calendar days. This approach allows for more accurate capture of episodic events. This revised methodology has been applied to all particulate matter data for 2022 and 2023.

Braya operates AQM stations at four locations near its refinery – Arnold's Cove, Come By Chance, Sunnyside, and the Braya Property Boundary (see Figure A-2.3-1 for locations). The Braya-operated air stations monitor ambient levels of SO_2 and $PM_{2.5}$. Although these AQM stations are located within the study areas for the Project, they do not measure a comprehensive range of air contaminants necessary to establish full baseline conditions for this study. Therefore, data from the Mount Pearl NAPS station were used to supplement the information collected from the AQM stations in Arnold's Cove, Come By Chance, Sunnyside, and the Braya Property Boundary. At the Arnold's Cove AQM station, SO_2 concentrations remained below the 1-hour, 3-hour, 24-hour, and annual NL AQS from 2020 to 2023. $PM_{2.5}$ concentrations at this station remained within the 24-hour NL AQS in 2020 and 2021. However, the 24-hour air quality standard was exceeded on two occasions in 2022, and for a continuous 28-hour period in September 2023. Despite these events, the annual average $PM_{2.5}$ concentrations remained below the NL AQS from 2020 through 2023. At the Come By Chance AQM station, SO_2 concentrations consistently remained within air quality standards, with no exceedances recorded from 2020 to 2023. $PM_{2.5}$ concentrations also met the 24-hour standard throughout 2020 to 2022. However, in September 2023, the NL AQS was exceeded for 22 consecutive hours. At the Sunnyside AQM station, SO_2 concentrations remained below the NL AQS from 2020 to 2023. $PM_{2.5}$ concentrations exceeded the 24-hour NL AQS on two occasions in 2020 and once in 2021. In 2022, there were 74 hourly exceedances, with 14 occurring in January and 60 in March. In 2023, 27 hourly exceedances of the 24-hour standard were recorded, all in September. Despite these exceedances, the annual average $PM_{2.5}$ concentrations remained within the limits set by the NL AQS. The Braya Property Boundary AQM station has historically recorded SO_2 and $PM_{2.5}$ levels exceeding air quality standards due to its proximity to the process area. However, with the Braya facility being non-operational from 2020 to 2023, no SO_2 air quality standards were exceeded

during this period. This station recorded one exceedance of the 24-hour $PM_{2.5}$ NL AQS in 2020 and no exceedances in 2021. The 24-hour $PM_{2.5}$ standard was exceeded for a total of 42 hours in 2022, while in 2023, it was exceeded for 33 consecutive hours in September. The annual average $PM_{2.5}$ concentrations from 2020 to 2023 remained within NL AQS limits. Exceedances of the 24-hour air quality standard in September 2023 for $PM_{2.5}$ at the AQM stations operated by the Braya facility were a result of the long-range transport of wildfire smoke from northern Alberta and the Northwest Territories in late summer and early fall. These wildfires had a significant impact on air quality in the province.

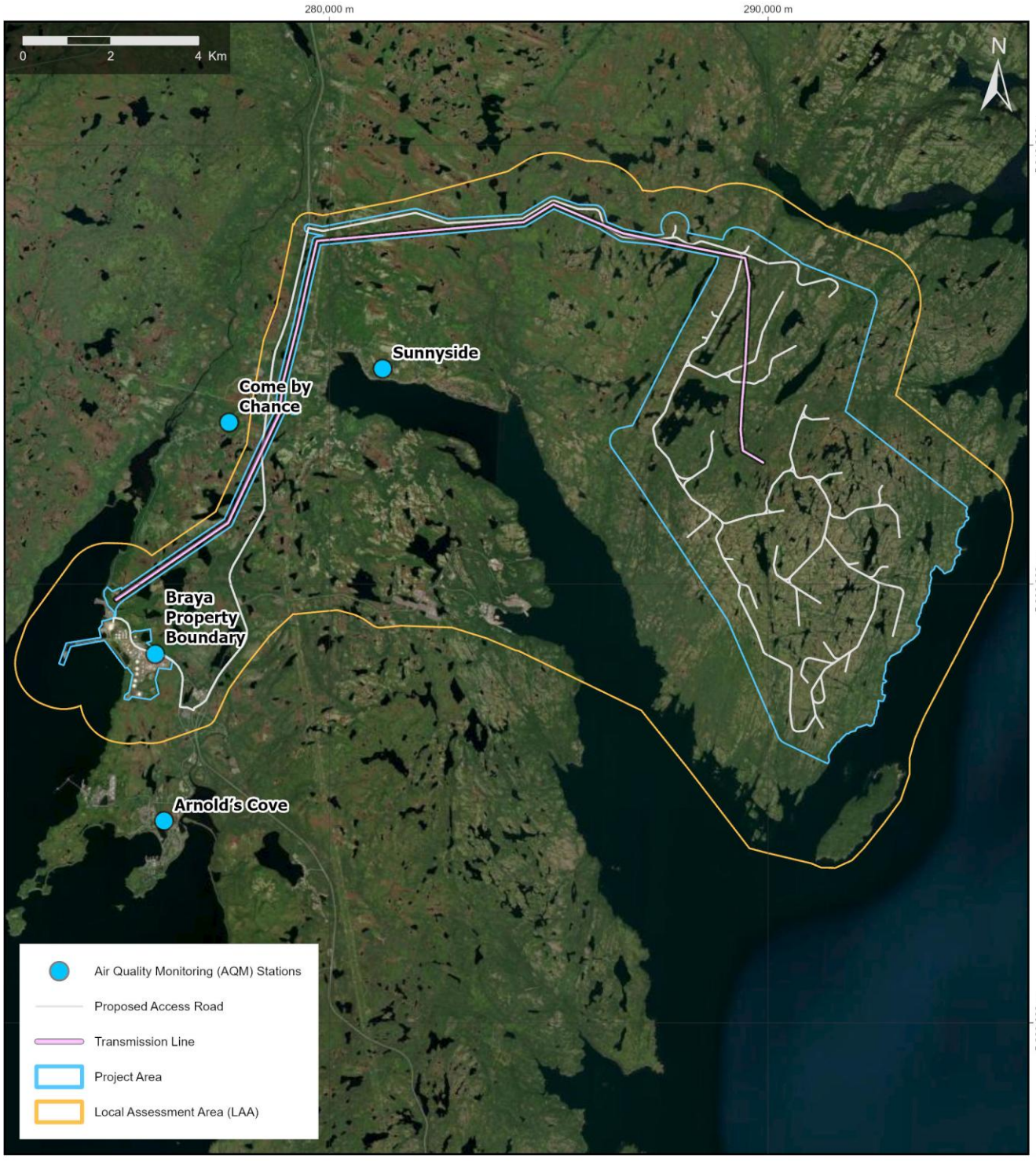

Figure A-2.3-1 Braya-operated AQM stations.

Table A-2.3-1 National Air Pollution Surveillance (NAPS) and Industrial Monitoring Network (IMN) air quality monitoring results.

Operator	Monitoring Station	Air Pollutant	Units of Concentration	Averaging Time	2020	2021	2022	2023	NL AQS
NAPS	Mount Pearl	SO_2	ppb	1-hour	8.7	3.8	5.0	2.7	344
				3-hour	6.6	2.6	1.9	2.0	229
				24-hour	2.2	0.6	0.5	0.5	115
				1-year	0.3	0.2	0.1	0.1	23
		$PM_{2.5}$	µg/m^3	24-hour	11.5	16.0	13.2	40.2	25
				1-year	5.1	4.8	4.6	5.2	8.8
		PM_{10}	µg/m^3	24-hour	--[1]	28.2	32.0	67.0	50
		NO_2	ppb	1-hour	40.3	23.5	13.5	40.2	213
				24-hour	11.7	5.6	3.6	6.5	106
				1-year	1.1	0.9	0.9	1.0	53
		CO	ppb	1-hour	698.3	1,700	700	1,200	30,582
				8-hour	436.5	500	300	800	13,107
		O_3	ppb	1-hour	50.0	54.3	48.7	63.3	82
				8-hour	44.6	49.0	43.1	51.6	44
Braya - IMN	Arnold's Cove	SO_2	ppb	1-hour	14.9	7.7	7.3	9.1	344
				3-hour	8.4	3.1	3.0	3.3	229
				24-hour	1.9	1.6	1.2	1.5	115
				1-year	0.6	0.7	0.5	0.6	23
		$PM_{2.5}$	µg/m^3	24-hour	25.0	18.0	50.0	37.0	25
				1-year	4.6	4.6	5.7	5.0	8.8
	Come By Chance	SO_2	ppb	1-hour	7.9	7.2	7.2	7.2	344
				3-hour	4.0	3.9	3.6	5.5	229
				24-hour	2.4	2.0	2.5	4.8	115
				1-year	0.8	0.8	1.0	1.3	23
		$PM_{2.5}$	µg/m^3	24-hour	10.7	15.6	16.6	32.6	25
				1-year	4.4	3.5	5.1	4.3	8.8
	Sunnyside	SO_2	ppb	1-hour	8.1	7.5	7.2	7.2	344
				3-hour	5.5	3.2	3.4	6.0	229

Operator	Monitoring Station	Air Pollutant	Units of Concentration	Averaging Time	2020	2021	2022	2023	NL AQS
				24-hour	3.1	1.3	2.4	4.6	115
				1-year	0.8	0.7	0.9	--[1]	23
		$PM_{2.5}$	$\mu g/m^3$	24-hour	32.0	25.2	80.3	36.1	25
				1-year	4.7	4.1	5.3	4.1	8.8
	Braya Property Boundary	SO_2	ppb	1-hour	77.1	18.5	10.1	9.2	344
				3-hour	66.9	15.4	5.1	3.4	229
				24-hour	27.6	5.4	2.3	1.0	115
				1-year	2.4	--[2]	--[2]	0.4	23
		$PM_{2.5}$	$\mu g/m^3$	24-hour	26.7	17.5	40.7	37.5	25
				1-year	4.0	4.2	5.3	5.1	8.8

Ambient AQM data from the Mount Pearl NAPS station and Braya Renewable Fuels stations demonstrate general comparability in SO_2 concentrations, though some differences were noted, particularly at the Braya Property Boundary monitoring station. Elevated SO_2 levels at this station are likely due to its proximity to the facility's processing area. Additionally, SO_2 concentrations recorded at the Arnold's Cove, Come By Chance, and Sunnyside stations were slightly higher than those observed at the Mount Pearl NAPS station. Overall, SO_2 concentrations decreased from 2020 to 2023, coinciding with the facility's conversion from a crude oil refinery to a renewable fuels refinery, during which time it remained non-operational. The 24-hour $PM_{2.5}$ concentrations recorded from 2020 to 2022 at the Arnold's Cove, Sunnyside, and Braya Property Boundary stations were higher than those observed at the Mount Pearl NAPS station. These instances of elevated $PM_{2.5}$ were primarily influenced by high winds and precipitation events, rather than emissions from any specific source. In contrast, 24-hour $PM_{2.5}$ concentrations at the Come By Chance station were comparable to those at the Mount Pearl NAPS station. Annual average $PM_{2.5}$ readings from 2020 to 2023 were consistent between the Braya-operated air monitoring stations and the Mount Pearl NAPS station.

Data from the Mount Pearl NAPS station were processed to meet the statistical metrics required by the CAAQS. Table A-2.3-2 provides an overview of the 2020-2022 NAPS monitoring results for the Mount Pearl station, focusing on air contaminants relevant to the Project. Data in Table A-2.3-2 are compared to NL AQS and CAAQS (2025+ period). At the time of report generation, annual summaries and hourly data from NAPS were not yet publicly available; therefore, the 2023 data was not included in this assessment. Additionally, no valid PM_{10} data was available at the Mount Pearl station between January 1, 2020, and September 3, 2020; monitoring equipment for PM_{10} was not installed until September 2020. Air quality measurements at the Mount Pearl NAPS station remained within the limits set by NL AQS and CAAQS between 2020 and 2022, with the exception of the maximum 8-hour average for ozone. Overall, air pollutant concentrations were well below provincial and federal guidelines.

Table A-2.3-2 NAPS monitoring results – Mount Pearl.

Averaging Period/Parameter		Measured Concentration (2020-2022)	NL AQS	CAAQS	
				2020-2024	2025+
SO_2 (ppb)					
Maximum hourly		8.7	344	-	-
Hourly concentrations	98th percentile	1.0	-	-	-
	90th percentile	0.3	-	-	-
3-hour rolling average 90th percentile hourly concentrations		0.3			
Maximum 24-hour average	all hourly values	2.2	115 [1]	-	-
	excl. values >90th percentile	0.2			
3-year average of 99th percentile of daily maximum hour		4.6	-	70	65
Maximum annual average		0.3	23 [2]	5.0	4.0

Averaging Period/Parameter		Measured Concentration (2020-2022)	NL AQS	CAAQS	
				2020-2024	2025+
NO_2 (ppb)					
Maximum hourly		40	213	-	-
Hourly concentrations	98th percentile	6	-	-	-
	90th percentile	2	-	-	-
Maximum 24-hour average	all hourly values	12	106 [1]	-	-
	excl. values >90th percentile	1			
3-year average of 99th percentile of daily maximum hour		16	-	60	42
Maximum annual average		1	53 [2]	17.0	12.0
O_3 (ppb)					
Maximum hourly		54	82	-	-
Hourly concentrations	98th percentile	42	-	-	-
	90th percentile	38	-	-	-
Maximum 24-hour average	all hourly values	46	-	-	-
	excl. values >90th percentile	25			
3-year average of the annual 4th highest daily maximum 8-hour average		44	-	62	60
Maximum 8-hour rolling average		49	44	-	-
Maximum annual average		28	-	-	-
CO (ppb)					
Maximum hourly		1,690	30,582	-	-
Hourly concentrations	98th percentile	280	-	-	-
	90th percentile	230	-	-	-
Maximum 8-hour rolling average		528	13,107	-	-
8- hour rolling average (excluding hourly values >90th percentile of 3-hour rolling average)		220			
$PM_{2.5}$ (µg/m^3)					
Maximum hourly		113	-	-	-
Hourly concentrations	98th percentile	13	-	-	-
	90th percentile	9	-	-	-
Maximum 24-hour average	all hourly values	16	25 [1]	-	-
	excl. values >90th percentile	8			
3-year average of annual average of the daily 24-hour average concentrations		5	-	27	27
Maximum annual average		5	53 [2]	8.8	8.8
PM_{10} (µg/m^3)					
Maximum hourly		83	-	-	-
Hourly concentrations	98th percentile	28	-	-	-
	90th percentile	18	-	-	-
Maximum 24-hour average	all hourly values	28	50 [1]	-	-
	excl. values >90th percentile	17	-	-	-
Maximum annual average		11	-	-	-

Averaging Period/Parameter	Measured Concentration (2020-2022)	NL AQS	CAAQS	
			2020-2024	2025+
Notes [1] 24-hour averaging period; [2] Annual averaging period; Measured concentrations obtained from ECCC 2023 unless otherwise stated				

A review of the NPRI data identified that the primary industrial emission sources within the RAA are operated by Braya Renewable Fuels (Newfoundland) LP in Come by Chance, NARL Logistics Limited Partnership in Come By Chance, and the Newfoundland Transshipment Terminal in Arnold's Cove (Government of Canada, 2024). Table A-2.3-3 provides a summary of air contaminants released in significant quantities by the identified facilities. Only substances that have corresponding NL AQS are included in the table. Substances that are above NPRI reporting thresholds but do not have applicable NL AQS, such as metals and metal compounds, VOCs, polycyclic aromatic hydrocarbons, organic compounds, inorganic compounds, and dioxins and furans, have been excluded from Table A-2.3-3. Emissions from the Braya Refinery are primarily composed of criteria air contaminants, including NOx, CO, SO_2, particulate matter, and VOCs. These contaminants are widely monitored and regulated due to their significant impact on human health, the environment, and visibility.

Table A-2.3-3 National Pollutant Release Inventory (NPRI) data in the RAA.

Facility	Substance	Units	Air Releases			
			2020	2021	2022	2023
Newfoundland Transshipment Terminal (Arnold's Cove, NL)	No air quality standards are specified for emitted NPRI substances.					
Braya Renewable Fuels (Newfoundland) LP (Come By Chance, NL)	Lead (and its compounds)	kg	-	-		0.11
	NOx (expressed as NO_2)	tonnes	-	-	53.78	-
	PM_{10}	tonnes	-	-	6.58	-
	$PM_{2.5}$	tonnes	-	-	4.35	0.31
	SO_2	tonnes	-	-	23.72	-
NARL Refining LP (Come By Chance, NL)	Cadmium (and its compounds)	kg	0.04	0.00	-	-
	CO	tonnes	61.96	412.50	-	-
	Lead (and its compounds)	kg	0.36	1.18	-	-
	Mercury (and its compounds)	kg	0.01	0.95	-	-
	Nickel (and its compounds)	tonnes	0.52	1.68	-	-
	NOx (expressed as NO_2)	tonnes	149.86	1,310.73	-	-
	PM_{10}	tonnes	22.09	137.30	-	-
	$PM_{2.5}$	tonnes	14.43	91.76	-	-
	SO_2	tonnes	607	607	-	-
	Total particulate matter	tonnes	25.66	158.50	-	-
	Total reduced sulphur (expressed as H_2S)	tonnes	0.03	1.03	-	-
NARL Logistics LP (Come By Chance, NL)	No air quality standards are specified for emitted NPRI substances.					

2.3.2 Field Survey

The baseline ambient air quality survey particulate matter sampling results are presented in Table A-2.3-4. Certificates of analysis and laboratory results for all parameters are provided in Appendix A-1. Laboratory analysis identified aluminum, chromium, copper, lead, magnesium, manganese, and sodium as the only metals detected on the PQ100 filters. Metals for which no applicable NL AQS exist were excluded from Table A-2.3-4. Arsenic (As), cadmium (Cd), nickel (Ni), vanadium (V), and zinc (Zn) concentrations were below the reportable detection limit (RDL) in all samples analyzed. Given that the RDLs for these metals are substantially lower than NL AQS, it can be concluded that As, Cd, Ni, V, and Zn were compliant with NL AQS. Copper (Cu) was detected in samples from Come By Chance, Sunnyside, and the Come By Chance Industrial Site fenceline, with concentrations measuring from 0.0013 to 0.0050 µg/m^3, all well below the NL AQS. Lead (Pb) was detected in a single sample from Sunnyside at a concentration of 0.0019 µg/m^3, which is also considerably lower than the NL AQS. Concentrations of PM_{10} ranged from 5.0 to 13.4 µg/m^3, while concentrations of TSP ranged from 5.1 to 18.6 µg/m^3 over a 24-hour period. PM_{10} readings were consistent with those observed at the Mount Pearl NAPS station. The maximum 24-hour PM_{10} concentration recorded was 28.2 µg/m^3 in 2021 and 27.5 µg/m^3 in 2022. Throughout 2021 and 2022, the PM_{10} air quality standards were not exceeded on any occasion. Results from the air particulate monitoring field survey showed that both PM_{10} and TSP 24-hour concentrations remained within the limits set by the NL AQS. The similarity between PM_{10} and TSP levels indicates that TSP is largely composed of coarse particulate.

The baseline ambient air quality survey passive air sampling results are summarized in Table A-2.3-5. Certifications of analysis and results from BV are provided in Appendix A-2. For comparison with NL AQS, 1-month exposure concentrations were converted to 1-hour, 24-hour, and 1-year averaging periods following the methodology outlined in Air Dispersion Modelling Guideline for Ontario (Ontario Ministry of the Environment and Climate Change, 2017). Guidance from Ontario was adapted in the absence of provincial guidance. Measured NO_2 concentrations did not exceed NL AQS limits when converted to 1-hour, 24-hour, and 1-year averages. NO_2 concentrations observed at the passive air sampling sites were notably less than those recorded at the Mount Pearl NAPS station for maximum 24-hour and annual averages. However, NO_2 concentrations measured at the sampling sites were comparable to those at the Mount Pearl NAPS station for maximum 1-hour readings.

Table A-2.3-4 Air quality 2024 survey results for PM_{10}, TSP, and metals.

Sampling Details		Monitoring Results (µg/m³)								
		Particulate Matter		Total Metals						
Site	Date	PM_{10}	TSP	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
Come By Chance	August 13	6.8	7.7	ND	ND	0.0015	ND	ND	ND	ND
	August 14	5.0	5.1	ND	ND	0.0014	ND	ND	ND	ND
	August 15	5.0	6.2	ND	ND	0.0017	ND	ND	ND	ND
Sunnyside	August 20	12.6	13.0	ND	ND	0.0020	ND	ND	ND	ND
	August 21	6.4	7.2	ND	ND	0.0017	0.0019	ND	ND	ND
	August 22	8.2	9.0	ND	ND	0.0050	ND	ND	ND	ND
Come By Chance Industrial Site Fenceline	August 26	7.7	9.7	ND	ND	0.0013	ND	ND	ND	ND
	August 27	10.2	13.8	ND	ND	0.0020	ND	ND	ND	ND
	August 28	13.4	18.6	ND	ND	0.0023	ND	ND	ND	ND
RDL		1.2	30	0.0020	0.00040	0.0012	0.0012	0.0020	0.0012	0.020
NL AQS		50	120	0.3	2	50	2	2	2	120

Notes
µg/m³ = micrograms per cubic metre, ND = not detected

Table A-2.3-5 Air quality 2024 survey results for NO_2.

Sampling Details		Monitoring Results (ppb)	NL AQS
Exposure Period	**Site**	**Nitrogen dioxide (NO_2)**	
1-month	Come By Chance	0.2	--
	Sunnyside	0.1	
	Come By Chance Industrial Site Fenceline	0.3	
1-hour	Come By Chance	1.3	213
	Sunnyside	0.6	
	Come By Chance Industrial Site Fenceline	1.9	
24-hour	Come By Chance	0.5	106
	Sunnyside	0.3	
	Come By Chance Industrial Site Fenceline	0.8	
1-year	Come By Chance	0.1	53
	Sunnyside	<0.1	
	Come By Chance Industrial Site Fenceline	0.1	

Notes
ppb=parts per billion
Results converted to 1-hour, 24-hour, and 1-year exposure periods for guideline comparison

3.0 Noise

Noise is defined as any sound that is unwanted or causes a disturbance. It impacts the atmospheric environment by adding energy to the air in the form of acoustical waves (Health Canada, 2017a). At elevated levels, noise can cause annoyance and stress responses in human and wildlife receptors (Health Canada, 2017b; Shannon et al., 2016). Existing noise conditions within the RAA were characterized by conducting a field acoustic assessment in 2024. This study was conducted in collaboration with GHD Limited (GHD) to characterize the current sound environment in terms of A-weighted decibels (dBA) since such units reflect frequencies most audible to the human ear (Health Canada, 2017b). Results from the field acoustic assessment were used to establish a baseline from which the Project could cause new or incremental impacts to the existing acoustic environment. Once established, the baseline was used to evaluate the potential of noise impacts generated from the Construction and Operation and Maintenance (O&M) Phases of the Project. The assessment of potential noise impacts generated from the Construction and O&M Phases are detailed in Appendix J of the Registration for the Project.

3.1 Regulatory Context

There are currently no provincial regulations regarding noise; therefore, federal guidance was used to assess baseline noise levels. Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise* details noise targets for annoyance and sleep disturbance (Health Canada, 2017b). Health Canada's acoustic assessment guidance incorporates aspects of international standards, including the Guidelines for Community Noise (1999) and Night Noise Guidelines for Europe (2009) per the World Health Organization (WHO). Health Canada recommends assessing noise impacts from projects in their operational phase by evaluating the increase in percent Highly Annoyed (%HA). This methodology is also applied to the construction phase for projects lasting more than one year in duration.

Guidelines for Wind Turbine Noise prepared by the Federal-Provincial-Territorial (FPT) Working Group on Wind Turbine Noise, a subcommittee of the FPT Committee on Health and the Environment (CHE) were used to support monitoring location selection (FPT Committee on Health and the Environment Working Group on Wind Turbine Noise, 2012).

3.2 Methodology

3.2.1 Site Selection

Ambient noise levels were measured in the vicinity of the PA to establish a baseline of existing noise levels, which will serve as a reference point for assessing any new or incremental noise impacts to the natural environment resulting from the Project. Six monitoring locations were selected within the RAA to capture variations in ambient noise levels at sensitive receptors (Figure A-3.2-1). The monitoring locations were chosen based on their proximity to Project infrastructure and their potential to be affected by noise emissions. The selected locations included: the Sunnyside location nearest to the Wind Farm, access roads, electrical collector system, and transmission lines; the Come By Chance location closest to the HGP, HP, and port and terminal infrastructure, which accounts for noise sources related to industrial processes and shipping activities; and four additional monitoring locations in the surrounding residential and recreational areas of Rantem, Upshall, Jack's Pond Park, and Arnold's Cove, ensuring that ambient noise levels in residential and community areas were documented. Monitoring locations in surrounding residential and recreational areas ensure assessment of ambient noise perceived by permanent and seasonal occupants. The Wind Farm is setback at least 1,000 m from the nearest sensitive receptor within monitored residential and recreational areas, which is greater than the 550 m limit set forth in the Guidelines for Wind Turbine Noise (FPT Committee on Health and the Environment Working Group on Wind Turbine Noise, 2012).

As outlined in Table A-3.2-1, ambient noise levels were measured in January, February, and August of 2024. Due to the rural nature of monitoring locations and metric used to assess changes in baseline noise (i.e., %HA), it is assumed that measured ambient noise levels are representative of the region and seasonal differences are negligible.

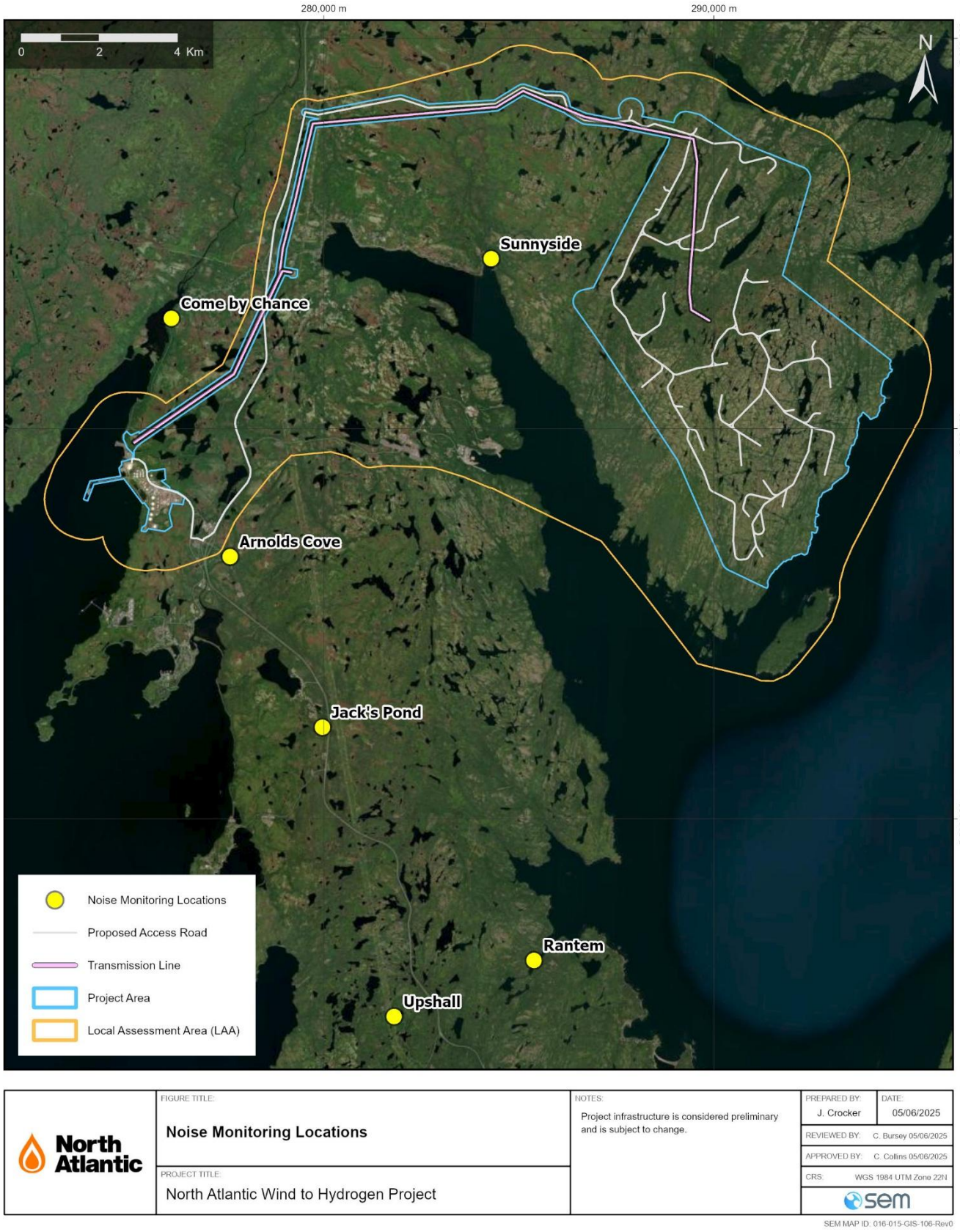

Figure A-3.2-1 Noise monitoring locations.

Table A-3.2-1 Noise monitoring locations.

Monitoring Location ID	Location name	Monitoring time range		Coordinates	
		Start	End	Easting	Northing
N1	Rantem, NL	2024-02-03	2024-02-09	285387	5286369
N2	Come By Chance, NL	2024-01-26	2024-01-29	276091	5302826
N3	Upshall, NL	2024-01-31	2024-02-03	281801	5284930
N4	Jacks Pond, NL	2024-01-15	2024-01-17	279964	5292344
N5	Arnolds Cove, NL	2024-01-24	2024-01-27	277597	5296718
N6	Sunnyside, NL	2024-08-06	2024-08-09	284290	5304354

3.2.2 Field Methods

Ambient noise levels were measured at the selected sites using calibrated, precision Class 1 sound level meters. The meters were equipped with a wind sock, rain screen, and desiccant to minimize extraneous noise from wind and precipitation. Baseline noise measurements were conducted in accordance with ISO 1996-2:2007 “Acoustics – Description, measurement and assessment of environmental noise – Part 2L Determination of environmental noise levels”, as recommended by Health Canada (Health Canada, 2017b). Noise measurements were conducted continuously at each location for a period ranging from two to six days. Calibration checks were performed both before and after the monitoring survey to ensure data accuracy. The sound level meters recorded continuous, time-averaged sound pressure levels, referred to as the equivalent continuous sound level (L_{eq}), in decibels (dB). The Leq represents the total sound energy over a specified period as a single, constant value, equivalent to the varying sound levels measured during that time. L_{eq} values were averaged over one-hour intervals to characterize baseline noise conditions. In addition to quantitative measurements, digital audio recordings were collected to aid in post-processing and to verify data integrity by identifying potential anomalies. The sound level meters underwent factory calibration prior to deployment and were field-calibrated both before and after each monitoring period at individual locations to ensure measurement accuracy.

Figure A-3.2-2 Sound level meter set up in Sunnyside.

3.2.3 Data Analysis

Baseline noise measurements were analyzed with consideration of potential nearby sources of sound, both natural and anthropogenic, along with digital audio recordings and meteorological conditions during each monitoring period. Meteorological conditions were assessed using climate data from nearby climate stations, as steady precipitation and high winds are considered non-representative (Health Canada, 2017b). Given the prevailing weather patterns in the region, noise data recorded during wind speeds exceeding 38 kilometres per hour (km/h) (classified as “strong breeze” on the Beaufort Wind Scale) may falsely elevate baseline noise levels. Audio recordings were also reviewed to evaluate the presence of interfering sounds, particularly those from elevated winds, which muffle recordings and could lead to a misrepresentation of the local acoustic environment. Noise levels during periods of inclement weather as well as those with suspect audio recordings were discarded due to their atypical nature.

The remaining data was then averaged over the appropriate period to obtain the equivalent continuous A-weighted noise levels (LA_{eq}). Noise levels were then categorized into the following periods: daytime sound pressure level (L_d) from 07:00 to 23:00, nighttime sound pressure level (L_n) from 23:00 to 07:00, and day-night average sound pressure level (L_{dn}), which represents the 24-hour period (Health Canada, 2017b).

Additionally, low frequency noise (LFN), noise with frequency content ranging from 16 to 200 hertz (Hz), was assessed as part of the noise baseline study. LFN is characterized by its longer wavelengths and deeper pitch, which can contribute to perceptible vibrations and potential disturbances, even at relatively low sound pressure levels (Technicon Acoustics, 2021). To quantify LFN, the difference between simultaneous A-weighted and C-weighted sound pressure levels (expressed in C-weighted decibels (dBC)) was calculated following established methodologies (Health Canada, 2017b; Nova Scotia Environment and Climate Change, 2023). Calculation details are provided in Appendix A-3.

3.3 Results

Table A-3.3-1 provides a summary of average noise levels recorded during the day (07:00-23:00) and night (23:00-07:00), including L_d, L_n, and L_{dn} measurements at each monitoring location. Hourly sound pressure levels for each site are provided in Appendix A-4.

Table A-3.3-1 Baseline noise levels.

Monitoring Location ID	Location name	Measured noise levels, dBA			
		Day; L_d	Night; L_n	Day-Night; L_{dn}	%HA
N1	Rantem, NL	52	41	52	2.8%
N2	Come By Chance,	47	49	55	4.2%
N3	Upshall, NL	44	31	43	0.9%
N4	Jacks Pond, NL	47	45	51	2.6%
N5	Arnolds Cove, NL	53	53	59	7.2%
N6	Sunnyside, NL	42	34	43	0.9%

Noise levels were highest at locations near significant sources of noise such as industrial facilities and roadways. Elevated noise levels were recorded both day and night at the Come By Chance and Arnold's Cove monitoring locations, likely due to ambient industrial noise from the Braya Refinery. Noise levels at the Jack's Pond location were contributed to primarily by road traffic from the Trans-Canada Highway. Noise levels at the other monitoring locations were characteristic of a rural environment, with minimal human generated noise and a predominantly natural soundscape, including wildlife calls and ocean noise due to proximity to the sea. Baseline L_{dn} values ranged from 43-59 dBA, corresponding to noise levels typical of quiet rural (<45 dBA) to urban residential (58-62 dBA) community type, according to Health

Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise(Health Canada, 2017b)*.

The assessment of LFN was conducted to determine the presence or absence of LFN at each monitoring location. Upon review of monitoring data, the presence of LFN was confirmed at locations N1 through N6. LFN was intermittently detected at each location, likely contributable to a combination of biogenic sources such as wind and anthropogenic sources such as road traffic and industrial operations; both of which are ubiquitous in the RAA (Alberta Energy Regulator, 2023)

4.0 Summary

4.1 Air Quality

A desktop study was conducted to characterize air quality within the RAA using data from the Mount Pearl NAPS station, Braya Renewable Fuels AQM stations, and provincial ambient air monitoring reports. Air quality data from 2020 to 2023 were reviewed and compared to Newfoundland and Labrador Air Quality Standards (NL AQS) and Canadian Ambient Air Quality Standards (CAAQS). AQM station data were supplemented with conclusions from provincial ambient air monitoring reports (Newfoundland and Labrador Department of Environment and Climate Change, 2022, 2023, 2024). Mount Pearl NAPS SO_2, NO_2, and CO concentrations remained consistently below the NL AQS limits, with no recorded exceedances from 2020 to 2023. O_3 concentrations exceeded the 8-hour NL AQS multiple times in 2020, 2021, and 2023. Exceedances of O_3 are likely attributable to hot, sunny days with little wind – key conditions for O_3 formation. No exceedances were recorded for $PM_{2.5}$ and PM_{10} from 2020 to 2022. However, in 2023, exceedances of 24-hour NL AQS were documented, primarily due to wildfire smoke transported from western Canada. Braya Renewable Fuels operates four AQM stations near its refinery, monitoring SO_2 and $PM_{2.5}$. SO_2 concentrations at all Braya-operated stations remained within NL AQS from 2020 to 2023, with notable decreases in concentrations coinciding with the refinery's transition from crude oil to renewable fuels. $PM_{2.5}$ concentrations at the Arnold's Cove and Come By Chance stations largely remained below NL AQS, except for hourly exceedances for a continuous period in 2023. $PM_{2.5}$ concentrations at the Sunnyside and Braya Property Boundary monitoring stations generally remained within NL AQS, except for several hourly exceedances recorded in 2022 and 2023. Data from the Mount Pearl NAPS station were processed to the statistical metrics required by the CAAQS. A comparison with the CAAQS and NL AQS revealed air contaminant concentrations at the Mount Pearl NAPS station did not exceed the air quality standards and were generally well below the established thresholds.

The desktop study was supplemented with a field survey measuring ambient air quality at the Come By Chance municipal building, Sunnyside community centre, and Come by Chance Industrial Site fenceline. BGI PQ100 particulate air samplers were deployed to collect 24-hour samples on pre-weighed filter media and measure ambient concentrations of PM_{10}, TSP, and metals. Laboratory analysis revealed that concentrations of arsenic, cadmium, nickel, vanadium, and zinc were below reportable detection limits, demonstrating compliance with NL AQS. Results from the particulate monitoring field survey showed that PM_{10} and TSP 24-hour concentrations remained within the limits set by NL AQS. NO_2 concentrations in ambient air were measured using PASS units, deployed at each monitoring site for one month. Measured NO_2 concentrations remained within NL AQS limits for 1-hour, 24-hour, and 1-year averages.

4.2 Noise

A field survey was conducted to evaluate ambient noise levels in the RAA. Baseline measurements were taken at six locations: Rantem, Come By Chance, Upshall, Jack's Pond, Arnold's Cove, and Sunnyside. The collected data were filtered to remove anomalies, and the refined dataset was used to calculate equivalent continuous sound pressure levels (L_d, L_n, L_{dn}) for comparison with Health Canada guidance. Baseline L_{dn} values ranged from 43 to 59 dBA, indicating noise levels typical of quiet rural (<45 dBA) to urban residential (58–62 dBA) environments. Monitoring locations near significant noise sources, such as industrial facilities and roadways, exhibited the highest noise levels.

The presence of LFN was confirmed in the RAA but is suspected to be a result of biogenic (i.e., originating from wind) and anthropogenic sources (i.e., traffic and existing industrial operations).

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Appendix A-1: Laboratory Results – PM_{10}, TSP, and Metals

Your Project #: 016-014
Site Location: NARL AIR QUALITY
Your C.O.C. #: N/A

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2024/09/19
Report #: R8326226
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4R6210
Received: 2024/09/05, 08:56

Sample Matrix: Filter
Samples Received: 18

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Metals on Hi-Vol Filter (6020Amod)	9	2024/09/06	2024/09/12	BRL SOP-00103 / BRL SOP-00102	EPA 6020A m
Total Metals on Small Filter (6020Bmod)	9	2024/09/16	2024/09/17	CAM SOP-00447	EPA 6020B m
Particulate Calculation PM 10 (IO-2mod)	9	N/A	2024/09/12	BRL SOP-00109	EPA IO-2mod
Total Particulate (PM10)	9	N/A	2024/09/10	BRL SOP-00109	Mthd IO-3-1
Particulate Calculation	9	N/A	2024/09/12	BRL SOP-00109	EPA IO-2mod
Total Particulate	9	N/A	2024/09/10	BRL SOP-00109	Mthd IO-3-1
Air Volume from LoVol Sampling	18	N/A	2024/09/06		

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: 016-014
Site Location: NARL AIR QUALITY
Your C.O.C. #: N/A

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2024/09/19
Report #: R8326226
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4R6210
Received: 2024/09/05, 08:56

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Cristina (Maria) Bacchus, Project Manager
Email: maria.bacchus@bureauveritas.com
Phone# (905)817-5763

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

RESULTS OF ANALYSES OF FILTER

Bureau Veritas ID		ABXL71			ABXL72			ABXL73		
Sampling Date		2024/08/13			2024/08/13			2024/08/14		
COC Number		N/A			N/A			N/A		
	UNITS	W35047238-PM10	RDL	QC Batch	W41121462-TSP	RDL	QC Batch	W35047236-PM10	RDL	QC Batch
Particulate	ug/m3				7.7	1.2	9623254			
PM 10 Particulate	ug/m3	6.8	1.2	9623253				5.0	1.2	9623253
Particulate Weight on Filter	ug	164	30	9633521	191	30	9633516	121	30	9633521
Volume	m3	24.05	N/A	ONSITE	24.86	N/A	ONSITE	24.05	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		ABXL74			ABXL75			ABXL76		
Sampling Date		2024/08/14			2024/08/15			2024/08/15		
COC Number		N/A			N/A			N/A		
	UNITS	W35047237-TSP	RDL	QC Batch	W41121465-PM10	RDL	QC Batch	W41121463-TSP	RDL	QC Batch
Particulate	ug/m3	5.1	1.2	9623254				6.2	1.2	9623254
PM 10 Particulate	ug/m3				5.0	1.2	9623253			
Particulate Weight on Filter	ug	128	30	9633516	120	30	9633521	153	30	9633516
Volume	m3	24.92	N/A	ONSITE	24.05	N/A	ONSITE	24.79	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		ABXL77			ABXL78			ABXL79		
Sampling Date		2024/08/20			2024/08/20			2024/08/21		
COC Number		N/A			N/A			N/A		
	UNITS	W41121456-PM10	RDL	QC Batch	W41121455-TSP	RDL	QC Batch	W41121454-PM10	RDL	QC Batch
Particulate	ug/m3				13.0	1.2	9623254			
PM 10 Particulate	ug/m3	12.6	1.2	9623253				6.4	1.2	9623253
Particulate Weight on Filter	ug	304	30	9633521	321	30	9633516	154	30	9633521
Volume	m3	24.05	N/A	ONSITE	24.76	N/A	ONSITE	24.05	N/A	ONSITE

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

RESULTS OF ANALYSES OF FILTER

Bureau Veritas ID		ABXL80			ABXL81			ABXL82		
Sampling Date		2024/08/21			2024/08/22			2024/08/22		
COC Number		N/A			N/A			N/A		
	UNITS	W41121453-TSP	RDL	QC Batch	W41121469-PM10	RDL	QC Batch	W41121468-TSP	RDL	QC Batch
Particulate	ug/m3	7.2	1.2	9623254				9.0	1.2	9623254
PM 10 Particulate	ug/m3				8.2	1.2	9623253			
Particulate Weight on Filter	ug	179	30	9633516	198	30	9633521	225	30	9633516
Volume	m3	24.79	N/A	ONSITE	24.05	N/A	ONSITE	24.98	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		ABXL83			ABXL84			ABXL85		
Sampling Date		2024/08/26			2024/08/26			2024/08/27		
COC Number		N/A			N/A			N/A		
	UNITS	W41121470-PM10	RDL	QC Batch	W41121464-TSP	RDL	QC Batch	W41121466-PM10	RDL	QC Batch
Particulate	ug/m3				9.7	1.2	9623254			
PM 10 Particulate	ug/m3	7.7	1.2	9623253				10.2	1.2	9623253
Particulate Weight on Filter	ug	184	30	9633521	239	30	9633516	245	30	9633521
Volume	m3	24.05	N/A	ONSITE	24.76	N/A	ONSITE	24.04	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas ID		ABXL86			ABXL87			ABXL88		
Sampling Date		2024/08/27			2024/08/28			2024/08/28		
COC Number		N/A			N/A			N/A		
	UNITS	W41121472-TSP	RDL	QC Batch	W35047239-PM10	RDL	QC Batch	W41121457-TSP	RDL	QC Batch
Particulate	ug/m3	13.8	1.2	9623254				18.6	1.2	9623254
PM 10 Particulate	ug/m3				13.4	1.2	9623253			
Particulate Weight on Filter	ug	336	30	9633516	322	30	9633521	462	30	9633516
Volume	m3	24.43	N/A	ONSITE	24.05	N/A	ONSITE	24.76	N/A	ONSITE

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL72			ABXL72			ABXL74		
Sampling Date		2024/08/13			2024/08/13			2024/08/14		
COC Number		N/A			N/A			N/A		
	UNITS	W41121462-TSP	RDL	QC Batch	W41121462-TSP Lab-Dup	RDL	QC Batch	W35047237-TSP	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug	ND	2.0	9640008	ND	2.0	9640008	3.5	2.0	9640008
Total Aluminum (Al)	ug/m3	ND	0.080	9622356				0.14	0.080	9622356
Total Antimony (Sb)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Antimony (Sb)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Arsenic (As)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Arsenic (As)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Barium (Ba)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Barium (Ba)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Beryllium (Be)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008
Total Beryllium (Be)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Bismuth (Bi)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Bismuth (Bi)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Boron (B)	ug	ND	1.0	9640008	ND	1.0	9640008	ND	1.0	9640008
Total Boron (B)	ug/m3	ND	0.040	9622356				ND	0.040	9622356
Total Cadmium (Cd)	ug	ND	0.010	9640008	ND	0.010	9640008	ND	0.010	9640008
Total Cadmium (Cd)	ug/m3	ND	0.00040	9622356				ND	0.00040	9622356
Total Calcium (Ca)	ug	ND	5.0	9640008	ND	5.0	9640008	ND	5.0	9640008
Total Calcium (Ca)	ug/m3	ND	0.20	9622356				ND	0.20	9622356
Total Chromium (Cr)	ug	ND	0.050	9640008	ND	0.050	9640008	0.096	0.050	9640008
Total Chromium (Cr)	ug/m3	ND	0.0020	9622356				0.0038	0.0020	9622356
Total Cobalt (Co)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008
Total Cobalt (Co)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Copper (Cu)	ug	0.037	0.030	9640008	0.035	0.030	9640008	0.035	0.030	9640008
Total Copper (Cu)	ug/m3	0.0015	0.0012	9622356				0.0014	0.0012	9622356
Total Iron (Fe)	ug	ND	5.0	9640008	ND	5.0	9640008	ND	5.0	9640008
Total Iron (Fe)	ug/m3	ND	0.20	9622356				ND	0.20	9622356
Total Lead (Pb)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008
Total Lead (Pb)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Magnesium (Mg)	ug	3.0	1.0	9640008	3.0	1.0	9640008	2.2	1.0	9640008
Total Magnesium (Mg)	ug/m3	0.12	0.040	9622356				0.089	0.040	9622356
Total Manganese (Mn)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Manganese (Mn)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Molybdenum (Mo)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL72			ABXL72			ABXL74		
Sampling Date		2024/08/13			2024/08/13			2024/08/14		
COC Number		N/A			N/A			N/A		
	UNITS	W41121462-TSP	RDL	QC Batch	W41121462-TSP Lab-Dup	RDL	QC Batch	W35047237-TSP	RDL	QC Batch
Total Molybdenum (Mo)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Nickel (Ni)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Nickel (Ni)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Phosphorus (P)	ug	ND	5.0	9640008	ND	5.0	9640008	ND	5.0	9640008
Total Potassium (K)	ug	ND	5.0	9640008	ND	5.0	9640008	ND	5.0	9640008
Total Potassium (K)	ug/m3	ND	0.20	9622356				ND	0.20	9622356
Total Selenium (Se)	ug	ND	0.10	9640008	ND	0.10	9640008	ND	0.10	9640008
Total Selenium (Se)	ug/m3	ND	0.0040	9622356				ND	0.0040	9622356
Total Silver (Ag)	ug	ND	0.010	9640008	ND	0.010	9640008	ND	0.010	9640008
Total Silver (Ag)	ug/m3	ND	0.00040	9622356				ND	0.00040	9622356
Total Sodium (Na)	ug	21	5.0	9640008	21	5.0	9640008	14	5.0	9640008
Total Sodium (Na)	ug/m3	0.85	0.20	9622356				0.57	0.20	9622356
Total Strontium (Sr)	ug	ND	0.050	9640008	ND	0.050	9640008	ND	0.050	9640008
Total Strontium (Sr)	ug/m3	ND	0.0020	9622356				ND	0.0020	9622356
Total Thallium (Tl)	ug	ND	0.010	9640008	ND	0.010	9640008	ND	0.010	9640008
Total Thallium (Tl)	ug/m3	ND	0.00040	9622356				ND	0.00040	9622356
Total Tin (Sn)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008
Total Tin (Sn)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Titanium (Ti)	ug	ND	0.10	9640008	ND	0.10	9640008	ND	0.10	9640008
Total Titanium (Ti)	ug/m3	ND	0.0040	9622356				ND	0.0040	9622356
Total Uranium (U)	ug	ND	0.010	9640008	ND	0.010	9640008	ND	0.010	9640008
Total Uranium (U)	ug/m3	ND	0.00040	9622356				ND	0.00040	9622356
Total Vanadium (V)	ug	ND	0.030	9640008	ND	0.030	9640008	ND	0.030	9640008
Total Vanadium (V)	ug/m3	ND	0.0012	9622356				ND	0.0012	9622356
Total Zinc (Zn)	ug	ND	0.50	9640008	ND	0.50	9640008	ND	0.50	9640008
Total Zinc (Zn)	ug/m3	ND	0.020	9622356				ND	0.020	9622356

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL76	ABXL78	ABXL80		ABXL82		
Sampling Date		2024/08/15	2024/08/20	2024/08/21		2024/08/22		
COC Number		N/A	N/A	N/A		N/A		
	UNITS	W41121463-TSP	W41121455-TSP	W41121453-TSP	RDL	W41121468-TSP	RDL	QC Batch
Metals								
Total Aluminum (Al)	ug	ND	ND	ND	2.0	ND	2.0	9640008
Total Aluminum (Al)	ug/m3	ND	ND	ND	0.081	ND	0.080	9622356
Total Antimony (Sb)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Antimony (Sb)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Arsenic (As)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Arsenic (As)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Barium (Ba)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Barium (Ba)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Beryllium (Be)	ug	ND	ND	ND	0.030	ND	0.030	9640008
Total Beryllium (Be)	ug/m3	ND	ND	ND	0.0012	ND	0.0012	9622356
Total Bismuth (Bi)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Bismuth (Bi)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Boron (B)	ug	ND	ND	ND	1.0	ND	1.0	9640008
Total Boron (B)	ug/m3	ND	ND	ND	0.040	ND	0.040	9622356
Total Cadmium (Cd)	ug	ND	ND	ND	0.010	ND	0.010	9640008
Total Cadmium (Cd)	ug/m3	ND	ND	ND	0.00040	ND	0.00040	9622356
Total Calcium (Ca)	ug	ND	ND	ND	5.0	ND	5.0	9640008
Total Calcium (Ca)	ug/m3	ND	ND	ND	0.20	ND	0.20	9622356
Total Chromium (Cr)	ug	0.10	0.055	0.062	0.050	0.078	0.050	9640008
Total Chromium (Cr)	ug/m3	0.0041	0.0022	0.0025	0.0020	0.0031	0.0020	9622356
Total Cobalt (Co)	ug	ND	ND	ND	0.030	ND	0.030	9640008
Total Cobalt (Co)	ug/m3	ND	ND	ND	0.0012	ND	0.0012	9622356
Total Copper (Cu)	ug	0.043	0.050	0.042	0.030	0.12	0.030	9640008
Total Copper (Cu)	ug/m3	0.0017	0.0020	0.0017	0.0012	0.0050	0.0012	9622356
Total Iron (Fe)	ug	ND	ND	ND	5.0	ND	5.0	9640008
Total Iron (Fe)	ug/m3	ND	ND	ND	0.20	ND	0.20	9622356
Total Lead (Pb)	ug	ND	ND	0.047	0.030	ND	0.030	9640008
Total Lead (Pb)	ug/m3	ND	ND	0.0019	0.0012	ND	0.0012	9622356
Total Magnesium (Mg)	ug	1.7	3.1	2.6	1.0	4.0	1.0	9640008
Total Magnesium (Mg)	ug/m3	0.069	0.13	0.11	0.040	0.16	0.040	9622356
Total Manganese (Mn)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Manganese (Mn)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Molybdenum (Mo)	ug	ND	ND	ND	0.030	ND	0.030	9640008
Total Molybdenum (Mo)	ug/m3	ND	ND	ND	0.0012	ND	0.0012	9622356

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ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL76	ABXL78	ABXL80		ABXL82		
Sampling Date		2024/08/15	2024/08/20	2024/08/21		2024/08/22		
COC Number		N/A	N/A	N/A		N/A		
	UNITS	W41121463-TSP	W41121455-TSP	W41121453-TSP	RDL	W41121468-TSP	RDL	QC Batch
Total Nickel (Ni)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Nickel (Ni)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Phosphorus (P)	ug	ND	ND	ND	5.0	ND	5.0	9640008
Total Potassium (K)	ug	ND	ND	ND	5.0	ND	5.0	9640008
Total Potassium (K)	ug/m3	ND	ND	ND	0.20	ND	0.20	9622356
Total Selenium (Se)	ug	ND	ND	ND	0.10	ND	0.10	9640008
Total Selenium (Se)	ug/m3	ND	ND	ND	0.0040	ND	0.0040	9622356
Total Silver (Ag)	ug	ND	ND	ND	0.010	ND	0.010	9640008
Total Silver (Ag)	ug/m3	ND	ND	ND	0.00040	ND	0.00040	9622356
Total Sodium (Na)	ug	11	23	19	5.0	31	5.0	9640008
Total Sodium (Na)	ug/m3	0.44	0.92	0.77	0.20	1.2	0.20	9622356
Total Strontium (Sr)	ug	ND	ND	ND	0.050	ND	0.050	9640008
Total Strontium (Sr)	ug/m3	ND	ND	ND	0.0020	ND	0.0020	9622356
Total Thallium (Tl)	ug	ND	ND	ND	0.010	ND	0.010	9640008
Total Thallium (Tl)	ug/m3	ND	ND	ND	0.00040	ND	0.00040	9622356
Total Tin (Sn)	ug	ND	ND	ND	0.030	ND	0.030	9640008
Total Tin (Sn)	ug/m3	ND	ND	ND	0.0012	ND	0.0012	9622356
Total Titanium (Ti)	ug	ND	ND	ND	0.10	ND	0.10	9640008
Total Titanium (Ti)	ug/m3	ND	ND	ND	0.0040	ND	0.0040	9622356
Total Uranium (U)	ug	ND	ND	ND	0.010	ND	0.010	9640008
Total Uranium (U)	ug/m3	ND	ND	ND	0.00040	ND	0.00040	9622356
Total Vanadium (V)	ug	ND	ND	ND	0.030	ND	0.030	9640008
Total Vanadium (V)	ug/m3	ND	ND	ND	0.0012	ND	0.0012	9622356
Total Zinc (Zn)	ug	ND	ND	ND	0.50	ND	0.50	9640008
Total Zinc (Zn)	ug/m3	ND	ND	ND	0.020	ND	0.020	9622356

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL84		ABXL86		ABXL88		
Sampling Date		2024/08/26		2024/08/27		2024/08/28		
COC Number		N/A		N/A		N/A		
	UNITS	W41121464-TSP	RDL	W41121472-TSP	RDL	W41121457-TSP	RDL	QC Batch
Metals								
Total Aluminum (Al)	ug	ND	2.0	ND	2.0	2.2	2.0	9640008
Total Aluminum (Al)	ug/m3	ND	0.081	ND	0.082	0.088	0.081	9622356
Total Antimony (Sb)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Antimony (Sb)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Arsenic (As)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Arsenic (As)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Barium (Ba)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Barium (Ba)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Beryllium (Be)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Beryllium (Be)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356
Total Bismuth (Bi)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Bismuth (Bi)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Boron (B)	ug	ND	1.0	ND	1.0	ND	1.0	9640008
Total Boron (B)	ug/m3	ND	0.040	ND	0.041	ND	0.040	9622356
Total Cadmium (Cd)	ug	ND	0.010	ND	0.010	ND	0.010	9640008
Total Cadmium (Cd)	ug/m3	ND	0.00040	ND	0.00041	ND	0.00040	9622356
Total Calcium (Ca)	ug	ND	5.0	ND	5.0	ND	5.0	9640008
Total Calcium (Ca)	ug/m3	ND	0.20	ND	0.20	ND	0.20	9622356
Total Chromium (Cr)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Chromium (Cr)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Cobalt (Co)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Cobalt (Co)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356
Total Copper (Cu)	ug	0.032	0.030	0.050	0.030	0.056	0.030	9640008
Total Copper (Cu)	ug/m3	0.0013	0.0012	0.0020	0.0012	0.0023	0.0012	9622356
Total Iron (Fe)	ug	ND	5.0	ND	5.0	ND	5.0	9640008
Total Iron (Fe)	ug/m3	ND	0.20	ND	0.20	ND	0.20	9622356
Total Lead (Pb)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Lead (Pb)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356
Total Magnesium (Mg)	ug	2.4	1.0	4.5	1.0	7.7	1.0	9640008
Total Magnesium (Mg)	ug/m3	0.096	0.040	0.19	0.041	0.31	0.040	9622356
Total Manganese (Mn)	ug	0.059	0.050	0.052	0.050	0.13	0.050	9640008
Total Manganese (Mn)	ug/m3	0.0024	0.0020	0.0021	0.0020	0.0051	0.0020	9622356
Total Molybdenum (Mo)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Molybdenum (Mo)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Bureau Veritas ID		ABXL84		ABXL86		ABXL88		
Sampling Date		2024/08/26		2024/08/27		2024/08/28		
COC Number		N/A		N/A		N/A		
	UNITS	W41121464-TSP	RDL	W41121472-TSP	RDL	W41121457-TSP	RDL	QC Batch
Total Nickel (Ni)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Nickel (Ni)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Phosphorus (P)	ug	ND	5.0	ND	5.0	ND	5.0	9640008
Total Potassium (K)	ug	ND	5.0	ND	5.0	ND	5.0	9640008
Total Potassium (K)	ug/m3	ND	0.20	ND	0.20	ND	0.20	9622356
Total Selenium (Se)	ug	ND	0.10	ND	0.10	ND	0.10	9640008
Total Selenium (Se)	ug/m3	ND	0.0040	ND	0.0041	ND	0.0040	9622356
Total Silver (Ag)	ug	ND	0.010	ND	0.010	ND	0.010	9640008
Total Silver (Ag)	ug/m3	ND	0.00040	ND	0.00041	ND	0.00040	9622356
Total Sodium (Na)	ug	15	5.0	32	5.0	59	5.0	9640008
Total Sodium (Na)	ug/m3	0.61	0.20	1.3	0.20	2.4	0.20	9622356
Total Strontium (Sr)	ug	ND	0.050	ND	0.050	ND	0.050	9640008
Total Strontium (Sr)	ug/m3	ND	0.0020	ND	0.0020	ND	0.0020	9622356
Total Thallium (Tl)	ug	ND	0.010	ND	0.010	ND	0.010	9640008
Total Thallium (Tl)	ug/m3	ND	0.00040	ND	0.00041	ND	0.00040	9622356
Total Tin (Sn)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Tin (Sn)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356
Total Titanium (Ti)	ug	ND	0.10	ND	0.10	ND	0.10	9640008
Total Titanium (Ti)	ug/m3	ND	0.0040	ND	0.0041	ND	0.0040	9622356
Total Uranium (U)	ug	ND	0.010	ND	0.010	ND	0.010	9640008
Total Uranium (U)	ug/m3	ND	0.00040	ND	0.00041	ND	0.00040	9622356
Total Vanadium (V)	ug	ND	0.030	ND	0.030	ND	0.030	9640008
Total Vanadium (V)	ug/m3	ND	0.0012	ND	0.0012	ND	0.0012	9622356
Total Zinc (Zn)	ug	ND	0.50	ND	0.50	ND	0.50	9640008
Total Zinc (Zn)	ug/m3	ND	0.020	ND	0.020	ND	0.020	9622356

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ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9640008	N_R	Reagent Blank	Total Aluminum (Al)	2024/09/17	ND, RDL=2.0		ug	
			Total Antimony (Sb)	2024/09/17	ND, RDL=0.050		ug	
			Total Arsenic (As)	2024/09/17	ND, RDL=0.050		ug	
			Total Barium (Ba)	2024/09/17	ND, RDL=0.050		ug	
			Total Beryllium (Be)	2024/09/17	ND, RDL=0.030		ug	
			Total Bismuth (Bi)	2024/09/17	ND, RDL=0.050		ug	
			Total Boron (B)	2024/09/17	ND, RDL=1.0		ug	
			Total Cadmium (Cd)	2024/09/17	ND, RDL=0.010		ug	
			Total Calcium (Ca)	2024/09/17	ND, RDL=5.0		ug	
			Total Chromium (Cr)	2024/09/17	0.13, RDL=0.050		ug	
			Total Cobalt (Co)	2024/09/17	ND, RDL=0.030		ug	
			Total Copper (Cu)	2024/09/17	ND, RDL=0.030		ug	
			Total Iron (Fe)	2024/09/17	ND, RDL=5.0		ug	
			Total Lead (Pb)	2024/09/17	ND, RDL=0.030		ug	
			Total Magnesium (Mg)	2024/09/17	ND, RDL=1.0		ug	
			Total Manganese (Mn)	2024/09/17	ND, RDL=0.050		ug	
			Total Molybdenum (Mo)	2024/09/17	ND, RDL=0.030		ug	
			Total Nickel (Ni)	2024/09/17	ND, RDL=0.050		ug	
			Total Phosphorus (P)	2024/09/17	ND, RDL=5.0		ug	
			Total Potassium (K)	2024/09/17	ND, RDL=5.0		ug	
			Total Selenium (Se)	2024/09/17	ND, RDL=0.10		ug	
			Total Silver (Ag)	2024/09/17	ND, RDL=0.010		ug	
			Total Sodium (Na)	2024/09/17	ND, RDL=5.0		ug	
			Total Strontium (Sr)	2024/09/17	ND, RDL=0.050		ug	
			Total Thallium (Tl)	2024/09/17	ND, RDL=0.010		ug	
			Total Tin (Sn)	2024/09/17	ND, RDL=0.030		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Titanium (Ti)	2024/09/17	ND, RDL=0.10		ug	
			Total Uranium (U)	2024/09/17	ND, RDL=0.010		ug	
			Total Vanadium (V)	2024/09/17	ND, RDL=0.030		ug	
			Total Zinc (Zn)	2024/09/17	ND, RDL=0.50		ug	
9640008	N_R	Matrix Spike [ABXL72-01]	Total Aluminum (Al)	2024/09/17		87	%	70 - 130
			Total Antimony (Sb)	2024/09/17		100	%	70 - 130
			Total Arsenic (As)	2024/09/17		100	%	70 - 130
			Total Barium (Ba)	2024/09/17		100	%	70 - 130
			Total Beryllium (Be)	2024/09/17		104	%	70 - 130
			Total Bismuth (Bi)	2024/09/17		102	%	70 - 130
			Total Boron (B)	2024/09/17		104	%	70 - 130
			Total Cadmium (Cd)	2024/09/17		97	%	70 - 130
			Total Calcium (Ca)	2024/09/17		94	%	70 - 130
			Total Chromium (Cr)	2024/09/17		101	%	70 - 130
			Total Cobalt (Co)	2024/09/17		100	%	70 - 130
			Total Copper (Cu)	2024/09/17		101	%	70 - 130
			Total Iron (Fe)	2024/09/17		101	%	70 - 130
			Total Lead (Pb)	2024/09/17		102	%	70 - 130
			Total Magnesium (Mg)	2024/09/17		101	%	70 - 130
			Total Manganese (Mn)	2024/09/17		97	%	70 - 130
			Total Molybdenum (Mo)	2024/09/17		103	%	70 - 130
			Total Nickel (Ni)	2024/09/17		98	%	70 - 130
			Total Phosphorus (P)	2024/09/17		104	%	70 - 130
			Total Potassium (K)	2024/09/17		104	%	70 - 130
			Total Selenium (Se)	2024/09/17		93	%	70 - 130
			Total Silver (Ag)	2024/09/17		105	%	70 - 130
			Total Sodium (Na)	2024/09/17		101	%	70 - 130
			Total Strontium (Sr)	2024/09/17		100	%	70 - 130
			Total Thallium (Tl)	2024/09/17		104	%	70 - 130
			Total Tin (Sn)	2024/09/17		102	%	70 - 130
			Total Titanium (Ti)	2024/09/17		93	%	70 - 130
			Total Uranium (U)	2024/09/17		100	%	70 - 130
			Total Vanadium (V)	2024/09/17		98	%	70 - 130
			Total Zinc (Zn)	2024/09/17		97	%	70 - 130
9640008	N_R	RPD [ABXL72-01]	Total Aluminum (Al)	2024/09/17	3.7		%	20
			Total Antimony (Sb)	2024/09/17	1.8		%	20
			Total Arsenic (As)	2024/09/17	1.7		%	20
			Total Barium (Ba)	2024/09/17	4.0		%	20
			Total Beryllium (Be)	2024/09/17	4.8		%	20
			Total Bismuth (Bi)	2024/09/17	1.3		%	20
			Total Boron (B)	2024/09/17	5.2		%	20
			Total Cadmium (Cd)	2024/09/17	2.9		%	20
			Total Calcium (Ca)	2024/09/17	0.61		%	20
			Total Chromium (Cr)	2024/09/17	1.8		%	20
			Total Cobalt (Co)	2024/09/17	1.1		%	20
			Total Copper (Cu)	2024/09/17	2.5		%	20
			Total Iron (Fe)	2024/09/17	2.1		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lead (Pb)	2024/09/17	0.17		%	20
			Total Magnesium (Mg)	2024/09/17	2.0		%	20
			Total Manganese (Mn)	2024/09/17	2.9		%	20
			Total Molybdenum (Mo)	2024/09/17	3.7		%	20
			Total Nickel (Ni)	2024/09/17	1.6		%	20
			Total Phosphorus (P)	2024/09/17	3.1		%	20
			Total Potassium (K)	2024/09/17	2.0		%	20
			Total Selenium (Se)	2024/09/17	1.3		%	20
			Total Silver (Ag)	2024/09/17	4.5		%	20
			Total Sodium (Na)	2024/09/17	4.1		%	20
			Total Strontium (Sr)	2024/09/17	2.2		%	20
			Total Thallium (Tl)	2024/09/17	3.6		%	20
			Total Tin (Sn)	2024/09/17	3.5		%	20
			Total Titanium (Ti)	2024/09/17	0.12		%	20
			Total Uranium (U)	2024/09/17	2.3		%	20
			Total Vanadium (V)	2024/09/17	2.4		%	20
			Total Zinc (Zn)	2024/09/17	2.9		%	20
			Total Aluminum (Al)	2024/09/17	NC		%	20
			Total Antimony (Sb)	2024/09/17	NC		%	20
			Total Arsenic (As)	2024/09/17	NC		%	20
			Total Barium (Ba)	2024/09/17	NC		%	20
			Total Beryllium (Be)	2024/09/17	NC		%	20
			Total Bismuth (Bi)	2024/09/17	NC		%	20
			Total Boron (B)	2024/09/17	NC		%	20
			Total Cadmium (Cd)	2024/09/17	NC		%	20
			Total Calcium (Ca)	2024/09/17	NC		%	20
			Total Chromium (Cr)	2024/09/17	NC		%	20
			Total Cobalt (Co)	2024/09/17	NC		%	20
			Total Copper (Cu)	2024/09/17	4.5		%	20
			Total Iron (Fe)	2024/09/17	NC		%	20
			Total Lead (Pb)	2024/09/17	NC		%	20
			Total Magnesium (Mg)	2024/09/17	0.32		%	20
			Total Manganese (Mn)	2024/09/17	NC		%	20
			Total Molybdenum (Mo)	2024/09/17	NC		%	20
			Total Nickel (Ni)	2024/09/17	NC		%	20
			Total Phosphorus (P)	2024/09/17	NC		%	20
			Total Potassium (K)	2024/09/17	NC		%	20
			Total Selenium (Se)	2024/09/17	NC		%	20
			Total Silver (Ag)	2024/09/17	NC		%	20
			Total Sodium (Na)	2024/09/17	1.1		%	20
			Total Strontium (Sr)	2024/09/17	NC		%	20
			Total Thallium (Tl)	2024/09/17	NC		%	20
			Total Tin (Sn)	2024/09/17	NC		%	20
			Total Titanium (Ti)	2024/09/17	NC		%	20
			Total Uranium (U)	2024/09/17	NC		%	20
			Total Vanadium (V)	2024/09/17	NC		%	20
			Total Zinc (Zn)	2024/09/17	NC		%	20
9640008	N_R	Spiked Blank	Total Aluminum (Al)	2024/09/17		97	%	85 - 115
			Total Antimony (Sb)	2024/09/17		90	%	85 - 115
			Total Arsenic (As)	2024/09/17		94	%	85 - 115
			Total Barium (Ba)	2024/09/17		90	%	85 - 115

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Beryllium (Be)	2024/09/17		103	%	85 - 115
			Total Bismuth (Bi)	2024/09/17		91	%	85 - 115
			Total Boron (B)	2024/09/17		102	%	85 - 115
			Total Cadmium (Cd)	2024/09/17		87	%	85 - 115
			Total Calcium (Ca)	2024/09/17		101	%	85 - 115
			Total Chromium (Cr)	2024/09/17		94	%	85 - 115
			Total Cobalt (Co)	2024/09/17		96	%	85 - 115
			Total Copper (Cu)	2024/09/17		92	%	85 - 115
			Total Iron (Fe)	2024/09/17		95	%	85 - 115
			Total Lead (Pb)	2024/09/17		93	%	85 - 115
			Total Magnesium (Mg)	2024/09/17		94	%	85 - 115
			Total Manganese (Mn)	2024/09/17		91	%	85 - 115
			Total Molybdenum (Mo)	2024/09/17		94	%	85 - 115
			Total Nickel (Ni)	2024/09/17		93	%	85 - 115
			Total Phosphorus (P)	2024/09/17		105	%	85 - 115
			Total Potassium (K)	2024/09/17		97	%	85 - 115
			Total Selenium (Se)	2024/09/17		98	%	85 - 115
			Total Silver (Ag)	2024/09/17		92	%	85 - 115
			Total Sodium (Na)	2024/09/17		95	%	85 - 115
			Total Strontium (Sr)	2024/09/17		94	%	85 - 115
			Total Thallium (Tl)	2024/09/17		93	%	85 - 115
			Total Tin (Sn)	2024/09/17		92	%	85 - 115
			Total Titanium (Ti)	2024/09/17		101	%	85 - 115
			Total Uranium (U)	2024/09/17		93	%	85 - 115
			Total Vanadium (V)	2024/09/17		92	%	85 - 115
			Total Zinc (Zn)	2024/09/17		90	%	85 - 115
9640008	N_R	RPD	Total Aluminum (Al)	2024/09/17	11		%	20
			Total Antimony (Sb)	2024/09/17	9.8		%	20
			Total Arsenic (As)	2024/09/17	4.5		%	20
			Total Barium (Ba)	2024/09/17	11		%	20
			Total Beryllium (Be)	2024/09/17	0.51		%	20
			Total Bismuth (Bi)	2024/09/17	11		%	20
			Total Boron (B)	2024/09/17	2.5		%	20
			Total Cadmium (Cd)	2024/09/17	9.1		%	20
			Total Calcium (Ca)	2024/09/17	8.4		%	20
			Total Chromium (Cr)	2024/09/17	3.9		%	20
			Total Cobalt (Co)	2024/09/17	4.5		%	20
			Total Copper (Cu)	2024/09/17	11		%	20
			Total Iron (Fe)	2024/09/17	5.2		%	20
			Total Lead (Pb)	2024/09/17	12		%	20
			Total Magnesium (Mg)	2024/09/17	5.4		%	20
			Total Manganese (Mn)	2024/09/17	5.2		%	20
			Total Molybdenum (Mo)	2024/09/17	9.7		%	20
			Total Nickel (Ni)	2024/09/17	3.9		%	20
			Total Phosphorus (P)	2024/09/17	2.5		%	20
			Total Potassium (K)	2024/09/17	5.7		%	20
			Total Selenium (Se)	2024/09/17	5.8		%	20
			Total Silver (Ag)	2024/09/17	8.6		%	20
			Total Sodium (Na)	2024/09/17	6.1		%	20
			Total Strontium (Sr)	2024/09/17	4.7		%	20
			Total Thallium (Tl)	2024/09/17	13		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tin (Sn)	2024/09/17	10		%	20
			Total Titanium (Ti)	2024/09/17	12		%	20
			Total Uranium (U)	2024/09/17	9.3		%	20
			Total Vanadium (V)	2024/09/17	4.9		%	20
			Total Zinc (Zn)	2024/09/17	5.3		%	20
9640008	N_R	Method Blank	Total Aluminum (Al)	2024/09/17	ND, RDL=2.0		ug	
			Total Antimony (Sb)	2024/09/17	ND, RDL=0.050		ug	
			Total Arsenic (As)	2024/09/17	ND, RDL=0.050		ug	
			Total Barium (Ba)	2024/09/17	ND, RDL=0.050		ug	
			Total Beryllium (Be)	2024/09/17	ND, RDL=0.030		ug	
			Total Bismuth (Bi)	2024/09/17	ND, RDL=0.050		ug	
			Total Boron (B)	2024/09/17	ND, RDL=1.0		ug	
			Total Cadmium (Cd)	2024/09/17	ND, RDL=0.010		ug	
			Total Calcium (Ca)	2024/09/17	ND, RDL=5.0		ug	
			Total Chromium (Cr)	2024/09/17	ND, RDL=0.050		ug	
			Total Cobalt (Co)	2024/09/17	ND, RDL=0.030		ug	
			Total Copper (Cu)	2024/09/17	ND, RDL=0.030		ug	
			Total Iron (Fe)	2024/09/17	ND, RDL=5.0		ug	
			Total Lead (Pb)	2024/09/17	ND, RDL=0.030		ug	
			Total Magnesium (Mg)	2024/09/17	ND, RDL=1.0		ug	
			Total Manganese (Mn)	2024/09/17	ND, RDL=0.050		ug	
			Total Molybdenum (Mo)	2024/09/17	ND, RDL=0.030		ug	
			Total Nickel (Ni)	2024/09/17	ND, RDL=0.050		ug	
			Total Phosphorus (P)	2024/09/17	ND, RDL=5.0		ug	
			Total Potassium (K)	2024/09/17	ND, RDL=5.0		ug	
			Total Selenium (Se)	2024/09/17	ND, RDL=0.10		ug	
			Total Silver (Ag)	2024/09/17	ND, RDL=0.010		ug	
			Total Sodium (Na)	2024/09/17	ND, RDL=5.0		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Strontium (Sr)	2024/09/17	ND, RDL=0.050		ug	
			Total Thallium (Tl)	2024/09/17	ND, RDL=0.010		ug	
			Total Tin (Sn)	2024/09/17	ND, RDL=0.030		ug	
			Total Titanium (Ti)	2024/09/17	ND, RDL=0.10		ug	
			Total Uranium (U)	2024/09/17	ND, RDL=0.010		ug	
			Total Vanadium (V)	2024/09/17	ND, RDL=0.030		ug	
			Total Zinc (Zn)	2024/09/17	ND, RDL=0.50		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Bureau Veritas Job #: C4R6210
Report Date: 2024/09/19

SEM Ltd.
Client Project #: 016-014
Site Location: NARL AIR QUALITY
Sampler Initials: BC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

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Appendix A-2: Laboratory Results – NO_2

Your Project #: 016-014
Site#: 2024/08/27-2024/09/26
Site Location: Ambient AQ Monitoring

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2024/10/10
Report #: R3569788
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C476665
Received: 2024/10/01, 08:00

Sample Matrix: Air
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
NO2 Passive Analysis	3	2024/10/03	2024/10/10	PTC SOP-00148	Passive NO2 in ATM

Results relate only to the items tested.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Customer Service Passives,
Email: PassiveAir@bureauveritas.com
Phone# (780) 378-8500
==========
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Bureau Veritas Edmonton: 6744 - 50th Street T6B 3M9 Telephone (780) 378-8500 Fax (780) 378-8699

Bureau Veritas Job #: C476665
Report Date: 2024/10/10

SEM Ltd.
Client Project #: 016-014
Site Location: Ambient AQ Monitoring
Sampler Initials: KM

RESULTS OF CHEMICAL ANALYSES OF AIR

Bureau Veritas ID		CWL360	CWL361	CWU821		
Sampling Date		2024/08/27 11:57	2024/08/27 12:25	2024/08/27 12:58		
	UNITS	1-FENCELINE	2-COME BY CHANCE	3-SUNNYSIDE	RDL	QC Batch
Passive Monitoring						
Calculated NO2	ppb	0.3	0.2	0.1	0.1	B549178
RDL = Reportable Detection Limit						

Bureau Veritas Edmonton: 6744 - 50th Street T6B 3M9 Telephone (780) 378-8500 Fax (780) 378-8699

Bureau Veritas Job #: C476665
Report Date: 2024/10/10

SEM Ltd.
Client Project #: 016-014
Site Location: Ambient AQ Monitoring
Sampler Initials: KM

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas Edmonton: 6744 - 50th Street T6B 3M9 Telephone (780) 378-8500 Fax (780) 378-8699

Bureau Veritas Job #: C476665
Report Date: 2024/10/10

SEM Ltd.
Client Project #: 016-014
Site Location: Ambient AQ Monitoring
Sampler Initials: KM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B549178	SDK	Spiked Blank	Calculated NO2			102	%	90 - 110
B549178	SDK	Method Blank	Calculated NO2		<0.1		ppb	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Bureau Veritas Edmonton: 6744 - 50th Street T6B 3M9 Telephone (780) 378-8500 Fax (780) 378-8699

Bureau Veritas Job #: C476665
Report Date: 2024/10/10

SEM Ltd.
Client Project #: 016-014
Site Location: Ambient AQ Monitoring
Sampler Initials: KM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Yang Liu, Laboratory Supervisor

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Bureau Veritas Edmonton: 6744 - 50th Street T6B 3M9 Telephone (780) 378-8500 Fax (780) 378-8699

Appendix A-3: Noise Calculation Details

Equations presented in this appendix follow methodology outlined in Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise (2017)* and Nova Scotia Environment and Climate Change's *Guidelines for Environmental Noise Measurement and Assessment (2023)*.

DAYTIME SOUND EQUIVALENT LEVEL [16 HOUR PERIOD]

$$L_d = 10 \log_{10} \left[\frac{\sum_{i=1}^{n} \left(t_i \times 10^{(0.1 \times L_{d,i})} \right)}{16} \right]$$

where: L_d = daytime sound equivalent level

t_i = duration of measurement

$L_{d,i}$ = sound pressure level at t_i

NIGHTTIME SOUND EQUIVALENT LEVEL [8 HOUR PERIOD]

$$L_n = 10 \log_{10} \left[\frac{\sum_{i=1}^{n} \left(t_i \times 10^{(0.1 \times L_{n,i})} \right)}{8} \right]$$

where: L_n = nighttime sound equivalent level

t_i = duration of measurement

$L_{n,i}$ = sound pressure level at t_i

DAY-NIGHT AVERAGE SOUND LEVEL [24 HOUR PERIOD]

$$L_{dn} = 10 \log_{10} \left[\frac{\left(\left(16 \times 10^{(0.1 \times L_d)} \right) + \left(8 \times 10^{(0.1 \times (L_n + 10))} \right) \right)}{24} \right]$$

where: L_{dn} = day-night average sound level

L_d = daytime sound equivalent level

L_n = nighttime sound equivalent level

LOW FREQUENCY NOISE

$$LFN = dBA - dBC \geq 20\ dB$$

where: LFN = low frequency noise

dBA = A-weighted sound level

dBC = C-weighted sound level

Appendix A-4: Hourly Sound Pressure Levels

Table J-1.1

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N1
North Atlantic Wind to Hydrogen Project
EASTING: 285387 m, NORTHING: 5286369 m
Rantem, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-02-03	10:00:00 AM		32	28	-1	0	
2024-02-03	11:00:00 AM		33	25	-0.8	0	
2024-02-03	12:00:00 PM		32	26	-0.7	0	
2024-02-03	1:00:00 PM		31	29	-0.6	0	
2024-02-03	2:00:00 PM		33	28	-0.7	0	
2024-02-03	3:00:00 PM		32	30	-0.6	0	
2024-02-03	4:00:00 PM		32	29	-1.2	0	
2024-02-03	5:00:00 PM		31	36	-1.4	0	
2024-02-03	6:00:00 PM		31	32	-1.2	0	
2024-02-03	7:00:00 PM		31	30	-1	0	
2024-02-03	8:00:00 PM		30	29	-0.9	0	
2024-02-03	9:00:00 PM		30	31	-0.8	0	
2024-02-03	10:00:00 PM		31	26	-0.8	0	
2024-02-03	11:00:00 PM		30	28	-0.8	0	
2024-02-04	12:00:00 AM		30	30	-0.6	0	
2024-02-04	1:00:00 AM		30	28	-0.5	0	
2024-02-04	2:00:00 AM		31	34	-0.4	0	
2024-02-04	3:00:00 AM		34	32	-0.3	0	
2024-02-04	4:00:00 AM		32	31	-0.3	0	
2024-02-04	5:00:00 AM		36	37	-0.3	0	
2024-02-04	6:00:00 AM		36	34	-0.3	0	
2024-02-04	7:00:00 AM		36	36	-0.1	0	
2024-02-04	8:00:00 AM		34	37	0.3	0	
2024-02-04	9:00:00 AM		31	37	0.7	0	
2024-02-04	10:00:00 AM		31	33	1.3	0	
2024-02-04	11:00:00 AM		34	28	1.8	0	
2024-02-04	12:00:00 PM		34	31	2.3	0	
2024-02-04	1:00:00 PM		32	32	2.4	0	
2024-02-04	2:00:00 PM		31	32	2.6	0	
2024-02-04	3:00:00 PM		31	29	2.6	0	
2024-02-04	4:00:00 PM		31	33	2.2	0	
2024-02-04	5:00:00 PM		30	37	2	0	
2024-02-04	6:00:00 PM		29	33	2.3	0	
2024-02-04	7:00:00 PM		27	41	2.8	0	Discarded - Wind speed > 38 km/h
2024-02-04	8:00:00 PM		27	46	2.5	0	Discarded - Wind speed > 38 km/h
2024-02-04	9:00:00 PM		30	48	2.3	0	Discarded - Wind speed > 38 km/h
2024-02-04	10:00:00 PM		29	44	2	0	Discarded - Wind speed > 38 km/h
2024-02-04	11:00:00 PM		34	37	2	0	
2024-02-05	12:00:00 AM		36	33	1.9	0	
2024-02-05	12:01:00 AM		35	33	1.9	0	
2024-02-05	1:00:00 AM		36	35	1.8	0	
2024-02-05	2:00:00 AM		42	30	1.7	0	
2024-02-05	3:00:00 AM		47	28	1.5	2.2	Discarded - Precipitation occurred
2024-02-05	4:00:00 AM		49	24	1.6	0.7	Discarded - Precipitation occurred
2024-02-05	5:00:00 AM		50	27	1.7	0	
2024-02-05	6:00:00 AM		53	18	1.6	0	
2024-02-05	7:00:00 AM		57	21	1.6	0	
2024-02-05	8:00:00 AM		59	24	1.5	0	
2024-02-05	9:00:00 AM		60	19	1.9	0	
2024-02-05	10:00:00 AM		59	21	2.2	0	
2024-02-05	11:00:00 AM		59	25	2.3	0	
2024-02-05	12:00:00 PM		58	24	2.2	0	
2024-02-05	1:00:00 PM		59	23	2.5	0	
2024-02-05	2:00:00 PM		58	24	1.4	0	
2024-02-05	3:00:00 PM		58	27	1.3	0	
2024-02-05	4:00:00 PM		58	30	1	0	
2024-02-05	5:00:00 PM		57	32	0.9	0	
2024-02-05	6:00:00 PM		56	34	1.1	0	
2024-02-05	7:00:00 PM		55	35	1.2	0	
2024-02-05	8:00:00 PM		54	45	1.1	0	Discarded - Wind speed > 38 km/h
2024-02-05	9:00:00 PM		53	41	1.1	0	Discarded - Wind speed > 38 km/h
2024-02-05	10:00:00 PM		51	40	1.2	0	Discarded - Wind speed > 38 km/h
2024-02-05	11:00:00 PM		47	40	1.2	0	Discarded - Wind speed > 38 km/h
2024-02-06	12:00:00 AM		40	42	1.3	0	Discarded - Wind speed > 38 km/h
2024-02-06	12:01:00 AM		46	42	1.3	0	Discarded - Wind speed > 38 km/h
2024-02-06	1:00:00 AM		47	45	1.4	0	Discarded - Wind speed > 38 km/h

Table J-1.1

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N1
North Atlantic Wind to Hydrogen Project
EASTING: 285387 m, NORTHING: 5286369 m
Rantem, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-02-06	2:00:00 AM		46	43	1.4	0	Discarded - Wind speed > 38 km/h
2024-02-06	3:00:00 AM		48	48	1.5	0	Discarded - Wind speed > 38 km/h
2024-02-06	4:00:00 AM		44	53	1.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	5:00:00 AM		42	55	1.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	6:00:00 AM		42	56	1.7	0	Discarded - Wind speed > 38 km/h
2024-02-06	7:00:00 AM		37	57	1.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	8:00:00 AM		36	58	1.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	9:00:00 AM		40	58	1.5	0	Discarded - Wind speed > 38 km/h
2024-02-06	10:00:00 AM		47	59	1.8	0	Discarded - Wind speed > 38 km/h
2024-02-06	11:00:00 AM		44	62	1.7	0	Discarded - Wind speed > 38 km/h
2024-02-06	12:00:00 PM		44	59	1.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	1:00:00 PM		44	56	1.3	0	Discarded - Wind speed > 38 km/h
2024-02-06	2:00:00 PM		43	58	1.2	0	Discarded - Wind speed > 38 km/h
2024-02-06	3:00:00 PM		44	55	1	0	Discarded - Wind speed > 38 km/h
2024-02-06	4:00:00 PM		46	56	0.9	0	Discarded - Wind speed > 38 km/h
2024-02-06	5:00:00 PM		42	55	0.9	0	Discarded - Wind speed > 38 km/h
2024-02-06	6:00:00 PM		45	59	1	0	Discarded - Wind speed > 38 km/h
2024-02-06	7:00:00 PM		43	54	0.9	0	Discarded - Wind speed > 38 km/h
2024-02-06	8:00:00 PM		41	61	0.8	0	Discarded - Wind speed > 38 km/h
2024-02-06	9:00:00 PM		41	54	0.6	0	Discarded - Wind speed > 38 km/h
2024-02-06	10:00:00 PM		40	53	0.2	0	Discarded - Wind speed > 38 km/h
2024-02-06	11:00:00 PM		40	47	-0.1	0	Discarded - Wind speed > 38 km/h
2024-02-07	12:00:00 AM		43	44	-0.3	0	Discarded - Wind speed > 38 km/h
2024-02-07	12:01:00 AM		40	44	-0.3	0	Discarded - Wind speed > 38 km/h
2024-02-07	1:00:00 AM		40	48	-0.4	0	Discarded - Wind speed > 38 km/h
2024-02-07	2:00:00 AM		44	50	-0.5	0	Discarded - Wind speed > 38 km/h
2024-02-07	3:00:00 AM		44	42	-0.6	0	Discarded - Wind speed > 38 km/h
2024-02-07	4:00:00 AM		43	45	-0.6	0	Discarded - Wind speed > 38 km/h
2024-02-07	5:00:00 AM		45	36	-0.5	0	
2024-02-07	6:00:00 AM		48	36	-0.7	0	
2024-02-07	7:00:00 AM		45	38	-0.6	0	
2024-02-07	8:00:00 AM		42	35	-0.8	0	
2024-02-07	9:00:00 AM		46	31	-0.7	0	
2024-02-07	10:00:00 AM		46	29	-0.7	0	
2024-02-07	11:00:00 AM		44	29	-0.4	0	
2024-02-07	12:00:00 PM		43	23	-0.3	0	
2024-02-07	1:00:00 PM		40	29	0.3	0	
2024-02-07	2:00:00 PM		35	30	0.3	0	
2024-02-07	3:00:00 PM		34	33	0.3	0	
2024-02-07	4:00:00 PM		34	34	-0.3	0	
2024-02-07	5:00:00 PM		32	29	-0.6	0	
2024-02-07	6:00:00 PM		30	24	-0.8	0	
2024-02-07	7:00:00 PM		29	23	-1.3	0	
2024-02-07	8:00:00 PM		37	28	-1.4	0	
2024-02-07	9:00:00 PM		29	24	-1.7	0	
2024-02-07	10:00:00 PM		34	26	-1.9	0	
2024-02-07	11:00:00 PM		31	24	-2.1	0	
2024-02-08	12:00:00 AM		30	26	-2.4	0	
2024-02-08	12:00:01 AM		30	26	-2.4	0	
2024-02-08	1:00:00 AM		31	27	-2.9	0	
2024-02-08	2:00:00 AM		30	29	-3.2	0	
2024-02-08	3:00:00 AM		31	32	-3.4	0	
2024-02-08	4:00:00 AM		34	33	-3.1	0	
2024-02-08	5:00:00 AM		37	30	-3	0	
2024-02-08	6:00:00 AM		42	25	-3	0	
2024-02-08	7:00:00 AM		46	28	-2.8	0	
2024-02-08	8:00:00 AM		45	30	-2.5	0	
2024-02-08	9:00:00 AM		47	30	-2.2	0	
2024-02-08	10:00:00 AM		53	30	-1.3	0	
2024-02-08	11:00:00 AM		52	26	-0.9	0	
2024-02-08	12:00:00 PM		48	29	-0.7	0	
2024-02-08	1:00:00 PM		46	28	-0.7	0	
2024-02-08	2:00:00 PM		48	26	-0.3	0	
2024-02-08	3:00:00 PM		47	28	-0.4	0	
2024-02-08	4:00:00 PM		46	30	-0.6	0	
2024-02-08	5:00:00 PM		45	27	-0.7	0	

Table J-1.1

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N1
North Atlantic Wind to Hydrogen Project
EASTING: 285387 m, NORTHING: 5286369 m
Rantem, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-02-08	6:00:00 PM		46	27	-0.8	0	
2024-02-08	7:00:00 PM		42	28	-1.1	0	
2024-02-08	8:00:00 PM		41	28	-1.1	0	
2024-02-08	9:00:00 PM		33	27	-1	0	
2024-02-08	10:00:00 PM		29	27	-0.9	0	
2024-02-08	11:00:00 PM		28	28	-0.8	0	
2024-02-09	12:00:00 AM		27	28	-0.8	0	
2024-02-09	1:00:00 AM		28	29	-1.1	0	
2024-02-09	2:00:00 AM		27	24	-1.2	0	
2024-02-09	3:00:00 AM		24	23	-1.3	0	
2024-02-09	4:00:00 AM		24	26	-1.5	0	
2024-02-09	5:00:00 AM		27	30	-1.7	0	
2024-02-09	6:00:00 AM		25	32	-1.6	0	
2024-02-09	7:00:00 AM		24	30	-1.6	0	

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	**51**	**89**	**69**	**20**
Nighttime 9h Leq (Ln) (22:00 - 07:00)	**41**	**58**	**37**	**21**

	Sound Level (dBA)
Ldn	**51**

	Value (%)
%HA	**2.60**

Notes:

(1) Weather data provided by Environment Canada's Argentia Climate Station (ID 8400104).
(2) Measurements recorded during inclement weather (winds speeds greater than 38 km/h and/or rain) were disregarded.

Legend
Day Time Hours
Night Time Hours

Table J-1.2

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N2
North Atlantic Wind to Hydrogen Project
EASTING: 276091 m, NORTHING: 5302826 m
Come By Chance, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-01-26	7:00:00 AM		52	26	-9.2	0	
2024-01-26	8:00:00 AM		60	23	-8.7	0	
2024-01-26	9:00:00 AM		46	13	-8.8	0	
2024-01-26	10:00:00 AM		44	7	-7.5	0	
2024-01-26	11:00:00 AM		51	2	-7	0	
2024-01-26	12:00:00 PM		42	7	-7.2	0	
2024-01-26	1:00:00 PM		44	12	-6.8	0	
2024-01-26	2:00:00 PM		37	15	-6	0	
2024-01-26	3:00:00 PM		39	25	-6	0	
2024-01-26	4:00:00 PM		43	25	-5.7	0	
2024-01-26	5:00:00 PM		39	27	-5	0	
2024-01-26	6:00:00 PM		38	25	-4.4	0	
2024-01-26	7:00:00 PM		32	26	-4.3	0	
2024-01-26	8:00:00 PM		32	25	-4	0	
2024-01-26	9:00:00 PM		32	22	-3.7	0	
2024-01-26	10:00:00 PM		39	25	-3.3	0	
2024-01-26	11:00:00 PM		48	25	-2.9	0	
2024-01-27	12:00:00 AM		43	27	-2.5	0	
2024-01-27	12:00:03 AM		48	27	-2.5	0	
2024-01-27	1:00:00 AM		43	26	-2.4	0	
2024-01-27	2:00:00 AM		43	18	-2.6	0	
2024-01-27	3:00:00 AM		43	15	-3.1	0	
2024-01-27	4:00:00 AM		45	14	-4.1	0	
2024-01-27	5:00:00 AM		45	10	-4.4	0	
2024-01-27	6:00:00 AM		47	8	-4.7	0	
2024-01-27	7:00:00 AM		51	5	-4.5	0	
2024-01-27	8:00:00 AM		49	4	-5.1	0	
2024-01-27	9:00:00 AM		41	7	-3.6	0	
2024-01-27	10:00:00 AM		50	3	-2.6	0	
2024-01-27	11:00:00 AM		50	6	-2.7	0	
2024-01-27	12:00:00 PM		49	7	-2.4	0	
2024-01-27	1:00:00 PM		48	7	-2.3	0	
2024-01-27	2:00:00 PM		45	5	-1.9	0	
2024-01-27	3:00:00 PM		43	6	-1.8	0	
2024-01-27	4:00:00 PM		40	9	-2.4	0	
2024-01-27	5:00:00 PM		41	8	-3.1	0	
2024-01-27	6:00:00 PM		39	7	-3.5	0	
2024-01-27	7:00:00 PM		37	10	-3.1	0	
2024-01-27	8:00:00 PM		44	13	-4.4	0	
2024-01-27	9:00:00 PM		45	11	-3.2	0	
2024-01-27	10:00:00 PM		43	20	-2.4	0	
2024-01-27	11:00:00 PM		47	18	-2.2	0	
2024-01-28	12:00:00 AM		33	22	-2.2	0	
2024-01-28	12:01:00 AM		42	22	-2.2	0	
2024-01-28	1:00:00 AM		45	24	-2.3	0	
2024-01-28	2:00:00 AM		47	25	-2.3	0	
2024-01-28	3:00:00 AM		46	23	-1.8	0	
2024-01-28	4:00:00 AM		47	28	-1.4	0	
2024-01-28	5:00:00 AM		48	31	-1.7	0	
2024-01-28	6:00:00 AM		50	24	-1.5	0	
2024-01-28	7:00:00 AM		47	29	-0.8	0	
2024-01-28	8:00:00 AM		47	34	-1	0	
2024-01-28	9:00:00 AM		47	33	-1.1	0	
2024-01-28	10:00:00 AM		45	29	-0.8	0	
2024-01-28	11:00:00 AM		47	29	-0.1	0	
2024-01-28	12:00:00 PM		45	28	0	0	
2024-01-28	1:00:00 PM		46	29	-0.1	0	
2024-01-28	2:00:00 PM		45	36	0	0	
2024-01-28	3:00:00 PM		45	37	-0.2	0	
2024-01-28	4:00:00 PM		42	29	-0.2	0	
2024-01-28	5:00:00 PM		29	30	0	0	
2024-01-28	6:00:00 PM		31	23	-0.4	0	
2024-01-28	7:00:00 PM		39	22	0	0	
2024-01-28	8:00:00 PM		36	20	-0.3	0	
2024-01-28	9:00:00 PM		43	22	-0.2	0	

Table J-1.2

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N2
North Atlantic Wind to Hydrogen Project
EASTING: 276091 m, NORTHING: 5302826 m
Come By Chance, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-01-28	10:00:00 PM		44	11	-0.5	0	
2024-01-28	11:00:00 PM		45	14	-0.7	0	
2024-01-29	12:00:00 AM		50	13	-1	0	
2024-01-29	1:00:00 AM		58	9	-0.9	0	

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	**48**	**45**	**45**	**0**
Nighttime 9h Leq (Ln) (22:00 - 07:00)	**49**	**24**	**24**	**0**

	Sound Level (dBA)
Ldn	**55**

	Value (%)
%HA	**4.08**

Notes:

(1) Weather data provided by Environment Canada's Argentia Climate Station (ID 8400104).
(2) Measurements recorded during inclement weather (winds speeds greater than 38 km/h and/or rain) were disregarded.

Legend
Day Time Hours
Night Time Hours

Table J-1.3

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N3
North Atlantic Wind to Hydrogen Project
EASTING: 281801 m, NORTHING: 5284930 m
Upshall, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-01-31	12:00:00 PM		39	18	-5.2	0	
2024-01-31	1:00:00 PM		37	17	-4.9	0	
2024-01-31	2:00:00 PM		36	17	-4.4	0	
2024-01-31	3:00:00 PM		36	14	-3.8	0	
2024-01-31	4:00:00 PM		31	9	-3.9	0	
2024-01-31	5:00:00 PM		33	8	-4.7	0	
2024-01-31	6:00:00 PM		33	14	-4.6	0	
2024-01-31	7:00:00 PM		28	9	-5	0	
2024-01-31	8:00:00 PM		27	10	-4.4	0	
2024-01-31	9:00:00 PM		28	14	-3.9	0	
2024-01-31	10:00:00 PM		25	13	-3.7	0	
2024-01-31	11:00:00 PM		25	19	-3.4	0	
2024-02-01	12:00:00 AM		24	18	-3.1	0	
2024-02-01	1:00:00 AM		24	24	-2.4	0	
2024-02-01	2:00:00 AM		26	29	-2.1	0	
2024-02-01	3:00:00 AM		26	24	-2.5	0	
2024-02-01	4:00:00 AM		27	23	-2.9	0	
2024-02-01	5:00:00 AM		27	19	-3.2	0	
2024-02-01	6:00:00 AM		35	21	-2.7	0	
2024-02-01	7:00:00 AM		35	14	-2.5	0	
2024-02-01	8:00:00 AM		36	18	-1.9	0	
2024-02-01	9:00:00 AM		38	17	-3.6	0	
2024-02-01	10:00:00 AM		36	12	-3.5	0	
2024-02-01	11:00:00 AM		52	9	-2.6	0	
2024-02-01	12:00:00 PM		33	5	-2.8	0	
2024-02-01	1:00:00 PM		37	5	-1.8	0	
2024-02-01	2:00:00 PM		35	8	-1.3	0	
2024-02-01	3:00:00 PM		36	11	-1.1	0	
2024-02-01	4:00:00 PM		35	17	-1.2	0	
2024-02-01	5:00:00 PM		38	16	-1	0	
2024-02-01	6:00:00 PM		34	11	-0.9	0	
2024-02-01	7:00:00 PM		33	12	-0.8	0	
2024-02-01	8:00:00 PM		34	20	-0.7	0	
2024-02-01	9:00:00 PM		32	16	-0.8	0	
2024-02-01	10:00:00 PM		28	16	-0.8	0	
2024-02-01	11:00:00 PM		30	12	-1.3	0	
2024-02-02	12:00:00 AM		28	11	-1.8	0	
2024-02-02	12:00:02 AM		31	11	-1.8	0	
2024-02-02	1:00:00 AM		30	16	-1.4	0	
2024-02-02	2:00:00 AM		30	18	-1.2	0	
2024-02-02	3:00:00 AM		30	18	-1.2	0	
2024-02-02	4:00:00 AM		31	15	-1.4	0	
2024-02-02	5:00:00 AM		32	15	-1.4	0	
2024-02-02	6:00:00 AM		33	18	-1.1	0	
2024-02-02	7:00:00 AM		34	14	-1.4	0	
2024-02-02	8:00:00 AM		31	15	-1.3	0	
2024-02-02	9:00:00 AM		35	14	-1.2	0	
2024-02-02	10:00:00 AM		33	15	-0.8	0	
2024-02-02	11:00:00 AM		35	11	-0.6	0	
2024-02-02	12:00:00 PM		33	12	-0.6	0	
2024-02-02	1:00:00 PM		37	9	-1	0	
2024-02-02	2:00:00 PM		36	9	-0.6	0	
2024-02-02	3:00:00 PM		34	7	-0.5	0	
2024-02-02	4:00:00 PM		31	12	-0.5	0	
2024-02-02	5:00:00 PM		31	7	-0.8	0	
2024-02-02	6:00:00 PM		31	6	-0.9	0	
2024-02-02	7:00:00 PM		36	8	-1.1	0	
2024-02-02	8:00:00 PM		31	4	-1.3	0	
2024-02-02	9:00:00 PM		34	9	-1.4	0	
2024-02-02	10:00:00 PM		30	7	-1.6	0	
2024-02-02	11:00:00 PM		35	8	-1.8	0	
2024-02-03	12:00:00 AM		34	10	-1.7	0	
2024-02-03	1:00:00 AM		36	14	-1.9	0	
2024-02-03	2:00:00 AM		34	14	-1.9	0	
2024-02-03	3:00:00 AM		34	16	-1.9	0	

Table J-1.3

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N3
North Atlantic Wind to Hydrogen Project
EASTING: 281801 m, NORTHING: 5284930 m
Upshall, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-02-03	4:00:00 AM		31	18	-1.9	0	
2024-02-03	5:00:00 AM		30	16	-1.9	0	
2024-02-03	6:00:00 AM		29	18	-2	0	

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	**38**	**41**	**41**	**0**
Nighttime 9h Leq (Ln) (22:00 - 07:00)	**31**	**28**	**28**	**0**

	Sound Level (dBA)
Ldn	**40**

	Value (%)
%HA	**0.56**

Notes:

(1) Weather data provided by Environment Canada's Argentia Climate Station (ID 8400104).
(2) Measurements recorded during inclement weather (winds speeds greater than 38 km/h and/or rain) were disregarded.

Legend
Day Time Hours
Night Time Hours

Table J-1.4

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N4
North Atlantic Wind to Hydrogen Project
EASTING: 279964 m, NORTHING: 5292344 m
Jacks Pond, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-01-15	2:00:00 PM		49	41	1.9	0	Discarded - Wind speed > 38 km/h
2024-01-15	3:00:00 PM		48	42	1.4	0	Discarded - Wind speed > 38 km/h
2024-01-15	4:00:00 PM		48	47	1.2	0	Discarded - Wind speed > 38 km/h
2024-01-15	5:00:00 PM		47	48	1	0	Discarded - Wind speed > 38 km/h
2024-01-15	6:00:00 PM		48	46	1.1	0	Discarded - Wind speed > 38 km/h
2024-01-15	7:00:00 PM		44	47	0.7	0	Discarded - Wind speed > 38 km/h
2024-01-15	8:00:00 PM		44	48	0.4	0	Discarded - Wind speed > 38 km/h
2024-01-15	9:00:00 PM		43	45	0.3	0	Discarded - Wind speed > 38 km/h
2024-01-15	10:00:00 PM		41	43	0	0	Discarded - Wind speed > 38 km/h
2024-01-15	11:00:00 PM		42	50	-0.8	0	Discarded - Wind speed > 38 km/h
2024-01-16	12:00:00 AM		41	46	-1.2	0	Discarded - Wind speed > 38 km/h
2024-01-16	12:01:00 AM		44	46	-1.2	0	Discarded - Wind speed > 38 km/h
2024-01-16	1:00:00 AM		39	40	-1.6	0	Discarded - Wind speed > 38 km/h
2024-01-16	2:00:00 AM		37	38	-1.4	0	
2024-01-16	3:00:00 AM		40	42	-1.1	0	Discarded - Wind speed > 38 km/h
2024-01-16	4:00:00 AM		42	40	-1.2	0	Discarded - Wind speed > 38 km/h
2024-01-16	5:00:00 AM		44	36	-1.7	0	
2024-01-16	6:00:00 AM		45	35	-1.9	0	
2024-01-16	7:00:00 AM		45	31	-2.2	0	
2024-01-16	8:00:00 AM		45	31	-2.2	0	
2024-01-16	9:00:00 AM		45	29	-1.7	0	
2024-01-16	10:00:00 AM		46	27	-1.8	0	
2024-01-16	11:00:00 AM		46	26	-1.4	0	
2024-01-16	12:00:00 PM		45	26	-1.6	0	
2024-01-16	1:00:00 PM		47	31	-1.4	0	
2024-01-16	2:00:00 PM		47	30	-0.9	0	
2024-01-16	3:00:00 PM		46	33	-1.2	0	
2024-01-16	4:00:00 PM		47	24	-1.6	0	
2024-01-16	5:00:00 PM		47	21	-1.8	0	
2024-01-16	6:00:00 PM		48	22	-1.8	0	
2024-01-16	7:00:00 PM		47	12	-2.4	0	
2024-01-16	8:00:00 PM		49	6	-2.7	0	
2024-01-16	9:00:00 PM		48	5	-2.7	0	
2024-01-16	10:00:00 PM		47	12	-4.9	0	
2024-01-16	11:00:00 PM		47	13	-3.8	0	
2024-01-17	12:00:00 AM		45	16	-3.6	0	
2024-01-17	1:00:00 AM		45	20	-3.7	0	
2024-01-17	2:00:00 AM		38	21	-3.9	1	Discarded - Precipitation occurred
2024-01-17	3:00:00 AM		39	16	-3.5	2.3	Discarded - Precipitation occurred
2024-01-17	4:00:00 AM		46	48	-2.4	0.9	Discarded - Wind speed > 38 km/h
2024-01-17	5:00:00 AM		55	55	-1	0	Discarded - Wind speed > 38 km/h
2024-01-17	6:00:00 AM		54	53	0.4	0	Discarded - Wind speed > 38 km/h
2024-01-17	7:00:00 AM		56	56	1.1	2	Discarded - Wind speed > 38 km/h and precipation occurred
2024-01-17	8:00:00 AM		56	56	1.9	0	Discarded - Wind speed > 38 km/h
2024-01-17	9:00:00 AM		54	44	3.6	2	Discarded - Wind speed > 38 km/h and precipation occurred
2024-01-17	10:00:00 AM		52	35	5.9	1.4	Discarded - Precipitation occurred
2024-01-17	11:00:00 AM		50	33	7.6	1.1	Discarded - Precipitation occurred
2024-01-17	12:00:00 PM		51	28	7.4	0.9	Discarded - Precipitation occurred
2024-01-17	1:00:00 PM		52	22	6.4	1.6	Discarded - Precipitation occurred
2024-01-17	2:00:00 PM		56	41	5.5	1.7	Discarded - Wind speed > 38 km/h and precipation occurred

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	**47**	**31**	**15**	**16**
Nighttime 9h Leq (Ln) (22:00 - 07:00)	**45**	**19**	**7**	**12**

	Sound Level (dBA)
Ldn	**52**

	Value (%)
%HA	**2.74**

Notes:

(1) Weather data provided by Environment Canada's Argentia Climate Station (ID 8400104).
(2) Measurements recorded during inclement weather (winds speeds greater than 38 km/h and/or rain) were disregarded.

Legend
Day Time Hours
Night Time Hours

Table J-1.5

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N5
North Atlantic Wind to Hydrogen Project
EASTING: 277597 m, NORTHING: 5296718 m
Arnolds Cove, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-01-24	9:00:00 AM		48	31	-11.7	0	
2024-01-24	10:00:00 AM		49	27	-10.6	0	
2024-01-24	11:00:00 AM		44	27	-10.3	0	
2024-01-24	12:00:00 PM		43	33	-9.1	0	
2024-01-24	1:00:00 PM		44	40	-8.4	0	Discarded - Wind speed > 38 km/h
2024-01-24	2:00:00 PM		41	27	-7.8	0	
2024-01-24	3:00:00 PM		43	27	-7.6	0	
2024-01-24	4:00:00 PM		48	23	-7.9	0	
2024-01-24	5:00:00 PM		44	28	-7.6	0	
2024-01-24	6:00:00 PM		54	28	-7	0	
2024-01-24	7:00:00 PM		58	28	-6.9	0	
2024-01-24	8:00:00 PM		61	29	-6.2	0	
2024-01-24	9:00:00 PM		60	35	-5.7	0	
2024-01-24	10:00:00 PM		61	31	-4.8	0	
2024-01-24	11:00:00 PM		62	43	-3.8	0	Discarded - Wind speed > 38 km/h
2024-01-25	12:00:00 AM		63	42	-2.5	0	Discarded - Wind speed > 38 km/h
2024-01-25	12:01:00 AM		62	42	-2.5	0	Discarded - Wind speed > 38 km/h
2024-01-25	1:00:00 AM		61	50	-2.5	0	Discarded - Wind speed > 38 km/h
2024-01-25	2:00:00 AM		62	50	-2	0	Discarded - Wind speed > 38 km/h
2024-01-25	3:00:00 AM		61	59	-1.3	0	Discarded - Wind speed > 38 km/h
2024-01-25	4:00:00 AM		60	57	-1	0	Discarded - Wind speed > 38 km/h
2024-01-25	5:00:00 AM		57	58	-0.7	0	Discarded - Wind speed > 38 km/h
2024-01-25	6:00:00 AM		55	61	-0.4	0	Discarded - Wind speed > 38 km/h
2024-01-25	7:00:00 AM		53	59	-0.1	0	Discarded - Wind speed > 38 km/h
2024-01-25	8:00:00 AM		49	59	0.1	0	Discarded - Wind speed > 38 km/h
2024-01-25	9:00:00 AM		48	55	0.3	0	Discarded - Wind speed > 38 km/h
2024-01-25	10:00:00 AM		57	54	0.4	0	Discarded - Wind speed > 38 km/h
2024-01-25	11:00:00 AM		66	52	0.5	0	Discarded - Wind speed > 38 km/h
2024-01-25	12:00:00 PM		53	45	0.6	0	Discarded - Wind speed > 38 km/h
2024-01-25	1:00:00 PM		49	44	0.8	0	Discarded - Wind speed > 38 km/h
2024-01-25	2:00:00 PM		52	40	-0.2	0	Discarded - Wind speed > 38 km/h
2024-01-25	3:00:00 PM		46	34	-0.2	0	
2024-01-25	4:00:00 PM		45	31	0.1	0	
2024-01-25	5:00:00 PM		51	25	0.2	0	
2024-01-25	7:00:00 PM		42	12	0.5	0.2	Discarded - Precipitation occurred
2024-01-25	8:00:00 PM		40	44	-2.1	0	Discarded - Wind speed > 38 km/h
2024-01-25	9:00:00 PM		40	45	-2.5	0	Discarded - Wind speed > 38 km/h
2024-01-25	10:00:00 PM		42	44	-3.9	0	Discarded - Wind speed > 38 km/h
2024-01-25	11:00:00 PM		54	48	-5.5	0	Discarded - Wind speed > 38 km/h
2024-01-26	12:00:00 AM		44	52	-6.4	0	Discarded - Wind speed > 38 km/h
2024-01-26	12:01:00 AM		43	52	-6.4	0	Discarded - Wind speed > 38 km/h
2024-01-26	1:00:00 AM		45	46	-7.2	0	Discarded - Wind speed > 38 km/h
2024-01-26	2:00:00 AM		44	42	-7.6	0	Discarded - Wind speed > 38 km/h
2024-01-26	3:00:00 AM		46	47	-8	0	Discarded - Wind speed > 38 km/h
2024-01-26	4:00:00 AM		41	37	-8.3	0	
2024-01-26	5:00:00 AM		50	34	-8.5	0	
2024-01-26	6:00:00 AM		59	28	-9.1	0	
2024-01-26	7:00:00 AM		52	26	-9.2	0	
2024-01-26	8:00:00 AM		60	23	-8.7	0	
2024-01-26	9:00:00 AM		46	13	-8.8	0	
2024-01-26	10:00:00 AM		44	7	-7.5	0	
2024-01-26	11:00:00 AM		51	2	-7	0	
2024-01-26	12:00:00 PM		42	7	-7.2	0	
2024-01-26	1:00:00 PM		44	12	-6.8	0	
2024-01-26	2:00:00 PM		37	15	-6	0	
2024-01-26	3:00:00 PM		39	25	-6	0	
2024-01-26	4:00:00 PM		43	25	-5.7	0	
2024-01-26	5:00:00 PM		39	27	-5	0	
2024-01-26	6:00:00 PM		38	25	-4.4	0	
2024-01-26	7:00:00 PM		32	26	-4.3	0	
2024-01-26	8:00:00 PM		32	25	-4	0	
2024-01-26	9:00:00 PM		32	22	-3.7	0	
2024-01-26	10:00:00 PM		39	25	-3.3	0	
2024-01-26	11:00:00 PM		48	25	-2.9	0	
2024-01-27	12:00:00 AM		43	27	-2.5	0	

Table J-1.5

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N5
North Atlantic Wind to Hydrogen Project
EASTING: 277597 m, NORTHING: 5296718 m
Arnolds Cove, Newfoundland and Labrador

Date	Time	Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	52	43	30	13
Nighttime 9h Leq (Ln) (22:00 - 07:00)	55	23	7	16

	Sound Level (dBA)
Ldn	61

	Value (%)
%HA	8.92

Notes:

(1) Weather data provided by Environment Canada's Argentia Climate Station (ID 8400104).
(2) Measurements recorded during inclement weather (winds speeds greater than 38 km/h and/or rain) were disregarded.

Legend	
Day Time Hours	
Night Time Hours	

Table J-1.6

Environmental Sound Level Measurements, LEQ - Ambient Background Baseline Measurements - N6
North Atlantic Wind to Hydrogen Project
EASTING: 284290 m, NORTHING: 5304354 m
Sunnyside, Newfoundland and Labrador

Date	Time		Leq [2]	Wind Spd (km/h) [1]	Temperature (°C)	Precipitation (mm)	Weather
2024-08-06	2:00:00 PM		42	2.7	18.6	1.02	Discarded - Precipitation occurred
2024-08-06	3:00:00 PM		38	2.1	19.1	0	
2024-08-06	4:00:00 PM		36	2.1	18.8	0	
2024-08-06	5:00:00 PM		34	2.6	19.7	0	
2024-08-06	6:00:00 PM		40	2.1	19.0	0	
2024-08-06	7:00:00 PM		41	2.0	18.5	0	
2024-08-06	8:00:00 PM		35	3.3	18.1	0	
2024-08-06	9:00:00 PM		36	2.5	17.0	0	
2024-08-06	10:00:00 PM		42	2.6	16.8	0	
2024-08-06	11:00:00 PM		45	1.9	16.3	0	
2024-08-06	12:00:00 AM		45	1.2	16.1	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-06	1:00:00 AM		45	1.3	15.3	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-06	2:00:00 AM		45	1.5	13.7	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-06	3:00:00 AM		45	1.6	13.4	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-06	4:00:00 AM		45	1.3	13.2	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-06	5:00:00 AM		45	1.3	12.4	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-07	6:00:00 AM		46	1.3	11.3	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-07	7:00:00 AM		45	1.2	11.3	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-07	8:00:00 AM		41	1.4	13.1	0	Discarded - Continuous Mechanical Equipment Measured
2024-08-07	9:00:00 AM		41	2.8	17.0	0	
2024-08-07	10:00:00 AM		45	3.5	19.2	0	
2024-08-07	11:00:00 AM		45	4.5	20.6	0	
2024-08-07	12:00:00 PM		46	4.8	21.3	0	
2024-08-07	1:00:00 PM		47	4.8	21.3	0	
2024-08-07	2:00:00 PM		44	5.4	21.2	0	
2024-08-07	3:00:00 PM		44	4.4	21.1	0	
2024-08-07	4:00:00 PM		45	4.3	21.6	0	
2024-08-07	5:00:00 PM		40	3.8	20.1	0.06	Discarded - Precipitation occurred
2024-08-07	6:00:00 PM		41	3.4	20.1	0	
2024-08-07	7:00:00 PM		42	3.5	19.9	0	
2024-08-07	8:00:00 PM		40	4.0	19.4	0	
2024-08-07	9:00:00 PM		33	3.2	18.8	0	
2024-08-07	10:00:00 PM		33	2.7	17.8	0	
2024-08-07	11:00:00 PM		30	1.7	17.1	0	
2024-08-07	12:00:00 AM		25	1.8	16.4	0	
2024-08-07	1:00:00 AM		23	1.9	15.8	0	
2024-08-07	2:00:00 AM		23	1.2	14.7	0	
2024-08-07	3:00:00 AM		25	1.1	11.9	0	
2024-08-07	4:00:00 AM		24	1.6	10.3	0	
2024-08-07	5:00:00 AM		33	1.7	9.4	0	
2024-08-08	6:00:00 AM		34	1.5	9.8	0	
2024-08-08	7:00:00 AM		36	1.5	10.3	0	
2024-08-08	8:00:00 AM		37	1.9	13.1	0	
2024-08-08	9:00:00 AM		52	3.0	17.3	0	
2024-08-08	10:00:00 AM		40	3.6	19.4	0	
2024-08-08	11:00:00 AM		41	4.0	20.7	0	
2024-08-08	12:00:00 PM		42	4.1	21.0	0	
2024-08-08	1:00:00 PM		38	4.6	22.5	0	
2024-08-08	2:00:00 PM		39	3.6	22.6	0	
2024-08-08	3:00:00 PM		38	3.8	23.4	0	
2024-08-08	4:00:00 PM		40	3.0	23.4	0	
2024-08-08	5:00:00 PM		38	3.5	23.4	0	
2024-08-08	6:00:00 PM		42	3.3	23.6	0	
2024-08-08	7:00:00 PM		39	4.0	21.8	0	
2024-08-08	8:00:00 PM		42	3.4	20.2	0	
2024-08-08	9:00:00 PM		32	2.2	18.5	0	
2024-08-08	10:00:00 PM		29	1.2	16.0	0	
2024-08-08	11:00:00 PM		29	1.2	13.8	0	
2024-08-08	12:00:00 AM		28	1.3	12.3	0	
2024-08-08	1:00:00 AM		23	1.4	10.9	0	
2024-08-08	2:00:00 AM		24	1.7	10.2	0	
2024-08-08	3:00:00 AM		29	1.6	9.7	0	
2024-08-08	4:00:00 AM		29	1.8	9.5	0	
2024-08-08	5:00:00 AM		30	1.3	8.5	0	
2024-08-09	6:00:00 AM		34	1.3	7.7	0	
2024-08-09	7:00:00 AM		37	1.2	8.3	0	
2024-08-09	8:00:00 AM		43	1.3	10.3	0	
2024-08-09	9:00:00 AM		39	1.4	15.5	0	
2024-08-09	10:00:00 AM		41	2.1	17.0	0	