Appendix J: Noise and Vibration Impact Study

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Abbreviations and Acronyms

Abbreviation	Definition
%HA	Percent Highly Annoyed
3D	Three-Dimensional
ANSI/ASA	American National Standards Institute / Acoustical Society of America
CAD	Computer Aided Design
CNVMP	Construction Noise and Vibration Management Plan
CS01/02	Construction Scenario 01 / 02
dB	Decibel
dBA	Decibel, A-weighted (representative of the response from the human ear)
dBC	Decibel, C-weighted (additional weighting to low frequencies)
DEFRA	Department for Environment, Food & Rural Affairs
EA	Environmental Approval
ECCC	Environment and Climate Change Canada
ERCB	Energy Resources Conservation Board
FTA	Federal Transit Administration
GHD	GHD Group Pty Ltd (formerly Gutteridge Haskins & Davey)
HP	Hydrogenation Plant
HGP	Hydrogen Generation Plant
ISEE	International Society of Explosives Engineers
ISO	International Organization for Standardization
kV	Kilovolt
LFN	Low Frequency Noise
LOHC	Liquid Organic Hydrogen Carriers
MCH	Methylcyclohexane
MRDEM	Medium Resolution Digital Elevation Model
MW	Megawatts
NARL	North Atlantic Refining Logistics Terminal
NL	Newfoundland Labrador
NLH	Newfoundland and Labrador Hydro
O&M	Operation and Maintenance
PEM	Proton Exchange Membrane
POR	Point-of-Reception
PPV	Peak Particle Velocity
RMS	Root Mean Squared
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
ZOI	Zone of Influence

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 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 kilovolt (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 be shipped from North Atlantic's port facilities to domestic and international markets for use in various decarbonization technologies.

1.1 Purpose of this Report

GHD Limited (GHD) was retained by North Atlantic to prepare a Noise and Vibration Impact Study (Study) for the Wind to Hydrogen Project located within the Placentia Bay and Trinity Bay region, NL (Site). This Study has been prepared in support of the Environmental Assessment (EA) of the Project.

2.0 Project Description

The North Atlantic Wind to Hydrogen Project will produce EU RED III RFNBO certified green hydrogen within the Placentia Bay / Trinity Bay region and transport to offtakes. The Project will utilize energy generated by its own Wind Farms, partially backed by power from NL Hydro, to generate green hydrogen. The hydrogen will then be converted into methylcyclohexane (MCH), a liquid organic hydrogen carrier (LOHC), for transport to European off takes.

In partnership with provincial, regional and Indigenous organizations, North Atlantic has undertaken the following initiatives toward investigating options for preliminary design of the Project:

- April 2023: Initiation of baseline environmental surveys that adhere to the Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Production Projects for the purpose of Project Environmental Assessment. This work is being executed by SEM Ltd.;
- August 2023: ASL Energy supported the installation process for wind data collection and wind energy assessment in the area around Come By Chance. The 12-month resource assessment was completed August 2024;
- January 2024: Completion of a Wind Farm and HGP Pre-FEED/FEL-2 engineering study for the Project, executed by Hatch Ltd;
- July 2024 – 10,316 ha land reserved by IET;

- July 2024: Initiation of Geotechnical Drilling Campaign for the wind power, transmission line and HGP. Completion of the Campaign September 2024; and
- September 2024: Initiation of the LOHC Pre-FEED/FEL-2 engineering study for the Project, being executed by Hatch Ltd.

North Atlantic will continue pre-development activities into 2025, including surveys for wind power, transmission line and plant sites, and a FEED/FEL-3 engineering study in support of the EA process and a final investment decision (FID) in 2026. In addition, North Atlantic will undertake several capital projects to modernize its port facilities to accommodate export of hydrogen and hydrogen derivatives. The following sections present preliminary descriptions of the main features of the Project based on the wind and hydrogen Pre-FEED report. More extensive and detailed information will become available as studies and detailed design proceed.

2.1 Wind Farm

The Wind Farm is between Sunnyside on the west and Deer Harbour on the east side on land, bounded by Bull Arm to the southwest and Trinity Bay (Figure J-2.1-1). It will be comprised of approximately 45 wind turbines with a rated power of approximately 7.2 MW each, totalling 324 MW of installed capacity. The Wind Farm includes an access road network, electrical collection and transmission systems, and three substations.

Figure J-2.1-1 Project layout and study areas.

2.2 Hydrogen Generation Plant

The HGP will be within the NARL Logistics Terminal boundaries. The HGP will utilize Proton exchange Membrane (PEM) electrolyzers, with fresh water as feedstock.

2.3 Hydrogenation Plant

The HP will be within the NARL Logistics Terminal Boundaries. The Project will use MCH LOHC for the transportation of green hydrogen and will include a HP near the HGP as part of the Project scope.

The LOHC technology is a cyclical process for hydrogen storage and transport. In this process, electrolytic green hydrogen undergoes a chemical reaction with toluene in a hydrogenation step, producing the hydrogen carrier, MCH. The MCH is then transported to a receiving facility, where it is processed in a reactor to remove the hydrogen for offtake. This dehydrogenation step regenerates toluene, which is subsequently returned to the HP to complete the cycle.

2.4 Electrical Infrastructure

A dedicated 138 kV transmission line will connect the Wind Farm to the HGP. A separate grid feed will supply additional power to the HGP substation from the Sunnyside substation owned by Newfoundland and Labrador Hydro (NLH).

2.5 Other Infrastructure

The main project components will be supported by the construction of access roads, laydown areas, an office building, warehouse, parking area, septic field, and firewater area. Potable water will be sourced from an artesian well and treated prior to use.

2.6 Transportation

Various project components and materials will be transported to Newfoundland via existing port facilities. Containerized cargo is expected to be shipped to Newfoundland via Montreal or Halifax. Large equipment and materials (e.g., wind turbine components) are expected to be transported by geared multipurpose vessels for unloading at existing port and laydown facilities at St. John's, Bull Arm or Come By Chance. The types of road trucks and trailers used will depend on the dimensions and weights of the materials being transported. Passenger vehicles will also be used.

2.7 Project Timeline

The anticipated Project timeline is as follows:

- Construction – The Construction Phase of the Project will be from Q4 2026 through Q4 2028, pending EA approval and receipt of other required permits and approvals. Early civil works are planned to start Q2/3 2026 through Q3 2027. Construction of the Wind Farm and associated infrastructure is expected to begin in Q4 2026 with completion in Q2 2029. The HGP will be constructed in phases from Q2/3 2026 to Q3 2028. The HP will be constructed in Q2/3 2026 to Q4 2028;
- Operation and Maintenance (O&M) – Wind Farm commissioning is anticipated to start Q1 2029. The 240 MW electrolyzers and HP are expected to be begin commissioning in Q3/4 2029. Commercial operations is anticipated for Q3 2029, with the operational life of the Project as 30 years; and
- Decommissioning and Rehabilitation – After a 30 year operational life, the Decommissioning and Rehabilitation Phase is anticipated to occur during 2059.

3.0 Existing Conditions & Baseline Noise Study Results

To establish existing conditions and associated noise limits in accordance with the Health Canada criteria (described in Section 4.2) baseline noise levels were required to be collected. Ambient noise levels were measured in the vicinity of the PA in January, February and August of 2024. These measurements were taken to determine an approximate baseline where the Project could cause new or incremental impacts to the natural environment.

The baseline sound quality monitoring survey was 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 2017). Ambient sound levels were measured using Type 1 Sound Pressure Level Meters. Measurements were taken continuously over a period of between 2 to 6 days at each location. Calibration checks were undertaken before and after the monitoring survey.

The results from this baseline noise monitoring program were obtained as a time averaged sound level (L_{eq}); a single number value that expresses the time varying sound level for the specified period (in this case, one hour) as though it were a constant sound level with the same total sound energy as the time varying level.

This data was then filtered via the historical climate data obtained from nearby climate stations; noise levels during periods of inclement weather were discarded due to their atypical nature and potential nearby sources of sound (both natural and anthropogenic) with associated audio recordings were also reviewed. The remaining data was then averaged over the appropriate period to obtain the equivalent continuous A-weighted noise levels (L_{Aeq}) averaged over day and nighttime periods. The sound pressure levels measured during the baseline sound quality survey are presented in Table J-3.0, including daytime sound level (L_d), nighttime sound level (L_n), and the day-night average sound level (L_{dn}) values (Health Canada 2017).

Noise levels were found to be highest at locations closer to significant sources of noise such as existing industry and roadways. For locations N2 – Come by Chance and N5 – Arnolds Cove, elevated day and night noise levels were captured, and were likely due to existing ambient industrial noise levels emanating from the Come by Chance Industrial Site (which includes the NARL Logistics Terminal and Braya Renewable Fuels Refinery). It is likely that noise levels at location N4 – Jacks Pond were contributed to most by road traffic noise from Trans Canada Highway 1. All other collected noise data was characteristic of a rural setting, with a minimally anthropomorphic (human based) and mostly natural noise environment, with wildlife calls and some ocean noise given its proximity to the sea.

Table J-3.0-1 summarizes these measurements in terms of average noise levels during the day (07:00 to 22:00), and night (22:00 to 07:00). The noise monitoring results are provided in Table J-1.1 to J-1.6 of Appendix J-1 and the monitoring locations are shown in Figure J-3.0-1.

Table J-3.0-1 Noise monitoring collected data summary.

Monitoring Location ID	Location name	Monitoring time range		Coordinates, m[1]		Measured noise levels, dBA			
		Start	End	Easting	Northing	Day L_d (7am-10pm), dBA	Night L_n (10pm-7am), dBA	L_{dn}, dBA	%HA[2]
N1	Rantem, NL	2024-02-03	2024-02-09	285387	5286369	51	41	51	2.6%
N2	Come By Chance, NL	2024-01-26	2024-01-29	276091	5302826	48	49	55	4.1%
N3	Upshall, NL	2024-01-31	2024-02-03	281801	5284930	38	31	40	0.6%
N4	Jacks Pond, NL	2024-01-15	2024-01-17	279964	5292344	47	45	52	2.7%
N5	Arnolds Cove, NL	2024-01-24	2024-01-27	277597	5296718	52	55	61	8.9%
N6	Sunnyside, NL	2024-08-06	2024-08-09	284290	5304354	42	35	44	1.0%

Notes
Note 1: CRS EPSG:26922 – North American Datum 1983 UTM zone 22N
Note 2: %HA – Percent Highly Annoyed. This is a metric used as part of the Health Canada Guideline.

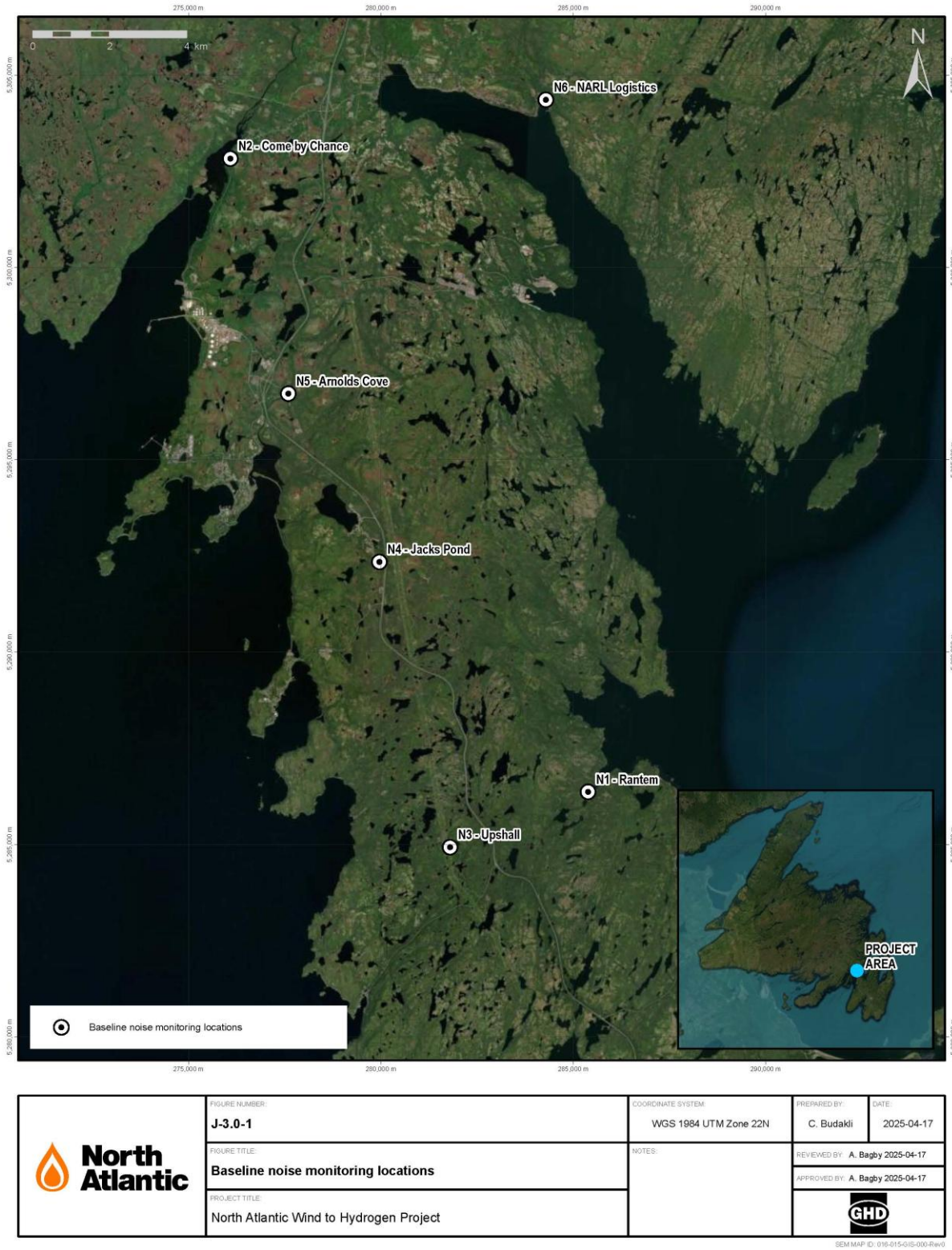


Figure J-3.0-1 Baseline noise monitoring locations.

4.0 Noise and Vibration Assessment Methodology

The Study presented herein, provides an evaluation of the potential noise impacts from the Project generated during Construction, and O&M Phases on the sensitive receptors located nearest to the Project, based on continuous 24-hour operations and daytime only construction.

The noise assessment of the Project is split into two components:

- Construction (CS01- Turbines & Hydrogen Hub Facilities & CS02 - Transmission Lines, Collector System and Road Construction); and
- Operation of the Turbines, associated production facilities and infrastructure.

4.1 3D Acoustical Model

Datakustik's CadnaA Acoustical Modelling Software (CadnaA) is the industry standard for environmental noise modelling in Canada. CadnaA version 2024 was used to model the potential impacts of the significant noise sources for Construction and Operations. CadnaA calculates sound level emissions based on the ISO 9613-2 2024 standard "Acoustics – Attenuation of Sound During Propagation Outdoors", which accounts for attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption, and directivity. Topography for the site and surrounding environment was prepared using data obtained from *Medium Resolution Digital Elevation Model (MRDEM) – CanElevation Series*, and input into the 3D acoustical model at a resolution of 10 metres.

CadnaA modelling assumptions used in this Study included:

- Noise Sources: All sources were modelled using full octave band data from the reference materials;
- Reflection Order: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from reflecting surfaces;
- Ground Absorption: The model included a ground absorption factor of G = 1 for soft ground, G = 0.5 was used for areas of gravel, G=0 for water;
- Tonality: A +5 dB adjustment was applied for tonal sources, if applicable;
- Building Surfaces: Buildings are modelled as reflective surfaces;
- Noise Source Modelling: Noise sources whose dimensions are small in comparison to the distance to the sensitive Points of Reception (PORs) (generators, air intakes and exhausts) are modelled as point sources in CadnaA. Noise sources with a larger area such as bay doors are modelled as vertical area sources. Noise sources extending in only one direction with small

dimensions in the other two directions such as conveyor lines or trucking routes are modelled as line sources. Each of these noise source types appears in the legend provided with Figure J-5.2-1 identifying the source type;

- Noise Source Modelling:
    - **Operation:** Noise sources pertaining to the HGP, HP and substation were modelled as area sources, with the total sound power level of each area equating to the energetic sum of all respective equipment within the area. With the exception of the flare, which is situated within the HP area. This is described in Section 5.1.2.
    - **Construction:** Noise modelling for construction utilizes a 'maximum' noise calculation approach, in which the activity sound power level is localized at the worst-case location within the construction area for each receptor. This is to account for the varying nature of construction activities as they move around within a specified construction footprint as construction progresses over time.
- Temperature: 10°C;
- Relative humidity: 70%;
- Wind speed: Downwind condition, wind speed of 3 ms^{-1};
- Maximum search radius: 200 km;
- Noise propagation model: CadnaA version 2024 (DataKustik);
- Standard: ISO 9613 2024;
- Terrain parameters: Digital ground terrain for the PA was incorporated;
- Foliage: The forest areas (coniferous trees) surrounding the Project were conservatively not included in the modelling;
- Plant activities are consistent throughout the day and night; and
- Construction activities are limited to daytime operations only.

It should be noted that the selected meteorological parameters (temperature and relative humidity) produce the worst case (most conservative) noise prediction results using CadnaA. Noise level predictions to account for varying temperature and relative humidity throughout the year were not conducted but would produce slightly different results.

4.2 Applicable Noise and Vibration Guidelines

4.2.1 Department of Environment and Climate Change – Government of Newfoundland and Labrador

The Government of NL have published a guideline for the assessment of environmental impacts for onshore wind and green hydrogen production projects in *Guidance for Registration of Onshore Wind*

Energy Generation and Green Hydrogen Product Projects (Government of Newfoundland and Labrador, April 2023). The following guidance is identified in relation to the assessment of noise:

> ***2.3.1 Construction Activities***
>
> *Details of materials, methods, schedule, and locations of all construction activities (including permanent and temporary infrastructure related to physical features) should be described. Depending on the project components, this may include:*
>
> *…*
>
> - *sources and intensity of noise, vibration and light emissions;*
>
> *…*
>
> ***2.3.2 Operation and Maintenance Activities***
>
> *Details of the **O&M** of the undertaking should be described in this section of the Registration. Proponents should include detailed descriptions of the following, if applicable:*
>
> *…*
>
> - *sources, decibels, duration and geographic reach of noise (including long-term, low frequency), light emissions and shadow flicker, and vibrations during O&M of wind turbines and hydrogen production facilities;*
>
> ***3.1.1 Atmospheric environment***
>
> *The proponent should describe the relevant components of the **atmospheric environment** in the PA, which may include the following:*
>
> *…*
>
> *g) ambient light, vibration and noise level, including low frequency noise; and*

4.2.2 Health Canada

In the absence of specific numerical criteria as set out in *Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Product Projects* from the Government of NL, guidance can be sought from Health Canada's guideline titled *Guideline for Evaluating Human Health Impacts in Environmental Assessment: Noise* (January 2017) (the Guideline). It recommends that noise from projects in their operational phase are assessed using an evaluation of the increase in Percent Highly Annoyed (%HA). This type of evaluation is also applied to a project's construction phase where it lasts more that a year in duration. In addition to the %HA evaluation, Health Canada also states that nighttime noise levels experienced indoors at sensitive receptors shall be less than 45 dBA.

4.2.2.1 Calculation of Percent Highly Annoyed

%HA is calculated based on the 15-hour daytime equivalent sound level (L_d) and the 9-hour nighttime equivalent sound level (L_n), using an equation defined in the guideline. Health Canada suggests that mitigation be implemented when noise levels during long-term construction result in greater than 6.5% increase in %HA (delta %HA) at receptors.

The calculation of %HA is as follows:

$$\%HA = \frac{100}{1 + e^{(10.4 - 0.132 \times L_R dn)}}$$

where $L_R dn$ is the day-night rating level, which is calculated by:

$$L_R dn = 10 \log_{10} \left(\frac{\left(15 \times 10^{(0.1 \times L_R d)}\right) + \left(9 \times 10^{(0.1 \times (L_R n + 10))}\right)}{24} \right)$$

where $L_R d$ is the day rating level, and $L_R n$ is the night rating level. As discussed in Section 3, baseline noise levels in the vicinity of the PA were collected at six locations surrounding the Project Area to provide an accurate comparison between project noise and ambient noise levels.

The method for determining compliance with the %HA limits described in the Health Canada Guideline states that baseline %HA is to be compared to the operational %HA plus the baseline %HA, this essentially models the pre and post project annoyance levels. The difference of these values is known as the resultant delta %HA and must not exceed 6.5%. If 6.5% is exceeded, then noise mitigation should be considered to reduce the delta %HA to compliant levels.

The Health Canada Guideline also provides allowances for receptors located in rural areas that may have a greater expectation of “peace and quiet”. Health Canada considers a “quiet rural area” to be a rural area with sound levels that do not exceed 45 dBA during the day and 35 dBA during the night (as per the Energy Resources Conservation Board (ERCB) Directive 038, 2007). Where a receptor is considered rural using these day and night baseline thresholds, baseline and predicted project noise levels are to be adjusted by +10 dB due to the expected heightened sensitivity to noise. The effect of this +10 dB adjustment produces a greater change in %HA than would occur with unadjusted noise levels.

4.2.2.2 Indoor Nighttime Noise Limits

Compliance with the nighttime limit of 45 dBA at indoor sensitive locations is to be assessed by comparing the predicted sound pressure levels indoors with the 45 dBA limit provided in the Health Canada Guideline. A 15 dBA reduction in the sound pressure level at the plane of a partially open window is

applied to ensure a conservative estimate of worst-case indoor noise levels, in accordance with Health Canada's Guidelines.

4.2.2.3 Low Frequency Noise

Wind turbines have the potential to emit high low-frequency noise (LFN) which could be summarized as noise in the frequency range of 16 Hz to 200 Hz. LFN is not accurately captured in A-weighted sound levels and sufficiently high LFN can cause annoyance issues even though the human ear is less sensitive to those frequencies.

To determine if a noise source is likely to generate high LFN, the difference between the C-weighted sound levels and the A-weighted sound levels of the source are calculated and compared to a limit of 10 dB. If 10 dB is exceeded, then the source is generally considered to be an LFN source. Additionally, Health Canada suggests that if the energetic sum of the sound pressure levels within the 16 Hz, 31.5 Hz, and 63 Hz bands (unweighted, dBZ) exceed 70 dB then mitigation measures should be explored to reduce these levels to within compliance.

4.2.2.4 Summary of Noise Criteria

The resulting noise criteria for the project is provided below in Table J-4.2-1.

Table J-4.2-1 Project noise criteria.

Project Phase	Monitoring Location	Considered rural?[1]	Baseline Data[2]		Criteria (project + baseline[3])			
			Ldn	%HA	Ldn	%HA	Indoor Nighttime[4]	LFN
Operational and Construction	N1	No	51 dBA	2.6%	61 dBA	9.1%	45 dBA	If $L_{Ceq} - L_{Aeq} >$ 10 dB, then $L_{16Hz+31.5Hz+63Hz}$ <70 dB
	N2	No	55 dBA	4.1%	63 dBA	10.6%		
	N3	Yes	50 dBA (40 dBA)	2.1%	61 dBA	8.6%		
	N4	No	52 dBA	2.7%	61 dBA	9.2%		
	N5	No	61 dBA	8.9%	66 dBA	15.4%		
	N6	Yes	54 dBA (44 dBA)	3.5%	62 dBA	10.0%		

Notes
Note 1: Where both the L_d and L_n baseline noise levels are on or below 45 dBA and 35 dBA respectively, it is considered rural in accordance with Health Canada.
Note 2: A +10 dB correction is applied to monitoring locations where it is considered rural in accordance with Health Canada. The measured L_{dn} level collected as part of baseline noise monitoring is bracketed.
Note 3: Cumulative noise contribution from both the baseline and project.
Note 4: Assessment location is within indoor sensitive rooms.

4.2.3 Vibration Criteria

Ground-borne vibration is the measure of ground oscillations, usually due to industrial activities such as construction, earthworks, pile driving, or even highway traffic. The most common approach to vibration measurement is by measuring velocity measurements at ground level, where higher velocities correspond to higher levels of vibration. One way to measure and report vibration is to record the maximum vibration level at any given time, also known as the peak particle velocity (PPV). Human exposure is more sensitive to vibrations that occur over a certain period of time more so than a more sudden exposure to vibrations for a short amount of time (Caltrans, 2020). Therefore, a more common measure of vibration for human exposure is the root-mean-square (RMS) of the vibrations. The RMS approach calculates an average vibration value for a given time period (usually one second). Since the RMS value is an average of the instantaneous vibration velocity measurements, it is always a lower value than the PPV value. The PPV and RMS can be related by a crest factor. The crest factor can be as low as 1.4 but can be as high as 8 depending on the nature of the vibration source (US FTA 2018).

There are no regulations or guideline exposure limits for vibration in Newfoundland and Labrador. Guidelines related to public nuisance from vibration have been developed by the American National Standards Institute (ANSI) and the Acoustical Society of America (ASA) through ANSI/ASA S.39-1983. These guidelines have been adopted by regulatory agencies such as the United States Federal Transit Administration (US FTA) and are often used in jurisdictions across Canada for assessing vibration. The ANSI guidance gives threshold values for different types of land use. For land uses associated with residential areas or in areas where sleeping occurs, the recommended ANSI threshold is 0.1 mms^{-1} RMS, while daytime thresholds are recommended to be 0.14 mms^{-1} RMS.

5.0 Noise Source Summary

5.1 Operational Noise Sources

Significant noise generation is expected to occur from the O&M Phase emanating from the wind turbines and plant area. These operations will involve the various types of equipment including cooling towers, compressors, air coolers, transformers, flares, chillers and diesel generators. It is expected that some equipment will be located indoors whilst others located outdoors, however the exact configuration of the facility is not yet determined at this stage. To remain conservative, all equipment associated with the facility are assumed to be operating outside. In order to predict the future worst-case noise impacts from the Project activities, representative octave band noise data was used, measured from processing equipment similar to what is noted to be required for the Project.

5.1.1 Wind Turbines

This Study focused on the noise emissions from the cumulative operation of both the wind turbines, and HGP and HP. Noise emissions from wind turbines typically increase with increasing wind speed and thus, the maximum wind speed was used to be conservative. Turbine specifications have been specified in Table J-5.1-1, and spectral sound data has been sourced from EnVentus document No. 0116-1715_03 – *Third octave noise emission EnVentus™ V162-7.2MW 50/60 Hz*, dated 13 January 2023, provided below in Table J-5.1-2.

Table J-5.1-1 Wind turbine specifications.

Description	Characteristic
Model	Vestas V162-7.2MW
Rated power	7.2 MW
Hub height	119 m
Rotor diameter	162 m
Rotor swept area	20,612 m^2
Number of blades	3
Sound power level at hub height[1]	105.5 dBA
Notes Note 1: Assuming wind speeds are over 15 m/s with serrated trailing edge rotor blades, as per EnVentus document No. 0116-1715_03	

Table J-5.1-2 Octave band sound power levels– Vestas V162-7.2.

Description	Linear Sound Power Octave band centre frequency, Hz									Total dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Sound power level at hub height	115	115	113	108	103	99	93	86	77	105.5

Noise emissions from wind turbines are dependent on a range of factors, including the turbine size, rotor diameter, blade design, power output and rotational speed. No special audible characteristics for the turbines considering low frequency, impulsiveness or tonality are identified and have not been applied to noise level predictions in the assessment. The locations of the turbines used in the noise modelling was determined based on the site plans shown in Figure J-2.1-1 and are summarized below in Figure J-5.1-1.

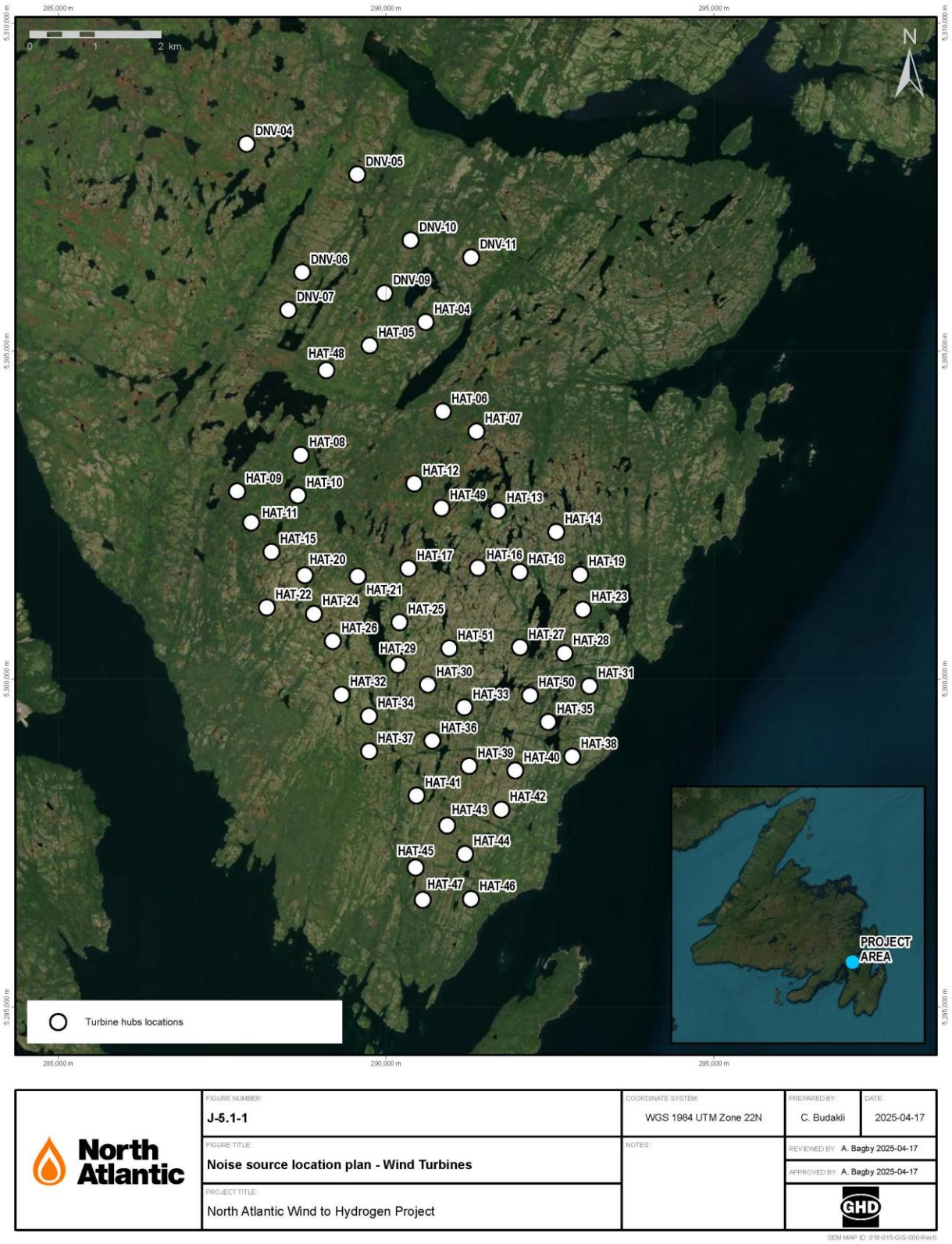


Figure J-5.1-1 Noise source location plan – Wind Turbines.

5.1.2 Hydrogen Generation Plant, Hydrogenation Plant, and Substations

Significant noise generation is expected to occur from operations emanating from the HGP, the HP, and the substations. These operations will involve the operation of various types of equipment, including compressors, air coolers, transformers, pumps and motor drivers. Approximate equipment lists and respective equipment wattages are sourced from the following documentation:

- North Atlantic Wind to Hydrogen Project EQUIPMENT LIST – PRELIMINARY FOR FEL2 ESTIMATE H371912-0000-210-026-0001; and
- Technical Information Package from a Technology Licensor.

Details for the Projects' configuration and equipment locations is not yet determined, and as such it is assumed that all equipment is located externally (i.e., not within any structure or shelter) and is evenly distributed across each of the HGP, the HP, and substation boundaries.

It is anticipated that a flare will be included as part of the HP. Flare source noise levels can vary significantly depending on its design and operational conditions. In consideration of this, a maximum allowable flare sound power level has been selected such that compliance with the criteria as outlined in Section 4.2 is achieved, with the octave band spectrum derived from the German standard VDI 3732 *Emissoinswerte technischer Schallquellen - Fackeln* (Characteristic noise emission values of technical sound sources - Flares). This is provided as a recommendation as discussed in Section 9.2. The assumed sound power level spectrum for the flare is provided below in Table J-5.1-3.

Table J-5.1-3 Octave Band Sound Power Levels, dBA – Flare

Description	Linear Sound Power Octave band centre frequency, Hz									Total dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Flare	139	132	128	12	120	119	119	119	119	126

Equipment sound power levels and spectrums were predicted using CadnaA's in built Sound Emission and Transmission (SET) function, which generates sound power spectra based on known technical system parameters of a sound source (for example: electric power in kW, volume flow in m^3/h, rotations in 1/min, etc.). Equipment source sound power spectra are provided below in Table J-5.1-4 for the HGP, Table J-5.1-5 for the HP, and Table J-5.1-6 for the substations.

The locations of these operational noise sources are provided in Figure J-5.1-2.

Table J-5.1-4 Source sound power spectra used in acoustic model – Hydrogen Generation Plant.

Source	Quantity of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)[1]										Percentage contribution to overall noise level
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Transformer 6 MVA	57	-	55	74	86	89	94	92	88	83	73	98	5%
Transformer 750 kVA	1	-	30	49	61	64	69	66	62	57	48	73	<1%
Transformer 45 kVA	3	-	34	53	65	67	73	70	66	61	52	76	<1%
Generator	1	-	65	70	83	105	105	102	98	96	85	110	73%
Pump_40kW	2	-	43	54	62	70	83	90	86	77	66	92	1%
Pump_50kW	2	-	44	55	63	71	84	91	87	78	67	93	2%
Pump_500kW	2	-	54	65	73	81	94	101	97	88	77	103	15%
Pump_20kW	2	-	40	51	59	67	80	87	83	74	63	89	1%
Pump_40kW_EMotor	2	-	32	44	60	70	75	77	76	71	65	81	<1%
Pump_50kW_EMotor	2	-	33	45	61	71	76	78	77	72	66	82	<1%
Pump_500kW_DMotor	2	-	45	57	73	83	88	90	89	84	78	94	2%
Pump_20kW_EMotor	2	-	40	51	59	67	80	87	83	74	63	89	1%
Compressor_37kW	1	-	55	68	73	77	82	86	86	80	72	91	1%
Compressor_37kW_E Motor	1	-	28	40	56	66	71	73	72	67	61	78	<1%
Total sound power spectra			***66***	***76***	***88***	***105***	***106***	***105***	***101***	***97***	***86***	***111***	

Notes
Note 1: Noise levels provided in this table include the required correction for equipment quantity and the specified enclosure reduction

Table J-5.1-5 Source sound power spectra used in acoustic model – Hydrogenation Plant.

Source	Number of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)[1]										Percentage contribution to overall noise level
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Hydrogen Compressor	1		67	83	96	99	101	102	99	95	90	107	3%
Makeup Gas Compressor	1	10	63	79	92	95	97	98	95	91	86	103	2%
Recycle Gas Compressor	1	10	61	78	90	94	95	97	93	90	84	102	2%
Charge Pump	1		60	74	84	93	101	102	100	97	92	107	3%
Fire Water Pump	1		61	75	85	94	102	103	101	98	93	107	4%
Hydrogen Compressor	1		67	83	96	99	101	102	99	95	90	107	3%
First Stage Stabilizer Offgas Compressors	1		63	79	91	95	97	98	95	91	86	103	2%
Second Stage Stablizer Offgas Compressors	1		63	79	92	95	97	98	95	91	86	103	2%
Third Stage Stabilizer Offgas Compressors	1		63	79	92	95	97	98	95	91	86	103	2%
Recycle Liquid Pumps	1		51	65	75	84	92	93	91	88	83	97	1%
Stabilizer Reflux Pumps	1		31	45	55	64	72	73	71	68	63	78	<1%
Stabilizer Net Bottoms Pumps	1		51	65	75	84	92	93	91	88	83	98	1%
Oxygen Stripper Overhead Pumps	1		49	63	73	82	90	91	89	86	81	95	<1%
Oxygen Stripper Bottoms Pumps	1		43	57	67	76	84	85	83	80	75	90	<1%
Deheptanizer Reflux Pumps	1		43	57	67	76	84	85	83	80	75	90	<1%
Deheptanizer Net Overhead Pumps	1		25	39	49	58	66	67	65	62	57	71	<1%
Deheptanizer Bottoms Pumps	1		53	67	77	86	94	95	93	90	85	99	1%
Rerun Net Overhead Pumps	1		37	51	61	70	78	79	77	74	69	84	<1%
Rerun Bottoms Pumps	1		25	39	49	58	66	67	65	62	57	71	<1%
Gasoline By-Product Storage Tank Pump	1		42	56	66	75	83	84	82	79	74	89	<1%

Source	Number of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)[1]										Percentage contribution to overall noise level
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Diesel By-Product Storage Tank Pump	1		31	45	55	64	72	73	71	68	63	78	<1%
Byproduct Storage Sump Pump	1		25	39	49	58	66	67	65	62	57	71	<1%
Toluene Storage Pumps	1		50	64	74	83	91	92	90	87	82	96	1%
Toluene Storage Pumps	1		50	64	74	83	91	92	90	87	82	96	1%
Raw Water Pump	1		46	60	70	79	87	88	86	83	78	93	<1%
Boiler Feed Water Pump	1		53	67	77	86	94	95	93	90	85	99	1%
Flare KO Drum Pump	1		39	53	63	72	80	81	79	76	71	86	<1%
Air Compressor	1		62	78	91	94	96	97	94	90	85	102	2%
Fire Water Jockey Pump	1		34	48	58	67	75	76	74	71	66	81	<1%
Hydrogen Compressor_Driver	1		64	76	92	102	107	109	108	103	97	113	7%
Makeup Gas Compressor_Driver	1	10	70	82	98	108	113	115	114	109	103	120	15%
Recycle Gas Compressor_Driver	1	10	66	78	94	104	109	111	110	105	99	116	9%
Charge Pump_Driver	1		66	78	94	104	109	111	110	105	99	116	10%
Fire Water Pump_Driver	1		50	62	78	88	93	95	94	89	83	99	1%
Hydrogen Compressor_Driver	1		46	58	74	84	89	91	90	85	79	96	<1%
First Stage Stabilizer Offgas Compressors_Driver	1		37	49	65	75	80	82	81	76	70	87	<1%
Second Stage Stablizer Offgas Compressors_Driver	1		37	49	65	75	80	82	81	76	70	87	<1%
Third Stage Stabilizer Offgas Compressors_Driver	1		37	49	65	75	80	82	81	76	70	87	<1%
Recycle Liquid Pumps_Driver	1		41	53	69	79	84	86	85	80	74	91	<1%

Source	Number of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)[1]										Percentage contribution to overall noise level
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Stabilizer Reflux Pumps_Driver	1		24	36	52	62	67	69	68	63	57	74	<1%
Stabilizer Net Bottoms Pumps_Driver	1		41	53	69	79	84	86	85	80	74	91	<1%
Oxygen Stripper Overhead Pumps_Driver	1		39	51	67	77	82	84	83	78	72	89	<1%
Oxygen Stripper Bottoms Pumps_Driver	1		35	47	63	73	78	80	79	74	68	84	<1%
Deheptanizer Reflux Pumps_Driver	1		34	46	62	72	77	79	78	73	67	84	<1%
Deheptanizer Net Overhead Pumps_Driver	1		19	31	47	57	62	64	63	58	52	69	<1%
Deheptanizer Bottoms Pumps_Driver	1		43	55	71	81	86	88	87	82	76	92	<1%
Rerun Net Overhead Pumps_Driver	1		29	41	57	67	72	74	73	68	62	79	<1%
Rerun Bottoms Pumps_Driver	1		19	31	47	57	62	64	63	58	52	69	<1%
Gasoline By-Product Storage Tank Pump_Driver	1		34	46	62	72	77	79	78	73	67	83	<1%
Diesel By-Product Storage Tank Pump_Driver	1		24	36	52	62	67	69	68	63	57	74	<1%
Byproduct Storage Sump Pump_Driver	1		19	31	47	57	62	64	63	58	52	69	<1%
Toluene Storage Pumps_Driver	1		40	52	68	78	83	85	84	79	73	90	<1%
Toluene Storage Pumps_Driver	1		40	52	68	78	83	85	84	79	73	90	<1%
Raw Water Pump_Driver	1		37	49	65	75	80	82	81	76	70	87	<1%
Boiler Feed Water Pump_Driver	1		43	55	71	81	86	88	87	82	76	92	<1%
Flare KO Drum Pump_Driver	1		31	43	59	69	74	76	75	70	64	81	<1%

Source	Number of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)[1]										Percentage contribution to overall noise level
			31.5	63	125	250	500	1000	2000	4000	8000	dBA	
Air Compressor_Driver	1		36	48	64	74	79	81	80	75	69	86	<1%
Fire Water Jockey Pump_Driver	1		27	39	55	65	70	72	71	66	60	77	<1%
30MVA OFAF Three Phase Transformer	1		41	51	83	89	86	83	85	84	80	93	<1%
30MVA OFAF Three Phase Transformer	1		41	51	83	89	86	83	85	84	80	93	<1%
1500kVA Dry type Three Phase Transformer	1		15	25	57	63	60	57	59	58	54	68	<1%
1500kVA Dry type Three Phase Transformer	1		15	25	57	63	60	57	59	58	54	68	<1%
2000kVA OFAF Three Phase Transformer	1		18	28	60	66	63	60	62	61	57	70	<1%
2000kVA OFAF Three Phase Transformer	1		18	28	60	66	63	60	62	61	57	70	<1%
400kVA Dry type Three Phase Transformer	1		12	22	54	60	57	54	56	55	51	65	<1%
Standby Generator	1		59	77	91	102	108	111	112	107	100	116	10%
Total sound power spectra			***77***	***91***	***105***	***113***	***118***	***120***	***119***	***114***	***108***	***124***	

Notes
Note 1: Noise levels provided in this table include the required correction for equipment quantity and the specified enclosure reduction

Table J-5.1-6 Source sound power spectra used in acoustic model – Wind Farm and HGP Substations.

Source	Number of equipment	Applied enclosure reduction	A-weighted sound power level (dBA) by Octave Band (Hz)									
			31.5	63	125	250	500	1000	2000	4000	8000	dBA
Wind farm 324 MVA substation	1	-	58	68	100	106	103	100	102	101	97	110
HGP 444 MVA substation	1	-	63	73	105	111	108	105	107	106	102	116

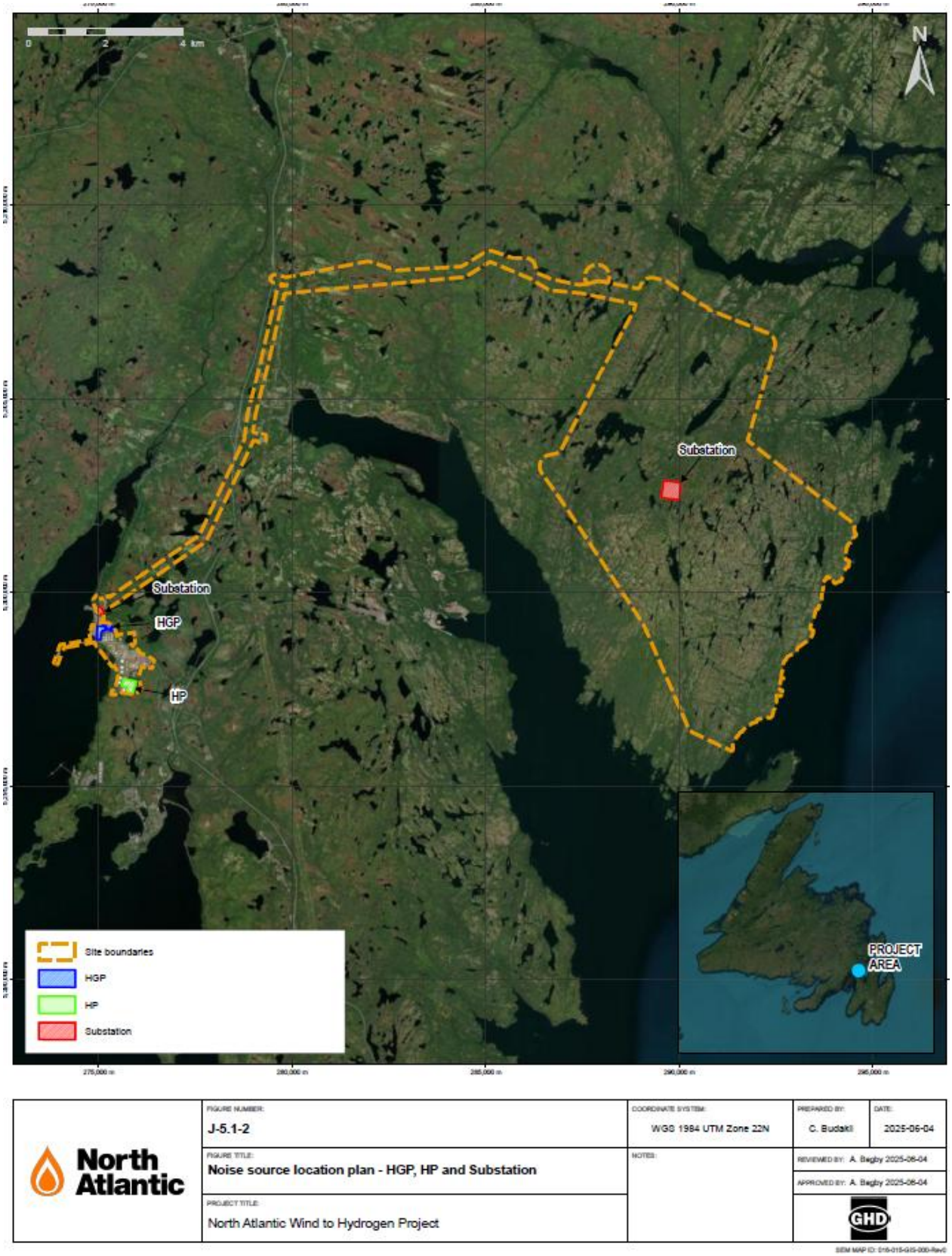


Figure J-5.1-2 Noise source location plan – HGP, HP, and Substations.

5.2 Construction Noise Sources

The construction of the Project is anticipated to occur over a period of 30 months. For construction activities lasting longer than one year, Health Canada recommends a quantitative assessment of noise emissions (Health Canada 2017).

The Project's Construction Phase noise emissions were established using the following information sources:

- Equipment lists and design data provided as part of the Project Description;
- Measurement data of similar equipment; and
- Publications that provide reference sound power levels and sound pressure levels for construction equipment (DEFRA, 2005; DEFRA, 2006).

Earthmoving and construction activities are planned for the HGP and HP, with the main source of noise emissions during construction relating to pile driving that may be required. The sound power levels assumed for pile driving activities are shown in Table J-5.2-1 and include a 12 dB penalty on the blasting source as it qualifies as a highly impulsive noise source as indicated in the Health Canada Guideline. A list of equipment and quantities that are planned to be used for the construction of the Wind Farm is provided in Table J-5.2-1 along with estimates of the sound power levels that could be emitted from the operation of the construction equipment.

Noise emissions during decommissioning and rehabilitation were considered to be less than noise emissions during construction and operation, and so were assessed qualitatively.

Sound emissions will also result from blasting during construction (if required). Blast energy that liberates into the atmosphere can generate air overpressure and noise. Blasting is expected to be limited to daytime hours and will follow best management practices (BMPs) outlined in guidance documents such as the Blasters Handbook (ISEE, 2016) and the Environmental Code of Practice for Metal Mines (ECCC, 2009) and as such was not assessed at this stage of design. These guidance documents provide detailed information on designing and carrying out blasting to reduce sound emissions, and these will be consulted during blasting design.

The equipment sources related to Project construction of the wind turbines were modelled as area sources covering the Wind Farm locations. The vehicle traffic to/from the Wind Farms and transmission line construction sources were modelled as line sources.

5.2.1 Construction Scenario 1 (CS01) – Wind Turbine, Hydrogen Generation Plant and Hydrogenation Plant Construction

This Study focused on noise generating pieces of construction equipment that are likely to be used during construction activities. The final list of plant and equipment needed for the Project would be determined during the construction planning phase. Anticipated construction equipment, quantities and their usage factors are provided below in Table J-5.2-1, and the location of this construction scenario is shown below in Figure J-5.2-1.

Table J-5.2-1 Anticipated construction equipment details CS01.

Equipment	Quantity	Usage Factor	Sound Power Level (PWL) $L_{Aeq(1hr)}$, dBA	Noise Level Reference Source
Backhoe	4	40%	112	FTA, 2018[1]
Blasting[3]	1	1%	138	FHWA, 2006[2]
Bulldozers	2	40%	117	FTA, 2018
Compactor	4	20%	114	FTA, 2018
Compressor	4	40%	112	FTA, 2018
Concrete Truck	10	40%	117	FHWA, 2006
Concrete Pump Truck	2	20%	114	FTA, 2018
Concrete Saws	2	20%	122	FHWA, 2006
Concrete Vibrators	2	20%	108	FTA, 2018
Crane	4	16%	115	FTA, 2018
Flat Bed Truck	4	40%	116	FHWA, 2006
Fork Truck	2	40%	99	FTA, 2018
Generator	8	50%	114	FTA, 2018
Grinders / Cutters	4	20%	112	FTA, 2018
Hydraulic rock breakers	2	40%	122	FHWA, 2006
Jack hammers	4	20%	117	FHWA, 2006
Pickup truck	4	40%	87	FHWA, 2006
Manlift	2	20%	117	FHWA, 2006
Welder	4	40%	105	FHWA, 2006
Vibratory Hammers	2	20%	127	FHWA, 2006
Impact Pile Driver[3]	2	1%	145	FTA, 2018
Total sound power level, dBA			***132***	

Notes
Note 1: *Transit Noise and Vibration Impact Assessment Manual* (Federal Transit Administration, September 2018)
Note 2: *Construction Noise Handbook* (Federal Highway Administration, 2006)
Note 3: A 12 dB penalty is included to account for the highly impulsive characteristics of the activity in accordance with Health Canada

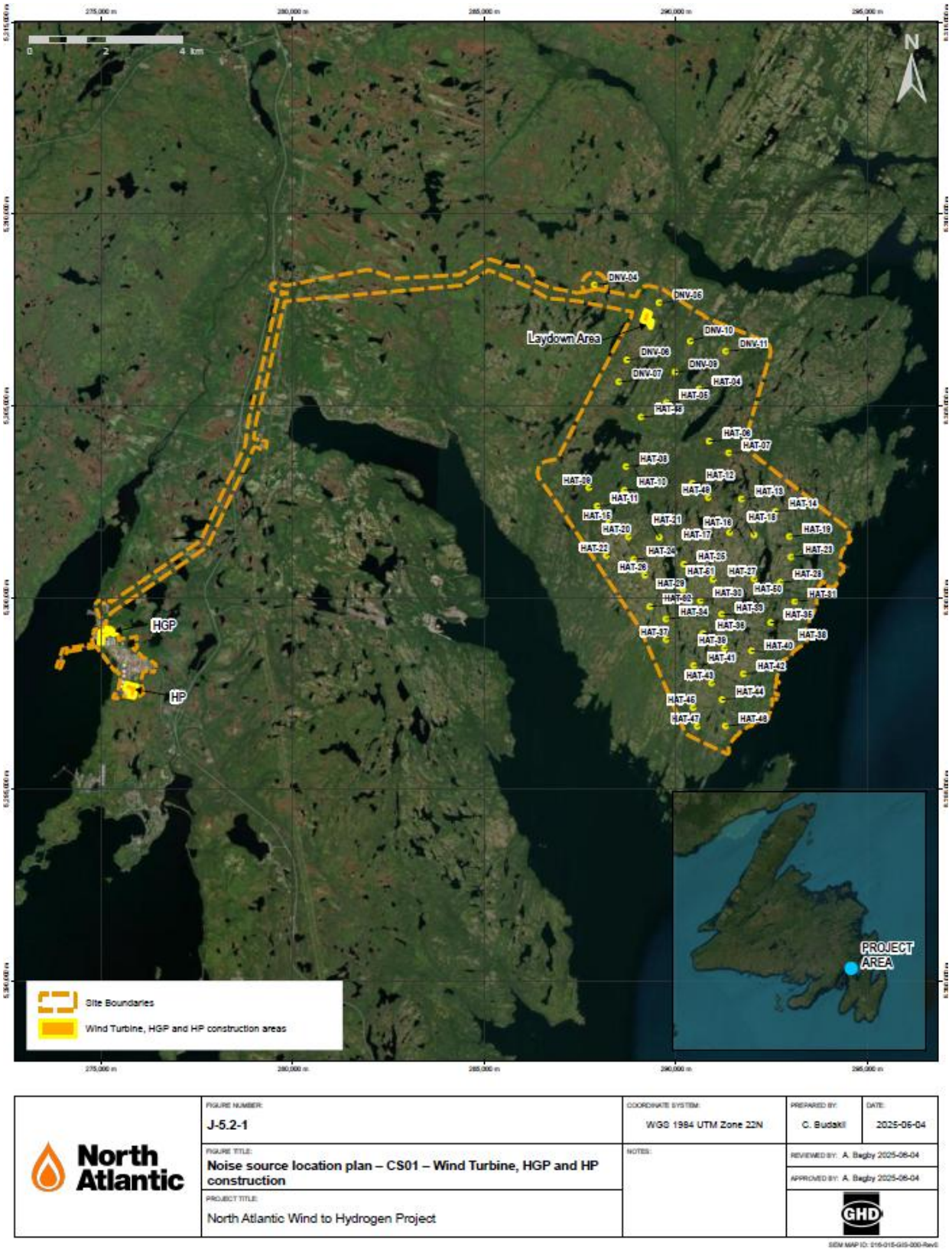


Figure J-5.2-1 Noise source location plan – CS01 – Wind Turbine, HGP and HP construction.

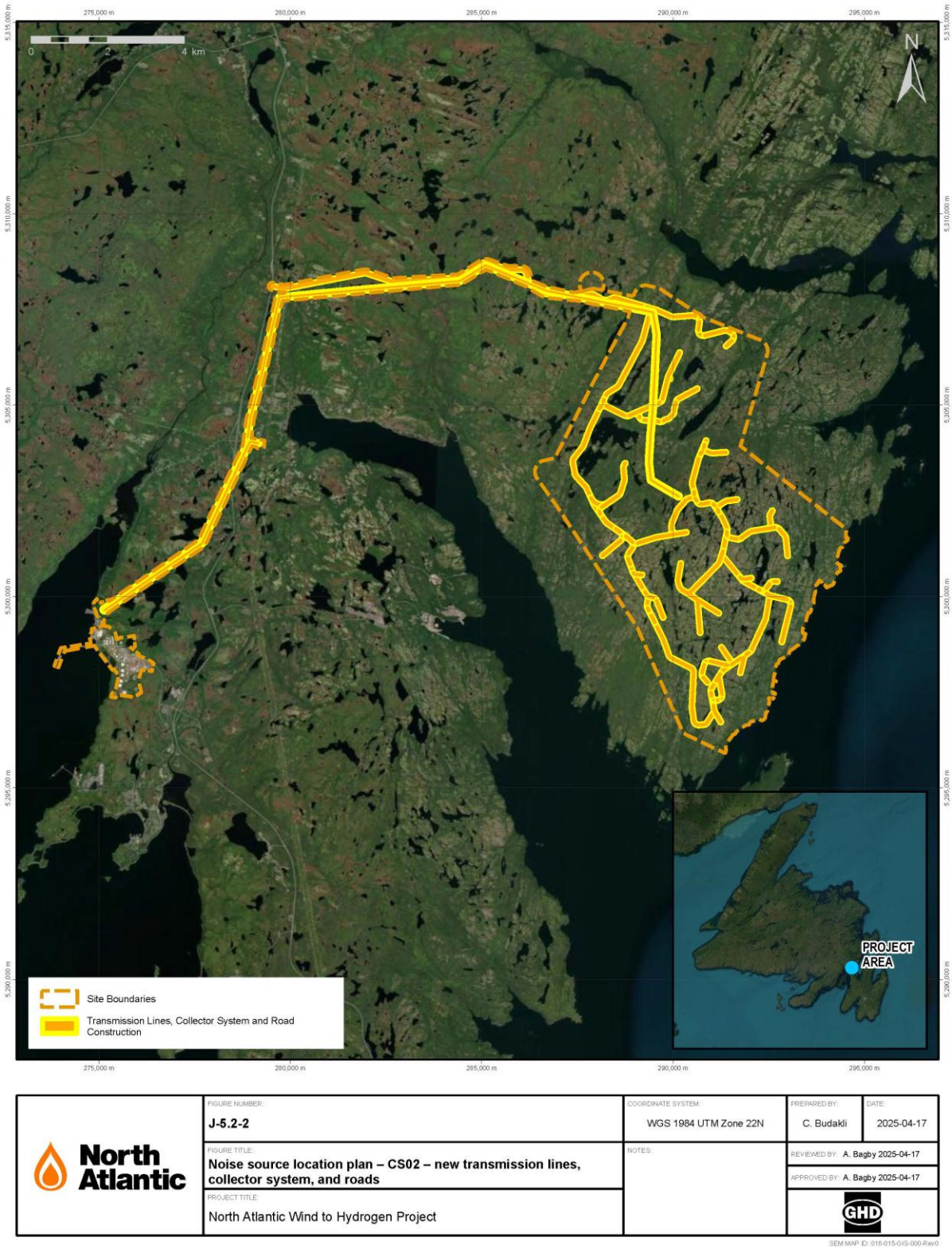
5.2.2 Construction Scenario 2 (CS02) – Transmission Lines, Collector System and Road Construction

For the construction of new transmission lines, collector system, and roads, a separate equipment list was used to determine the sound levels. As with Scenario 1, the final list of plant and equipment needed for the Project would be determined during the construction planning phase. Anticipated construction equipment, quantities and their usage factors are provided below in Table J-5.2-2 and displayed in Figure J-5.2-2.

Table J-5.2-2 Anticipated construction equipment details CS02.

Equipment	Quantity	Usage Factor	Sound Power Level (SWL) $L_{Aeq(1hr)}$, dBA	Noise Level Source
Compressor	1	20%	112	FTA, 2018[1]
Crane	2	16%	115	FTA, 2018
Flat Bed Truck	2	40%	116	FTA, 2018
Pickup Truck	2	40%	87	FHWA, 2006[2]
Tamper	2	20%	94	DEFRA, 2006[3]
Mobile Drill	1	10%	117	FHWA, 2006
Compactor	1	20%	114	FTA, 2018
Concrete Truck	1	40%	117	FHWA, 2006
Concrete Pump Truck	1	20%	114	FTA, 2018
Concrete Vibrators	1	20%	108	FTA, 2018
Generator	1	50%	114	FTA, 2018
Excavator	2	50%	117	FHWA, 2006
Welder	4	40%	105	FHWA, 2006
Total sound power level, dBA			***123***	

Notes
Note 1: *Transit Noise and Vibration Impact Assessment Manual* (Federal Transit Administration, September 2018)
Note 2: *Construction Noise Handbook* (Federal Highway Administration, 2006)
Note 3: *Noise Database for Prediction of Noise on Construction and Open Sites* (Department for Environment, Food, and Rural Affairs, 2006)



FigureJ-5.2-2 Noise source location plan – CS02 – new transmission lines, collector system, and roads.

6.0 Vibration Source Summary

The risk for vibration impacts would occur primarily during the Construction Phase of the Project, due to the operation of certain high vibration generating pieces of equipment. The following pieces of equipment provided in Table J-6.0-1, selected from the list of anticipated equipment as provided in Table J-5.2-1 and Table J-5.2-2, are considered to be vibration intensive.

Table 7-4 of US Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual*, *FTA Report No. 0123,* (September 2018) (FTA Manual) provides vibration source levels for various pieces of equipment. Using equation 7-2 of the FTA Manual, vibration zones of influence (ZOI) can be calculated, which act as a minimum buffer distance between construction activities and vibration sensitive receptors. These ZOIs for relevant pieces of equipment, along with their source vibration levels, are provided below in Table J-6.0-1.

Table J-6.0-1 Construction equipment vibration ZOIs.

Equipment type	PPV at 7.62 m (25 ft), mm/s	RMS velocity at 7.62 m (25 ft), mm/s	Vibration ZOI[1], m
Bulldozers	2.26	0.57	24
Trucks	1.93	0.48	22
Jackhammer	0.89	0.22	13
Notes Note 1: Vibration ZOI is calculated based on the nighttime ANSI threshold of RMS velocity 0.1 mm/s, as discussed in Section 4.2.3.			

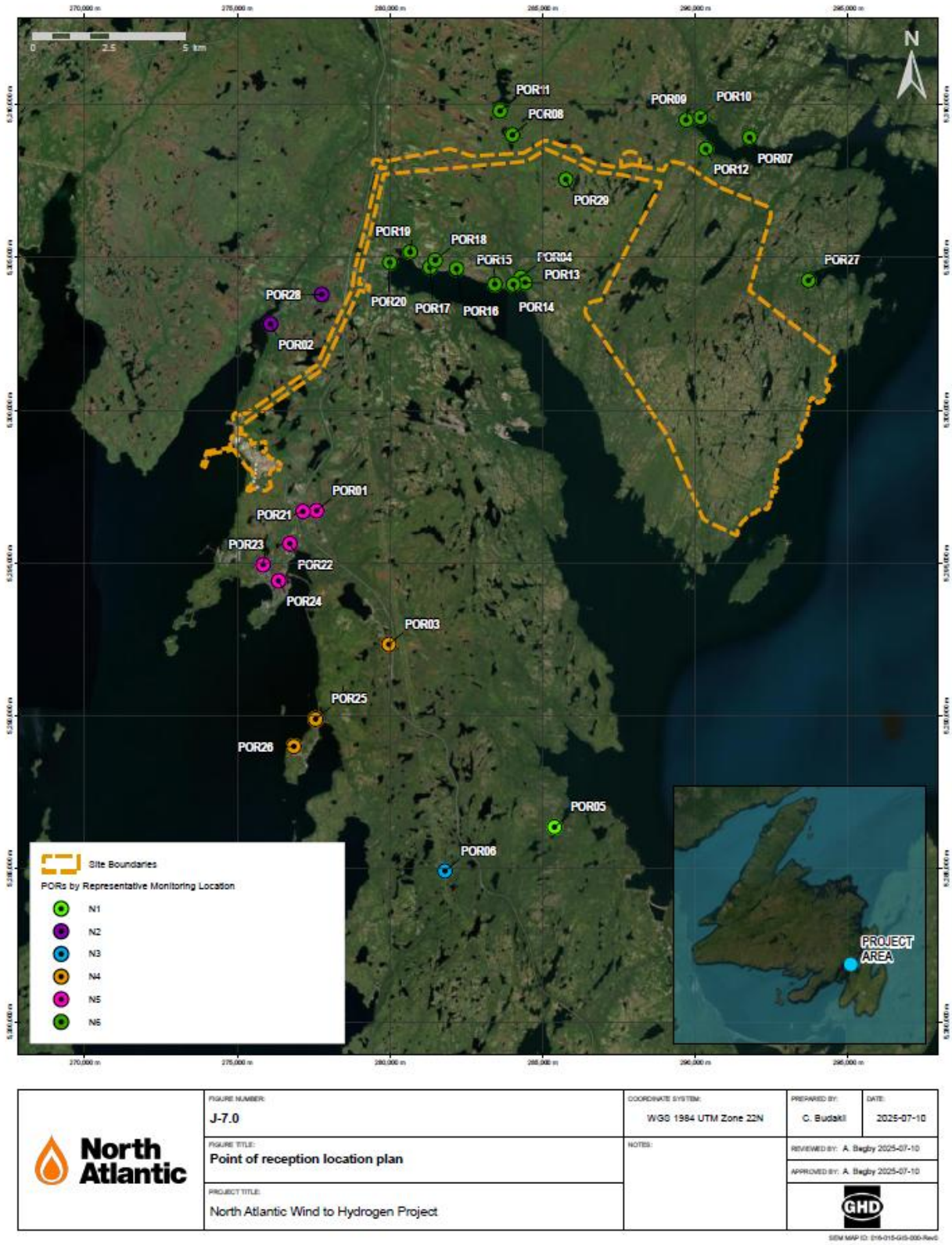
The minimum separation distance between the closest receptor to construction activities, being POR29 during transmission lines, collector system and road construction activities, is 84 m. This distance falls outside the highest vibration ZOI, being 24 m from the operation of a bulldozer (Table J-6.0-1), and as such, vibration impacts are not anticipated during construction activities.

7.0 Point-of-Reception Summary

A “point-of-reception” refers to any location on a person’s property where sound origination from an external source is received. A point-of-reception may be located in areas where individuals typically live, work, or take part in recreation. However, it does not apply to workplace environments occupied exclusively by a company’s work force.

The objective of this Study is to determine the predictable worst-case day-night L_{dn} equivalent sound level at the worst-case points of reception (PORs). The worst-case PORs are defined as the sensitive receptors with the greatest potential exposure to the Project noise sources due to proximity and direct line of sight exposure.

All POR locations within the study area were considered; however, the noise impact at only the worst-case and most exposed PORs are presented herein. The locations of the worst-case PORs are provided in Figure J-7.0-1, with full details provided in Table J-2.1 of Appendix J-2. This only considers identified cabins that are confirmed to be occupied based off satellite imagery and a helicopter fly-over of the subject site completed in January 2025.



FigureJ-7.0-1 Point of reception location plan.

8.0 Noise Impact Assessment Results

8.1 Operational Noise

Noise predictions for the O&M Phase of the Project are provided in this section. Noise modelling does assume and incorporates the recommended noise mitigation measures as outlined in Section 9.2 which will be incorporated into the detailed design and equipment selection process.

8.1.1 %HA Assessment

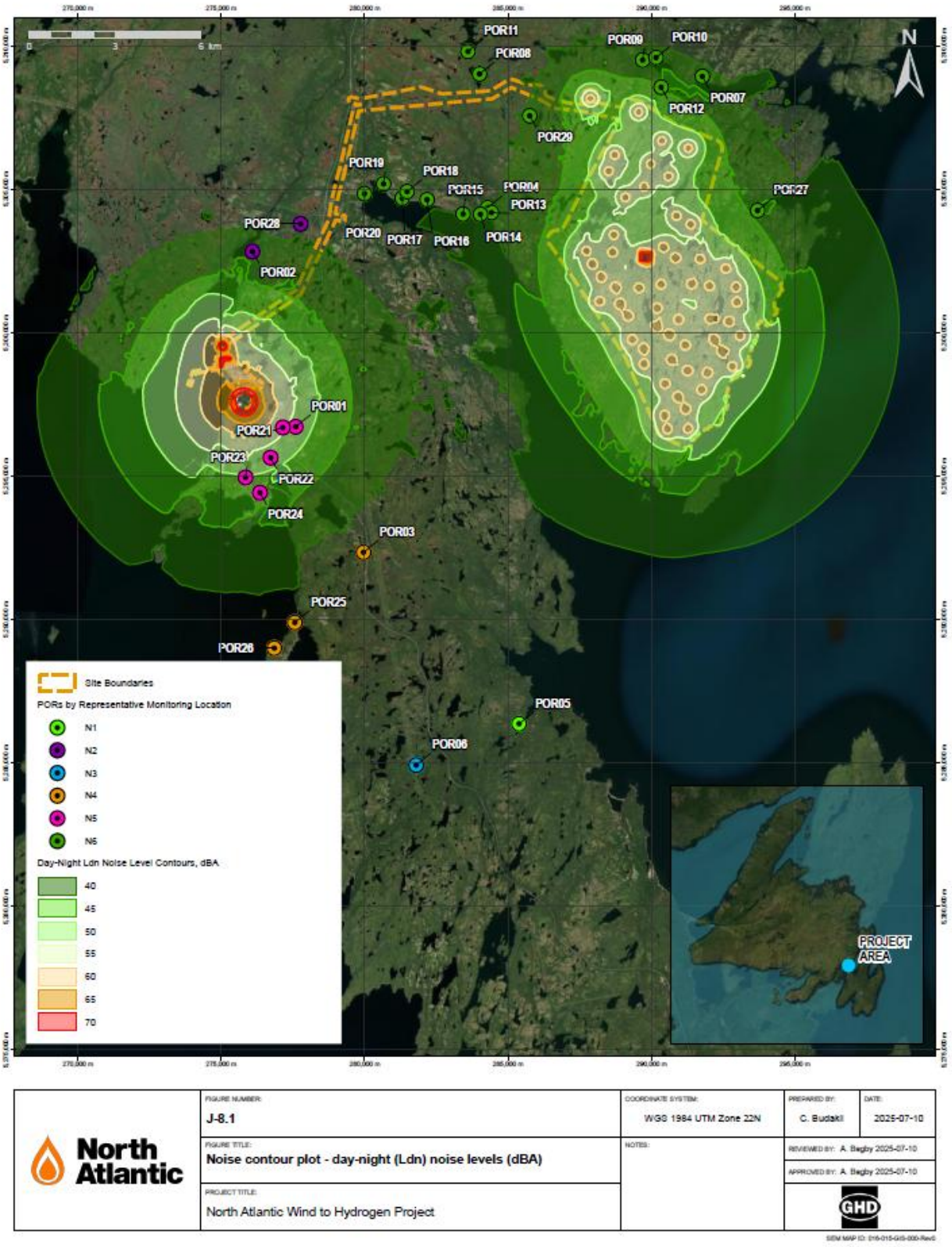
The predicted Project-related daytime and nighttime sound levels for the O&M Phase are shown below in Table J-8.1-1. The predicted daytime (L_d), nighttime (L_n) and day-night average sound levels (L_{dn}) at the receptors result in a difference in %HA levels that are lower than the limit of 6.5%. Therefore, noise mitigation measures are not required for operational noise with respect to the %HA criteria. A contour plot can be found in Figure J-8.1-1 which displays the day-night L_{dn} levels in relation to the sensitive receptors.

Table J-8.1-1 Modelling results, operational phase – day-night rating sound levels (L_{dn}) and % Highly Annoyed (%HA) at points of reception.

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR01	N5	No	61	8.9	48	61	9.2	0.2	Yes
POR02	N2	No	55	4.1	37	55	4.1	0.0	Yes
POR03	N4	No	52	2.7	33	52	2.8	0.0	Yes
POR04	N6	Yes	54 (44)	3.5	45 (35)	54	3.7	0.2	Yes
POR05	N1	No	51	2.6	26	51	2.6	0.0	Yes
POR06	N3	Yes	50 (40)	2.1	35 (25)	50	2.1	0.0	Yes
POR07	N6	Yes	54 (44)	3.5	48 (38)	55	4.0	0.5	Yes
POR08	N6	Yes	54 (44)	3.5	41 (31)	54	3.6	0.1	Yes
POR09	N6	Yes	54 (44)	3.5	47 (37)	54	3.9	0.4	Yes
POR10	N6	Yes	54 (44)	3.5	47 (37)	55	3.9	0.4	Yes
POR11	N6	Yes	54 (44)	3.5	40 (30)	54	3.5	0.1	Yes
POR12	N6	Yes	54 (44)	3.5	49 (39)	55	4.1	0.6	Yes
POR13	N6	Yes	54 (44)	3.5	45 (35)	54	3.7	0.2	Yes
POR14	N6	Yes	54 (44)	3.5	46 (36)	54	3.8	0.3	Yes
POR15	N6	Yes	54 (44)	3.5	44 (34)	54	3.7	0.2	Yes
POR16	N6	Yes	54 (44)	3.5	42 (32)	54	3.6	0.1	Yes
POR17	N6	Yes	54 (44)	3.5	43 (33)	54	3.6	0.2	Yes
POR18	N6	Yes	54 (44)	3.5	42 (32)	54	3.6	0.1	Yes
POR19	N6	Yes	54 (44)	3.5	42 (32)	54	3.6	0.1	Yes
POR20	N6	Yes	54 (44)	3.5	42 (32)	54	3.6	0.1	Yes
POR21	N5	No	61	8.9	51	62	9.3	0.4	Yes
POR22	N5	No	61	8.9	47	61	9.1	0.2	Yes
POR23	N5	No	61	8.9	45	61	9.0	0.1	Yes
POR24	N5	No	61	8.9	42	61	9.0	0.1	Yes
POR25	N4	No	52	2.7	32	52	2.8	0.0	Yes

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR26	N4	No	52	2.7	31	52	2.8	0.0	Yes
POR27	N6	Yes	54 (44)	3.5	49 (39)	55	4.1	0.6	Yes
POR28	N2	No	55	4.1	34	55	4.1	0.0	Yes
POR29	N6	Yes	54 (44)	3.5	46 (36)	54	3.8	0.3	Yes

Notes
Note 1: A +10 dB correction is applied to monitoring locations where it is considered rural in accordance with Health Canada. The measured L_{dn} level collected as part of baseline noise monitoring is bracketed.
Note 2: Where a POR is considered rural, a +10 dB correction is applied to predicted project L_{dn} noise levels in accordance with Health Canada. The raw predicted L_{dn} level is bracketed.



FigureJ-8.1-1 Noise contour plot - day-night (L_{dn}) noise levels (dBA).

8.1.2 Indoor Nighttime Noise Assessment

The predicted Project-related indoor nighttime sound levels for the O&M phase are shown below in Table J-8.1-2. As per the Health Canada Guideline, 15 dBA was conservatively subtracted from the outdoor project noise at the plane of window of the sensitive receptors to obtain the predicted indoor noise levels. The predicted indoor nighttime levels at all receptors are within 45 dBA, and thus, noise mitigation measures are not required for operational noise with respect to the nighttime noise criteria.

Table J-8.1-2 Modelling results, operational phase – indoor nighttime sound levels at points of reception.

Receptor	Project Predicted Nighttime Leq (dBA)	Predicted Indoor Noise Levels	Health Canada Indoor Noise Limits	Compliance with Limits? (Yes/No)
POR01	42	27	45	Yes
POR02	30	15	45	Yes
POR03	26	11	45	Yes
POR04	28	13	45	Yes
POR05	19	4	45	Yes
POR06	19	4	45	Yes
POR07	32	17	45	Yes
POR08	25	10	45	Yes
POR09	30	15	45	Yes
POR10	31	16	45	Yes
POR11	23	8	45	Yes
POR12	33	18	45	Yes
POR13	28	13	45	Yes
POR14	29	14	45	Yes
POR15	28	13	45	Yes
POR16	26	11	45	Yes
POR17	26	11	45	Yes
POR18	25	10	45	Yes
POR19	26	11	45	Yes
POR20	26	11	45	Yes
POR21	45	30	45	Yes
POR22	41	26	45	Yes
POR23	38	23	45	Yes
POR24	36	21	45	Yes
POR25	26	11	45	Yes
POR26	24	9	45	Yes
POR27	33	18	45	Yes
POR28	27	12	45	Yes
POR29	30	15	45	Yes

8.1.3 Low-Frequency Noise Assessment

Operational noise has been assessed for the potential to emit high LFN and is provided below in Table J-8.1-3. For each POR, the difference between C-weighted and A-weighted noise levels is calculated, as well as the logarithmic sum of low frequency bands 16 Hz, 31.5 Hz and 63 Hz.

The results show that while the difference between C-weighted and A-weighted noise levels exceed 10 dB for the majority of PORs, the total LFN at each POR remains below 70 dB. As such, LFN is not anticipated to be an issue for the surrounding receptors and no additional noise mitigation measures are required to achieve compliance.

Table J-8.1-3 Modelling results, operational phase – low frequency noise at points of reception.

Receptor	Predicted Delta between L_{Ceq} – L_{Aeq} (dB)	Low Frequency Noise Component, $L_{16Hz+31.5Hz+63Hz}$ (dB)	Health Canada Low Frequency Noise Limits, $L_{16Hz+31.5Hz+63Hz}$ (dB)	Compliance with Limits? (Yes/No)
POR01	22	67	70	Yes
POR02	26	59	70	Yes
POR03	28	57	70	Yes
POR04	25	55	70	Yes
POR05	29	51	70	Yes
POR06	30	51	70	Yes
POR07	20	54	70	Yes
POR08	26	53	70	Yes
POR09	22	54	70	Yes
POR10	21	54	70	Yes
POR11	27	52	70	Yes
POR12	21	55	70	Yes
POR13	25	55	70	Yes
POR14	24	55	70	Yes
POR15	25	55	70	Yes
POR16	27	55	70	Yes
POR17	26	55	70	Yes
POR18	27	55	70	Yes
POR19	27	55	70	Yes
POR20	27	55	70	Yes
POR21	21	68	70	Yes
POR22	23	66	70	Yes
POR23	24	64	70	Yes
POR24	25	63	70	Yes
POR25	27	55	70	Yes
POR26	28	55	70	Yes

Receptor	Predicted Delta between L_{Ceq} – L_{Aeq} (dB)	Low Frequency Noise Component, $L_{16Hz+31.5Hz+63Hz}$ (dB)	Health Canada Low Frequency Noise Limits, $L_{16Hz+31.5Hz+63Hz}$ (dB)	Compliance with Limits? (Yes/No)
POR27	21	56	70	Yes
POR28	27	57	70	Yes
POR29	22	54	70	Yes

8.2 Construction Noise

The predicted Project-relative daytime and nighttime sound levels for the Construction Phase are provided below in Table J-8.2-1 for construction scenario CS01 (Turbine and Plant Construction), and Table J-8.2-2 for construction scenario CS02 (Transmission Lines, Collector System, and Road Construction).

Table J-8.2-1 Modelling results, construction phase CS01 day-night rating sound levels (L_{dn}) and % Highly Annoyed (%HA) at points of reception.

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR01	N5	No	61	8.9	19	61	8.9	0.0	Yes
POR02	N2	No	55	4.1	19	55	4.1	0.0	Yes
POR03	N4	No	52	2.7	19	52	2.7	0.0	Yes
POR04	N6	Yes	54 (44)	3.5	44 (34)	54	3.7	0.2	Yes
POR05	N1	No	51	2.6	19	51	2.6	0.0	Yes
POR06	N3	Yes	50 (40)	2.1	27 (17)	50	2.1	0.0	Yes
POR07	N6	Yes	54 (44)	3.5	53 (43)	56	4.9	1.4	Yes
POR08	N6	Yes	54 (44)	3.5	44 (34)	54	3.7	0.2	Yes
POR09	N6	Yes	54 (44)	3.5	55 (45)	57	5.6	2.1	Yes
POR10	N6	Yes	54 (44)	3.5	55 (45)	57	5.6	2.1	Yes
POR11	N6	Yes	54 (44)	3.5	41 (31)	54	3.6	0.1	Yes
POR12	N6	Yes	54 (44)	3.5	47 (37)	54	3.9	0.4	Yes
POR13	N6	Yes	54 (44)	3.5	41 (31)	54	3.6	0.1	Yes
POR14	N6	Yes	54 (44)	3.5	45 (35)	54	3.7	0.3	Yes
POR15	N6	Yes	54 (44)	3.5	42 (32)	54	3.6	0.1	Yes
POR16	N6	Yes	54 (44)	3.5	38 (28)	54	3.5	0.1	Yes
POR17	N6	Yes	54 (44)	3.5	37 (27)	54	3.5	0.0	Yes
POR18	N6	Yes	54 (44)	3.5	36 (26)	54	3.5	0.0	Yes
POR19	N6	Yes	54 (44)	3.5	34 (24)	54	3.5	0.0	Yes
POR20	N6	Yes	54 (44)	3.5	35 (25)	54	3.5	0.0	Yes
POR21	N5	No	61	8.9	19	61	8.9	0.0	Yes
POR22	N5	No	61	8.9	18	61	8.9	0.0	Yes
POR23	N5	No	61	8.9	17	61	8.9	0.0	Yes
POR24	N5	No	61	8.9	17	61	8.9	0.0	Yes
POR25	N4	No	52	2.7	17	52	2.7	0.0	Yes

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR26	N4	No	52	2.7	16	52	2.7	0.0	Yes
POR27	N6	Yes	54 (44)	3.5	49 (39)	55	4.1	0.6	Yes
POR28	N2	No	55	4.1	21	55	4.1	0.0	Yes
POR29	N6	Yes	54 (44)	3.5	54 (44)	57	5.2	1.7	Yes

Notes
Note 1: A +10 dB correction is applied to monitoring locations where it is considered rural in accordance with Health Canada. The measured L_{dn} level collected as part of baseline noise monitoring is bracketed.
Note 2: Where a POR is considered rural, a +10 dB correction is applied to predicted project L_{dn} noise levels in accordance with Health Canada. The raw predicted L_{dn} level is bracketed.

Table J-8.2-2 Modelling results, construction phase CS02 - day-night rating sound levels (L_{dn}) and % Highly Annoyed (%HA) at points of reception.

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR01	N5	No	61	8.9	27	61	8.9	0.0	Yes
POR02	N2	No	55	4.1	36	55	4.1	0.0	Yes
POR03	N4	No	52	2.7	17	52	2.7	0.0	Yes
POR04	N6	Yes	54 (44)	3.5	40 (30)	54	3.6	0.1	Yes
POR05	N1	No	51	2.6	15	51	2.6	0.0	Yes
POR06	N3	Yes	50 (40)	2.1	23 (13)	50	2.1	0.0	Yes
POR07	N6	Yes	54 (44)	3.5	46 (36)	54	3.8	0.3	Yes
POR08	N6	Yes	54 (44)	3.5	57 (47)	59	6.5	3.1	Yes
POR09	N6	Yes	54 (44)	3.5	45 (35)	54	3.7	0.3	Yes
POR10	N6	Yes	54 (44)	3.5	45 (35)	54	3.7	0.3	Yes
POR11	N6	Yes	54 (44)	3.5	48 (38)	55	4.0	0.5	Yes

Receptor	Reference Monitoring Location	Rural POR?	Baseline		Project Predicted Ldn (dBA)[2]	Total (Baseline plus Project)		Delta %HA (Between Total and Baseline)	Compliance with Limits?
			Ldn (dBA)[1]	%HA (%)		Ldn (dBA)	%HA (%)		
POR12	N6	Yes	54 (44)	3.5	39 (29)	54	3.5	0.1	Yes
POR13	N6	Yes	54 (44)	3.5	37 (27)	54	3.5	0.0	Yes
POR14	N6	Yes	54 (44)	3.5	40 (30)	54	3.6	0.1	Yes
POR15	N6	Yes	54 (44)	3.5	37 (27)	54	3.5	0.0	Yes
POR16	N6	Yes	54 (44)	3.5	40 (30)	54	3.6	0.1	Yes
POR17	N6	Yes	54 (44)	3.5	44 (34)	54	3.7	0.2	Yes
POR18	N6	Yes	54 (44)	3.5	43 (33)	54	3.6	0.2	Yes
POR19	N6	Yes	54 (44)	3.5	49 (39)	55	4.1	0.6	Yes
POR20	N6	Yes	54 (44)	3.5	53 (43)	56	4.9	1.4	Yes
POR21	N5	No	61	8.9	27	61	8.9	0.0	Yes
POR22	N5	No	61	8.9	25	61	8.9	0.0	Yes
POR23	N5	No	61	8.9	24	61	8.9	0.0	Yes
POR24	N5	No	61	8.9	22	61	8.9	0.0	Yes
POR25	N4	No	52	2.7	16	52	2.7	0.0	Yes
POR26	N4	No	52	2.7	16	52	2.7	0.0	Yes
POR27	N6	Yes	54 (44)	3.5	41 (31)	54	3.6	0.1	Yes
POR28	N2	No	55	4.1	44	55	4.3	0.2	Yes
POR29	N6	Yes	54 (44)	3.5	56 (46)	58	6.0	2.6	Yes

Notes
Note 1: A +10 dB correction is applied to monitoring locations where it is considered rural in accordance with Health Canada. The measured L_{dn} level collected as part of baseline noise monitoring is bracketed.
Note 2: Where a POR is considered rural, a +10 dB correction is applied to predicted project L_{dn} noise levels in accordance with Health Canada. The raw predicted L_{dn} level is bracketed.

As shown in Table J-8.2-1 and Table J-8.2-2, the change in %HA level is below 6.5% for all PORs. As such construction noise impacts are not anticipated during both CS01 (wind turbine, HGP and HP construction activities) and CS02 (transmission lines, collector system and road construction activities).

Despite the prediction of compliance with the construction noise criteria, recommendations for construction noise are provided in Section 9.1.

9.0 General Noise Mitigation Measures and Best Practices

9.1 On Site Best Practices for Construction Noise

General recommendations to assist in minimising noise impacts during the Construction Phase are provided in Table J-9.1-1.

Table J-9.1-1 Construction noise and vibration mitigation measures

Action Required	Details
Management Measures	
Implement community consultation measures	Notification detailing work activities, dates and hours, impacts and mitigation measures, any operational noise benefits from the works (where applicable) and contact telephone number.
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Construction employee parking areas • Designated loading/ unloading areas and procedures • Construction traffic routes • Site opening/closing times (including deliveries) • Environmental incident procedures
Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
Monitoring	A noise monitoring program may be carried out for the duration of the works in accordance with a prepared Construction Noise and Vibration Management Plan, and any approval and licence conditions.
Attended vibration measurement	Attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Building condition surveys	Undertake building dilapidation surveys on all buildings located within the buffer zone prior to commencement of activities with the potential to cause property damage

Action Required	Details
Blasting Noise and Vibration Mitigation	Blasting activities (if required) will be included under a contract service agreement with the explosives supplier and who will have a valid blasters certificate issued by Newfoundland and Labrador Environment and Climate Change (NL DECC). An Explosives and Blasting Management Plan will be developed by the blasting contractor to provide direction for the safe storage, handling and use of explosives and explosive components at the Project site, to address the safety of the public and Project personnel, and protection of both the environment and Project components. Blasting patterns and procedures will be used to reduce shock or instantaneous peak noise levels, in accordance with a Blast Management Plan that will be developed for the Project. Blasts should be designed by the blasting contractor to meet the required noise and vibration limits. Blast sound and vibration levels can be controlled by adjusting various parameters such as hole spacing, explosive charge weight, and the time delay between rows.
Source Controls	
Construction hours and scheduling	Where reasonable and feasible, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods. Further to this, it is recommended that the use of mulchers, jack hammers, concrete saws, rock breakers, compaction or other equipment used in very close proximity to the receivers should be limited where feasible and reasonable to the standard construction hours.
Equipment selection	Use quieter and less vibration emitting construction methods where reasonable and feasible.
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receptors is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site
Plan worksites and activities to minimise noise and vibration	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noisy activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00 pm.
Non-tonal reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Reduced equipment power	Use only the necessary size and power.

Action Required	Details
Minimise disturbance arising from delivery of goods to construction sites	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Path Controls	
Shield stationary noise sources such as pumps, compressors, fans etc.	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.
Shield sensitive receivers from noisy activities	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

9.2 Recommendations for Operational Noise

General recommendations to assist in minimizing noise impacts during the O&M Phase are provided below in Table J-9.2-1. In addition to these general recommendations, the following pieces of equipment, located in the HP, are required to be constructed in an enclosure that achieves a minimum noise reduction of 10 dB or equipment tendered to achieve the following maximum allowable sound power levels each:

- 6204-COM-1003A/B Makeup Gas Compressor and driver:
  - Maximum sound power level of compressor 103 dBA; and
  - Maximum sound power level of driver 120 dBA.
- 6610-COM-1005A/B Recycle Gas Compressors and driver:
  - Maximum sound power level of compressor 102 dBA; and
  - Maximum sound power level of driver 116 dBA.

Alternative noise mitigation strategies may be considered (such as selection of alternative and/or quieter equipment), however a 10 dB reduction is required from GHD's initial sound level estimates to achieve compliance with the requirements of Health Canada.

Table J-9.2-1 Operational noise and vibration mitigation measures

Action Required	Details
Management Measures	
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: • All relevant project specific and standard noise and vibration mitigation measures • Relevant licence and approval conditions • Permissible hours of work • Any limitations on high noise generating activities • Location of nearest sensitive receivers • Employee parking areas • Designated loading/ unloading areas and procedures • Operational traffic routes • Site opening/closing times (including deliveries) • Environmental incident procedures
Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
Source Controls	
Equipment selection	Equipment sound power levels are to be selected such that source noise levels are equivalent or less than the assumed equipment sound power levels as described in Section 5.1. Use quieter and less vibration emitting equipment where reasonable and feasible.
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receptors is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site
Plan worksites and activities to minimise noise and vibration	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noisy activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00 pm.
Non-tonal reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Reduced equipment power	Use only the necessary size and power.

Action Required	Details
Minimise disturbance arising from delivery of goods to facility	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Path Controls	

Shield stationary noise sources such as pumps, compressors, fans etc.	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.
	The following equipment are required to be constructed in an enclosure that achieves a minimum noise reduction of 10 dB:
	• 6204-COM-1003A/B Makeup Gas Compressor and driver
	  ○ Maximum sound power level of compressor 103 dBA
	  ○ Maximum sound power level of driver 120 dBA
	• 6610-COM-1005A/B Recycle Gas Compressors and driver
	  ○ Maximum sound power level of compressor 102 dBA
	  ○ Maximum sound power level of driver 116 dBA

10.0 Conclusions

In general, facility operations and construction often produce elevated noise levels that have the potential to impact the surrounding environment. Thus, noise levels produced by equipment at the proposed Project have been assessed at the identified worst-case receptors and property lines to determine the future impact on residents of the nearest communities. This is not intended to preclude residents at farther distances but rather is presented to document those sensitive receptors (i.e., human receptors – seasonal and permanent dwellings) that are closest and represent a worst-case scenario.

10.1 Noise Compliance at Receptors

The predicted noise levels produced by worst-case activities during the Construction, and O&M Phases of the Project are within the applicable guideline limits for all identified receptors provided that select operational equipment is tendered with low noise options or mitigated appropriately. Based on these predictions, noise levels at nearby sensitive receptors are expected to be within the Health Canada %HA noise level limits.

10.2 Vibration Compliance at Receptors

Project vibration during both Construction, and O&M Phases are not expected to generate substantial vibration levels at sensitive receptors. The minimum separation distance between the closest receptor to vibration intensive activities, being POR29 during transmission lines, collector system and road construction activities, is 84 m. This distance falls outside the highest vibration ZOI, being 24 m from the operation of a bulldozer (Table J-6.0-1), and as such, vibration impacts are not anticipated during construction activities.

10.3 Follow-Up and Monitoring

Follow-up and monitoring are intended to verify the accuracy of predictions made during the Study, to assess the implementation and effectiveness of mitigation, and to manage adaptively, if required. Compliance monitoring, where required by permitting or regulations, will be conducted to confirm that mitigation measures are properly implemented. Should an unexpected deterioration of the environment be observed as part of follow-up and/or monitoring, intervention mechanisms may include the application of noise mitigation measures to address it.

Based on the results of the Noise and Vibration Impact Study, follow-up and monitoring are not planned at this time.

11.0 References

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Appendix J-1 – Baseline Noise Monitoring Results

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	

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

	Sound Level (dBA)	Total Hours Recorded	# Valid Weather Hours	# Inclement Weather Hours
Daytime 15h Leq (Ld) (07:00 - 22:00)	42	42	38	4
Nighttime 9h Leq (Ln) (22:00 - 07:00)	35	27	20	7

	Sound Level (dBA)
Ldn	44

	Value (%)
%HA	0.95

Notes:

(1) Weather data provided by weather station placed adjacent to noise monitor.
(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

Appendix J-2 – Points of Reception Details

Table J-2.1 - Points of Reception Details

Receptor ID	Monitoring Location ID	Receptor Description	Rural POR?[1]	Coordinates[2] (m)		Baseline monitoring results[3]		Criteria, project + baseline		Criteria, project only
				Easting	Northing	Ldn, dBA	%HA	Ldn, dBA	%HA	Ldn, dBA
POR01	N5	Arnolds Cove Station residence façade, 4.5m Above Ground (AG)	No	277597	5296718	61	8.9	66	15.4	64
POR02	N2	459 Main Rd residence façade, 4.5m, AG	No	276091	5302826	55	4.1	63	10.6	62
POR03	N4	Jack's Pond Park residence façade, 4.5m AG	No	279964	5292344	52	2.7	61	9.2	61
POR04	N6	485 Main Rd residence façade, 4.5m AG	Yes	284290	5304354	54 (44)	3.5	62	10.0	61
POR05	N1	Rantem residence façade, 4.5m AG	No	285387	5286369	51	2.6	61	9.1	61
POR06	N3	Upshall residence façade, 4.5m AG	Yes	281801	5284930	50 (40)	2.1	61	8.6	61
POR07	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	291778	5308929	54 (44)	3.5	62	10.0	61
POR08	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	284009	5309011	54 (44)	3.5	62	10.0	61
POR09	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	289696	5309498	54 (44)	3.5	62	10.0	61
POR10	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	290163	5309585	54 (44)	3.5	62	10.0	61
POR11	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	283605	5309797	54 (44)	3.5	62	10.0	61
POR12	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	290342	5308551	54 (44)	3.5	62	10.0	61
POR13	N6	495 Main Rd residence façade, 4.5m AG	Yes	284425	5304185	54 (44)	3.5	62	10.0	61
POR14	N6	Main Rd Sunnyside residence façade, 4.5m AG	Yes	284039	5304123	54 (44)	3.5	62	10.0	61
POR15	N6	406 Main Rd Sunnyside residence façade, 4.5m AG	Yes	283433	5304130	54 (44)	3.5	62	10.0	61
POR16	N6	289 Main Rd Sunnyside residence façade, 4.5m AG	Yes	282180	5304634	54 (44)	3.5	62	10.0	61
POR17	N6	234 Main Rd Sunnyside residence façade, 4.5m AG	Yes	281310	5304681	54 (44)	3.5	62	10.0	61
POR18	N6	5 Mercer St Sunnyside residence façade, 4.5m AG	Yes	281483	5304915	54 (44)	3.5	62	10.0	61
POR19	N6	161 Main Rd Sunnyside residence façade, 4.5m AG	Yes	280661	5305182	54 (44)	3.5	62	10.0	61
POR20	N6	77 Main Rd Sunnyside residence façade, 4.5m AG	Yes	279996	5304840	54 (44)	3.5	62	10.0	61
POR21	N5	Arnolds Cove Station residence façade, 4.5m AG	No	277153	5296693	61	8.9	66	15.4	64
POR22	N5	192 Main Road Arnolds Cove residence façade, 4.5m AG	No	276722	5295642	61	8.9	66	15.4	64
POR23	N5	2 Woody Island Drive Arnolds Cove residence façade, 4.5m AG	No	275849	5294952	61	8.9	66	15.4	64
POR24	N5	5 Kingwell Crescent Arnolds Cove residence façade, 4.5m AG	No	276353	5294423	61	8.9	66	15.4	64
POR25	N4	13 Centennial Drive Little Harbour East residence façade, 4.5m AG	No	277567	5289898	52	2.7	61	9.2	61
POR26	N4	63 Bayview Dr Little Harbour East residence façade, 4.5m AG	No	276852	5289006	52	2.7	61	9.2	61
POR27	N6	Identified Garretts Cove cabin residence façade, 4.5m AG	Yes	293701	5304255	54 (44)	3.5	62	10.0	61
POR28	N2	105 Main Rd Come By Chance residence façade, 4.5m AG	No	277768	5303790	55	4.1	63	10.6	62
POR29	N6	Identified Sunnyside cabin residence façade, 4.5m AG	Yes	285758	5307556	54 (44)	3.5	62	10.0	61

Note 1: Where both the L_d and L_n baseline noise levels are on or below 45 dBA and 35 dBA respectively, it is considered rural in accordance with Health Canada.

Note 2: CRS EPSG:26922 – North American Datum 1983 UTM zone 22N.

Note 3: A +10 dB correction is applied to monitoring locations where it is considered rural in accordance with Health Canada. The measured L_{dn} level collected as part of baseline nosie monitoring is bracketed.