Appendix G

Air Assessment

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Memorandum

To	Joan Liu, Metro Vancouver	Page	1
CC	Michael Celli, AECOM Brent Start, AECOM		
Subject	**Conveyance for the NSWWTP: Air Assessment**		
From	Elizabeth Philp, AECOM Peter Tkalec, AECOM		
Date	April 13, 2017	Project Number	60513172

1. Introduction

Metro Vancouver collects and treats wastewater from the member municipalities, First Nation, and electoral area around the Vancouver Gateway. The existing Lions Gate Wastewater Treatment Plant (LGWWTP), located adjacent to the proposed facility, has been providing primary treatment since 1954 to the communities of West Vancouver and North Vancouver.

The LGWWTP's capacity has been expanded several times since it opened, and the plant is one of two primary treatment plants remaining in the region. In order to meet new standards, Metro Vancouver is planning to build the North Shore Wastewater Treatment Plant (NSWWTP) at a site approximately two kilometres east of the existing treatment plant. This would result in the decommissioning of the LGWWTP in 2020.

To support this change, a new project, the Conveyance for the NSWWTP is proposed that will interconnect with the existing Hollyburn Extension to redirect flow from the LGWWTP to the proposed NSWWTP. Treated effluent from the NSWWTP will flow by gravity back to the existing outfall at the LGWWTP. The pump station (Bridge Road Pump Station) is anticipated to be operational for 50 years before a major structural rehabilitation will be required.

The Bridge Road Pump Station is located under the Lions Gate Bridge, to the east of the existing LGWWTP site. The site is adjacent to an undeveloped property to the east. Given its location near the first narrows of the Burrard Inlet, it will be visible by marine vessels passing under the Lions Gate Bridge.

The Bridge Road Pump Station will use electric pumps that will normally receive electricity from the BC Hydro grid. In the case of a power failure, the Bridge Road Pump Station will be equipped with a diesel generator. When in use, the generator (genset) will release combustion by-products to the surrounding airshed, potentially affecting air quality and contributing to climate change. As such, this Level 1 air assessment has been completed to determine the quantification of total emissions and

qualification of emission variability to provide an indication on degree and/or potential that the discharges from the Bridge Road Pump Station could affect air quality.

2. Project Description

2.1 Project Overview

The Project includes the following:

- Extension of the existing Hollyburn Interceptor to redirect flow that originally was conveyed to the LGWWTP to the proposed pumping station. New inlet sewer piping will be 1200 mm diameter.
- Wastewater pumping station including:
    - 4 x 200 hp screw impeller pumps
    - Concrete wet-well / dry-well below-ground structure, approximately 10 m deep
    - Carbon scrubber for control of sewer odours
    - Diesel gen-set for backup power
    - Architectural roof and building treatments for visual appeal
    - Roadway to and around site for fire truck turnaround including parking for operations and maintenance staff
- Below-ground discharge forcemain, 900 mm diameter HDPE pipe directing flow to the NSWWTP
- Gravity outfall sewer, 2100 mm diameter, directing flow from the NSWWTP to the existing marine outfall

The design life of the pumping station is anticipated to be 80 years before major structural rehabilitation will be required. The mechanical and electrical equipment has a design life of 25 years before replacement is anticipated to be required. Below ground piping design life can range from 50 to 100 years before replacement or major rehabilitation work is required.

The Bridge Road Pump Station will operate 24 hours per day, 7 days per week. Metro Vancouver operations and maintenance staff will make regular visits to the pumping station during normal working hours. In case of emergency (e.g. power failure), Metro Vancouver may visit the pumping station at any time of day including outside of normal operating hours.

The project will produce air pollutant and GHG emissions from three sources:

1. Air releases from the wastewater conveyance system, following treatment from a carbon scrubber;
2. Combustion by-products from maintenance and emergency operation of the diesel genset; and
3. Combustion by-products from the operation of maintenance vehicles.

2.2 Baseline Case

The existing LGWWTP receives flow from the Hollyburn Extension and North Vancouver Interceptor, provides primary treatment, and discharges it through the existing outfall that will remain in service. It is not necessary to have a conveyance pump station to direct the flow from the Hollyburn Extension to the LGWWTP as gravity flow is sufficient; as such, the base case is considered to have no emissions associated with the project scope.

2.3 Project Case

As gravity flow is not sufficient to reach the new NSWWTP, the proposed Bridge Road Pump Station will direct wastewater from the Hollyburn Extension to the proposed NSWWTP. The Bridge Road Pump Station has been designed to deliver a peak flow of 110 MLD, which is the projected Basic Service Flow in 2101, as summarized in Table 1.

Table 1. Hollyburn Extension Design Flow

Parameter	L/s	MLD
NSWWTP Pump Station Design Flow	1270	110
Average Dry Weather Flow (ADWF)	185	16.0
Peak Wet Weather Flow (PWWF)	700	60.5
Peak Dry Weather Flow (PDWF)	80.0	6.91

One, two or three pumps will operate depending on the flow rate required. The pumps will be electric and under normal conditions will receive electricity from the BC Hydro grid, resulting in no localized air emissions but indirectly causing an increase in GHG emissions.

There will be a backup diesel generator on-site for power outages to ensure the pump station is always operational. The diesel generator will be exercised monthly and used for a maximum of 24 hours per year as backup power. There will be a carbon scrubber that is constantly operational to remove and mitigate odour compounds from the pump station.

2.4 No Project Case

The LGWWTP will be decommissioned and the new NSWWTP will be operational by 2019. In order to direct flow from the existing Hollyburn Extension, SN and North Vancouver Interceptor a pump station will need to be installed as gravity flow is insufficient to direct the flow to the new NSWWTP. As such, there is no applicable no project case for consideration.

3. Geographic Scope

3.1 Facility

The proposed Bridge Road Pump Station will collect flow from the existing Hollyburn Extension, Squamish Nation, and some flowfrom the North Vancouver Interceptor (NVI) collected west of the new treatment plant and pump it through a proposed forcemain to the proposed NSWWTP. The terminus of the existing Hollyburn Extension is located at the northeast corner of the existing treatment plant site which is bounded to the north by a CN Rail right of way, to the east by the north approach of the Lions Gate Bridge and to the west the Capilano River. In order to facilitate operation of the existing plant during construction of the new pump station, the new pump station will need to be located outside of the existing treatment plant. The Bridge Road Pump Station emissions will be from the diesel generator at the pump station, as well as odourous air emissions that will be released from the wastewater system via a carbon scrubber. The facility boundary can be seen in **Figure 2.**

3.2 Supply Chain

Supply chain GHG emissions associated with the electricity consumption of the Bridge Road Pump Station are included based on BC Hydro generation and emission information. Additionally, the operation and management crews will visit the pump station weekly for regular inspections, creating vehicular emissions; maintenance issues may require multiple visits by multiple vehicles. There are no other associated supply chain activities (e.g marine or rail) associated with the project.

3.3 Receiver Identification and Proximity

The site borders a residential neighbourhood to the north. The nearest sensitive receptors are the Squamish Nation (SN) approximately 500 m to the north of the project site. Sensitive receptors are labelled and seen in Table 2 and Figure 3.

Table 2. Sensitive Receptor coordinates

Receptor	UTM E (m)	UTM N (m)	Distance from Pump Station
Nearest Residence (SN)	490404	5433219	500 m
Ambleside Park	489737	5463224	580 m
Capilano Reserve Park	490790	5463065	725 m
Park Royale Mall	490019	5463512	770 m

4. Emission Sources

4.1 Primary Sources

There are 4 primary emission sources at the **Bridge Road Pump Station**. The electric sources are designed to be continually operational for the year, with the exception of power outages. There will be an increased electricity requirement for the operation of the pumps and the odour control equipment in high flow periods. The sources are described in **Table 3**.

Table 3. Primary Source Detail

Primary Source	Detail	Mode	Metric	Fuel
Stationary (Facility)	Diesel Generator	Back-up power	Backup power: 24 hours/year Exercising: 1 hour/month exercising	Diesel
On Road (Facility &Supply Chain)	Light duty trucks	Idling, driving or parked	Facility: 0.5 hour/week, 0.5 km travel Supply Chain: 0.25 hour/week, 10 km travel	Gasoline
Electricity (Supply Chain)	HVAC, lights, pumps	BC Hydro	Process: Average Power consumption = 22 kW Daily Power consumption = 0.53MWh/d HVAC: Ventilation fans: 10.5kW = 0.25 MWh/d Heating: Peak load of 138.65kW * 30% average = 42 kW = 1 MWh/d	Electricity
Odour Control (Supply Chain)	Carbon scrubber	Based on instantaneous sewer flow	Fan: 11kW = 0.27 MWh/d	Electricity

4.2 Emission Variability

The Bridge Road Pump Station is designed to work continuously 24 hours per day, 7 days a week. The diesel generator is designed as a backup power source for cases when there is a power outage or maintenance issue with the electric pumps. In addition, emissions may increase if more than one pump is operational at once, which will occur when the flow is higher than average.

As part of a regular maintenance cycle, the diesel generator will be tested monthly for 1 hour at ¼ standby and once annually for 2 hours and full standby. Additionally, the generator will operate during electricity outages, estimated in this assessment as 24 hours per year at ½ standby.

4.3 Pollutants of Concern

To address the effects of the proposed pump station on the existing ambient air environment of the surrounding area, the annual emissions of the following Criteria Air Contaminants (CAC) in Canada and air toxics that are applicable to the project have been quantified:

- Carbon Monoxide (CO);
- Nitrogen Oxides (NO_x);
- Sulphur Oxides (SO_x);
- Volatile Organic Compounds (VOCs);
- Hydrogen Sulphide (H_2S);
- Total Suspended Particulate (TSP);
- Carbon Dioxide (CO_2);
- Nitrous Oxide (N_2O); and
- Methane (CH_4).

Note that Methane and Nitrous Oxide are expressed in the assessment as CO_2 equivalent, designated as CO_2e.

5. Current Condition

5.1 Air Quality

Baseline/background air quality includes chemical concentrations from human-caused and natural sources, including existing nearby sources, and unidentified, possibly distant sources. This section summarizes the baseline/background air quality concentrations that will be used for this analysis.

Topographical features, such as river valleys and mountainous terrain, can have an important effect on airflow and, therefore, the dispersion of atmospheric contaminants. Examples of topographically induced circulations include mountain-valley circulations and flow around topographical boundaries (i.e., a valley in which a river flows, could introduce wind tunnelling). As such, terrain data will be reviewed and assessed to determine air monitoring stations that may provide representative data. Topographical features have been assessed for the area surrounding the proposed site and compared to the monitoring station sites. The proposed site is at an elevation of 4 m. Upon reviewing the terrain data from the digital elevation model the Terminal terrain is on a gentle slope with the Burrard Inlet immediately south. There are several monitoring stations that are nearby and have similar topography. The North-Vancouver and the Vancouver-Downtown ambient air monitoring stations were used to analyze background concentrations.

Overall, the Lower Fraser Valley (LFV) Air Quality Monitoring Network rates the air quality surrounding the Terminal as “good”. There were two air quality advisories in 2014 as per the Lower Fraser Valley (LFV) Air Quality Monitoring Network due to high ozone levels and particulate matter levels due to nearby wildfires.

Table 4 outlines the applicable baseline/background concentrations for the parameters of concern for this analysis.

Table 4. Baseline/Background Concentrations

Parameter	Averaging Period	BCAAQO (µg/m^3)	MVAAQO (µg/m^3)	Background (µg/m^3)
Nitrogen Dioxide Source: T001	1-hour	188	200	92.1
	Annual	66	40	40.5
Sulphur Dioxide Source: T024 & T001	1-hour	200	196	67.2
	24-hour		125	
	Annual		30	
Carbon Monoxide Source: T001	1-hour	14,300	30,000	902
	8-hour	5,500	10,000	826
PM_{10} Source: T024	24-hour	50	50	21.5
	Annual		20	9.3

Notes:

[1] British Columbia Ambient Air Quality Objectives and Guidelines, BCMOE 2016.

[2] Background concentrations taken from the Vancouver Downtown and North-Vancouver ambient monitoring station (approximately 3kmaway) http://www.metrovancouver.org/services/air-quality/AirQualityPublications/2014_LFV_AQ_Monitoring_Report.pdf

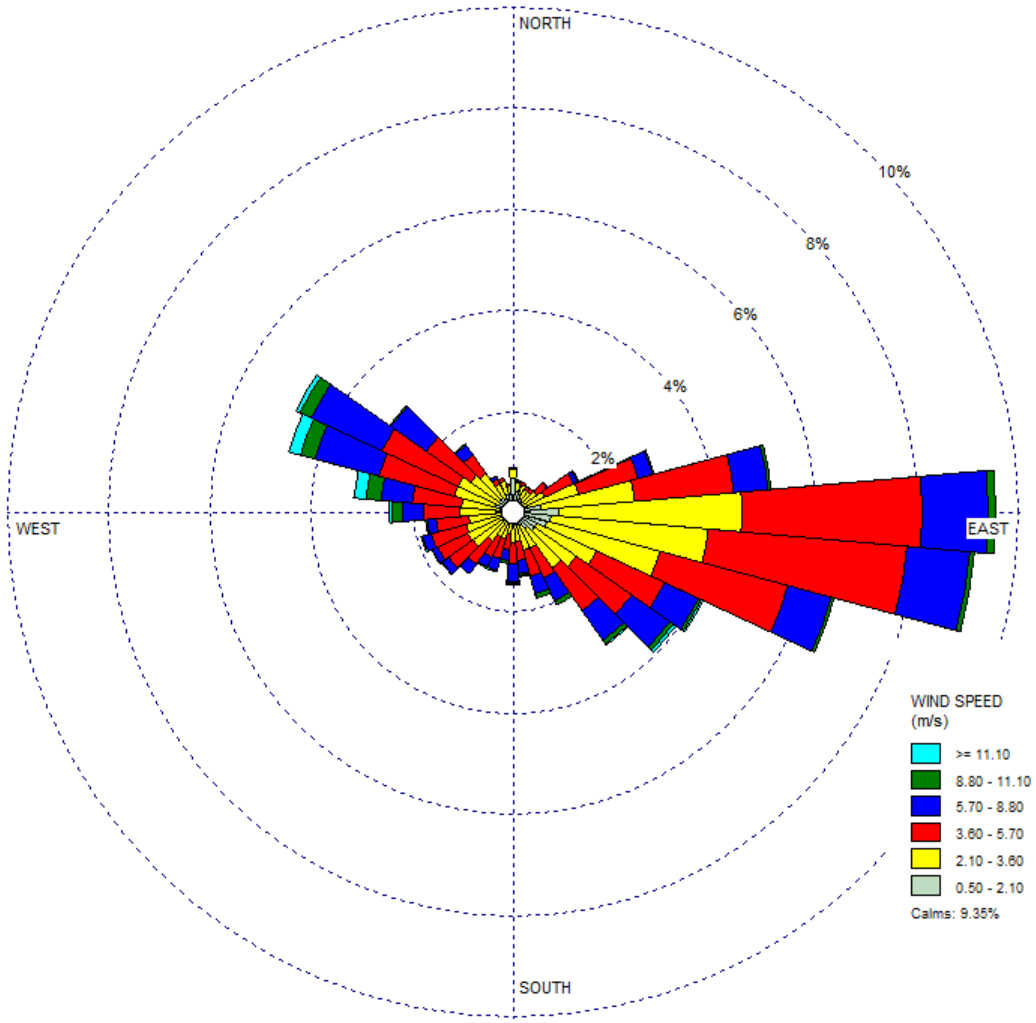
[3] 1 hour values represent the 98th percentile value

5.2 Meteorological Influences

Air quality is dependent on the rate of pollutant emissions into the atmosphere and the ability of the atmosphere to disperse the pollutant emissions. The dispersion of air pollutants is affected by local meteorological patterns. The wind direction controls the path that air pollutants follow from the point of emission to the receptors. In addition, wind speeds affect the time taken for pollutants to travel from source to receptor and the distance over which air pollutants travel. As a result, wind speeds also impact the dispersion of air pollutants. Therefore, it is important to assess local meteorological patterns to assess potential air quality effects.

Given the location of the project, immediately adjacent to salt water, winds from the south will experience a rougher surface over the water creating a more turbulent dispersion environment. Winds from the north will experience a much smoother surface over the urban area creating a less turbulent dispersion environment. **Figure 1** shows the average wind speed and direction from a variety of wind data sources around the site location. In addition, due to proximity to mountains there are inversions and increased precipitation.

Figure 1. Windrose from 2011-2015



5.3 Historical Trends

As there is no existing need for a pump station there is no historical activity information. The decommissioning of the LGWWTP and the introduction of the NSWWTP requires a pump station to move the flow to the new facility. The flow is expected to remain consistent with present flow. The baseline case and therefore historical trends are not applicable to this project.

6. Future Conditions

6.1 Horizon Year

2019 was selected as the horizon year as the Bridge Road Pump Station is anticipated to be constructed and operational; at this point the NSWWTP is expected to be operational and will require the Bridge Road Pump Station.

6.2 Project and No Project Case

The project case is considered to be when the Bridge Road Pump Station is under predicted operating conditions with:

- one to three electric pumps operational;
- a heating and ventilation system;
- lights;
- backup generator; and
- infrequent truck visits to the facility.

The “no project case” has not been considered due to the fact that gravity flow in the sewer is insufficient to direct the flow to the new NSWWTP. There will need to be a pump station to direct flow from the existing Hollyburn Extension, SN and North Vancouver Interceptor to the new NSWWTP.

6.3 Design Capacity Limitation

The pump station has been designed to meet present and anticipated flow rates up until 2050. There will be four electric pumps installed, however it is anticipated that a maximum of three would operate at once. There are no supply chain sources at the Bridge Road Pump Station with the exception of maintenance visits and electricity purchased from BC Hydro.

7. Emission Estimates

Emission estimates were based on operating hours of equipment per year and emission rates from manufacturer specifications or literature results.

7.1 Project Case

The proposed Project will create air emissions. All new equipment for the proposed Project will be electrified however for cases of power loss or power upset there will be a diesel-powered generator that meets the most stringent emission standards. Greenhouse gases from electricity were based on BC Hydro emission factors and the known energy requirements for the pumps. There will be odourous compounds released from the odour control facility that have been calculated as VOCs. The stationary emissions from the diesel generator are estimated assuming 3 power outages per year totaling 24 hours, as well as monthly generator exercising to ensure it is operational when needed. **Table 5** shows the calculated emission estimates per year for each primary source.

Table 5. Annual Emission Estimate - Facility

Primary Source	kg/year							
	CO	NO_X	SO_2	VOC	H_2S	TSP/ PM_{10}/	$PM_{2.5}$	CO_2e
Stationary	11.8	98.3	2.29	0	0	3.58	3.58	11,434
On Road	0.0351	0.00486	0	0.00295	0	0.000126	0.0000590	291
Electricity	0	0	0	0	0	0	0	0
Odour Control	0	0	0	0.152	0.138	0	0	1051

Table 6. Annual Emission Estimate – Supply Chain

Primary Source	kg/year							
	CO	NO_X	SO_2	VOC	H_2S	TSP/ PM_{10}/	$PM_{2.5}$	CO_2e
Stationary	0	0	0	0	0	0	0	0
On Road	70.6	17.0	0	8.46	-	0.305	0.267	583
Electricity	0	0	0	0	0	0	0	4,288
Odour Control	0	0	0	0	0	0	0	0

7.2 No Project Case

The “no project case” has not been considered due to the fact that gravity flow in the sewer is insufficient to direct the flow to the new NSWWTP. The proposed NSWWTP will require the construction and operation of the Bridge Road Pump Station to direct flow from the existing Hollyburn Extension, SN and North Vancouver Interceptor to the NSWWTP

8. Mitigation Potential

8.1 Best Available Technique Cases

The Bridge Road Pump Station has been designed to be fully electric under normal operation, which represents the best available technology under normal operating conditions. During electrical outages, backup power is provided by a diesel generator. The specified diesel engine does not meet USEPA Tier 4 emission standards for off-road compression-ignition engines, adopted by Canada in 2011. As a backup electrical generator intended for emergency use, these emission standards do not apply to the project, however they do indicate that generators with lower emissions are available for use.

Given the very limited planned use of the diesel generator at the Bridge Road Pump Station – approximately 38 hours annually – the emission increase from the best available diesel generator to the selected generator is considered negligible.

Emissions associated with maintenance vehicles could be further offset by the use of hybrid or electric vehicles; again the planned use of these vehicles is very limited and the emission increase from using conventional vehicles is considered negligible.

9. Impact Potential

Since the baseline conditions does not produce emissions, and the no-project case is not feasible, the impact potential is best represented by the project case on its' own. The emission estimates presented in Tables 5 and 6 represent a 100% increase from the baseline, and without a viable no-project case a comparison cannot be made in that regard.

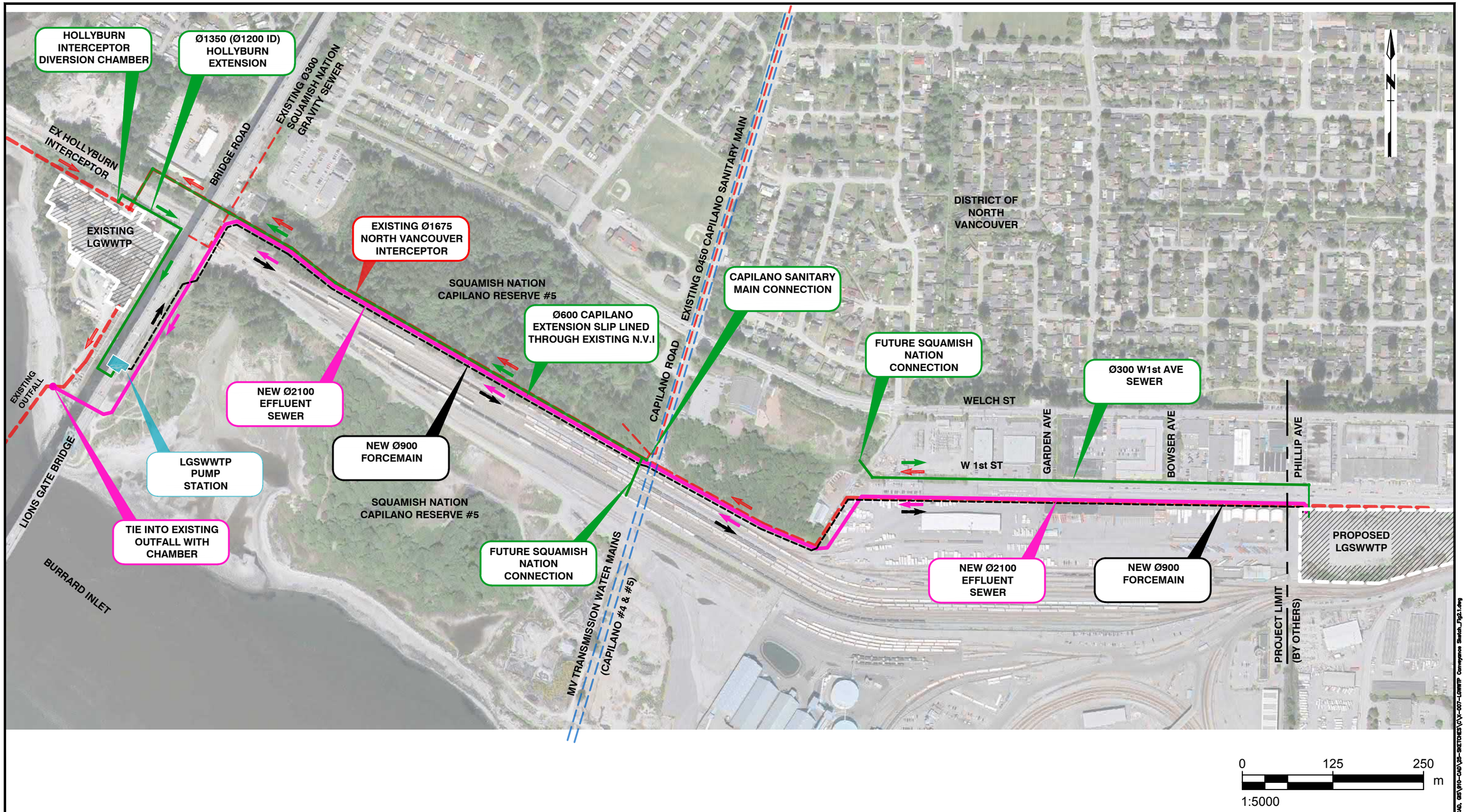
The nearest sensitive receptors are the Squamish Nation (SN) approximately 500 m to the north of the project site. While a Level 1 assessment does not include an evaluation of ambient concentrations at given receptors, the intermittent operation of the diesel generator and the low use of maintenance vehicles would be expected to result in negligible impacts to surrounding communities and other receptors.

The Best Available Technique offers two potential technology changes. The first – a diesel generator that meets USEPA Tier 4 emission standards – would result in an approximate NO_X reduction of 83.2 kg/y and an approximate PM reduction of 2.91 kg/y. The second potential improvement would be the use of electric vehicles (EVs) for maintenance operations. EVs would prevent air emission from On Road sources in Tables 5 and 6, above, while increasing the CO2e from electricity demand by approximately 4 kg/year.

10. Figures

The following figures are presented on the following pages:

- Figure 2. Conveyance for North Shore WWTP System Overview; and
- Figure 3. Sensitive Receptor Locations.



LEGEND

- EXISTING SANITARY SEWERS
- NEW SANITARY SEWERS
- NEW FORCEMAIN
- NEW EFFLUENT SEWER
- FLOW DIRECTION

CONVEYANCE FOR
LIONS GATE SECONDARY WWTP
SYSTEM OVERVIEW

Figure: 2

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xref files:

2.3 Project Case

As gravity flow is not sufficient to reach the new NSWWTP, the proposed Bridge Road Pump Station will direct wastewater from the Hollyburn Extension to the proposed NSWWTP. The Bridge Road Pump Station has been designed to deliver a peak flow of 110 MLD, which is the projected Basic Service Flow in 2101, as summarized in Table 1.

Table 1. Hollyburn Extension Design Flow

Parameter	L/s	MLD
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One, two or three pumps will operate depending on the flow rate required. The pumps will be electric and under normal conditions will receive electricity from the BC Hydro grid, resulting in no localized air emissions but indirectly causing an increase in GHG emissions.

There will be a backup diesel generator on-site for power outages to ensure the pump station is always operational. The diesel generator will be exercised monthly and used for a maximum of 24 hours per year as backup power. There will be a carbon scrubber that is constantly operational to remove and mitigate odour compounds from the pump station.

2.4 No Project Case

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3. Geographic Scope

3.1 Facility

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11. Appendix I – Estimation Methodologies

1. Stationary - Diesel Generator:

Cummins Power Generation

Exhaust Emission Data Sheet
900DQFAC
60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc. QST30-G5 NR2	Bore:	5.51 in. (139 mm)
Type:	4 Cycle, 50°V, 12 Cylinder Diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and Low Temperature aftercooled	Displacement:	1860 cu. in. (30.4 liters)
Compression Ratio:	14.7:1		
Emission Control Device:	Aftercooled (Air-to-Air)		

	1/4 Standby	1/2 Standby	3/4 Standby	Full Standby	Full Prime
PERFORMANCE DATA					
BHP @ 1800 RPM (60 Hz)	331	661	992	1322	1202
Fuel Consumption (gal/Hr)	17.3	32.1	47.5	63.9	57.7
Exhaust Gas Flow (CFM)	2540	4160	5480	6950	6600
Exhaust Gas Temperature (°F)	583	728	798	866	836
EXHAUST EMISSION DATA					
HC (Total Unburned Hydrocarbons)	0.16	0.11	0.09	0.08	0.08
NOx (Oxides of Nitrogen as NO2)	5.48	4.15	3.90	4.05	4.00
CO (carbon Monoxide)	0.95	0.41	0.43	0.58	0.53
PM (Particular Matter)	0.19	0.16	0.13	0.11	0.12
SO2 (Sulfur Dioxide)	0.11	0.10	0.10	0.10	0.10
Smoke (Bosch)	0.77	0.81	0.80	0.76	0.78

All Values are Grams/HP-Hour, Smoke is Bosch #

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (±2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

- Generator Exercising:
  - Exercised once per month at low load (1/4 standby) for 1 hour
  - Exercised once per year at high load (full standby) for 2 hours
- Frequency of power outages:
  - Once per year for 24 hours – 3 power outages total
  - ½ standby when called to run for an outage

2. On-Road:

Trucks are assumed to visit the site once per week, will drive for less than 30 minutes per week.

Fuel consumption rates for terminal support vehicles based on a 2013 Ford F-150 4x4 (15.7 L/100km), City fuel efficiency (L/100km) and 30 km/hr speed.

http://oee.nrcan.gc.ca/fcr-rcf/public/index-e.cfm?submitted=true&sort=overall_rank&searchbox=&year=2013&class=PU&make=FORD&model=all&trans=all&FT=all&cylinders=all&unit=0&kmPerYear=&cityRating=&fuelGas=&fuelPremium=&fuelDiesel=&onSearchLink=%231&pageSize=10&btnSearch=Search#aSearch

3. Electricity:

Emission factors and methodology from 2016/17 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions, BC Ministry of Environment, 2016.

http://www2.gov.bc.ca/assets/gov/environment/climate-change/policy-legislation-and-responses/carbon-neutral-government/measure-page/2016-2017_bc_best_practices_methodology_for_quantifying_ghg_emissions.pdf

HVAC and process power requirements:

- Process:
  - Average flow is 220 L/s
  - Discharge head at average flow is 7.2 m
  - Pump efficiency is 80%, based on manufacturer's data
  - Assume 10% distribution losses
  - Average power consumption = 224 kW
  - Daily power consumption = 0.52 MWh/d

- HVAC:
  - Ventilation fans: 10.5 kW = 0.25 MWh/d
  - Heating: Peak load of 138.65 kW - Annual Average Consumption = 80 kW = 0.08 MWh/d
  - Total power consumption HAV and Ventilation
    - Demand = 149kW
    - Annual average power consumption – 0.33MWh/d

- Lighting:
    - Demand = 15kW
    - Annual average consumption = 0.04MWh/d

4. Odour Control Facility:

The odour control equipment (carbon scrubber) will process up to 5000 cfm of flow with 99.5 % removal. The odour control facility will be continuously operational to mitigate odours from the facility. It is expected to require 0.211 MWh/d.

Parameter	Design Value Inlet
Average Hydrogen Sulphide (H2S)	2 ppm
Peak Hydrogen Sulphide	5 ppm
Ammonia	0.1 ppm
Dimethyl Disulphide	0.1 ppm
Dimethyl Sulphide	0.1 ppm
Ethyl Mercaptan	0.1 ppm
Methyl Mercaptan	0.5 ppm
Volatile Organic Compounds (VOCs)	0.3 ppm