



# **Emission Summary and Dispersion Modelling Report**

**424 Soby Road, Grimsby, Ontario**

Escarpment Renewables

July 29, 2024

**GHD**



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# Version Control

Revision	Date	Revised Description	Reviewer Initials
	October 1, 2014	Original Renewable Energy Approval (REA) Application – REA No. 8541-9HSGG3	
	October 31, 2018	Amendment to REA No. 8541-9HSGG3	
	July 26, 2019	Amendment to REA No. 8541-9HSGG3	
1.0	November 2021	ESDM update for REA Application for Facility updates	MG

# Executive summary

This Emission Summary and Dispersion Modelling (ESDM) Report was prepared to support an application for an Amendment for Renewable Energy Approval (REA) (Air & Noise) No. 8541-9HSGG3. The ESDM Report was prepared in accordance with s.26 of Ontario Regulation (O. Reg.) 419/05 to support the REA amendment application. In addition, guidance in the ministry publication "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2018 (ESDM Procedure Document) was followed, as appropriate.

Escarpment Renewables operates an anaerobic digester to produce renewable energy from digester biogas on their property, located at 424 Soby Road in Grimsby, Ontario (Facility). The Facility is in an area zoned 'Agricultural'.

This application and supporting documentation were prepared in accordance with all applicable regulatory and Ministry requirements that were in effect at the time of application.

The primary North American Industrial Classification System (NAICS) Code that applies to the Facility is 562210 – "Waste Treatment and Disposal". Compliance has been assessed using the AERMOD dispersion model and the standards listed in Schedule 3 of O. Reg. 419/05, in the document entitled "Air Contaminants Benchmarks (ACB) List: Standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", version 2.0, dated April 2018 (ACB List).

The Facility is expected to emit odour, volatile organic compounds (VOCs) and products of combustion. Some of the sources and contaminants were considered negligible in accordance with s.8 of O. Reg. 419/05.

The maximum point of impingement (POI) concentrations were calculated based on the operating conditions where all significant sources are operating simultaneously at their individual maximum rates of production. The maximum emission rates for each significant contaminant emitted from the significant sources were calculated in accordance with s. 11 of O. Reg. 419/05 and the data quality assessment follows the process outlined in the requirements of the ESDM Procedure Document.

A POI concentration for each significant contaminant emitted from the Facility was calculated based on the calculated emission rates and the output from the approved dispersion model; the results are present in the following Emission Summary Table in accordance with s.26 of O. Reg. 419/05.

The POI concentrations listed in the Emission Summary Tables were compared against criteria in the ACB List. All of the predicted POI concentrations for contaminants listed in the Emission Summary Table that are included in the ACB List, are below the corresponding limits.

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# 1. Introduction and Facility Description

This section provides a description of the facility as required by sub paragraph 1 of s.26 (1) of Ontario Regulation 419/05 (O. Reg. 419/05). Escarpment Renewables operates an anaerobic digester (AD) facility at 424 Soby Road in Grimsby, Ontario (Facility). The location of the Facility is presented on Figure 1 and the land use designation of the site and surrounding area is presented on Figure 2. The property line along with the location of the discharges from each of the sources is presented on Figure 3. The location of each of the sources is specified with the source reference number.

The primary North American Industrial Classification System (NAICS) that applies to the Facility is 562210 – "Waste Treatment and Disposal". This NAICS Code is listed in Schedule 5 of O. Reg. 419/05. The assessment of compliance was performed using the AERMOD dispersion model and the standards listed in Schedule 3 of O. Reg. 419/05, in the document entitled "Air Contaminants Benchmarks (ACB) List: Standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", version 2.0, dated April 2018 (ACB List).

## 1.1 Purpose and Scope of ESDM Report

The ESDM report was prepared in accordance with s.26 of O. Reg. 419/05 and guidance in the Ontario Ministry of the Environment, Conservation and Parks (MECP) publication "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2018 (ESDM Procedure Document) PIBS 3614e04.1.

This ESDM Report has been prepared as part of an Amendment Application for a Renewable Energy Approval (REA) (Air & Noise). The Facility currently operates under REA (Air & Noise) No. 8541-9HSGG3 that was originally dated February 16, 2012 and was most recently amended April 22, 2020. The current REA is provided in Appendix A. The Facility is planning an expansion and has prepared an up-to-date ESDM, incorporating all proposed modifications to be made to the Facility.

For ease of review and to promote clarity, this ESDM Report is structured to correspond to each of the items listed in the Ministry publication "Emission Summary and Dispersion Modelling Check-List", March 2017, PIBS 5357E.

## 1.2 Description of Processes and NAICS Codes

Escarpment Renewables operates a renewable energy generation facility with an anaerobic biodigester. The raw materials include solid and liquid wastes that are brought to the facility for the anaerobic digesting process. The digestates are then shipped off site for beneficial use while the biogas is used to generate electricity, renewable natural gas (RNG) or combusted.

The NAICS Code that applies to this Facility is 562210 – "Waste Treatment and Disposal".

## 1.3 Description of Products and Raw Materials

The processes at the Facility include material receiving, heating, digesting, electricity and RNG generation and waste disposal.

Product usages and process information are provided in greater detail in Appendix B – Supporting Calculations. Refer to Table 1 - Sources and Contaminants Identification Table, which tabulates the individual sources of emissions at the Facility.

## 1.4 Process Flow Diagram

Refer to Figure 4A, Figure 4B, and Figure 4C – Process Flow Diagram for a graphical representation of the manufacturing processes at the Facility.

## 1.5 Operating Schedule

The Facility can operate up to 24 hours per day, 365 days per year.

## 1.6 Feedstock and Site Changes

A summary of the changes to:

- Feedstock waste types and quantities can be found in Section 2.2 of the Design & Operation (D&O) Report. In summary Escarpment Renewables is currently approved to process a maximum of 23,000 tonnes of biomass per year which will be increased to 159,000 tonnes per year and include the following waste types and maximum tonnages:
  - Agricultural waste (up to 7,000 tonnes per year)
  - Source-Separated Organics (SSO) (up to 120,000 tonnes per year)
  - Industrial, Commercial, and Institutional (ICI) packaged waste (up to 100,000 tonnes per year)
  - ICI Liquid waste (up to 100,000 tonnes per year)
  - Combined maximum 159,000 tonnes per year

The annual composition of waste received may consist of any combination of the above waste types up to the maximum tonnes indicated and not exceeding a combined maximum of 159,000 tonnes per year.

- Changes to the Site (equipment, process and layout) can be found in Section 2 of the D&O Report. In summary these will include:
  - Increased digester capacity
  - Expanded Site footprint
  - Operating Hours
  - Waste Storage Improvements
  - New organics pre-processing building
  - New air treatment
  - New digestate/biogas storage tanks
  - New RNG Upgrading System
  - New Flare

## 2. Initial Identification of Sources and Contaminants

This section provides an initial identification of all of the sources and contaminants emitted at the Facility, as required by subparagraphs 2 to 4 of s.26 (1) of O. Reg. 419/05.

There may be general ventilation from the Facility that only discharges uncontaminated air from the workspaces or air from the workspace that may include contaminants that come from commercial office supplies, building maintenance



products or supplies and activities; these types of ventilation sources are considered to be negligible and were not identified as sources at the Facility.

General ventilation located in the process area that does not vent process emissions is also considered negligible.

## **2.1 Sources and Contaminants Identification Table**

Table 1 – Sources and Contaminants Identification Table tabulates all the emission sources at the Facility. Table 1 provides the information required for sub paragraphs 2 to 4 of s.26 (1) of O. Reg. 419/05.

The expected contaminants emitted from each source are also identified in Table 1. Each of the identified sources has been assigned a source reference number.

The site plan, including the property line is presented along with the location of the discharges from each of the sources is presented on Figure 3. The location of each of the sources is specified with the source reference number.

## **3. Assessment of Significance of Sources and Contaminants**

This section provides an explanation for each source and contaminant identified as negligible in Table 1, as required by subparagraph 5 of s.26(1) of O. Reg. 419/05.

In Accordance with s.8 of O. Reg. 419/05, emission rate calculations and dispersion modelling does not have to be performed for emissions from negligible sources or for the emission of negligible contaminants from significant sources.

### **3.1 Identification of Negligible Contaminants and Sources**

Each negligible source is identified in Table 1 – Sources and Contaminants Identification Table. The remaining sources are significant. These sources will be included in the dispersion modelling for the Facility.

### **3.2 Rationale for Assessment**

For each source in Table 1 that has been identified as being negligible there is an accompanying documented rationale. The technical information required to substantiate the argument that each of the identified sources is negligible is presented in Appendix C – Supporting Information for Assessment of Negligibility.

## **4. Operating Conditions, Emissions Estimating and Data Quality**

This section provides a description of the operating conditions used in the calculation of the emission estimates and an assessment of the data quality of the emission estimates for each significant contaminant from the facility as required by sub paragraphs 6 and 7 of s.26 (1) of O. Reg. 419/05. In accordance with s.8 of O. Reg. 419/05, emission rate calculations and dispersion modelling does not have to be performed for emissions from negligible sources or for the emission of negligible contaminants from significant sources.

## **4.1 Description of Operating Conditions**

Section 10 of O. Reg. 419/05 states that an acceptable operating condition is a scenario that assumes operating conditions for the Facility that would result, for the relevant contaminant, in the highest concentration of the contaminant at POI that the Facility is capable of, the operating condition described in this ESDM Report meets this requirement.

The operating conditions that would result in the highest concentration of the contaminants were used for this assessment. The individual maximum rates of production for each significant source of emissions are explicitly described in Appendix B.

## **4.2 Explanation of the Methods Used to Calculate Emission Rates**

The maximum emission rates for each significant contaminant emitted from the significant sources were calculated in accordance with requirements of the ESDM Procedure Document.

The emission rate for each significant contaminant emitted from a significant source was estimated and the methodology for the calculation is documented in Table 2A and Table 2B.

## **4.3 Sample Calculations**

The technical rationale, including sample calculations, required to substantiate the emission rates presented in Table 2A and Table 2B is documented in Appendix B.

## **4.4 Assessment of Data Quality**

This section provides a description of the assessment of the data quality of the emission estimates for each significant contaminant from the facility.

The assessment of the data quality of the emission rate estimates for each significant contaminant emitted from the significant sources was performed in accordance with the requirements of subparagraph 7iii of s.26 (1) of O. Reg. 419/05.

For each contaminant, the emission rate was estimated and the data quality of the estimate is documented in Table 2A and Table 2B. The assessment of data quality for each source listed in Table 2A and Table 2B is documented in Appendix B.

All the emission rates listed in Table 2A and Table 2B correspond to the operating scenario where all significant sources are operating simultaneously at their individual maximum rates of production. Therefore, emission rate estimates listed in Table 2A and Table 2B are not likely to be an underestimate of the actual emission rates and use of these emission rates will result in a calculated concentration at POI greater than the actual concentrations.

## **5. Source Summary Table and Site Plan**

This section provides the table required by subparagraph 8 and the site plan required by subparagraph 9 of s.26 (1) of O. Reg. 419/05.

## 5.1 Source Summary Table

For each source of significant contaminants, the following parameters are referenced:

- Contaminant
- Chemical Abstract Society (CAS) reference number
- Source reference number
- Source description
- Stack parameters (flow rate, exhaust temperature, diameter, height above grade, height above roof)
- Location referenced to a Universal Transverse Mercator (UTM) coordinate system presented in Figure 3A
- Maximum emission rate
- Averaging period
- Emission estimating technique
- Estimation data quality
- Percentage of overall emission

## 5.2 Site Plan

The locations of the emission sources listed in Table 2A and Table 2B are presented on Figure 3; the location of each of the sources is specified with the source reference number. The location of the property-line is indicated on Figure 3, with the end points of each section of the property-line clearly referenced in a Cartesian coordinate system. The location of each source is referenced to this coordinate system under a column in Table 2A and Table 2B.

The heights of the structures that are part of the Facility are labeled on Figure 3.

# 6. Dispersion Modelling

This section provides a description of how the dispersion modelling was conducted at the Facility to calculate the maximum concentration at a POI.

The dispersion modelling was conducted in accordance with the ministry publication "Air Dispersion Modelling Guideline for Ontario" PIBS 5165e03 (ADMGO). A general description of the input data used in the dispersion model is provided below and summarized in Table 3.

The Schedule 3 standards have been applied to Escarpment Renewables in this ESDM for the February 1, 2020 implementation date.

The emission rates used in the dispersion model meet the requirements of Section 11(1) 1 of O. Reg. 419/05, which requires that the emission rate used in the dispersion model is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of for the relevant contaminant. These emission rates are further described in Appendix B.

The AERMOD modelling system has been identified by the MECP as one of the approved dispersion models under O. Reg. 419/05, and currently includes the Plume Rise Model Enhancements (PRIME) algorithms for assessing the effects of buildings on air dispersion.

The AERMOD modelling system is made up of the AERMOD dispersion model, the AERMET meteorological pre-processor and the AERMAP terrain pre-processor. The following approved dispersion model and pre-processors were used in the assessment:

- AERMOD dispersion model (v. 19191)

- AERMAP surface pre-processor (v. 18081)
- BPIP building downwash pre-processor (v. 04274)

A summary of the AERMOD source input parameters is provided in Appendix D.

AERMET was not used in this assessment, as a pre-processed MECP meteorological dataset was used.

The emission rates used in the dispersion model meet the requirements of Section 11(1) 1 of O. Reg. 419/05, which requires that the emission rate used in the dispersion model is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of for the relevant contaminant. These emission rates are further described in Appendix B.

There is no childcare facility, health care facility, senior's residence, long-term care facility, or an education facility located at the Facility. Furthermore, the nearest POI is located greater than 5 metres (m) from the building on which the point of emissions are located. As such, same structure contamination was not considered.

## 6.1 Co-ordinate System

The UTM coordinate system, as per Section 5.2.2 of the ADMGO, was used to specify model object sources, buildings and receptors. All coordinates were defined in the North American Datum of 1983 (NAD83).

All sources, building, and the property line coordinates are provided on Figure 3.

## 6.2 Meteorology and Land Use Zoning Plan

Subparagraph 10 of s.26 (1) of O. Reg. 419/05 requires a description of the local land use conditions if meteorological data described in paragraph 2 of s.13 (1) of O. Reg. 419/05 was used. Site specific meteorological data was obtained from the MECP.

A land use zoning plan is provided on Figure 2. Figure 2 also illustrates the extents of the Facility property boundary and provides the zoning of adjacent land uses. The Facility is located in an area zoned 'Agricultural'. The land use surrounding the Facility is zoned 'Agricultural' as well.

## 6.3 Terrain

AERMOD captures the essential physics of dispersion in complex terrain though the use of a separate height scale factor for each receptor (United States Environmental Protection Agency [USEPA], 1998 – AERMAP UG). The highest scale factor represents the terrain that would dominate flow in the vicinity of the receptor.

The height scale factor that is used by AERMOD is generated by the AERMAP terrain pre-processor. AERMAP utilizes terrain data, or Digital Elevation Model (DEM) data in conjunction with a layout of receptors and sources to height scale factors that can be directly used in AERMOD. Terrain data used in this assessment was obtained from MECP (7.5-minute format).

## 6.4 Receptors

Receptors were chosen based on recommendations provided in Section 7.1 of the ADMGO, which is in accordance with s.14 of O. Reg. 419/05. A tiered receptor grid was defined starting with a rectangular boundary that encloses all the modelled sources (bounding box). A tiered grid was then defined starting from the edge of the bounding box with a fine resolution, to coarser resolutions further away. All tiered distances were defined relative to the bounding box. The receptor grid used is described as follows:

- 20-m spacing within 200 m of the edge of the bounding box
- 50-m spacing from 200 to 500 m
- 100-m spacing from 500 to 1,000 m

- 200-m spacing from 1,000 to 2,000 m
- 500-m spacing from 2,000 to 5,000 m

A property line ground level receptor grid with 10-m spacing was used to evaluate the maximum property boundary concentration. No receptors were placed inside the Facility's property line.

## 6.5 Building Downwash

The Facility buildings were entered into the model using the USEPA Building Profile Input Program (BPIP-PRIME). The inputs into this pre-processor include the co-ordinates and heights of the buildings and stacks. The BPIP program was executed to evaluate any building cavity downwash effects. Cavity downwash can result in air contaminants being forced to ground level prematurely under certain meteorological conditions. The on-site buildings and structures were modelled with their respective average roof heights.

The PRIME plume rise algorithms include vertical wind shear calculations (important for buoyant releases from short stacks (i.e., stacks at release heights within the recirculation zones of the buildings). The PRIME algorithm also allows for the wind speed deficit factors to improve the accuracy of predicted concentrations within building wake zones that form in the lee of buildings. The BPIP input file is provided in Appendix D.

## 6.6 Deposition

AERMOD has the ability to account for wet and dry deposition of substances that would reduce ground level concentrations at POIs. However, the deposition algorithm has not been implemented in this assessment and therefore, the predicted POI concentrations are considered to be more conservative.

## 6.7 Averaging Time and Conversions

The shortest time scale that AERMOD predicts is a 1-hour average value. Schedule 3 standards were used to assess compliance at this Facility. Many of these standards are based on 1-hour and 24-hour averaging times, which are averaging times that are easily provided by AERMOD. In cases where a standard has an averaging period less than 1 hour (e.g., 10-minute), a conversion to the appropriate averaging period was completed using the MECF recommended conversion factors, as documented in the ADMGO.

## 6.8 Dispersion Modelling Options

The options used in the AERMOD dispersion model are summarized in the table below.

Modelling Parameter	Description	Used in the Assessment?
DFAULT	Specifies that regulatory default options will be used	Yes
ADJ_U*	Specifies that AERMET is pre-processed to adjust friction velocity for low wind speed conditions	Yes
CONC	Specifies that concentration values will be calculated	Yes
DDPLETE	Specifies that dry deposition will be calculated	No
WDPLETE	Specifies that wet deposition will be calculated	No
FLAT	Specifies that the non-default option of assuming flat terrain will be used	No, the model will use elevated terrain as detailed in the AERMAP output
NOSTD	Specifies that the non-default option of no stack-tip downwash will be used	No

Modelling Parameter	Description	Used in the Assessment?
AVERTIME	Time averaging periods calculated	1-hour, 24-hour, Annual
URBANOPT	Allows model to incorporate the effects of increased surface heating from an urban area on pollutant dispersion under stable atmospheric conditions	No
FLAGPOLE	Specifies that receptor heights above local ground level are allowed on the receptors	No

## 6.9 Dispersion Modelling Input and Output Files

The information input into the approved dispersion model is recorded in Appendix D. Appendix D also includes the input and output files from the AERMOD model in electronic form.

Table 3 provides a detailed description of the source input parameters.

# 7. Emission Summary Table and Conclusions

This section provides the table required by subparagraph 14 of s.26 (1) of O. Reg. 419/05 and provides an interpretation of the results as required by the ESDM Procedure Report.

## 7.1 Emission Summary Table

A POI concentration for each significant contaminant emitted from the Facility was calculated based on the emission rates listed in Table 2A and Table 2B and the output from the approved dispersion model presented in Appendix D. The results are presented in Table 4. This table follows the format provided in the ESDM Procedure Document. For each source of significant contaminants, the following parameters are referenced:

- Contaminant name
- CAS number
- Total facility emission rate
- Approved dispersion model used
- Maximum POI concentration
- Averaging period for the dispersion modelling
- MECP POI limit
- Indication of limiting effect
- Schedule in O. Reg. 419/05
- The percentage of standard

The POI concentrations listed in Table 4 were compared against Schedule 3 criteria in the ACB List.

## 7.2 Conclusions

This ESDM Report was prepared in accordance with s.26 of O. Reg. 419/05. In addition, guidance in the ESDM Procedure Document was followed as appropriate.

The emission rate estimates for each source of significant contaminants are documented in Table 2A and Table 2B. All the emission rates listed in Table 2A and Table 2B correspond to the operating scenario where all significant

sources are operating simultaneously at their individual maximum rates of production. Therefore, these emission rate estimates listed in Table 2A and Table 2B are not likely to be an underestimate of the actual emission rates.

A POI concentration for each significant contaminant emitted from the Facility was calculated based on the calculated emission rates and the output from the AERMOD dispersion model with the results presented in Table 4.

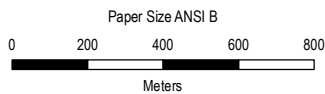
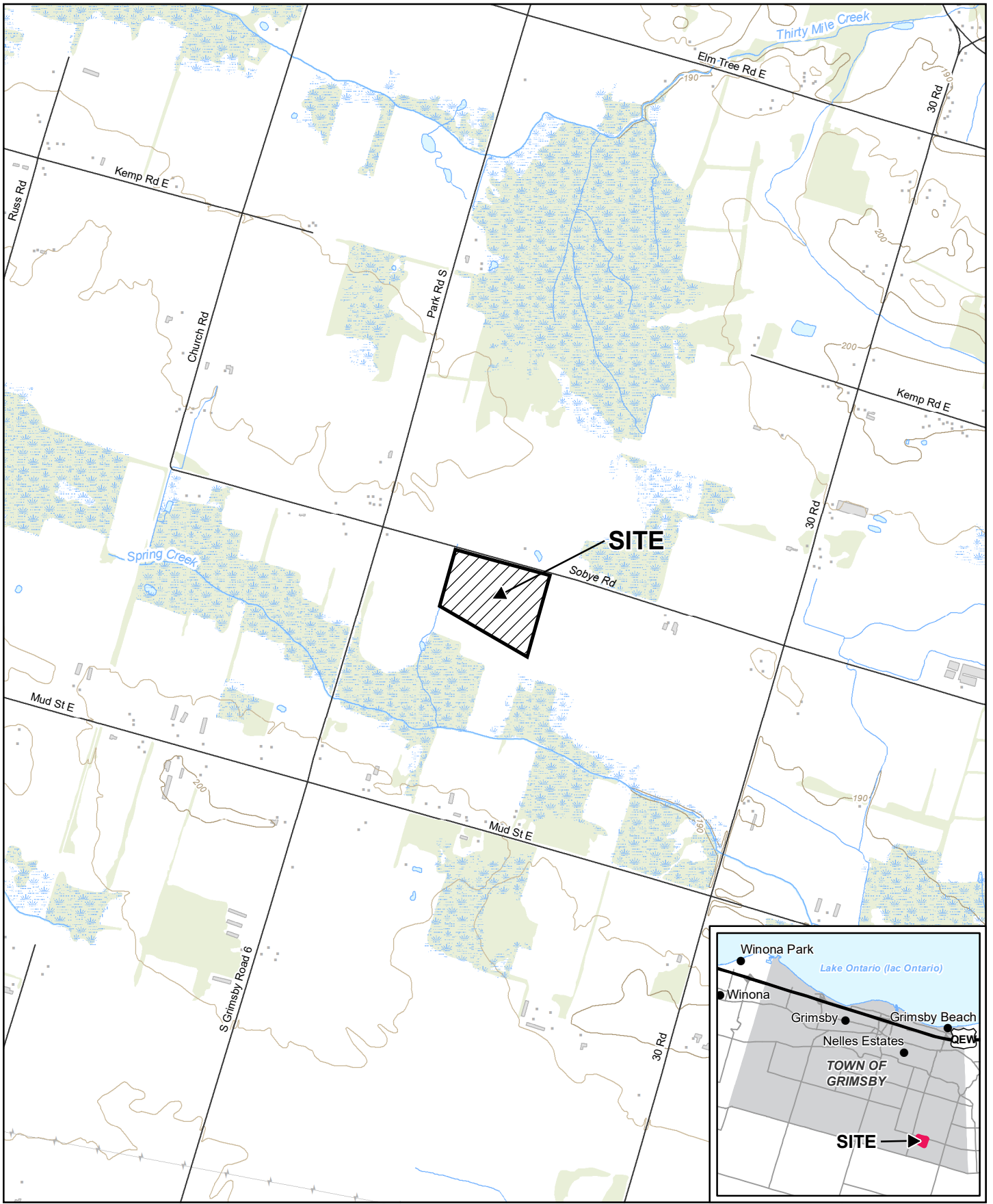
The POI concentrations listed in Table 4 were compared against criteria listed in the Ministry publication, "Air Contaminants Benchmarks (ACB) List: Standards, Guidelines, and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants", version 2.0, dated April 2018.

All the contaminants that have limits in the ACB list are below their corresponding MECP POI Limit.

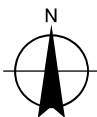
This ESDM Report demonstrates that the Facility can operate in compliance with O. Reg. 419/05 using the proposed operating scenarios.

# Figures





Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 17N



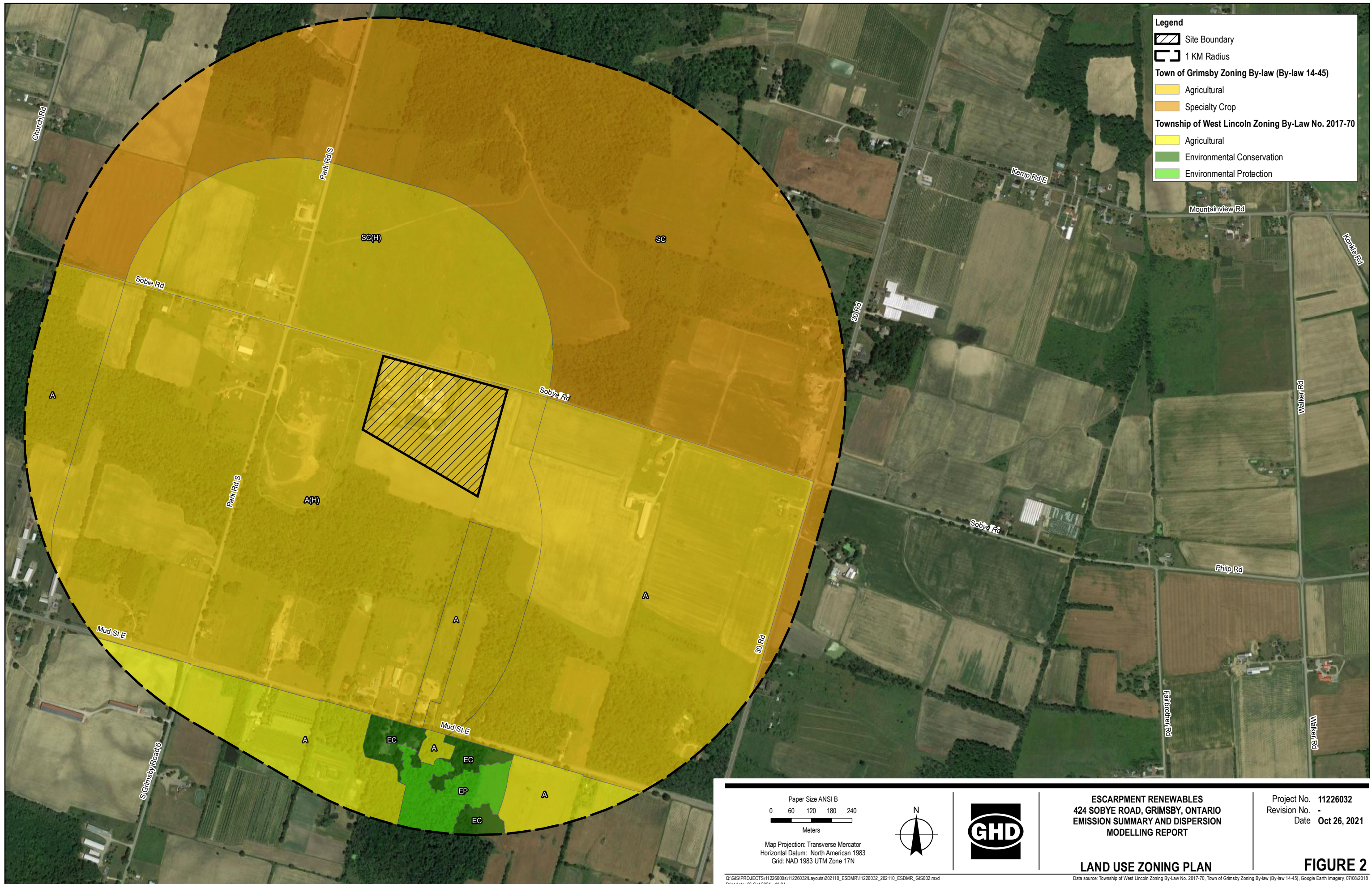
**ESCARPMENT RENEWABLES**  
**424 SOBYE ROAD, GRIMSBY, ONTARIO**  
**EMISSION SUMMARY AND DISPERSION**  
**MODELLING REPORT**

Project No. 11226032  
 Date Oct 26, 2021

**SITE LOCATION MAP**

**FIGURE 1**





**Legend**

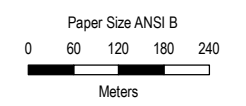
- Site Boundary
- 1 KM Radius

**Town of Grimsby Zoning By-law (By-law 14-45)**

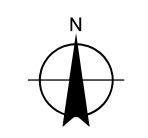
- Agricultural
- Specialty Crop

**Township of West Lincoln Zoning By-Law No. 2017-70**

- Agricultural
- Environmental Conservation
- Environmental Protection



Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 17N



**ESCAPMENT RENEWABLES**  
**424 SOBYE ROAD, GRIMSBY, ONTARIO**  
**EMISSION SUMMARY AND DISPERSION**  
**MODELLING REPORT**

Project No. 11226032  
 Revision No. -  
 Date Oct 26, 2021

**LAND USE ZONING PLAN**

**FIGURE 2**

Q:\GIS\PROJECTS\11226032\layouts\202110\_ESDMR\11226032\_202110\_ESDMR\_GIS002.mxd  
 Print date: 26 Oct 2021 - 11:54

Data source: Township of West Lincoln Zoning By-Law No. 2017-70, Town of Grimsby Zoning By-law (By-law 14-45), Google Earth Imagery, 07/08/2018





### SITE LEGEND

- PARKING SPACE TAGS
- BARRIER FREE PARKING SPACE
- TREE / PLANTING
- PROPERTY LINE
- ZONING SETBACKS
- GRAVEL
- EXISTING BUILDING
- PROPOSED BUILDING
- RIP-RAP
- SWM POND
- EXTERIOR DOOR / B.F. ENTRANCE
- UNOBSTRUCTED FIRE FIGHTER ACCESS DOOR/WINDOW/PANEL
- OVERHEAD DOOR
- TRUCK ROUTE
- FENCE LINE
- SOD / GRASS
- CONCRETE
- ASPHALT
- RECLAIMED ASPHALT
- FARM FIELD

**ZONING:**  
A - AGRICULTURAL ZONE (REFER TO ZONING INFO TABLE FOR DETAILS)

**OFF-STREET PARKING: (AS PER ZBL SECTION 5.1)**

**EXISTING:**  
 PUMP AND PAST. BUILDING = 532m<sup>2</sup> x 1 SPACE / 90m<sup>2</sup> = 6 SPACES  
 SEPARATION BUILDING = 60m<sup>2</sup> x 1 SPACE / 90m<sup>2</sup> = 1 SPACES  
 EXISTING BUILDINGS = 101m<sup>2</sup> x 1 SPACE / 28m<sup>2</sup> = 4 SPACES  
 TOTAL FOR EXISTING = 11 SPACES

**PROPOSED:**  
 OFFICE = 74m<sup>2</sup> x 1 SPACE / 28m<sup>2</sup> = 3 SPACES  
 PRE-PROCESS BUILDING = 2 230m<sup>2</sup> x 1 SPACE / 90m<sup>2</sup> = 25 SPACES  
 BOILER & HEAT BUILDING = 300m<sup>2</sup> x 1 SPACE / 90m<sup>2</sup> = 4 SPACES  
 PUMP BUILDING #2 = 250m<sup>2</sup> x 1 SPACE / 90m<sup>2</sup> = 3 SPACES  
 TOTAL PROPOSED REQUIRED = 35 SPACES  
 TOTAL PROPOSED PROVIDED = 48 SPACES

**BARRIER FREE (AS PER ZBL SECTION 5.13):**  
 TOTAL REQUIRED PARKING SPACES (1 PER 20 SPACES)  
 (11 EXISTING + 38 PROPOSED) x 1 SPACE / 20 SPACES = 3 SPACES  
 THEREFORE, REQ'D NO. OF BARRIER FREE SPACES = 3 SPACES

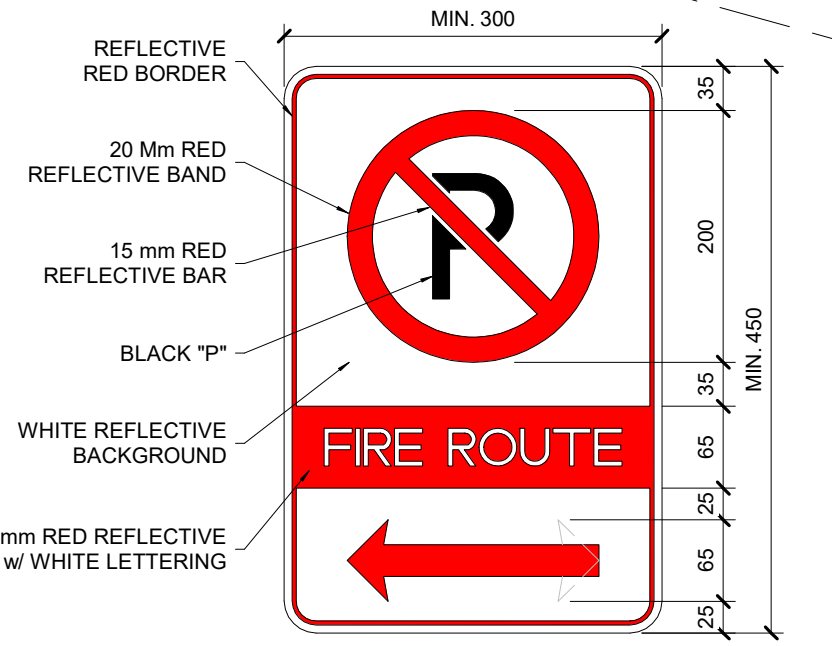
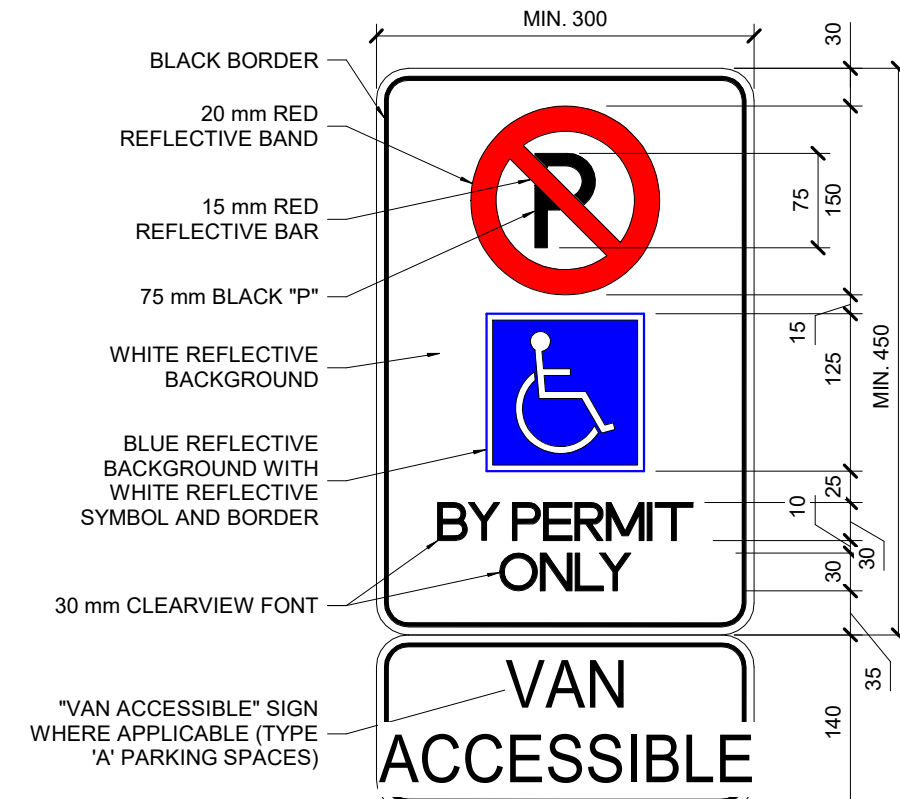
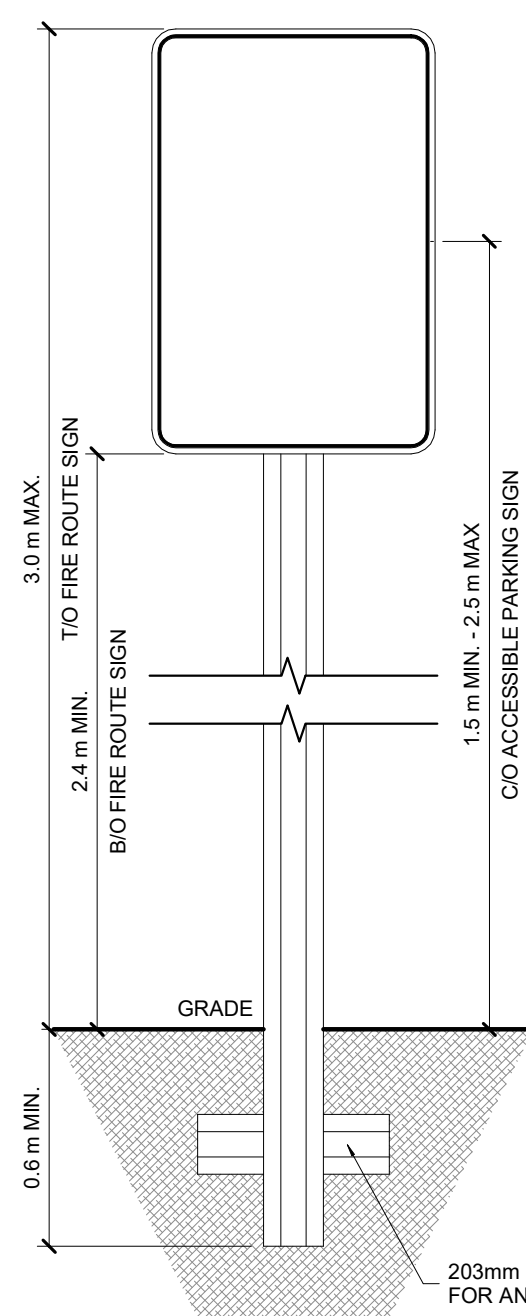
OVERALL TOTAL PROVIDED ON SITE = 46 SPACES  
 - INCLUDING BARRIER FREE

**OFF-STREET LOADING SPACES: (AS PER ZBL SECTION 5.15)**  
 REQUIRED LOADING SPACES (AS PER ZBL SECTION 5.15)  
 GROSS FLOOR AREA (2.351 to 7.900m<sup>2</sup>) = 2 SPACE  
 TOTAL REQUIRED = 2 SPACE  
 TOTAL PROPOSED = 2 SPACE

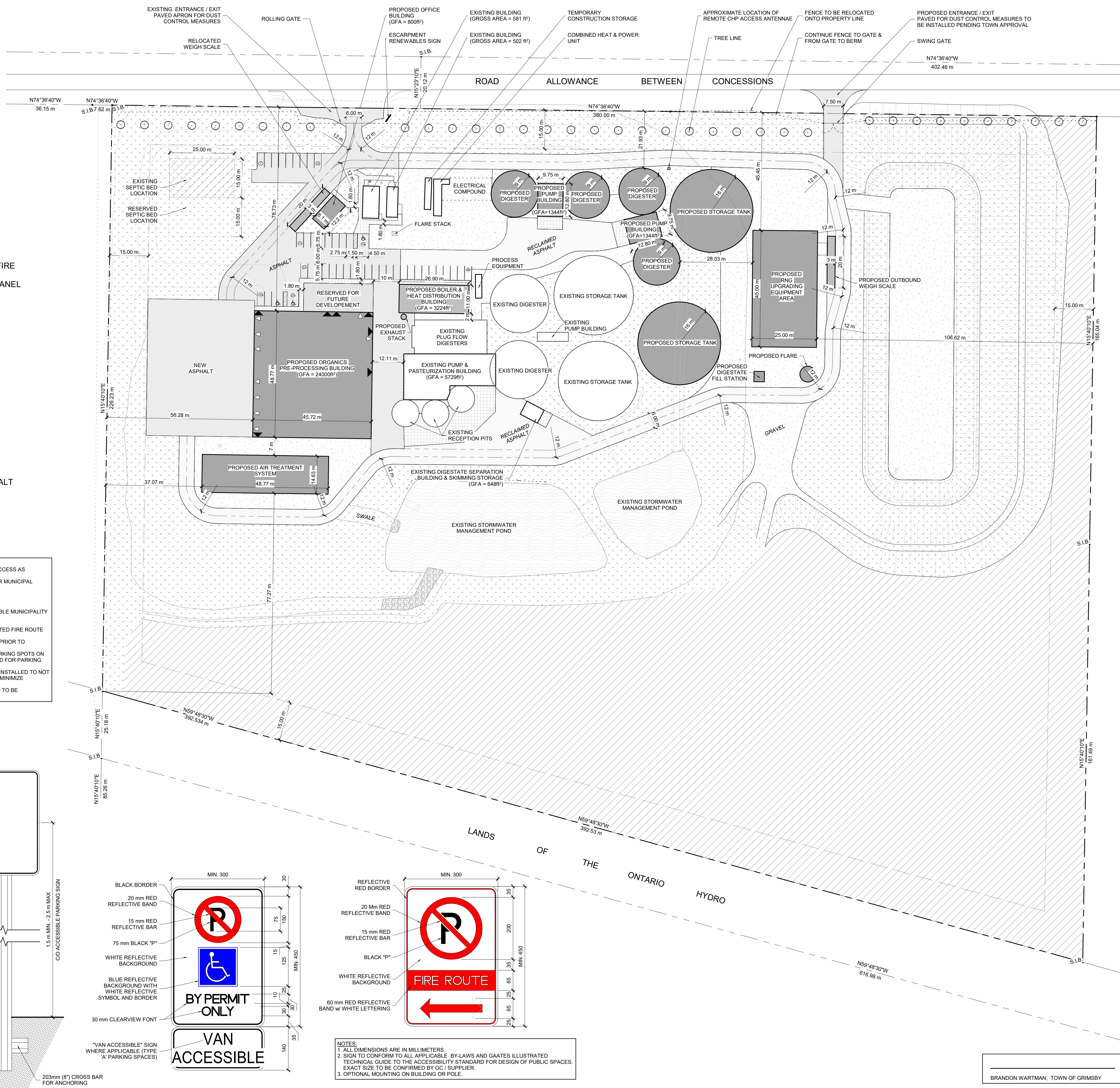
**SITE PLAN NOTES:**

- FIRE ROUTE ACCESS REQUIRES FIRE PERSONNEL ACCESS AS REQUIRED BY OBC.
- FIRE ROUTE TO BE POSTED AND DESIGNATED UNDER MUNICIPAL BY-LAW DESIGN REQUIREMENTS AS FOLLOWS:
  - MIN. 6m WIDE
  - 12m CENTRE LINE TURNING RADIUS
  - MAX. 8% SLOPE
- FIRE ROUTE SIGNS MUST BE STANDARD OF APPLICABLE MUNICIPALITY AND ARE TO BE PLACED AS FOLLOWS:
  - INTERVALS OF NOT LESS THAN 15.2m (50')
  - NOT MORE THAN 45.7m (150') ALONG THE DESIGNATED FIRE ROUTE
  - AT A HEIGHT OF NOT LESS THAN 1.8m (6')
- ANY SITE FENCING TO BE CONFIRMED WITH OWNER PRIOR TO CONSTRUCTION
- STANDARD BUMP BLOCKS TO BE INSTALLED FOR PARKING SPOTS ON GRAVEL SURFACES. PAINTED LINES TO BE INSTALLED FOR PARKING SPOTS ON PAVED SURFACES
- YARD LIGHTING LOCATION AND ORIENTATION TO BE INSTALLED TO NOT INTERFERE WITH TRAFFIC ON COUNTY ROADS PLUS MINIMIZE INTERFERENCE ON NEIGHBORING PROPERTIES.
- PROPERTY LINES ARE APPROXIMATE AND MAY NEED TO BE CONFIRMED BY AN OLS.

ZONING BY-LAW INFORMATION TABLE			
	ZONING BY-LAW	EXISTING	PROPOSED
LOT AREA (MIN.)	400 000 m <sup>2</sup>	105 026 m <sup>2</sup>	105 026 m <sup>2</sup>
LOT FRONTAGE (MIN.)	183 m	380 m	380 m
FRONT YARD SETBACK	15 m	30 m	22.3 m
EAST SIDE YARD SETBACK	15 m	175.4 m	106.2 m
WEST SIDE YARD SETBACK	15 m	97.7 m	37.1 m
REAR YARD SETBACK	15 m	102 m	77.3 m
LOT DEPTH (MIN.)	NO PROVISIONS	226.3 m	226.3 m
BUILDING FLOOR AREA	NO PROVISIONS	N/A	3 546 m <sup>2</sup>
GROSS FLOOR AREA	NO PROVISIONS	N/A	3 546 m <sup>2</sup>
LOT COVERAGE (ALL BLDGS)	20% (MAX.)	N/A	3.4%
LOT COVERAGE (ACCESSORY)	NO PROVISIONS	0%	7.1%
BUILDING HEIGHT (MAX.)	NO PROVISIONS	N/A	14 m
NUMBER OF PARKING SPACES	44	8	47
BARRIER FREE SPACES	3	0	3
NUMBER OF LOADING SPACES	1	3	4
LANDSCAPED AREA	NO PROVISIONS	N/A	74 396 m <sup>2</sup>
GRANULAR AREA	NO PROVISIONS	N/A	8 336 m <sup>2</sup>
PAVED AREA	NO PROVISIONS	N/A	11 271 m <sup>2</sup>

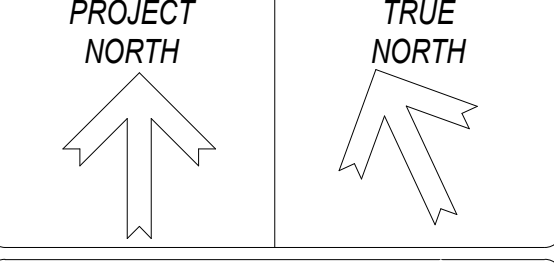


**NOTES:**  
 1. ALL DIMENSIONS ARE IN MILLIMETERS.  
 2. SIGN TO CONFORM TO ALL APPLICABLE BY-LAWS AND GAATES ILLUSTRATED TECHNICAL GUIDE TO THE ACCESSIBILITY STANDARD FOR DESIGN OF PUBLIC SPACES. EXACT SIZE TO BE CONFIRMED BY GC / SUPPLIER.  
 3. OPTIONAL MOUNTING ON BUILDING OR POLE.



**NOTES:**  
 PLEASE READ NOTE PAGE AT BEGINNING OF DRAWING SET FOR ALL NOTES REGARDING THIS PROJECT

**NOTES:**  
 1. OWNER: ESCARPMENT RENEWABLES  
 2. LEGAL DESCRIPTION: PART OF LOT 1 CONCESSION 6 GEOGRAPHIC TOWNSHIP OF GRIMSBY TOWN OF GRIMSBY COUNTY OF LINCOLN  
 3. SITE GRADING, SERVING AND EROSION & SEDIMENT CONTROL PLAN PROVIDED BY GRIT ENGINEERING INC. REFER TO PROJECT No. GE22-0178-1 DRAWING No. C300 & C500



PROFESSIONAL ENGINEER'S SEAL  
**STONECREST ENGINEERING INC.**  
 EST. 1995  
 440 Wright Blvd Unit #2, Stratford, ON, N4Z 1H3  
 519-625-8025 - info@stonecrestengineering.com

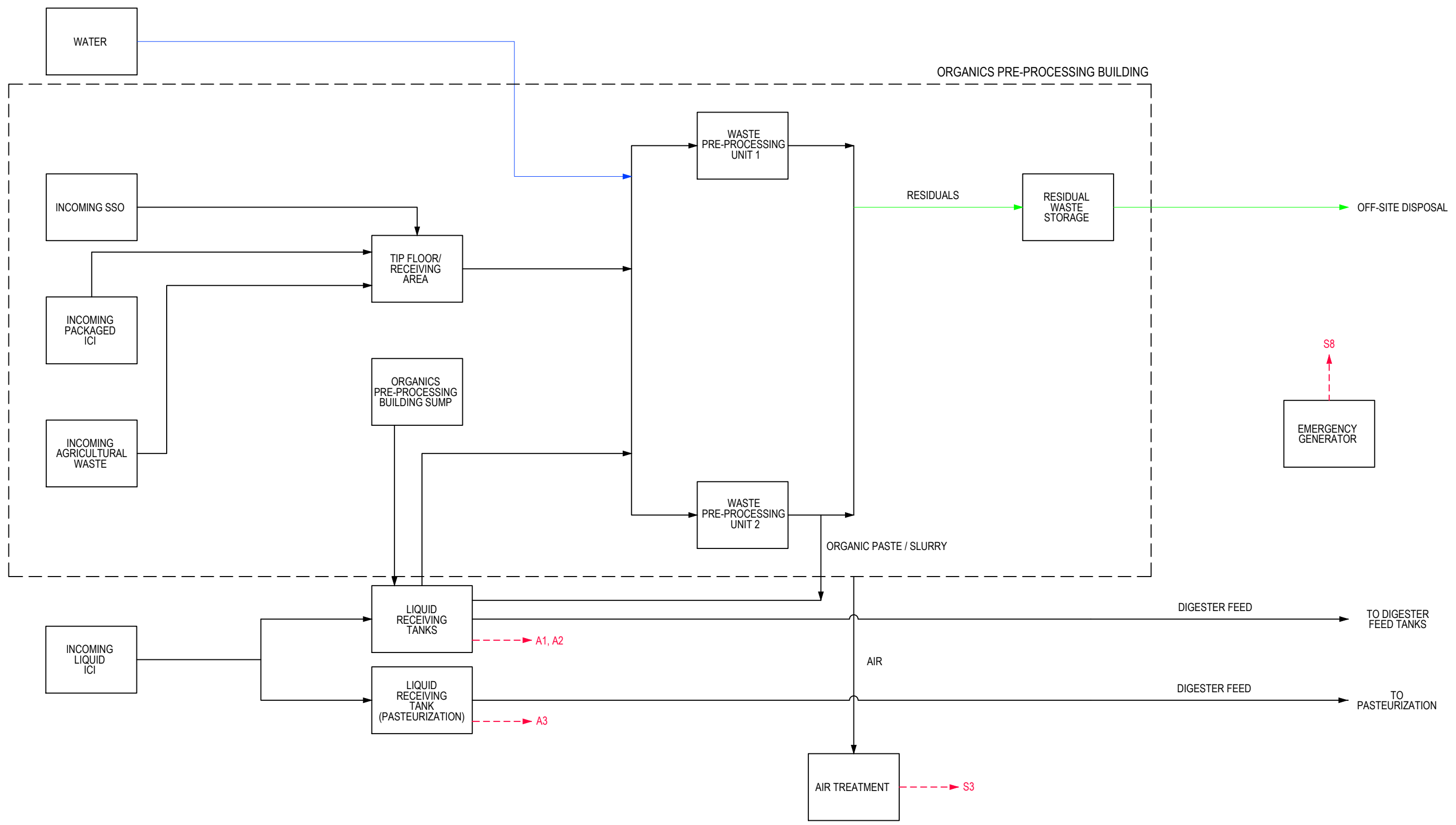
CONTRACTOR TO CHECK ALL DIMENSIONS AND ELEVATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK  
 DO NOT SCALE THE DRAWINGS

**CLIENT:** ESCARPMENT RENEWABLES  
**LOCATION:** 424 SOBYE ROAD, BEAMSVILLE, ON  
**PROJECT NAME:** PRE-PROCESS BUILDING  
**PROJECT STATUS AND VERSION:** CONCEPT DRAWINGS

**DESIGNED BY:** T.L./M.W. **PRINT DATE:** 2024.02.01  
**PAGE DESCRIPTION:** SITE LAYOUT  
**SCALE:** AS NOTED  
**FILE:** 8016-1  
**PAGE NUMBER:**

BRANDON WARTMAN, TOWN OF GRIMSBY

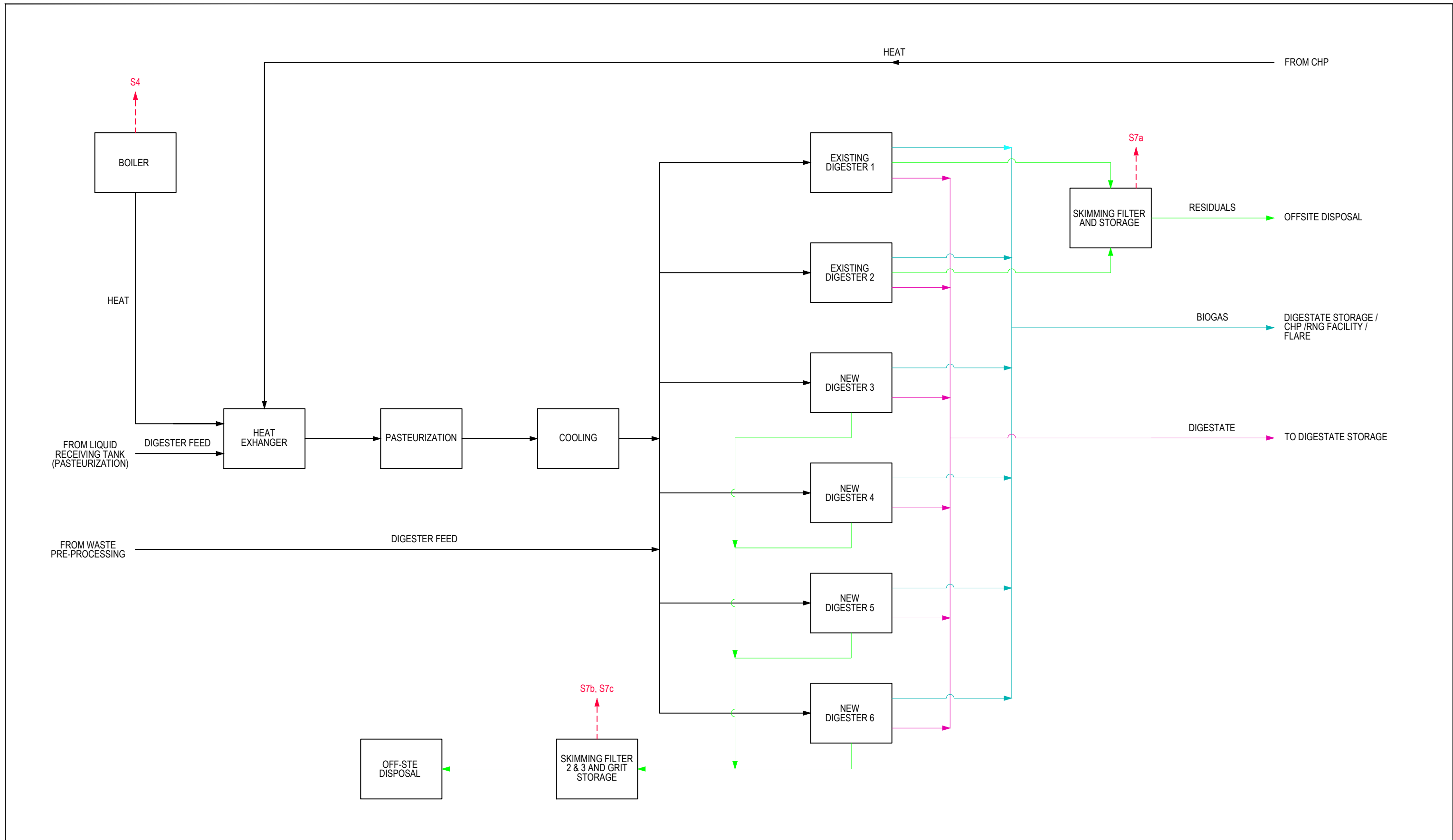




ESCARPMENT RENEWABLES  
 442 SOBYE ROAD, GRIMSBY, ONTARIO  
 EMISSION SUMMARY AND  
 DISPERSION MODELLING REPORT  
**PROCESS FLOW DIAGRAM**  
**WASTE RECEIVING AND PROCESSING**

Project No. 11226032  
 Date January 2022

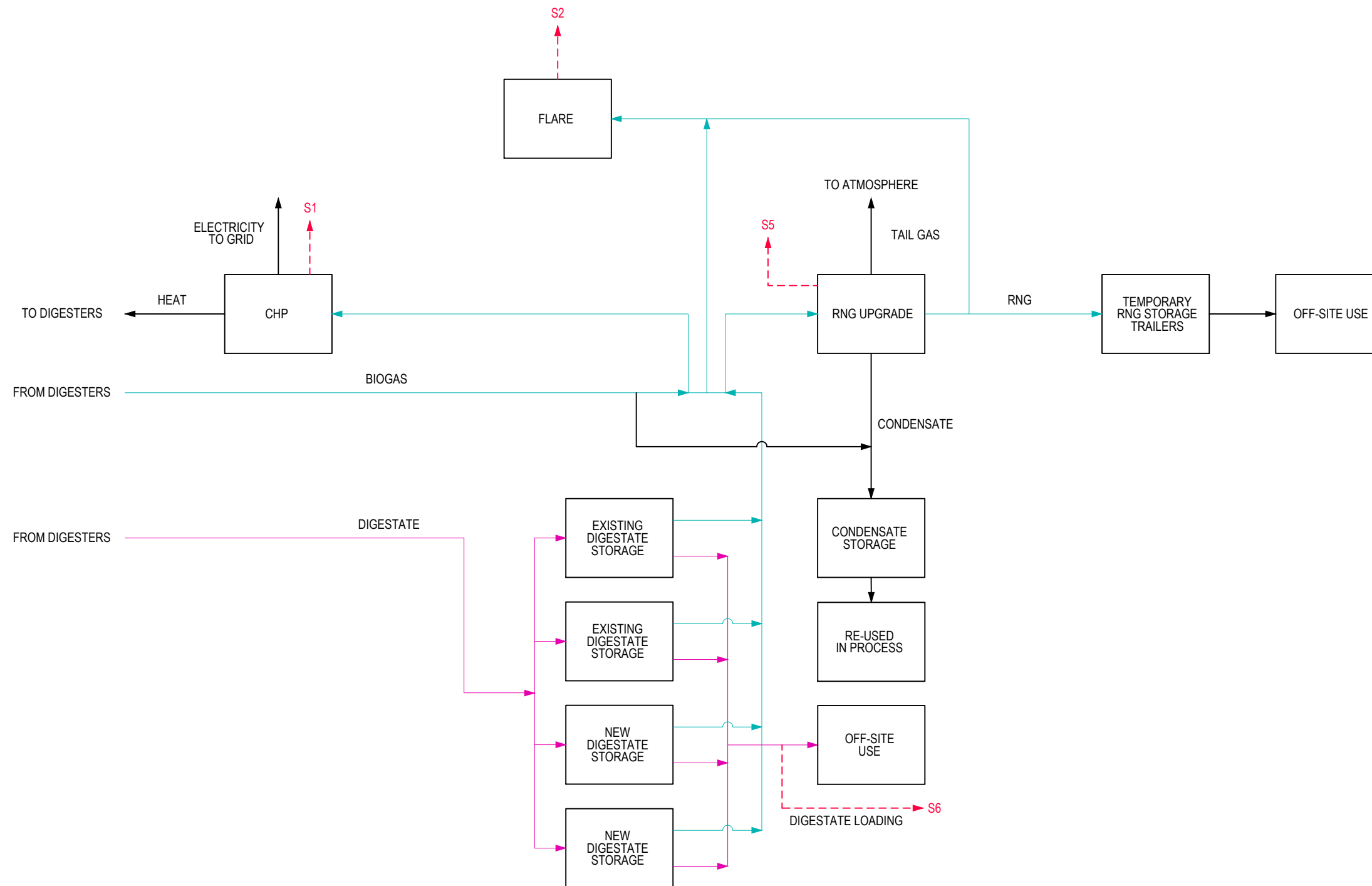
**FIGURE 4A**



ESCARPMENT RENEWABLES  
 442 SOBYE ROAD, GRIMSBY,  
 ONTARIO EMISSION SUMMARY AND  
 DISPERSION MODELLING REPORT  
 PROCESS FLOW DIAGRAM  
 DIGESTION

Project No. 11226032  
 Date January 2022

FIGURE 4B



ESCARPMENT RENEWABLES  
 442 SOBYE ROAD, GRIMSBY, ONTARIO  
 EMISSION SUMMARY AND  
 DISPERSION MODELLING REPORT  
**PROCESS FLOW DIAGRAM**  
**DIGESTATE AND BIOGAS MANAGEMENT**

Project No. 11226032  
 Date January 2022

**FIGURE 4C**

# Tables

Table 1

**Sources and Contaminants Identification Table  
Escarpment Renewables  
Grimsby, Ontario**

Source ID	Source Description	Location	Expected Contaminants	Significant (Y/N)	Rationale
S1	CHP Engines/Turbines	Outdoors	Products of Combustion, Sulphur Dioxide, TRS	Y/N	Some of the contaminants are insignificant. Refer to Appendix C and Table C.1
S2	Closed Flare	Outdoors	Products of Combustion, Sulphur Dioxide, TRS	Y/N	
S3	Biofilter Stack	Organics Pre-Processing Building	Ammonia, Hydrogen Sulphide, Odour	Y	Some of the contaminants are insignificant. Refer to Appendix C and Table C.1
S4	Boiler	Boiler/Heat Distribution Building	Products of Propane Combustion	Y/N	
S5	Biogas Upgrade Tail Gas	RNG Upgrading Facility	Carbon Dioxide, Methane	Y/N	Some of the contaminants are insignificant. Refer to Appendix C and Table C.1
S6	Digestate Loading Displacement Air	Outdoors	Odour	Y	
S7a	Grit Removal Building 1	Grit Removal Building	Odour	Y	Some of the contaminants are insignificant. Refer to Appendix C and Table C.1
S7b	Grit Removal Building 2	Grit Removal Building	Odour	Y	
S7c	Grit Removal Building 3	Grit Removal Building	Odour	Y	
S8	Emergency Generator	Outdoors	Products of Diesel Combustion	Y/N	Some of the contaminants are insignificant. Refer to Appendix C and Table C.1
A1	Receiving Tank #1 Displacement Air	Receiving Tanks - Outdoors	Odour	Y	
A2	Receiving Tank #2 Displacement Air	Receiving Tanks - Outdoors	Odour	Y	Not listed in Table 7-2 or 7-3 of Section 7.4 of the ESDM Procedure Document
A3	Receiving Tank #3 Displacement Air Roads, Parking Lots	Receiving Tanks - Outdoors Outdoors	Odour Dust	Y N	



**Table 2A**  
**Source Summary Table - Sorted by Source**  
**Escarpment Renewables**  
**Grimsby, Ontario**

Source ID	Source Type	Description	Point Source Data							Contaminant	CAS No.	Emission Data					
			Stack Flow Rate (m <sup>3</sup> /s)	Stack Exit Gas Temperature (C)	Stack Inner Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Exhaust Orientation	Source Coordinates			Maximum Emission Rate (g/s) or (OU/m <sup>2</sup> -s)	Averaging Period (hours)	Emission Estimation Technique	Emission Data Quality	% of Overall Emissions (%)	
									X (m)								Y (m)
S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	Nitrogen Oxides	10102-44-0	1.67E-02	1-hr, 24-hr	EF	AA	4%
S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	Particulate Matter	NA-PM	6.31E-03	24-hr	EF	AA	4%
S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	Carbon Monoxide	630-08-0	1.95E-02	1/2-hr	EF	AA	3%
S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	Sulphur Dioxide	7446-09-5	1.17E-03	1-hr, Annual	EF	AA	4%
S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	TRS	NA-02	2.69E-05	10-minute	EF	AA	4%
S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	Nitrogen Oxides	10102-44-0	3.73E-01	1-hr, 24-hr	EF	AA	87%
S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	Particulate Matter	NA-PM	1.41E-01	24-hr	EF	AA	87%
S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	Carbon Monoxide	630-08-0	4.36E-01	1/2-hr	EF	AA	64%
S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	Sulphur Dioxide	7446-09-5	2.61E-02	1-hr, Annual	EF	AA	94%
S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	TRS	NA-02	5.99E-04	10-minute	EF	AA	96%
S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	Odour	NA-01	2.26E+04	10-minute	EC	A	91%
S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	Ammonia	7664-41-7	3.03E-02	24-hr	EC	A	100%
S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	Hydrogen Sulphide	7783-06-4	3.03E-02	10-minute, 24-hr	EC	A	100%
S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	Nitrogen Oxides	10102-44-0	4.14E-02	1-hr, 24-hr	EF	M	10%
S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	Particulate Matter	NA-PM	3.14E-03	24-hr	EF	M	2%
S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	Carbon Monoxide	630-08-0	3.47E-02	1/2-hr	EF	M	5%
S5	Point	Biogas Upgrade Tail Gas	25.70	25	1.28	5	2	Vertical	618945.3893	4778213.216	Carbon Dioxide	124-38-9	3.34E+02	24-hr	EF	A	100%
S6	Point	Digestate Loading Displacement Air	0.03	25	0.30	4	-	Capped	618926.2748	4778187.167	Odour	NA-01	7.69E+01	10-minute	EC	A	<1%
S7a	Point	Grit Removal Building 1	0.94	Ambient	0.50	2.5	-	Horizontal	618836.71	4778201.4	Odour	NA-01	6.42E+02	10-minute	EC	A	3%
S7b	Point	Grit Removal Building 2	0.94	Ambient	0.50	2.5	-	Horizontal	618861.3713	4778259.922	Odour	NA-01	6.42E+02	10-minute	EC	A	3%
S7c	Point	Grit Removal Building 3	0.94	Ambient	0.50	2.5	-	Horizontal	618883.1453	4778255.913	Odour	NA-01	6.42E+02	10-minute	EC	A	3%
S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	Nitrogen Oxides	10102-44-0 (Emergency)	2.22E-01	1-hr, 24-hr	EF	M	100%
S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	Particulate Matter	NA-PM	1.11E-02	24-hr	EF	M	7%
S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	Carbon Monoxide	630-08-0	1.94E-01	1/2-hr	EF	M	28%
S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	Sulphur Dioxide	7446-09-5	4.25E-04	1-hr, Annual	EF	M	2%
A1	Area Circle	Receiving Tank #1 Displacement Air	-	-	-	0.3	-	-	618788.9	4778210.06	Odour	NA-01	8.02E+01	10-minute	EC	A	<1%
A2	Area Circle	Receiving Tank #2 Displacement Air	-	-	-	0.3	-	-	618800.03	4778206.98	Odour	NA-01	8.02E+01	10-minute	EC	A	<1%
A3	Area Circle	Receiving Tank #3 Displacement Air	-	-	-	0.3	-	-	618811.12	4778209.47	Odour	NA-01	8.02E+01	10-minute	EC	A	<1%

## Notes:

EC - Engineering Calculation  
EF - Emission Factor  
AA - Above Average  
A - Average  
M - Marginal

**Table 2B**  
**Source Summary Table - Sorted by Contaminant**  
**Escarpment Renewables**  
**Grimsby, Ontario**

Contaminant	CAS No.	Source ID	Source Type	Description	Point Source Data						Emission Data						
					Stack Flow Rate (m <sup>3</sup> /s)	Stack Exit Gas Temperature (C)	Stack Inner Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Exhaust Orientation	Source Coordinates		Maximum Emission Rate (g/s) or (OU/m <sup>2</sup> -s)	Averaging Period (hours)	Emission Estimation Technique	Emission Data Quality	% of Overall Emissions (%)
											X (m)	Y (m)					
Ammonia	7664-41-7	S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	3.03E-02	24-hr	EC	A	100%
Carbon Dioxide	124-38-9	S5	Point	Biogas Upgrade Tail Gas	25.70	25	1.28	5	2	Vertical	618945.3893	4778213.216	3.34E+02	24-hr	EF	A	100%
Carbon Monoxide	630-08-0	S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	1.95E-02	1/2-hr	EF	AA	3%
Carbon Monoxide	630-08-0	S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	4.36E-01	1/2-hr	EF	AA	64%
Carbon Monoxide	630-08-0	S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	3.47E-02	1/2-hr	EF	M	5%
Carbon Monoxide	630-08-0	S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	1.94E-01	1/2-hr	EF	M	28%
Hydrogen Sulphide	7783-06-4	S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	3.03E-02	10-minute, 24-hr	EC	A	100%
Nitrogen Oxides	10102-44-0	S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	1.67E-02	1-hr, 24-hr	EF	AA	4%
Nitrogen Oxides	10102-44-0	S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	3.73E-01	1-hr, 24-hr	EF	AA	87%
Nitrogen Oxides	10102-44-0	S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	4.14E-02	1-hr, 24-hr	EF	M	10%
Nitrogen Oxides	10102-44-0 (Emergency)	S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	2.22E-01	1-hr, 24-hr	EF	M	100%
Odour	NA-01	S3	Point	Biofilter Stack	21.75	25	1.47	20	17	Vertical	618744.3731	4778198.364	2.26E+04	10-minute	EC	A	91%
Odour	NA-01	S6	Point	Digestate Loading Displacement Air	0.03	25	0.30	4	-	Capped	618926.2748	4778187.167	7.69E+01	10-minute	EC	A	<1%
Odour	NA-01	S7a	Point	Grit Removal Building 1	0.94	Ambient	0.50	2.5	-	Horizontal	618836.71	4778201.4	6.42E+02	10-minute	EC	A	3%
Odour	NA-01	S7b	Point	Grit Removal Building 2	0.94	Ambient	0.50	2.5	-	Horizontal	618861.3713	4778259.922	6.42E+02	10-minute	EC	A	3%
Odour	NA-01	S7c	Point	Grit Removal Building 3	0.94	Ambient	0.50	2.5	-	Horizontal	618883.1453	4778255.913	6.42E+02	10-minute	EC	A	3%
Odour	NA-01	A1	Area Circle	Receiving Tank #1 Displacement Air	-	-	-	0.3	-	-	618788.9	4778210.06	8.02E+01	10-minute	EC	A	<1%
Odour	NA-01	A2	Area Circle	Receiving Tank #2 Displacement Air	-	-	-	0.3	-	-	618800.03	4778206.98	8.02E+01	10-minute	EC	A	<1%
Odour	NA-01	A3	Area Circle	Receiving Tank #3 Displacement Air	-	-	-	0.3	-	-	618811.12	4778209.47	8.02E+01	10-minute	EC	A	<1%
Particulate Matter	NA-PM	S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	6.31E-03	24-hr	EF	AA	4%
Particulate Matter	NA-PM	S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	1.41E-01	24-hr	EF	AA	87%
Particulate Matter	NA-PM	S4	Point	Boiler	0.36	150	0.15	3.5	-	Vertical	618821.73	4778239.017	3.14E-03	24-hr	EF	M	2%
Particulate Matter	NA-PM	S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	1.11E-02	24-hr	EF	M	7%
Sulphur Dioxide	7446-09-5	S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	1.17E-03	1-hr, Annual	EF	AA	4%
Sulphur Dioxide	7446-09-5	S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	2.61E-02	1-hr, Annual	EF	AA	94%
Sulphur Dioxide	7446-09-5	S8	Point	Emergency Generator	0.73	500	0.15	1.83	-	Vertical	618841.516	4778283.622	4.25E-04	1-hr, Annual	EF	M	2%
TRS	NA-02	S1	Point	CHP Engines/Turbines	0.60	150	0.15	9	6	Vertical	618823.2	4778286.86	2.69E-05	10-minute	EF	AA	4%
TRS	NA-02	S2	Point	Closed Flare	0.82	981	2.64	12.3	-	Vertical	618945.0257	4778186.179	5.99E-04	10-minute	EF	AA	96%

## Notes:

EC - Engineering Calculation  
EF - Emission Factor  
AA - Above Average  
A - Average  
M - Marginal

Table 3

**Dispersion Modelling Input Summary Table  
Escarpment Renewables  
Grimsby, Ontario**

<b>Relevant Section of the Regulation</b>	<b>Section Title</b>	<b>Description of How the Approved Dispersion Model was Used</b>
Section 8	Negligible Sources	Sources and contaminants that were considered negligible were explicitly identified, and therefore were not modelled, in accordance with s.8 of O. Reg. 419. See Table 1 - Sources and Contaminants Identification Table and Appendix B of the ESDM Report for more information
Section 9	Same Structure Contamination	Not applicable as the Escarpment Renewables is the only tenant occupying the site, and does not have a child care facility, health care facility, seniors' residence, long-term care facility or an educational facility located at the Facility
Section 10	Operating Conditions	All equipment was assumed to be operating at the maximum production rates at the same time. See Section 4.1 and Appendix A of the ESDM Report.
Section 11	Source of Contaminant Emission Rate	The emission rate for each significant contaminant emitted from a significant source was estimated, the methodology for the calculation is documented in Table 2 - Source Summary Table. See Section 4.1 and Section 4.2 and Appendix A of the ESDM Report for more information.
Section 12	Combined Effect of Assumptions for Operating Conditions and Emission Rates	The operating conditions were estimated in accordance with s.10(1) and 1 and S.11 (1) 1 of O. Reg. 419 and are therefore considered to result in the highest concentrations at POI that the Facility is capable of for the contaminants emitted. See Section 4.1 and Section 4.2 of the ESDM Report.
Section 13	Meteorological Conditions	MECP provided meteorological data
Section 14	Area of Modelling Coverage	The modelling coverage used correspond to the receptor grid specified in Section 14 (1) of O. Reg. 419.
Section 15	Stack Height	Please refer to Table 2.
Section 16	Terrain Data	Terrain Data was obtained from the Ontario MECP and was processed using AERMAP.
Section 17	Averaging Periods	The averaging periods required under Schedule 3 were used. For odour the hourly averaging period was converted to a 10-min average.

Table 4

Emission Summary Table  
Escarpment Renewables  
Grimsby, Ontario

Contaminant	CAS No.	Total Facility Emission Rate (g/s) or (OU*m <sup>3</sup> /s)	Air Dispersion Model Used	Max. POI Concentration (OU/m <sup>3</sup> ) or (µg/m <sup>3</sup> )	Averaging Period	MECP Screening Limit <sup>(2)</sup> (OU/m <sup>3</sup> ) or (µg/m <sup>3</sup> )	Limiting Effect	Benchmark Category	Percentage of MECP POI Limit
Ammonia	7664-41-7	3.03E-02	AERMOD v.19191	0.579	24-hr	100	Health	B1	<1%
Carbon Monoxide	630-08-0	6.85E-01	AERMOD v.19191	455.458	0.5-hr	6,000	Health	B1	8%
Carbon Dioxide	124-38-9	3.34E+02	AERMOD v.19191	58880.674	24-hr	255,800	Health	B2	23%
Hydrogen Sulphide	7783-06-4	3.03E-02	AERMOD v.19191	4.136	10-minute	13	Health	B1	32%
Hydrogen Sulphide	7783-06-4	3.03E-02	AERMOD v.19191	0.579	24-hr	7	Odour	B1	8%
Nitrogen Oxides	10102-44-0	4.31E-01	AERMOD v.19191	272.809	1-hr	400	Health	B1	68%
Nitrogen Oxides	10102-44-0	4.31E-01	AERMOD v.19191	57.613	24-hr	200	Health	B1	29%
Nitrogen Oxides	10102-44-0 (Emergency)	2.22E-01	AERMOD v.19191	511.822	0.5-hr	1,880	Health	Emergency	27%
Odour - Receptor	NA-01	2.48E+04	AERMOD v.19191	- <sup>(4)</sup>	10-minute	-	Odour	-	- <sup>(4)</sup>
Particulate Matter	NA-PM	1.61E-01	AERMOD v.19191	21.675	24-hr	120	Visibility	B1	18%
Sulphur Dioxide (Effective July	7446-09-5	2.77E-02	AERMOD v.19191	14.782	1-hr	100 (3)	Health & Vegetation	B1	15%
Sulphur Dioxide (Effective July	7446-09-5	2.77E-02	AERMOD v.19191	0.618	annual	10 (3)	Health & Vegetation	B1	6%
Total Reduced Sulphur	NA-02	6.26E-04	AERMOD v.19191	0.556	10-min	13	Odour	B1	4%

Notes:

NA - Not applicable

(1) The 1-hr maximum concentration was converted to a 10-min average using a conversion factor of 1.65 as specified in the ADMGO, MECP guidance document.

(2) Criteria listed in the MECP Air Contaminants Benchmarks (ACB) List: Standards, Guidelines, and Screening Levels for Assessing POI Concentrations of Air Contaminants dated April 2018

(3) Proposed Sulphur Dioxide Limits to be implemented by 2020 as per the MECP document "Ontario Air Standards For Sulphur Dioxide (SO<sub>2</sub>)" dated March 2018

(4) Odour concentration is such that it will not result in odour complaints at sensitive receptors.

B1 - Benchmark 1 - Exceedence of a Benchmark 1 concentration triggers specific actions under the Regulation.

B2 - Benchmark 2 - Exceedence of a Benchmark 2 concentration triggers a toxicological assessment to determine the likelihood of adverse effect.

# Appendices

# **Appendix A**

**Existing Renewable Energy Approval**

**Content Copy Of Original**



Ministry of the Environment, Conservation and Parks  
Ministère de l'Environnement, de la Protection de la nature et des Parcs

**AMENDMENT TO RENEWABLE ENERGY APPROVAL  
NUMBER 8541-9HSGG3  
Issue Date: April 22, 2020**

1414229 Ontario Limited operating as Escarpment Renewables  
180 Renfrew Drive, Unit 130  
Markham, Ontario  
L3R 9Z2

**Site Location:** Grimsby Energy Inc. Anaerobic Digester  
424 Sobie Rd  
Grimsby Town, Regional Municipality of Niagara  
L3M 4E7

*You are hereby notified that I have amended Approval No. 8541-9HSGG3 issued on October 1, 2014 for a Class 3 anaerobic digestion facility , as follows:*

**A. The Company name and address has been changed:**

FROM: Grimsby Energy Incorporated  
231 Roberts Rd  
Grimsby, Ontario  
L3M 5N2

TO: 1414229 Ontario Limited operating as Escarpment Renewables  
180 Renfrew Drive, Unit 130  
Markham, Ontario  
L3R 9Z2

**B. The definitions of the "Application" and "Company" of the Approval are deleted and replaced by the following:**

4. "Application" means the application for a Renewable Energy Approval dated February 26, 2013, signed by James Detenbeck, President, Grimsby Energy Inc., and all supporting documentation submitted with the application, including amended documentation submitted up to September 2, 2014; and as further amended by the application for an amendment to the Renewable Energy Approval dated June 26, 2017, signed by Gerhard Klammer, CEO, PurEnergy Resources Inc., and all supporting documentation submitted with the application, including amended documentation submitted up to November 17, 2017; and as further amended by the application for an amendment to the Renewable Energy Approval dated October 18, 2019, signed by Jud Whiteside, President, and all supporting documentation submitted with the application, including amended documentation submitted up to April 1, 2020.

10. "Company" means 1414229 Ontario Limited operating as Escarpment Renewables and includes its successors and assignees;

**All other Terms and Conditions of the Approval remain the same.**

**This Notice shall constitute part of the approval issued under Approval No. 8541-9HSGG3 dated October 1, 2014**

*In accordance with Section 139 of the Environmental Protection Act, within 15 days after the service of this notice, you may by further written notice served upon the Director, the Environmental Review Tribunal and the Minister of the Environment, Conservation and Parks, require a hearing by the Tribunal.*

*In accordance with Section 47 of the Environmental Bill of Rights, 1993, the Minister of the Environment, Conservation and Parks will place notice of your request for a hearing on the Environmental Registry.*

*Section 142 of the Environmental Protection Act provides that the notice requiring the hearing shall state:*

- a. The portions of the renewable energy approval or each term or condition in the renewable energy approval in respect of which the hearing is required, and;
- b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The signed and dated notice requiring the hearing should also include:*

1. The name of the appellant;
2. The address of the appellant;
3. The renewable energy approval number;
4. The date of the renewable energy approval;
5. The name of the Director;
6. The municipality or municipalities within which the project is to be engaged in;

*This notice must be served upon:*

**The Secretary\*  
Environmental Review  
Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5**

**AND**

**The Minister of the  
Environment, Conservation  
and Parks  
777 Bay Street, 5th Floor  
Toronto, Ontario  
M7A 2J3**

**AND**

**The Director  
Section 47.5, *Environmental  
Protection Act*  
Ministry of the Environment,  
Conservation and Parks  
135 St. Clair Avenue West, 1st Floor  
Toronto, Ontario  
M4V 1P5**

**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**



*Under Section 142.1 of the Environmental Protection Act, residents of Ontario may require a hearing by the Environmental Review Tribunal within 15 days after the day on which notice of this decision is published in the Environmental Registry. By accessing the Environmental Registry at <https://ero.ontario.ca/>, you can determine when this period ends.*

*Approval for the above noted renewable energy project is issued to you under Section 47.5 of the Environmental Protection Act subject to the terms and conditions outlined above.*

DATED AT TORONTO this 22nd day of April, 2020

Mohsen Keyvani, P.Eng.  
Director  
Section 47.5, *Environmental Protection Act*

JG/  
c: District Manager, MECP Niagara  
Christine McLeod, Miller Waste Systems Inc.

# **Appendix B**

## **Supporting Calculation**

# Appendix B Supporting Calculations Escarpment Renewables

## Usage Rates

The usage rates found in Table B.1 correspond to the operating conditions that would result in maximum emission rate in accordance with s.10 and s.11 of O. Reg. 419/05.

## List of Combustion Equipment

A list of combustion equipment and their associated ratings are found in Table B.2.

## Emission Calculations

**Source:** S1 and S2 - Digester Gas Combustion

**Methodology:** Emission Factor (EF)

The estimated maximum emission rate for nitrogen oxides (NOx), Particulate Matter and Carbon Monoxide were determined based on the USEPA AP-42 emission factors from Chapter 2.4, emission factors for digester gas combustion in flares.

The estimated maximum emission rate for sulphur dioxide (SO<sub>2</sub>) was determined based on an emission factor calculation methodology from the document entitled "Air Quality Emissions and Impact, Milbank Community Foundation dba Midwest Dairy Institute". A hydrogen sulphide content of 10 parts per million (ppm) was assumed and is reflective of typical digester gas composition. An AP-42 Conversion factor obtained by dividing the molecular weight of hydrogen sulphide by a value of 385.1 was used to convert ppm to lb/MMft<sup>3</sup>. The calculated emission factor was multiplied by the maximum heat input rating to determine an emission rate. Emission estimates from S1 are provided in Table B.3 and the emission estimates from S2 are provided in Table B.4.

Hydrogen Sulphide Content =	10 ppm
AP-42 Conversion Factor (ppm to lbs/MMft <sup>3</sup> ) =	0.088 lbs/MMft <sup>3</sup>
Weight fraction of sulphur in hydrogen sulphide =	0.9408 lb S/lb H <sub>2</sub> S
Weight fraction of sulphur in sulphur dioxide =	0.5 lb S/lb SO <sub>2</sub>
Heat Content of Digester Gas =	614 MMBtus/MMft <sup>3</sup>

The USEPA quotes these emission factor as having a quality rating of "A".

**Sample Calculation:** Sulphur Dioxide emissions from CHP (S1)

$$EF = 10 \text{ ppm} \times \frac{0.088 \text{ lb H}_2\text{S}}{\text{MMft}^3} \times \frac{0.9408 \text{ SO}_2}{\text{lb H}_2\text{S}} \times \frac{\text{MMft}^3}{614 \text{ MMBTU}}$$

$$EF = 0.0027 \frac{\text{lb SO}_2}{\text{MMBTU}}$$

$$ER = 0.0027 \frac{lb SO_2}{MMBTU} \times \frac{3,412,000 BTU}{hr} \times \frac{MMBTU}{1,000,000 BTU} \times \frac{hr}{3600 sec} \times \frac{kg}{2.2 lbs} \times \frac{1000 g}{kg}$$

$$ER = 1.17 \times 10^{-3} \frac{g}{s}$$

**Sample Calculation:** Nitrogen Oxide emissions from CHP (S1)

$$ER = \frac{3,412,000 BTU}{hr} \times 631 \frac{kg}{10^6 m^3} \times \frac{ft^3}{614 BTU} \times \frac{1 m^3}{35.28 ft^3} \times \frac{1000g}{kg} \times \frac{hr}{3600 sec} \times 60.7\% methane$$

$$ER = 1.67 \times 10^{-2} \frac{g}{s}$$

**Data Quality:** Above Average

Section 9.2.3 of the ESDM Procedure Document titled "Average Data Quality" Emission Estimating Techniques includes emission estimates that are developed from tests on a reasonable number of facilities where the source category population is sufficiently specific to minimize variability.

Section 9.2.2 of the ESDM Procedure Document titled "Above Average Data Quality" Emission Estimating Techniques includes emission estimates with a USEPA AP-42 emission factor quality rating of "A" or "B".

**Operating Condition, Individual Maximum Rates of Production:**

The emission rate calculation for these sources are based on each piece of combustion equipment operating simultaneously at its maximum firing rate.

**Source:** S4 – Boiler

**Methodology:** Emission Factor (EF)

The emissions from the natural gas/propane fueled generator have been calculated based on USEPA AP-42 Chapter 1.4, Table 1.4-1 and Chapter 1.5, Table 1.5-1 respectively. The estimated emissions from the boiler are presented in Table B.5.

**Sample Calculation:** Carbon Monoxide emissions from Natural Gas Burning Boiler (S4)

$$ER = \frac{3,353,996 BTU}{hr} \times 1,344 \frac{1 kg NOx}{k10^6 m^3} \times \frac{1000 g}{kg} \times \frac{1 ft^3}{1,020 BTU} \times \frac{0.0283 m^3}{ft^3} \times \frac{1 hr}{3600 sec}$$

$$ER = 2.61 \times 10^{-2} \frac{g}{s}$$

**Data Quality:** Marginal

Section 9.2.4 of the ESDM Procedure Document titled "Marginal Data Quality" Emission Estimating Techniques, includes emission factors with a rating of "D".

**Operating Condition, Individual Maximum Rates of Production:**

The emission estimates for this source is based on the boiler operating at its maximum firing rate.

**Source:** S8 – Emergency Generator

**Methodology:** Emission Factor (EF)

The emissions from the diesel-fueled generator have been calculated based on US EPA Tier 3 standards for "Nonroad Compression-Ignition Engines: Exhaust Emission Standards" (EPA-420-B-16-022, March 2016). The sulphur dioxide emissions were estimated using a typical fuel consumption rate and sulphur content in diesel. The estimated emissions from the generators are presented in Table B.6.

**Sample Calculation:** Nitrogen Oxide emissions from Emergency Generator (S8)

$$ER = 200 \text{ kW} \times 4 \frac{\text{g}}{\text{kW} - \text{hr}} \times \frac{1 \text{ hr}}{3600 \text{ sec}}$$

$$ER = 0.22 \frac{\text{g}}{\text{s}}$$

**Sample Calculation:** Sulphur Dioxide emissions from Emergency Generator (S8)

$$ER = 51 \frac{\text{kg}}{\text{hr}} \times 15 \frac{\text{mg}}{\text{kg}} \times \frac{1 \text{ g}}{1000 \text{ mg}} \times \frac{1 \text{ hr}}{3600 \text{ sec}}$$

$$ER = 4.25 \times 10^{-4} \frac{\text{g}}{\text{s}}$$

**Data Quality:** Marginal

Section 9.2.4 of the ESDM Procedure Document titled "Marginal Data Quality" Emission Estimating Techniques, includes emission factors with a rating of "D", and calculations where the scientific/technical integrity of the approach is uncertain.

**Operating Condition, Individual Maximum Rates of Production:**

The emission estimates for this source is based on the emergency generator operating at its maximum firing rate.

**Source:** A1, A2, A3, S3, S6, S7a, S7b, S7c – Odour, Ammonia, and Hydrogen Sulphide Emissions

**Methodology:** Emission Factor (EF)

The odour detection threshold emission factor (EF) must be converted to an odour emission rate (OU/s). The source flow rate (m<sup>3</sup>/s) and the odour detection threshold emission factor (OU/s) were used to estimate the emissions. The odour concentration value was based on the document entitled "Odor Threshold Emission Factors for Common WWTP Processes" from St. Croix Sensory Inc., dated April 2008.

The estimated emissions from the processes are presented in Table B.7.

**Sample Calculation:** Odour emissions from the Receiving Tank #1 Displacement Air (A1)

$$ER = ODT \times Q$$

$$ER = 7,000 \times 0.0115 \frac{\text{m}^3}{\text{s}}$$

$$ER = 80.2 \frac{\text{OU m}^3}{\text{s}}$$

Where:

ER = Emission rate of compound (OU m<sup>3</sup>/s or g/s)

ODT = Odour concentration of compound (OU/m<sup>3</sup> or g/ m<sup>3</sup>)

Q = aerated air flow rate (m<sup>3</sup>/s)

**Data Quality:** Average

Section 9.2.3 of the ESDM Procedure Document titled "Average Data Quality" Emission Estimating Techniques includes emission factor calculations with USEPA emission factor quality rating of "C".

**Operating Condition, Individual Maximum Rates of Production:**

The emission rate calculations for these sources are based on maximum operating conditions and published emission factors specific to these processes.

**Source:** S5 – Tail Gas Emissions

**Methodology:** Engineering Calculation (EC)

The Biogas Upgrade Facility will emit a tail gas of carbon dioxide and methane. The source flow rate was used to calculate a contaminant flow rate based on the design values of 40% of the biogas being carbon dioxide and 60% being methane with 98.5% of this being recovered. Based on the compound densities their maximum emission rates were calculated.

The estimated emissions from the tail gas are presented in Table B.8.

**Sample Calculation:** Methane emissions from the Biogas Upgrade Tail Gas (S5)

$$ER = 1,542 \frac{m^3}{hr} \times 60\% \text{ methane} \times (100\% - 98.5\% \text{ recovered methane}) \times 0.621 \frac{kg}{m^3} \times 1000 \frac{g}{kg} \times \frac{hr}{3,600 s}$$

$$ER = 2.39 \frac{g}{s}$$

**Data Quality:** Average

Section 9.2.3 of the ESDM Procedure Document titled "Average Data Quality" Emission Estimating Techniques includes Engineering Calculations.

**Operating Condition, Individual Maximum Rates of Production:**

The emission rate calculations for this source are based on maximum operating conditions.

Table B.1

**Product Usage Rates  
Escarpment Renewables  
Grimsby, Ontario**

<b>Source Designation</b>	<b>Description</b>	<b>Maximum Processing Rate</b>
S1	CHP Engines/Turbines	1,000.00 kW
S2	Flare	104,700.00 ft <sup>3</sup> /hour
S3	Biofilter Stack	1,879,344.00 m <sup>3</sup> /day
S4	Boiler	983.00 kW
S5	Biogas Upgrade Tail Gas	1,542.00 m <sup>3</sup> /hr
S6	Digestate Loading Displacement Air	384.10 m <sup>3</sup> /day
S7a	Grit Removal Building 1	0.94 m <sup>3</sup> /s
S7b	Grit Removal Building 2	0.94 m <sup>3</sup> /s
S7c	Grit Removal Building 3	0.94 m <sup>3</sup> /s
S8	Emergency Diesel Generator	200.00 kW
A1	Receiving Tank #1 Displacement Air	55.01 m <sup>3</sup> /day
A2	Receiving Tank #2 Displacement Air	55.01 m <sup>3</sup> /day
A3	Receiving Tank #3 Displacement Air	55.01 m <sup>3</sup> /day

**Table B.2****List of Combustion Equipment  
Escarpment Renewables  
Grimsby, Ontario**

<b>Source ID</b>	<b>Description</b>	<b>Ratings (kW)</b>	<b>Ratings (BTU/hr)</b>
S1	CHP Engines/Turbines	1,000	3,412,000
S2	Closed Flare	22,304	76,100,000
S4	Standby Boiler Exhaust 983 kW	983	3,353,996
S8	Standby Diesel Generator	200	682,400



**Table B.3**

**Estimated Emissions from use of CHP  
Escarpment Renewables  
Grimsby, Ontario**

**Maximum CHP (S1) Heat Input Rating (Digester Gas):** 3,412,000 Btu/hr

<b>Compound</b>	<b>CAS No.</b>	<b>USEPA AP-42 Emission Factor - Biogas (kg/10<sup>6</sup>m<sup>3</sup>) Methane</b>	<b>Estimated Maximum Emission Rate (g/s)<sup>(1)</sup></b>
Nitrogen Dioxide	10102-44-0	631	1.67E-02
Particulate Matter	NA-PM	238	6.31E-03
Carbon Monoxide	630-08-0	737	1.95E-02

Flare Operating on Digester Gas:

Hydrogen Sulphide Content<sup>(2)</sup> = 10 ppm  
 AP-42 Conversion Factor (ppm to lbs/MMft<sup>3</sup>)<sup>(3)</sup> = 0.088 lbs/MMft<sup>3</sup>  
 Weight fraction of sulphur in hydrogen sulphide = 0.9408 lb S / lb H<sub>2</sub>S  
 Weight fraction of sulphur in sulphur dioxide = 0.5 lb S / lb SO<sub>2</sub>  
 Heat Content of Digester Gas = 614 MMBtus / MMft<sup>3</sup>

<b>Compound</b>	<b>Digester Gas Emission Factor<sup>(4)</sup> (lbs. SO<sub>2</sub> / MMBtu)</b>	<b>Conversion Efficiency<sup>(5)</sup> (%)</b>	<b>Estimated Maximum Emission Rate<sup>(6)</sup> (g/s)</b>
Sulphur Dioxide	0.0027		1.17E-03
Total Reduced Sulphur		97.7	2.69E-05

Notes:

- (1) Based on a digester gas heating value of 614 BTU/ft<sup>3</sup>, methane concentration of 60.7%, and the USEPA AP-42 Chapter 2.4 Table 2.4-4 emission factors for digester gas combustion in a Flare.
- (2) Hydrogen Sulphide content based on typical digester gas composition
- (3) AP-42 Conversion Factor is calculated by dividing the molecular weight of hydrogen sulphide by a value of 385.1.
- (4) The emission factor calculation is based on a document entitled "Air Quality Emissions and Impact, Milbank Community Foundation dba Midwest Dairy Institute, Milbank, South Dakota"
- (5) AP-42 Chapter 2.4 control efficiency for a flare operating on biogas converting hydrogen sulphide into sulphur dioxide is 97.7%.
- (6) As a conservative estimate the biogas has not been adjusted for air : fuel ratio.

**Table B.4**

**Estimated Emissions from use of Digester Gas Flare  
Escarpment Renewables  
Grimsby, Ontario**

**Maximum Flare (S2) Heat Input Rating (Digester Gas):** 76,100,000 Btu/hr

<b>Compound</b>	<b>CAS No.</b>	<b>USEPA AP-42 Emission Factor - Biogas (kg/10<sup>6</sup>m<sup>3</sup>) Methane</b>	<b>Estimated Maximum Emission Rate (g/s)<sup>(1)</sup></b>
Nitrogen Dioxide	10102-44-0	631	3.73E-01
Particulate Matter	NA-PM	238	1.41E-01
Carbon Monoxide	630-08-0	737	4.36E-01

Flare Operating on Digester Gas:

Hydrogen Sulphide Content<sup>(2)</sup> = 10 ppm  
 AP-42 Conversion Factor (ppm to lbs/MMft<sup>3</sup>)<sup>(3)</sup> = 0.088 lbs/MMft<sup>3</sup>  
 Weight fraction of sulphur in hydrogen sulphide = 0.9408 lb S / lb H<sub>2</sub>S  
 Weight fraction of sulphur in sulphur dioxide = 0.5 lb S / lb SO<sub>2</sub>  
 Heat Content of Digester Gas = 614 MMBtus / MMft<sup>3</sup>

<b>Compound</b>	<b>Digester Gas Emission Factor<sup>(4)</sup> (lbs. SO<sub>2</sub> / MMBtu)</b>	<b>Conversion Efficiency<sup>(5)</sup> (%)</b>	<b>Estimated Maximum Emission Rate<sup>(6)</sup> (g/s)</b>
Sulphur Dioxide	0.0027		2.61E-02
Total Reduced Sulphur		97.7	5.99E-04

Notes:

- (1) Based on a digester gas heating value of 614 BTU/ft<sup>3</sup>, methane concentration of 60.7%, and the USEPA AP-42 Chapter 2.4 emission factors for digester gas combustion in a Flare.
- (2) Hydrogen Sulphide content based on typical digester gas composition
- (3) AP-42 Conversion Factor is calculated by dividing the molecular weight of hydrogen sulphide by a value of 385.1.
- (4) The emission factor calculation is based on a document entitled "Air Quality Emissions and Impact, Milbank Community Foundation dba Midwest Dairy Institute, Milbank, South Dakota"
- (5) AP-42 Chapter 2.4 control efficiency for a flare operating on biogas converting hydrogen sulphide into sulphur dioxide is 97.7%.
- (6) As a conservative estimate the biogas has not been adjusted for air : fuel ratio.

Table B.5

**Estimated Combustion Products Emissions from Boiler  
Escarpment Renewables  
Grimsby, Ontario**

<b>Maximum Boiler (S4) Heat Input Rating: 3,353,996</b>		<b>BTU/hr</b>			
<b>Compound</b>	<b>CAS No.</b>	<b>USEPA AP-42 Emission Factor - Natural Gas (kg/10<sup>6</sup>m<sup>3</sup>)</b>	<b>USEPA AP-42 Emission Factor - Propane (kg/10<sup>6</sup>m<sup>3</sup>)</b>	<b>Natural Gas (Alternate) Estimated Maximum Emission Rate (g/s)<sup>(1)</sup></b>	<b>Propane Estimated Maximum Emission Rate (g/s)<sup>(2)</sup></b>
Carbon Monoxide	630-08-0	1344	1008	3.47E-02	2.61E-02
Nitrogen Oxides	10102-44-0	1600	1560	4.14E-02	4.03E-02
Particulate Matter	NA-PM	122	84	3.14E-03	2.17E-03

## Notes:

- (1) Based on the maximum facility heat input rating, a natural gas heating value of 1,020 BTU/ft<sup>3</sup> and USEPA AP-42 Chapter 1.4 emission factors for natural gas combustion in commercial boilers (<100 MM BTU).
- (2) Based on the maximum facility heat input rating, a propane heating value of 1,020 BTU/ft<sup>3</sup> and USEPA AP-42 Chapter 1.5 emission factors for propane combustion in commercial boilers (<100 MM BTU).
- (3) The maximum value between the two estimated emission rates (per pollutant) was chosen as input for AERMOD.

Table B.6

**Estimated Maximum Diesel Combustion Products  
Escarpment Renewables  
Grimsby, Ontario**

**Maximum Emergency Generator (S8) Heat Input Rating:                      200                      kW**

Source ID	Compound	CAS No.	Tier 3 Emission Factor - Compression Ignition <sup>(2)</sup> (g/kW-hr)	Estimated Maximum Emission Rate (g/s)
S8	Nitrogen Oxides	10102-44-0 (Emergency)	4.00E+00 (3)	2.22E-01
	Carbon Monoxide	630-08-0	3.50E+00	1.94E-01
	Particulate Matter	NA-PM	2.00E-01	1.11E-02
	Sulphur Dioxide	7446-09-5	-	4.25E-04

***Estimating SO<sub>2</sub> emissions:***

Fuel Consumption	60	L/hr
	51	kg/hr
Sulphur in Diesel	15	mg/kg
Sulphur consumption rate	2.13E-04	g/s
SO <sub>2</sub> Emission Rate	4.25E-04	g/s

**Notes:**

(1) The generator is expected to adhere to Tier 3 rating of emissions as per US EPA guidelines.

(2) Emission factors taken from US EPA "Nonroad Compression-Ignition Engines: Exhaust Emission Standards" (EPA-420-B-16-022, March 2016)

(3) The NMHC + NO<sub>x</sub> emission factor from (2) is chosen to conservatively represent total NO<sub>x</sub> emissions.

(4) The SO<sub>2</sub> emission rate is estimated based on sulphur content in diesel (as per Sulphur in Diesel Fuel Regulations SOR/2002-254), and typical fuel consumption rate of a 200 kW generator at full load.

Table B.7

**Estimated Odour and Ammonia and Hydrogen Sulphide Emissions  
Escarpment Renewables  
Grimsby, Ontario**

Source ID	Description	Compound	CAS No.	Flowrate (m <sup>3</sup> /s)	Source Concentration <sup>(1)</sup> (ou/m <sup>3</sup> ) or (g/m <sup>3</sup> )	Estimated Maximum Emission Rate (ou m <sup>3</sup> /s) or (g/s)
A1	Receiving Tank #1 Displacement Air	Odour	NA-01	0.0115 (2)	7,000	80.2
A2	Receiving Tank #2 Displacement Air	Odour	NA-01	0.0115 (2)	7,000	80.2
A3	Receiving Tank #3 Displacement Air	Odour	NA-01	0.0115 (2)	7,000	80.2
S3	Biofilter Stack	Odour	NA-01	21.75	1,038	22,578
		Ammonia	7664-41-7		0.00139 (3)	0.0303
		Hydrogen Sulphide	7783-06-4		0.001 (4)	0.0303
S6	Digestate Loading Displacement Air	Odour	NA-01	0.030 (5)	2,600	77
S7a	Grit Removal Building 1	Odour	NA-01	0.9438	680	6.42E+02
S7b	Grit Removal Building 2	Odour	NA-01	0.9438	680	6.42E+02
S7c	Grit Removal Building 3	Odour	NA-01	0.9438	680	6.42E+02

## Notes:

(1) Odour concentrations based on "Odor Threshold Emission Factors for Common WWTP Processes" from St. Croix Sensory Inc., April 2008 unless otherwise stated.

(2) Based on a fill time of 10 minutes per delivery. Maximum of 8 deliveries per day.

(3) Ammonia content (6 ppm) based on typical tank head gas composition

(4) Hydrogen Sulphide content (1 ppm) based on typical tank head gas composition

(5) Based on a fill time of 15 minutes per delivery. Maximum of 15 deliveries per day.

Table B.8

**Biogas Upgrade Tail Gas Emission Calculations  
Escarpment Renewables  
Grimsby, Ontario**

Source ID	Description	Compound	CAS No.	Flowrate (m <sup>3</sup> /h)	Contaminant Flow Rate <sup>(1)</sup> (m <sup>3</sup> /h)	Density (kg/m <sup>3</sup> )	Estimated Maximum Emission Rate (g/s)
S5	Biogas Upgrade Tail Gas	Carbon Dioxide	124-38-9	1,542	617	1.95	3.34E+02
		Methane	74-82-8	1,542	14	0.62	2.39E+00

Note:

(1) Biogas methane content is 60% of which 98.5% is recovered.

# **Appendix C**

**Supporting Information for  
Assessment of Negligibility**

# Appendix C      Supporting Information for Assessment of Negligibility Escarpment Renewables

Sources were screened for negligibility using the following screening protocols listed in the ESDM Procedure Document:

- Combustion of natural gas and propane (Section 7.1.1.)
- Identifying significant contaminants using an emission threshold (Section 7.1.2)
- Specific examples of sources that emit contaminants in negligible amounts (Section 7.2.2 and Table B-3)

## ***Combustion of Natural Gas and Propane***

As per Section 7.1.1 of the ESDM Procedure Document contaminants other than NO<sub>x</sub> are generally considered negligible from this type of source. Therefore, only NO<sub>x</sub> has been assessed for the following list of equipment listed in Table B.2.

## ***Identifying Significant Contaminants using an Emission Threshold:***

Section 7.1.2 of the ESDM Procedure Document states that contaminants that are emitted from a specific facility may be identified as negligible when they are below emissions thresholds that are developed using the following formula:

$$\text{Emission Threshold (g/s)} = \frac{0.5 \times \text{MECP POI Limit } (\mu\text{g/m}^3)}{\text{Dispersion Factor } (\mu\text{g/m}^3 \text{ per g/s emission})}$$

All facility emissions of contaminants with an MECP POI limit were assessed against the appropriate emission threshold based on the appropriate 1-hour urban dispersion factor of 8,700  $\mu\text{g/m}^3$  per g/s 20 m from the property boundary. A number of contaminants are deemed to be emitted in negligible amounts, as indicated in Table C.1.

## ***Specific Examples of Sources that Emit Contaminants in Negligible Amounts***

Table B-3 of the ESDM Report Procedure Document and O. Reg. 524/98 lists sources that can be considered to be insignificant. The following sources at the Facility are listed in either Table B-3 or O. Reg. 524/98:

- General exhausts, sources such as building exhausts, building ventilation, building intake, change rooms, cafeteria, release valves, etc.
- Roads and parking lot (NAICS code not listed in Tables 7-2 and 7-3 of Section 7.4 of the ESDM Report Procedure Document)



Table C.1

**Assessment of Significance  
Escarpment Renewables  
Grimsby, Ontario**

Contaminant	CAS #	Emission Rate (g/s) or (OU/s)	MECP POI Limit <sup>(1)</sup> (µg/m <sup>3</sup> )	Averaging Period	Limiting Effect	Benchmark Category	Emission Threshold <sup>(2)</sup> (g/s)	Significant? (Yes/No)
Ammonia	7664-41-7	3.03E-02	100	24-hr	Health	B1	1.40E-02	Yes
Carbon Dioxide	124-38-9	3.34E+02	255,800	24-hr	Health	B2	3.58E+01	Yes
Carbon Monoxide	630-08-0	6.85E-01	6,000	1/2-hr	Health	B1	2.84E-01	Yes
Hydrogen Sulphide	7783-06-4	3.03E-02	13	10-minute	Odour	B1	4.52E-04	Yes
Hydrogen Sulphide	7783-06-4	3.03E-02	7	24-hr	Health	B1	9.80E-04	Yes
Methane	74-82-8	2.39E+00	37,330	24-hr	Health	B2	5.22E+00	No
Nitrogen Oxides	10102-44-0	4.31E-01	400	1-hr	Health	B1	2.30E-02	Yes
Nitrogen Oxides	10102-44-0	4.31E-01	200	24-hr	Health	B1	2.80E-02	Yes
Nitrogen Oxides	10102-44-0 (Emergency)	2.22E-01	1,800	1/2-hr	Emergency	Emergency	8.52E-02	Yes
Particulate Matter	NA-PM	1.61E-01	120	24-hr	Visibility	B1	1.68E-02	Yes
Sulphur Dioxide (Effective until July 1, 2023)	7446-09-5	2.77E-02	690	1-hr	Health & Vegetation	B1	3.97E-02	No
Sulphur Dioxide (Effective until July 1, 2023)	7446-09-5	2.77E-02	275	24-hr	Health & Vegetation	B1	3.85E-02	No
Sulphur Dioxide (Effective July 1, 2023)	7446-09-5	2.77E-02	100	1-hr	Health & Vegetation	B1	5.75E-03	Yes
Sulphur Dioxide (Effective July 1, 2023)	7446-09-5	2.77E-02	10	Annual	Health & Vegetation	B1	7.30E-03	Yes
Total Reduced Sulphur	NA-02	6.26E-04	13	10-minute	Odour	B1	4.52E-04	Yes
Total Reduced Sulphur	NA-02	6.26E-04	7	24-hr	Health	B1	9.80E-04	No

## Notes:

(1) MECP POI Limit listed on the "Air Contaminants Benchmarks (ACB) List: Standards, Guidelines and Screening Levels for Assessing Point of Impingement Concentrations of Air Contaminants" publication dated April 2018.

(2) Emission Threshold based on the following default urban dispersion factors from Table B-1 of the ESDM Report Procedure Document:

10-minute	14,368	(µg/m <sup>3</sup> )/(g/s)
1/2-hr	10,563	(µg/m <sup>3</sup> )/(g/s)
1-hr	8,700	(µg/m <sup>3</sup> )/(g/s)
24-hr	3,573	(µg/m <sup>3</sup> )/(g/s)
30-day	1,379	(µg/m <sup>3</sup> )/(g/s)
Annual	685	(µg/m <sup>3</sup> )/(g/s)

B1 - Benchmark 1 - Exceedence of a Benchmark 1 concentration triggers specific actions under the Regulation

B2 - Benchmark 2 - Exceedence of a Benchmark 2 concentration triggers a toxicological assessment to determine the likelihood of adverse effect.

# **Appendix D**

**Dispersion Modelling Input**

Table D.1

**AERMOD Dispersion Modelling Input Parameters  
Escarpment Renewables  
Grimsby, Ontario**

Source ID	Description	Stack Velocity (m/s)	Exhaust Temperature (K)	Exhaust Diameter (m)	Stack Height Above Grade (m)	Exhaust Orientation	UTM Source Coordinates	
							x (m)	y (m)
S1	CHP Engines/Turbines	33.95	423.15	0.15	9.00	VERTICAL	618823.20	4778286.86
S2	Closed Flare	0.15	1254.15	2.64	12.30	VERTICAL	618945.03	4778186.18
S3	Biofilter Stack	12.83	298.15	1.47	20.00	VERTICAL	618744.37	4778198.36
S4	Boiler	20.00	423.15	0.15	3.50	VERTICAL	618821.73	4778239.02
S5	Biogas Upgrade Tail Gas	20.00	298.15	1.28	5.00	VERTICAL	618945.39	4778213.22
S6	Digestate Loading Displacement Air	0.42	298.15	0.30	4.00	CAPPED	618926.27	4778187.17
S7A	Grit Removal Building 1	4.81	298.15	0.50	2.50	HORIZONTAL	618836.71	4778201.40
S7B	Grit Removal Building 2	4.81	298.15	0.50	2.50	HORIZONTAL	618861.37	4778259.92
S7C	Grit Removal Building 3	4.81	298.15	0.50	2.50	HORIZONTAL	618883.15	4778255.91
S8	Emergency Generator	40.00	773.15	0.15	1.83	VERTICAL	618841.52	4778283.62
A1	Receiving Tank #1 Displacement Air	-	-	5.32	0.30	-	618788.90	4778210.06
A2	Receiving Tank #2 Displacement Air	-	-	5.32	0.30	-	618800.03	4778206.98
A3	Receiving Tank #3 Displacement Air	-	-	5.32	0.30	-	618811.12	4778209.47



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