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Emission Summary and Dispersion Modelling (ESDM) Report in Support of an Application for an Environmental Compliance Approval (Air and Noise)

**The Midhurst Landowners Group c/o 1755575 Ontario Inc.
Midhurst Interim Water Treatment Plant (WTP) and
Wastewater Treatment Plant (WWTP)**

Report to: Ministry of the Environment, Conservation and Parks
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Executive Summary

This Emission Summary and Dispersion Modelling (ESDM) report is being submitted by The Midhurst Landowner's Group (the Company) in support of an application for an Environmental Compliance Approval (Air & Noise) under Section 9 of the Environmental Protection Act for the interim phase of the proposed water treatment plant (WTP) and wastewater treatment plant (WWTP) to be located at 1432 Snow Valley Road in Springwater, Ontario (Facility).

The ESDM Report has been prepared in accordance with Section 26 of Ontario Regulation 419/05; the Ministry of the Environment, Conservation and Parks' (Ministry) *Procedure for Preparing an Emission Summary and Dispersion Modelling Report (September 2016)* (Procedure), the *Air Dispersion Modelling Guideline for Ontario (February 2017)* (ADMGO) and the *Technical Bulletin: Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines for Odour under O. Reg. 419/05 (September 2016)*.

In accordance with the approved Midhurst Class Environmental Assessment, the Facility is to be designed and constructed in phases. This application is for the interim phase of the Facility (prior to the design and construction of Phase 1), which will service up to 800 residential units.

The primary air emissions expected from the Facility will be (i) odour-causing compounds including hydrogen sulphide, methyl mercaptan, dimethyl sulphide, carbon disulphide and total reduced sulphur, as well as odour generated through the processing and treatment of wastewater and (ii) nitrogen oxides (NO_x), generated from routine testing of the standby diesel generators servicing the WTP and WWTP.

The emission inventory was developed based on source testing data for both a larger scale conventional WWTP as well as a similar membrane bioreactor WWTP, engineering calculations and manufacturer's specifications.

Maximum site-wide emissions were modelled using the Ministry approved US EPA AERMOD system (version 19191) and the Ministry processed site-specific meteorological data. The resulting Point-of-Impingement (POI) concentrations were compared to the standards, guidelines and screening levels in the Ministry Air Contaminants Benchmark (ACB) List, dated April 2018. As presented in Table ES-1, all modelled concentrations were below Ministry standards, guidelines and screening levels.

NO_x emissions from routine testing of the emergency generator were modelled using the Ministry approved US EPA AERMOD dispersion model (version 19191) and compared to applicable POI limit contained in the Ministry *Emergency Generator Checklist Supplement to Applications for Approval, EPA S.9 (November 2010)*. As presented in Table ES-1, all modelled concentrations were below Ministry limits, as presented in Table ES-1

With respect to odour, the maximum 10-min average odour concentrations are no greater than 1 OU/m³ for more than 0.5% of the time at any of the offsite existing and proposed sensitive receptors, using a conservative maximum emissions scenario. As shown in Table ES-2, the Facility meets the Ministry's odour guideline.



Since there are sensitive noise receptors within 1000 m of the Site, an Acoustic Assessment Report (AAR) is presented under separate cover.



Table ES-1: Emission Summary Table

Contaminant	CAS No	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period Emission Rate	Averaging Period POI Concentration	Ministry POI Limit ($\mu\text{g}/\text{m}^3$)	Limiting Effect	Regulation Schedule #	Percentage of Ministry POI Limit (%)
Scenario 1 - Treatment Operations										
Hydrogen Sulphide	7783-06-4	9.69E-05	AERMOD	2.92E-01	1 hr	10 min	13	Odour	3	2.2%
Hydrogen Sulphide	7783-06-4	9.69E-05	AERMOD	5.70E-02	24 hr	24 hr	7	Health	3	0.8%
Methyl Mercaptan	74-93-1	7.70E-07	AERMOD	2.32E-03	1 hr	10 min	13	Odour	3	0.02%
Dimethyl Sulphide	75-18-3	2.49E-08	AERMOD	7.50E-05	1 hr	10 min	30	Odour	Guideline	0.0003%
Carbon Disulphide	75-15-0	9.94E-09	AERMOD	5.85E-06	24 hr	24 hr	330	Odour	Guideline	0.000002%
Total Reduced Sulphur	-	9.77E-05	AERMOD	2.95E-01	1 hr	10 min	13	Odour	3	2.3%
Total Reduced Sulphur	-	9.77E-05	AERMOD	5.75E-02	24 hr	24 hr	7	Health	3	0.8%
Scenario 2 - Emergency Generator Testing ⁽¹⁾										
Nitrogen Oxides	10102-44-0	1.15E+00	AERMOD	1.99E+02	1 hr	1/2 hr	1880	Health	Other	10.6%
Nitrogen Oxides	10102-44-0	1.15E+00	AERMOD	2.34E+01	1 hr	1/2 hr	500	Health	Other	4.7%

⁽¹⁾ Other - The modelling results at the non-sensitive receptors (houses, commercial plazas) were compared to the 1/2-hour screening level of $1880 \mu\text{g}/\text{m}^3$. The modelling results of sensitive receptors (places of worship, schools, daycares) were compared to the 1/2-hour screening level of $500 \mu\text{g}/\text{m}^3$ for the sensitive receptors outlined in the Ministry Emergency Generator Checklist, Supplement to Application for Approval, s.9.

Table ES-2: Odour Modelling Results for Discrete Receptors

Contaminant					Odour			
Total Facility Emission Rate (OU/s)					4.09E+03			
Air Dispersion Model Used					AERMOD			
Total Number of Hours Modelled					43848			
Averaging Period					10 min			
Ministry POI Standard (OU/m ³)					1			
Receptor Number	Receptor Description	Distance from Facility to Receptor ⁽¹⁾ (m)	UTM Coordinates (m)		Number of Hours Exceeding Ministry POI Standard over 5-year period ⁽²⁾		Frequency of Exceedance of Ministry POI Limit (%) ⁽²⁾	
			Easting	Northing	1 metre flagpole receptor	6 metre flagpole receptor	1 metre flagpole receptor	6 metre flagpole receptor
R1	Golf Course Entrance	706	598503.2	4919678.6	0	0	n/a	n/a
R2	Existing Residence	534	598395.6	4920074.6	21	23	0.05%	0.05%
R3	Existing Residence	535	598414.8	4920027.7	34	40	0.08%	0.09%
R4	Existing Residence	536	598432.6	4919994.4	44	48	0.10%	0.11%
R5	Existing Residence	639	598641.3	4919680.4	0	0	n/a	n/a
R6	Proposed Residence	410	598816.7	4919864.8	0	28	n/a	0.06%
R7	Proposed Residence	403	598825.3	4919871.0	0	26	n/a	0.06%
R8	Proposed Residence	395	598834.7	4919877.4	0	26	n/a	0.06%
R9	Proposed Residence	387	598843.7	4919883.8	5	35	0.01%	0.08%
R10	Proposed Residence	380	598852.9	4919890.3	6	38	0.01%	0.09%
R11	Proposed Residence	373	598861.7	4919896.3	6	40	0.01%	0.09%
R12	Proposed Residence	366	598870.7	4919902.8	13	42	0.03%	0.10%
R13	Proposed Residence	359	598879.6	4919908.7	11	43	0.03%	0.10%
R14	Proposed Residence	352	598889.4	4919915.5	7	40	0.02%	0.09%
R15	Proposed Residence	346	598898.5	4919922.2	4	32	0.01%	0.07%
R16	Proposed Residence	339	598908.1	4919928.8	10	34	0.02%	0.08%
R17	Proposed Residence	324	598931.5	4919945.6	32	44	0.07%	0.10%
R18	Proposed Residence	319	598940.1	4919951.9	40	44	0.09%	0.10%
R19	Proposed Residence	315	598949.1	4919957.7	43	46	0.10%	0.10%
R20	Proposed Residence	311	598957.8	4919963.9	48	51	0.11%	0.12%
R21	Proposed Residence	307	598966.6	4919969.8	52	51	0.12%	0.12%
R22	Proposed Residence	303	598975.9	4919976.1	50	50	0.11%	0.11%
R23	Proposed Residence	300	598984.2	4919982.4	49	45	0.11%	0.10%
R24	Proposed Residence	296	598993.1	4919988.6	51	44	0.12%	0.10%
R25	Proposed Residence	294	599002.6	4919994.9	52	40	0.12%	0.09%
R26	Proposed Residence	292	599011.8	4920000.9	50	38	0.11%	0.09%
R27	Proposed Residence	290	599020.5	4920007.2	49	37	0.11%	0.08%
R28	Proposed Residence	288	599029.9	4920014.2	44	36	0.10%	0.08%
R29	Proposed Residence	287	599039.1	4920020.1	36	31	0.08%	0.07%
R30	Proposed Residence	292	599059.6	4920027.4	37	29	0.08%	0.07%
R31	Proposed Residence	308	599068.4	4920015.0	31	28	0.07%	0.06%
R32	Proposed Residence	322	599074.4	4920001.1	30	28	0.07%	0.06%
R33	Proposed Residence	337	599080.3	4919987.1	30	27	0.07%	0.06%
R34	Proposed Residence	275	599088.3	4920073.4	49	32	0.11%	0.07%
R35	Proposed Residence	290	599097.1	4920061.0	43	25	0.10%	0.06%
R36	Proposed Residence	305	599103.1	4920047.1	31	21	0.07%	0.05%
R37	Proposed Residence	319	599109.1	4920033.1	27	12	0.06%	0.03%
R38	Existing Residence	781	598112.8	4920244.7	0	0	n/a	n/a
R39	Existing Residence	769	598126.4	4920209.0	0	0	n/a	n/a
R40	Existing Residence	755	598144.3	4920175.7	0	0	n/a	n/a
R41	Snowmobile Club	471	599346.4	4920397.3	56	128	0.13%	0.29%
R42	Existing Residence	654	599502.9	4920504.2	31	37	0.07%	0.08%
R43	Existing Residence	775	599319.5	4920914.9	0	0	n/a	n/a
R44	Provincial Park	1019	598507.2	4921210.5	0	0	n/a	n/a

⁽¹⁾ Measured from the WWTP Biofiltration Unit

⁽²⁾ Per the Ministry's *Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines under O.Reg. 419-5 (September 2016)*, if the modelled number of exceedances at a human receptor are below the odour guideline 0.5% of the time on an annual basis, then the facility is deemed, for assessment purposes, to meet the standard/guideline.



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1 INTRODUCTION

The Midhurst Landowner's Group (the Company) retained BCX Environmental Consulting (BCX) to prepare this Emission Summary and Dispersion Modelling (ESDM) report in support of an Environmental Compliance Approval (Air & Noise) (ECA) under Section 9 of the Environmental Protection Act for the interim phase of the proposed Midhurst Water Treatment Plant (WTP) and Wastewater Treatment Plant (WWTP) to be located at 1432 Snow Valley Road in Springwater, Ontario (Facility).

The ESDM report has been prepared in accordance with Section 26 of Ontario Regulation (O. Reg.) 419/05; the Ministry of the Environment, Conservation and Parks' (Ministry) *Procedure for Preparing an Emission Summary and Dispersion Modelling Report (September 2016)* (Procedure), the Ministry's *Air Dispersion Modelling Guideline for Ontario (February 2017)* (ADMGO) and *Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines for Odour under O. Reg. 419/05 (September 2016)* (Methodology).

The Facility's primary North American Industry Classification System (NAICS) codes are 221310 – Water supply and irrigation systems and 221320 – Sewage treatment facilities.

1.1 Environmental Activity and Sector Registry Eligibility

O. Reg. 1/17 details the eligibility for registration in the Environmental Activity and Sector Registry (EASR) for activities requiring assessment of air emissions (Air Emissions EASR).

Section 2(2) of O. Reg. 1/17 describes facility activities and/or operations that are not eligible for the Air Emissions EASR, thereby requiring the facility to obtain an Environmental Compliance Approval (ECA) under Section 9 of the Environmental Protection Act.

The primary NAICS codes for the Facility are 221310 – Water supply and irrigation systems and 221320 – Sewage treatment facilities. Per Section 2(2) item 1 of O. Reg. 1/17 facilities with a primary NAICS code of 221320 are not eligible for the Air Emissions EASR. Therefore, the Facility must be permitted under an ECA.

1.2 Site Description

The Facility will be located at 1432 Snow Valley Road in Springwater, Ontario. The site layout (Figures 2A & 2B) and zoning map are provided in Appendix A.

The purpose of the Facility is to service the Midhurst Secondary Plan area as identified in the approved Midhurst Class Environmental Assessment (Ainley, 2018). The Facility is to be designed and constructed in phases. This application is for the interim phase of the Facility, which will service up to 800 residential units. This ESDM report addresses emissions from the interim phase, only.

The WTP will use an ion exchange system to treat groundwater. The interim phase WTP will have a maximum capacity of 2,114 cubic metres of influent per day (m³/day) and will operate 24 hours per day, 7 days per week.

The WWTP will use membrane bioreactor (MBR) technology to treat wastewater. The interim WWTP will have a maximum peak instantaneous flow of 3,523 m³/day. The actual WWTP capacity is based on an average day flow of 1,032 m³/day. The WWTP will operate 24 hours per day, 7 days per week.

1.3 Process Description

1.3.1 Water Treatment Plant

The interim WTP will be composed of the following processes and primary components:

- Intake Pumphouses
- Cartridge Filtration
- Ion Exchange System
- High Lift Pump Station
- Disinfection
- Treated Water Reservoir

The WTP will be equipped with a dedicated stand-by diesel generator. The detailed process flow diagram is presented as Figure 1A (in Appendix A). The WTP plant does not have any odorous sources.

1.3.2 Wastewater Treatment Plant

The interim WWTP will be composed of the following processes and primary components:

- Headworks (influent pumping station, screen building, one equalization tank);
- Biological treatment (one anoxic, one aerobic tank, and three membrane tanks);
- UV Disinfection; and
- Waste activated sludge management (one sludge tank with jet mixing).

The WWTP will also be equipped with a dedicated stand-by diesel generator.

The detailed process flow diagram is presented as Figure 1B (in Appendix A). A detailed process description for the treatment train is presented in the following sections.

1.3.2.1 Headworks

Influent Pumping Station

The influent wastewater enters the WWTP through the influent pumping station. Any displaced air is vented to the atmosphere through a gooseneck pipe.

Screen Building

The influent wastewater will be pumped through one of two fine screens and a grit classifier to remove any debris that might damage membranes and pump equipment in the WWTP. The screenings (solids) will be transferred either directly to a solids bin, or through a grit separator before the solids bin. The effluent from the screen will be pumped to the equalization tank. The air in the screen room will be vented through a high performance two-stage biofilter to remove odours prior to being released to the atmosphere.

Equalization Tank

The wastewater from the screen will enter the closed top equalization tank which will buffer influent flow variations to maintain the desired water level and biological conditions in the downstream processes. A jet mixing system will be used to maintain mixed conditions and to inhibit odours associated with septicity. Air in the headspace of the equalization tanks may be vented to the atmosphere through the roof seams.

1.3.2.2 Biological Treatment

Anoxic/Aerobic Tank

The wastewater leaving the equalization tank will enter the closed top annular anoxic/aerobic tank. The wastewater will first enter the inner, anoxic tank where the wastewater will be agitated under oxygen-deficient conditions to promote denitrification. The wastewater will then transfer to the outer, aerobic tank where fresh air will be blown in through the jet mixing system to provide oxygen for biological oxidation. Dissolved oxygen, pH levels and temperature in the aerobic tank will be controlled to maintain the optimum conditions in the tanks. The two concentric tanks share common headspace.

Membrane Tanks

The effluent wastewater from the aerobic tank will undergo solid/liquid separation through the membranes in the membrane tanks. The treated water (i.e. permeate) will be filtered through the membranes.

The overflow [return activated sludge (RAS)] from the closed top membrane tanks will be gravity-fed back into the anoxic tank.

1.3.2.3 UV Disinfection

The effluent leaving the membrane tanks will enter the UV disinfection system prior to being discharged into the environment.

1.3.2.4 Waste Activated Sludge Management

The waste activated sludge (WAS) will be pumped from the membrane tanks to the closed top sludge storage tank for storage prior to disposal. The tank will be jet mixed to encourage continual biological oxidization of most odourous compounds and mitigate formation of odourous compounds.

1.4 Summary of Equipment and Operations for which Approval is Sought

The Company is requesting an ECA to include the following equipment exhausting to the atmosphere:

- One (1) influent pumping station;
- One (1) biofilter odour control system, venting to the atmosphere at a flow rate of 0.1 m³/s, through an equivalent stack diameter of 0.2 m, released 1.9 m above grade, controlling the emissions from two (2) screens and one (1) grit classifier;
- One (1) flow equalization tank and associated pumps;
- One (1) emergency diesel-fired generator, servicing the water treatment plant, having a maximum power rating of 500 kW; and
- One (1) emergency diesel-fired generator, servicing the wastewater treatment plant, having a maximum power rating of 300 kW.

This ESDM Report provides a full site-wide emission inventory and air dispersion modelling exercise for the entire Facility.

2 INITIAL IDENTIFICATION OF SOURCES AND CONTAMINANTS

Table 1 below provides a summary of sources and contaminants on site. Negligible sources are discussed in Section 3.0. Significant sources are discussed in Section 4.0.

Table 1: Source and Contaminant Identification Summary

Source Information			Expected Contaminants	Included in Modelling?
Source I.D.	Source Description	General Location		Significant? (Yes or No)
Water Treatment Plant				
1-1	Pumphouses	See Figure 2	n/a	No - Insignificant
1-2	Filter System	See Figure 2	n/a	No - Insignificant
1-3	Treated Water Reservoir	See Figure 2	n/a	No - Insignificant
1-4	Emergency diesel-fired generator for WTP	See Figure 2	NO _x	Yes
Wastewater Treatment Plant				
2-1	Influent Pumping Station	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	Yes Yes Yes Yes Yes Yes
2-2	Screen Building, venting through a Biofilter unit	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	Yes Yes Yes Yes Yes Yes
2-3	Equalization Tank	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	Yes Yes Yes Yes Yes Yes
2-4	Anoxic Tank	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-5	Aeration Tanks	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-6	Aerobic Digester Tank	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-7	Membrane System	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-8	UV System	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-9	Waste Activated Sludge Tank	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-10	Effluent Pumping Station	See Figure 2	Hydrogen Sulphide Methyl Mercaptan Dimethyl Sulphide Carbon Disulphide Total Reduced Sulphur Odour	No - Insignificant
2-11	Emergency diesel-fired generator for WWTP	See Figure 2	Nitrogen Oxides	Yes
Other Activities				
3	Maintenance activities	See Figure 2	Not Applicable	No - Exempt per EPA Section 9 (3)(a)

3 ASSESSMENT OF SIGNIFICANCE OF CONTAMINANTS AND SOURCES

As identified in Table 1, some contaminant sources are expected to be negligible and are, therefore, not included in the emission summary or source summary tables. The rationale for defining these sources as insignificant is presented below.

3.1 Sources Exempt from Requiring an ECA (Air & Noise)

Section 9(3) of the *Environmental Protection Act* identifies equipment and operations which are exempt from requiring an Environmental Compliance Approval (Air & Noise). Item (a) identifies routine maintenance carried out on any plant, structure, equipment, apparatus, mechanism or thing to be exempt. Maintenance activities at the WWTP are, therefore, considered exempt.

3.2 Screening Out Sources that Emit Odour in Negligible Amounts

Water Treatment Plant

There are no significant air contaminants including odour emissions expected to be emitted from the treatment of drinking water, apart from the nitrogen oxide (NO_x) emissions from testing of the WTP emergency generator.

Anoxic, Aerobic and Membrane Tanks (Biological Treatment)

Any odours realized from biological treatment processes, including aeration tanks, are generally earthy and musty and not sulphide-based, therefore, they are less objectionable to human receptors than those produced from headworks or primary treatment processes. Furthermore, the type of aeration mechanism (blower and diffuser) and biological process (extended aeration) proposed for the Midhurst WWTP produce lower odour levels than those produced by mechanical aerators and non-extended aeration systems.¹

Based on the above and the tank construction with bolt and mastic at every joint², it is anticipated that odour emissions from the proposed Midhurst WWTP anoxic, aeration and membrane tanks will be negligible.

¹ Control of Odors and Emissions from Wastewater Treatment Plants, Water Environment Federation, MOP 25, 2004.

² H2Flow Tanks and Systems Inc., Permastore Tanks and Silos.

4 EMISSION ESTIMATION AND MAXIMUM EMISSIONS SCENARIOS

Emission rate calculations, data quality ratings and emission estimation techniques for significant sources are shown in Appendix F. The data quality rating and emission estimation technique are identified for significant sources in the Source Summary Table, Table 2.

4.1 Emission Estimation Methodologies

Odour

Since site specific odour emission sampling data is not available for the proposed Midhurst WWTP, emissions for potentially odorous sources were derived from source testing data for a comparable WWTP (Newterra Talbotville WWTP, equipped with MBR system), which was recently reviewed and approved by the Ministry.

The odour emission rates from the influent pumping station, screen building and equalization tanks were prorated based on the source testing from the comparable WWTP. Source testing data for the influent pumping station was not available at the comparable WWTP, therefore the higher odour emission rate was conservatively used to estimate emissions from this source at the Midhurst WWTP.

A control efficiency of 95% was applied for the biofilter, which will be used to control emissions from the Midhurst WWTP screen building. The manufacturer specification is provided in Appendix C.

A detailed sample calculation is presented with the calculation sheets in Appendix B.

Hydrogen Sulphide

Hydrogen sulphide (H₂S) emissions data is not available in the source testing report for the comparable WWTP. H₂S emissions were derived from the source testing data for equivalent processes in the Duffin Creek Water Pollution Control Plant's Odour Control Study, September 2016 (Duffin Creek Study) and from sampling results in a study entitled "*Odor Control – Solutions from Managing Emissions from Wastewater Treatment Facilities*" (Simon, Alix & Arrebola, 2010) (Odour Control Study).

The H₂S emission calculation was completed using the following steps:

1. The uncontrolled H₂S emission rates from the influent pumping station and the grit and screening building in the Duffin Creek Study were selected as a conservative representation of the influent pumping station, and the primary treatment emissions (screen building and equalization tank) at Midhurst WWTP. The emissions rates were prorated to the Midhurst WWTP maximum peak capacity of 3,523 m³/day;

2. A ratio of concentrations of methyl mercaptan, dimethyl sulphide and carbon disulphide to H₂S was determined (as described below) to calculate the emission rates for the remaining contaminants using the H₂S source concentrations calculated in step 2;
3. The sulphur containing compounds were added together to create an uncontrolled emission rate (g/s) for total reduced sulphur (TRS); and
4. A control efficiency of 95% was applied for the biofilter, which will be used to control emissions from the Midhurst WWTP screen building. The manufacturer specification is provided in Appendix C.

A detailed sample calculation is presented with the calculation sheets in Appendix B.

Other Odour-Causing Compounds

The Duffin Creek study and other various references reviewed by BCX identified and assessed H₂S as the main odour causing compound from the headworks and primary treatment processes. The other odour causing compounds (e.g. mercaptans) are typically considered insignificant. However, for the completeness of this assessment, a quantitative assessment of these other contaminants was also completed.

An emission inventory for other odour causing compounds was developed using sampling results in a recent study entitled “*Odor Control – Solutions from Managing Emissions from Wastewater Treatment Facilities*” (Simon, Alix, & Arrebola, 2010).

Table below summarizes the concentrations found from the sampling.

Sample Testing Results for Odour Causing Compounds
(Simon, Alix & Arrebola, 2010)

Compound	Concentration (ppbv)
Hydrogen Sulfide	39000
Methyl Mercaptan	310
Dimethyl Sulfide	10
Carbon Disulfide	4

The equation below shows the calculation for the emission rates for each of the compounds:

$$Emission\ Rate_{Compound\ A} \left(\frac{g}{s} \right) = Emission\ Rate_{H_2S} \left(\frac{g}{s} \right) \times \frac{Concentration_{Compound\ A}}{Concentration_{H_2S}}$$

A detailed sample calculation is presented with the calculation sheets in Appendix B.

4.2 Maximum Emissions Scenario

Two maximum emission scenarios, Scenario 1 and Scenario 2 were identified to assess emissions from treatment operations and emergency generator testing, respectively.

4.2.1 Scenario 1 – Treatment Operations

The maximum emissions scenario for the WWTP treatment operations (Scenario 1) was based on the maximum influent capacity for the interim phase (3,523 m³/day). The maximum emissions scenario also assumed all equipment and processes operate simultaneously at their respective maximum capacity, 24 hours per day, all year round.

These operating conditions represent very conservative maximum worst-case scenarios. Actual facility maximum operations are not expected to approach these conditions.

4.2.2 Scenario 2 – Emergency Generator Testing

The emergency generator testing (Scenario 2) modelling was based on the NO_x emitted during the testing of the emergency generator at 100% of the load capacity. The testing was assumed to occur 24 hours per day, all year round.

These operating conditions represent very conservative maximum worst-case scenarios. Actual facility maximum operations are not expected to approach these conditions.

5 SOURCE SUMMARY TABLE

The Source Summary Table (Table 2) shows the emission rate for each significant contaminant emitted from each significant source. The Ministry's Procedure, Appendix D Format 2 – Sorted by Source, is used. As required by O. Reg. 419 only significant sources and contaminants are listed in the Source Summary Table.

Table 2: Source Summary Table

Source I.D.	Description	Source Data							Emissions Data						
		Stack Volumetric Flow Rate (m ³ /s)	Stack Exit Temperature (°C)	Stack Inner Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Coordinates (m)	Modelled Source	Contaminant	CAS #	Maximum Emission Rate (g/s)	Averaging Period	Emission Estimating Technique	Emissions Data Quality	% of Overall Emissions
Water Treatment Plant															
1-4	Emergency diesel-fired generator for WTP	1.7	531.1	0.2	2.0	n/a	n/a	EGEN1	Nitrogen Oxides	10102-44-0	8.38E-01	1 hr	EF	Above Average	72.8%
Wastewater Treatment Plant															
2-1	Influent Pumping Station	n/a	n/a	n/a	n/a	n/a	n/a	PUMP	Hydrogen Sulphide	7789-06-4	1.10E-05	1 hr	EC	Average	11.4%
									Hydrogen Sulphide	7789-06-4	1.10E-05	24 hr	EC	Average	11.4%
									Methyl Mercaptan	74-93-1	8.75E-08	1 hr	EC	Average	11.4%
									Dimethyl Sulphide	75-18-3	2.82E-09	1 hr	EC	Average	11.4%
									Carbon Disulphide	75-15-0	1.13E-09	24 hr	EC	Average	11.4%
									Total Reduced Sulphur	TRS	1.11E-05	1 hr	EC	Average	11.4%
									Total Reduced Sulphur	TRS	1.11E-05	24 hr	EC	Average	11.4%
									Odour	-	2.03E+03	1 hr	EC	Average	49.7%
2-2	Screen Building, venting through a Biofilter unit	0.1	AMBIENT	0.2	1.9	n/a	n/a	ODRCTRL	Hydrogen Sulphide	7789-06-4	4.09E-06	1 hr	EC	Average	4.2%
									Hydrogen Sulphide	7789-06-4	4.09E-06	24 hr	EC	Average	4.2%
									Methyl Mercaptan	74-93-1	3.25E-08	1 hr	EC	Average	4.2%
									Dimethyl Sulphide	75-18-3	1.05E-09	1 hr	EC	Average	4.2%
									Carbon Disulphide	75-15-0	4.20E-10	24 hr	EC	Average	4.2%
									Total Reduced Sulphur	TRS	4.12E-06	1 hr	EC	Average	4.2%
									Total Reduced Sulphur	TRS	4.12E-06	24 hr	EC	Average	4.2%
									Odour	-	2.72E+01	1 hr	EC	Average	0.7%
2-3	Equalization Tank	n/a	n/a	n/a	n/a	n/a	n/a	EQTANK	Hydrogen Sulphide	7789-06-4	8.18E-05	1 hr	EC	Average	84.4%
									Hydrogen Sulphide	7789-06-4	8.18E-05	24 hr	EC	Average	84.4%
									Methyl Mercaptan	74-93-1	6.50E-07	1 hr	EC	Average	84.4%
									Dimethyl Sulphide	75-18-3	2.10E-08	1 hr	EC	Average	84.4%
									Carbon Disulphide	75-15-0	8.39E-09	24 hr	EC	Average	84.4%
									Total Reduced Sulphur	TRS	8.25E-05	1 hr	EC	Average	84.4%
									Total Reduced Sulphur	TRS	8.25E-05	24 hr	EC	Average	84.4%
									Odour	-	2.03E+03	1 hr	EC	Average	49.7%
2-11	Emergency diesel-fired generator for WWTP	1.2	497.3	0.2	2.000	n/a	n/a	EGEN2	Nitrogen Oxides	10102-44-0	3.13E-01	1 hr	EF	Above Average	27.2%

Notes: n/a = Not Applicable; EC = Engineering Calculations; EF = Emission Factor

6 AIR DISPERSION MODELLING

Air dispersion modelling for the treatment operations (Scenario 1) and emergency diesel generator testing (Scenario 2) was undertaken using the U.S. EPA AERMOD dispersion system. This model calculates maximum hourly concentrations, which are used to provide maximum concentrations for other averaging periods using the appropriate Ministry supplied meteorological data.

6.1 AERMOD

AERMOD is a Ministry approved steady-state Gaussian plume dispersion modelling system that can be used to assess pollutant concentrations from a wide variety of complex industrial settings including multiple stacks, fugitive emissions, and building wake effects. The AERMOD modelling system was developed by the AMS/EPA Regulatory Model Improvement Committee (AERMIC) and consists of two pre-processors (AERMET and AERMAP) and the dispersion model, AERMOD.

AERMET is a general-purpose meteorological pre-processor which uses surface and upper air meteorological conditions together with surface characteristics to calculate the boundary layer parameters needed by AERMOD. AERMAP is the terrain pre-processor used to calculate a representative terrain-influenced height associated with each receptor within the modelling domain.

6.1.1 Dispersion Modelling Input Summary Table

To demonstrate compliance with O. Reg. 419/05, Table 3 provides a description of the way in which the approved dispersion model was used.

6.1.2 Land Use Zoning Designation Plan

The land use zoning plan is provided in Appendix A.

6.1.3 Dispersion Modelling Input and Output files (AERMOD)

The AERMOD input and output files, when requested, will be provided as a ZIP file to the Client Services and Permissions Branch. The maximum POI concentrations are shown in Table 5.

6.1.4 Meteorology

Site-specific hourly surface and upper air meteorological data processed by the Ministry (AERMET Version 19191) were used for the AERMOD dispersion modelling. A copy of the approval under Section 13(1) and the wind rose is provided in Appendix D. The wind rose shows the distribution of wind directions and wind speeds from the surface data.

Table 3: Dispersion Modelling Input Summary Table

Relevant Section of Regulation 419	Section Title	Description of How the Approved Dispersion Model was Used
Section 6	Approved Dispersion Models	AERMOD Version 19191
Section 8	Negligible Sources of Contaminants	See Section 3
Section 9	Same Structure Contamination	Not Applicable
Section 10	Operating Conditions	See Section 4.2
Section 11	Source of Contaminant Emission Rate	See Appendix B, and Table 2
Section 12	Combined Effect of Assumptions for Operating Conditions and Emission Rates	See Section 4
Section 13	Meteorological Conditions	See Section 6.1.4
Section 14	Area of Modelling Coverage	See Section 6.1.6
Section 15	Stack Height for Certain New Sources of Contaminant	Not Applicable
Section 16	Terrain Data	See Section 6.1.5
Section 17	Averaging Periods	10-minute, ½-hr, 24-hour

6.1.5 Terrain

The terrain data used, *cdem_dem_031D*, was downloaded from the *Canadian Digital Elevation Model* on the Ministry’s website.

6.1.6 Modelling Domain and Receptor Grid

All modelling was undertaken in UTM coordinates as defined in Table 4. The model was based on a receptor grid centered in the site and extended out approximately 1 km from the property line in all directions. A tiered grid was used for receptor placements and was created based upon the receptor spacing recommended in the ADMGO.

In addition, fenceline receptors and a set of forty-four discrete receptors with flagpole heights set at one metre and six metres (32 proposed residential homes, 9 existing residential homes, 1 golf course, 1 snowmobile club and 1 provincial park, shown in Figure 2C and Table 6) were included in the modelling exercise to assess the Facility’s potential off-site impact on nearby existing and proposed sensitive receptors. As identified in Figure 2C, the closest sensitive receptor is a proposed residence (R34) located approximately 260 metres south of the proposed WWTP influent pumping station.

Figure 3 (Appendix A) shows the modelling domain, receptor grid and the general locations of the discrete receptors. All modelling was undertaken in Universal Transverse Mercator (UTM) coordinates.

6.1.7 Source Parameters

The physical parameters of the modelling sources are summarized in Table 4-1.

A multiplier of 1.65 was included in the model source input for odour, which converts the averaging period for the modelling results from 1 hour to 10 minutes.

A multiplier of 10^6 was included in the model source input for methyl mercaptan, dimethyl sulphide and carbon disulphide to obtain results from AERMOD. The results were divided by 10^6 in the emission summary table.

6.1.8 Building Downwash

The biofilter unit and emergency generators were modelled as point sources. As such, building downwash has been considered in the modelling exercise. The building profile input program (BPIP) input file will be included in the AERMOD input and output files, that will be provided to the Client Services and Permissions Branch as indicated in Section 6.1.3 above.

Table 4: AERMOD Source Input Parameters

Source Type	Modelling Source ID	Source ID	Description	Emission Rates							Base Elevation	Release Height Above Grade	Stack Inner Diameter	Exit Velocity	Stack Exit Temperature	Stack Release Type	Initial Lateral Dimension	Initial Vertical Dimension	Length of Side	X Coordinate	Y Coordinate
				Hydrogen Sulphide	Methyl Mercaptan	Dimethyl Sulphide	Carbon Disulphide	Total Reduced Sulphur	Odour	Nitrogen Oxides											
				(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(OU/s)	(g/s)											
Scenario 1 - Treatment Operations																					
POINT	PUMP	2-1	Pumping Station Exhaust	1.10E-05	8.75E-08	2.82E-09	1.13E-09	1.11E-05	2.03E+03	-	240.0	2.0	-	-	AMBIENT	-	1.2	0.5	5.0	598894.2	4920246.5
POINT	ODRCTRL	2-2	Screen Building, venting through a Biofilter Unit	4.09E-06	3.25E-08	1.05E-09	4.20E-10	4.12E-06	2.72E+01	-	239.0	1.9	0.2	2.7	AMBIENT	VERTICAL	-	-	-	598893.1	4920267.7
POINT	EQTANK	2-3	Equalization Tank	8.18E-05	6.50E-07	2.10E-08	8.39E-09	8.25E-05	2.03E+03	-	239.0	7.9	-	-	AMBIENT	-	1.3	3.7	5.8	598899.4	4920268.5
Scenario 2 - Emergency Generator Testing																					
POINT	EGEN1	1-4	Emergency Diesel-Fired Generator, WTP	-	-	-	-	-	-	8.38E-01	235.0	2.0	0.2	54.2	804.3	HORIZONTAL	-	-	-	598742.6	4920180.6
POINT	EGEN2	2-11	Emergency Diesel-Fired Generator, WWTP	-	-	-	-	-	-	3.13E-01	239.0	2.0	0.2	37.0	770.5	HORIZONTAL	-	-	-	598860.1	4920262.1

- Base elevations were extracted from AERMAP.
- All sources are elevated (Release Height > 0).

7 RESULTS

The Emission Summary Table (Table 5) shows the predicted maximum POI concentrations from all sources compared to the standards and guidelines in the Ministry Air Contaminants Benchmark (ACB) List, dated April 2018.

NO_x emissions from maintenance testing of the emergency generator were modelled using the Ministry approved U.S. EPA AERMOD dispersion model. The maximum POI concentration at the closest receptor was compared to the Ministry's POI limit set out in the Ministry Emergency Generator Checklist.

As shown in the Table 5, all contaminants are below their respective applicable limits at the Facility's property line, the nearby existing sensitive receptors, and the proposed nearby residential subdivision.

With respect to odour, following the Ministry's Methodology, a frequency analysis was completed at the closest off-site existing and proposed sensitive receptors, at heights of 1 metre and 6 metres above grade.

As shown in Table 6, the maximum 10-minute average odour concentrations are no greater than 1 OU/m³ for more than 0.5% of the time at any of the offsite existing and proposed sensitive receptors.

Table 5: Emission Summary Table

Contaminant	CAS No	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Maximum POI Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period Emission Rate	Averaging Period POI Concentration	Ministry POI Limit ($\mu\text{g}/\text{m}^3$)	Limiting Effect	Regulation Schedule #	Percentage of Ministry POI Limit (%)
Scenario 1 - Treatment Operations										
Hydrogen Sulphide	7783-06-4	9.69E-05	AERMOD	2.92E-01	1 hr	10 min	13	Odour	3	2.2%
Hydrogen Sulphide	7783-06-4	9.69E-05	AERMOD	5.70E-02	24 hr	24 hr	7	Health	3	0.8%
Methyl Mercaptan	74-93-1	7.70E-07	AERMOD	2.32E-03	1 hr	10 min	13	Odour	3	0.02%
Dimethyl Sulphide	75-18-3	2.49E-08	AERMOD	7.50E-05	1 hr	10 min	30	Odour	Guideline	0.0003%
Carbon Disulphide	75-15-0	9.94E-09	AERMOD	5.85E-06	24 hr	24 hr	330	Odour	Guideline	0.000002%
Total Reduced Sulphur	-	9.77E-05	AERMOD	2.95E-01	1 hr	10 min	13	Odour	3	2.3%
Total Reduced Sulphur	-	9.77E-05	AERMOD	5.75E-02	24 hr	24 hr	7	Health	3	0.8%
Scenario 2 - Emergency Generator Testing ⁽¹⁾										
Nitrogen Oxides	10102-44-0	1.15E+00	AERMOD	1.99E+02	1 hr	1/2 hr	1880	Health	Other	10.6%
Nitrogen Oxides	10102-44-0	1.15E+00	AERMOD	2.34E+01	1 hr	1/2 hr	500	Health	Other	4.7%

⁽¹⁾ The modelling results at the non-sensitive receptors (houses, commercial plazas) were compared to the 1/2-hour screening level of $1880 \mu\text{g}/\text{m}^3$. The modelling results of sensitive receptors (places of worship, schools, daycares) were compared to the 1/2-hour screening level of $500 \mu\text{g}/\text{m}^3$ for the sensitive receptors outlined in the Ministry Emergency Generator Checklist, Supplement to Application for Approval, s.9.

Table 6: Odour Modelling Results for Discrete Receptors

Contaminant				Odour				
Total Facility Emission Rate (OU/s)				4.09E+03				
Air Dispersion Model Used				AERMOD				
Total Number of Hours Modelled				43848				
Averaging Period				10 min				
Ministry POI Standard (OU/m ³)				1				
Receptor Number	Receptor Description	Distance from Facility to Receptor ⁽¹⁾ (m)	UTM Coordinates (m)		Number of Hours Exceeding Ministry POI Standard over 5-year period ⁽²⁾		Frequency of Exceedance of Ministry POI Limit (%) ⁽²⁾	
			Easting	Northing	1 metre flagpole receptor	6 metre flagpole receptor	1 metre flagpole receptor	6 metre flagpole receptor
R1	Golf Course Entrance	706	598503.2	4919678.6	0	0	n/a	n/a
R2	Existing Residence	534	598395.6	4920074.6	21	23	0.05%	0.05%
R3	Existing Residence	535	598414.8	4920027.7	34	40	0.08%	0.09%
R4	Existing Residence	536	598432.6	4919994.4	44	48	0.10%	0.11%
R5	Existing Residence	639	598641.3	4919680.4	0	0	n/a	n/a
R6	Proposed Residence	410	598816.7	4919864.8	0	28	n/a	0.06%
R7	Proposed Residence	403	598825.3	4919871.0	0	26	n/a	0.06%
R8	Proposed Residence	395	598834.7	4919877.4	0	26	n/a	0.06%
R9	Proposed Residence	387	598843.7	4919883.8	5	35	0.01%	0.08%
R10	Proposed Residence	380	598852.9	4919890.3	6	38	0.01%	0.09%
R11	Proposed Residence	373	598861.7	4919896.3	6	40	0.01%	0.09%
R12	Proposed Residence	366	598870.7	4919902.8	13	42	0.03%	0.10%
R13	Proposed Residence	359	598879.6	4919908.7	11	43	0.03%	0.10%
R14	Proposed Residence	352	598889.4	4919915.5	7	40	0.02%	0.09%
R15	Proposed Residence	346	598898.5	4919922.2	4	32	0.01%	0.07%
R16	Proposed Residence	339	598908.1	4919928.8	10	34	0.02%	0.08%
R17	Proposed Residence	324	598931.5	4919945.6	32	44	0.07%	0.10%
R18	Proposed Residence	319	598940.1	4919951.9	40	44	0.09%	0.10%
R19	Proposed Residence	315	598949.1	4919957.7	43	46	0.10%	0.10%
R20	Proposed Residence	311	598957.8	4919963.9	48	51	0.11%	0.12%
R21	Proposed Residence	307	598966.6	4919969.8	52	51	0.12%	0.12%
R22	Proposed Residence	303	598975.9	4919976.1	50	50	0.11%	0.11%
R23	Proposed Residence	300	598984.2	4919982.4	49	45	0.11%	0.10%
R24	Proposed Residence	296	598993.1	4919988.6	51	44	0.12%	0.10%
R25	Proposed Residence	294	599002.6	4919994.9	52	40	0.12%	0.09%
R26	Proposed Residence	292	599011.8	4920000.9	50	38	0.11%	0.09%
R27	Proposed Residence	290	599020.5	4920007.2	49	37	0.11%	0.08%
R28	Proposed Residence	288	599029.9	4920014.2	44	36	0.10%	0.08%
R29	Proposed Residence	287	599039.1	4920020.1	36	31	0.08%	0.07%
R30	Proposed Residence	292	599059.6	4920027.4	37	29	0.08%	0.07%
R31	Proposed Residence	308	599068.4	4920015.0	31	28	0.07%	0.06%
R32	Proposed Residence	322	599074.4	4920001.1	30	28	0.07%	0.06%
R33	Proposed Residence	337	599080.3	4919987.1	30	27	0.07%	0.06%
R34	Proposed Residence	275	599088.3	4920073.4	49	32	0.11%	0.07%
R35	Proposed Residence	290	599097.1	4920061.0	43	25	0.10%	0.06%
R36	Proposed Residence	305	599103.1	4920047.1	31	21	0.07%	0.05%
R37	Proposed Residence	319	599109.1	4920033.1	27	12	0.06%	0.03%
R38	Existing Residence	781	598112.8	4920244.7	0	0	n/a	n/a
R39	Existing Residence	769	598126.4	4920209.0	0	0	n/a	n/a
R40	Existing Residence	755	598144.3	4920175.7	0	0	n/a	n/a
R41	Snowmobile Club ⁽³⁾	471	599346.4	4920397.3	56	128	0.13%	0.29%
R42	Existing Residence	654	599502.9	4920504.2	31	37	0.07%	0.08%
R43	Existing Residence	775	599319.5	4920914.9	0	0	n/a	n/a
R44	Provincial Park	1019	598507.2	4921210.5	0	0	n/a	n/a

⁽¹⁾ Measured from the WWTP Biofiltration Unit

⁽²⁾ Per the Ministry's *Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines under O.Reg. 419-5 (September 2016)*, if the modelled number of exceedances at a human receptor are below the odour guideline 0.5% of the time on an annual basis, then the facility is deemed, for assessment purposes, to meet the standard/guideline.

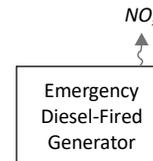
⁽³⁾ Due to the seasonality of this receptor, exceedances were only considered between the Fall/Winter months of September to March.

8 SOURCES OF NOISE

Since there are sensitive noise receptors within 1000 m of the Site, an Acoustic Assessment Report (AAR) is presented under separate cover.

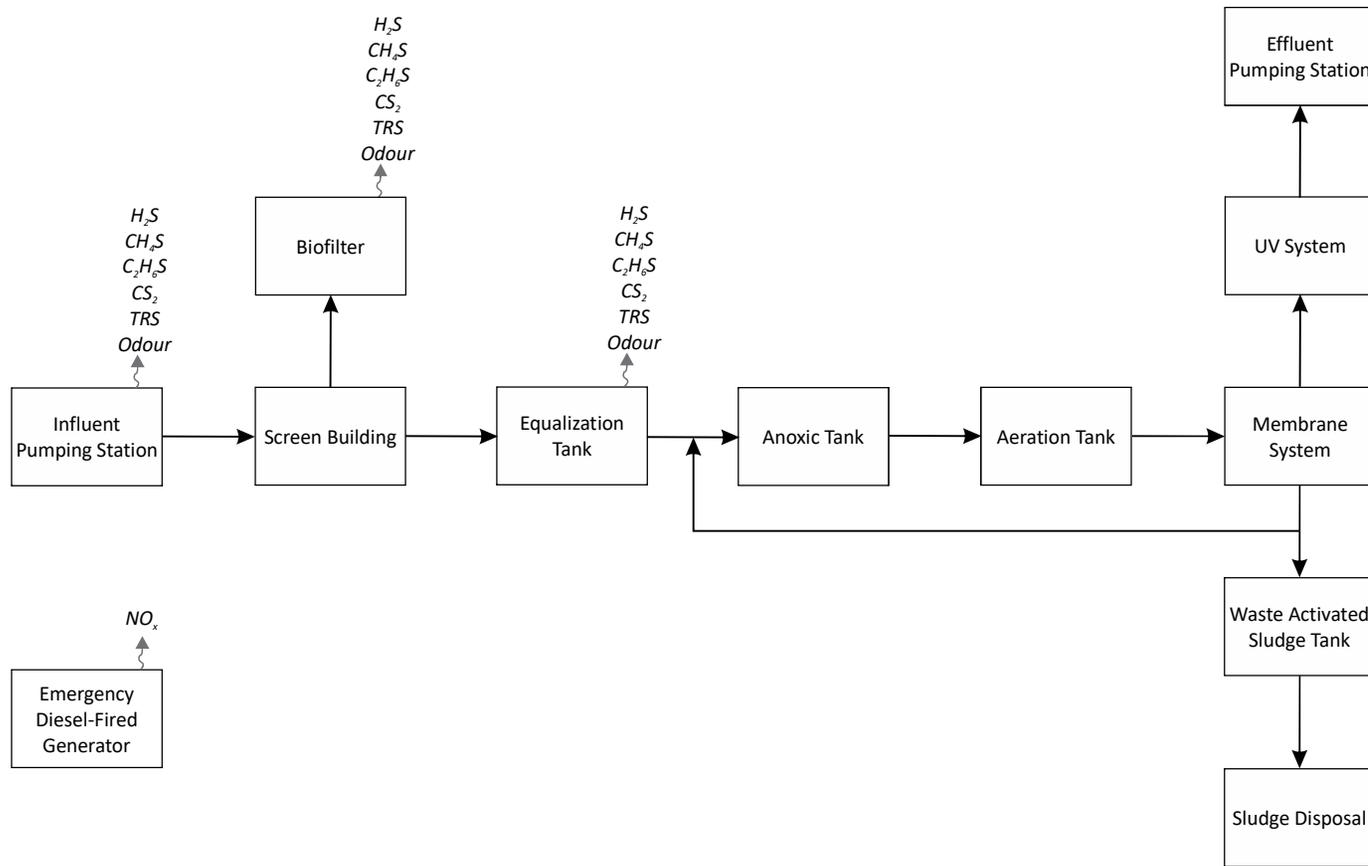
Appendix A
Figures and Zoning Map





LEGEND	
NO_x Nitrogen Oxides	Material Flow →
	Emissions Release ↗

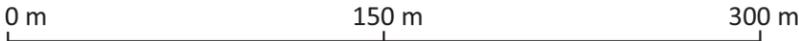
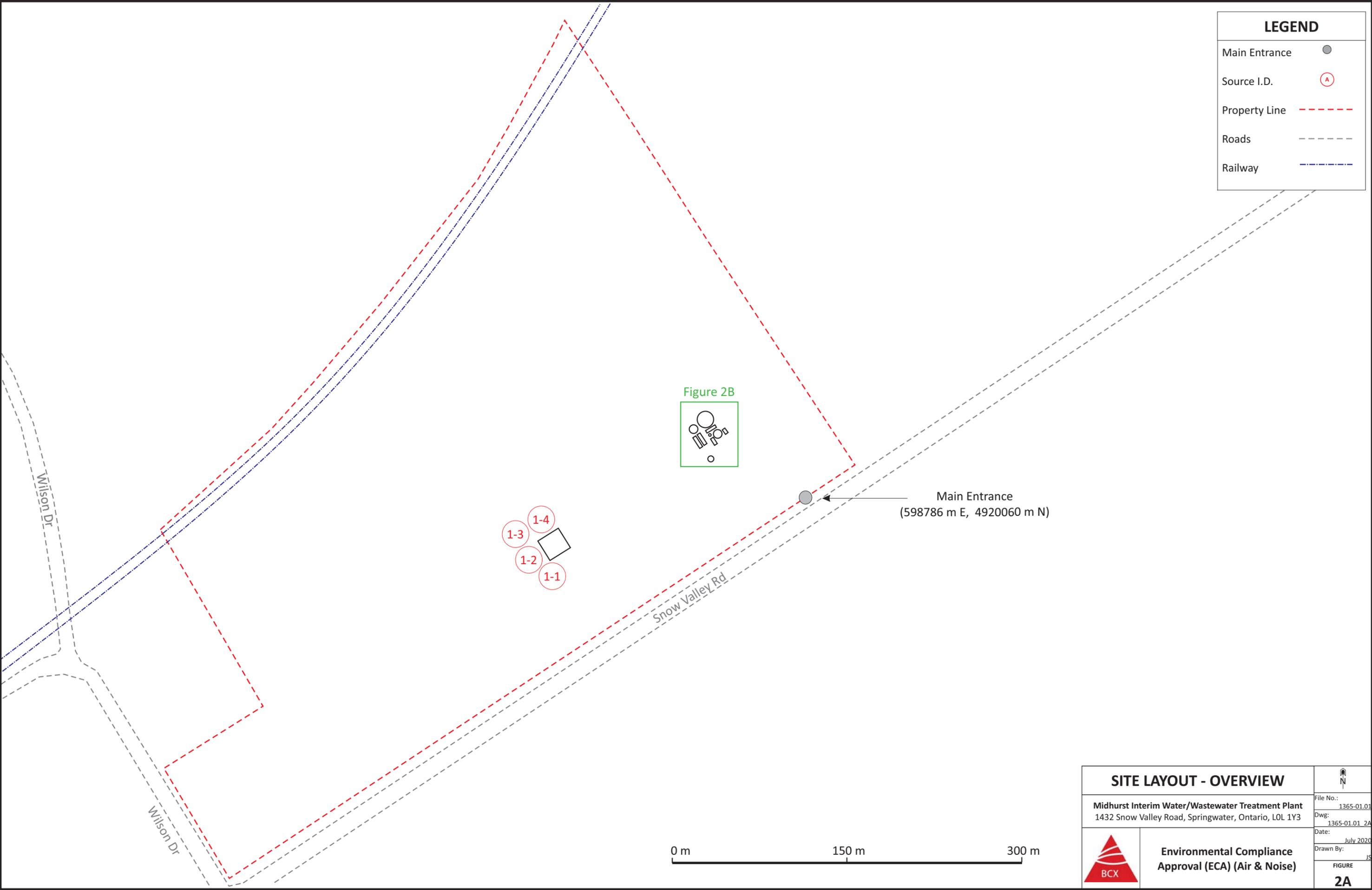
PROCESS FLOW DIAGRAM Water Treatment Plant		File No.:
Midhurst Interim Water/Wastewater Treatment Plant 1432 Snow Valley Road, Springwater, Ontario, L0L 1Y3		1365-01.01
		Dwg: 1365-01.01_1A
 Environmental Compliance Approval (Air & Noise)		Date: July 2020
		Drawn By: JS
		FIGURE 1A



LEGEND	
No_x	Nitrogen Oxides
H_2S	Hydrogen Sulphide
CH_4S	Methyl Mercaptan
C_2H_6S	Dimethyl Sulphide
CS_2	Carbon Disulphide
TRS	Total Reduced Sulphur
	Material Flow →
	Emissions Release ↗

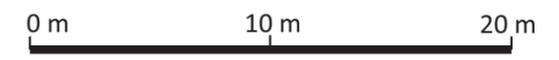
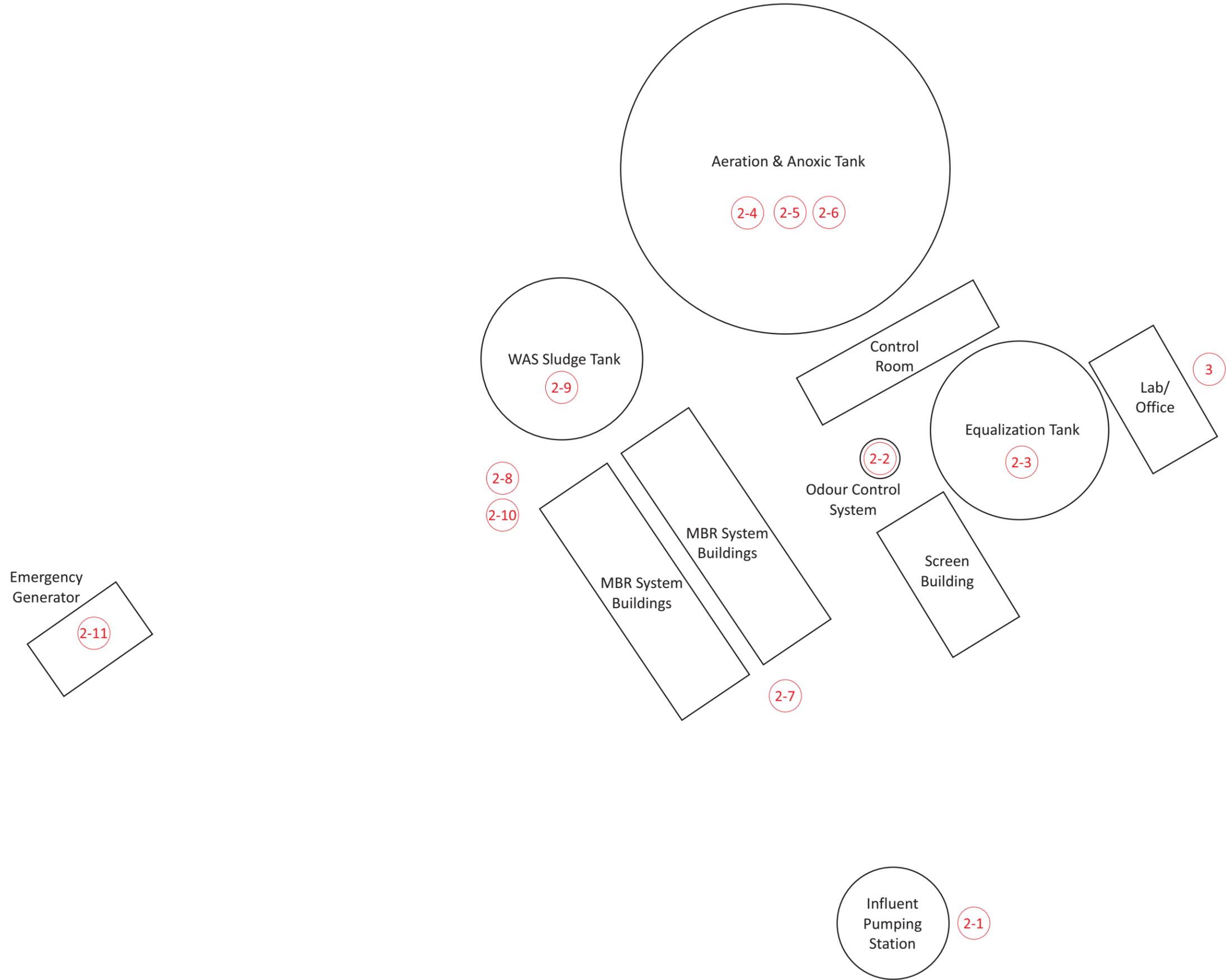
PROCESS FLOW DIAGRAM		File No.: 1365-01.01
Wastewater Treatment Plant		Dwg: 1365-01.01_1B
Midhurst Interim Water/Wastewater Treatment Plant 1432 Snow Valley Road, Springwater, Ontario, L0L 1Y3		Date: July 2020
	Environmental Compliance	Drawn By: JS
	Approval (Air & Noise)	FIGURE 1B

LEGEND	
Main Entrance	●
Source I.D.	⊙
Property Line	- - - -
Roads	- - - -
Railway	- · - · - ·



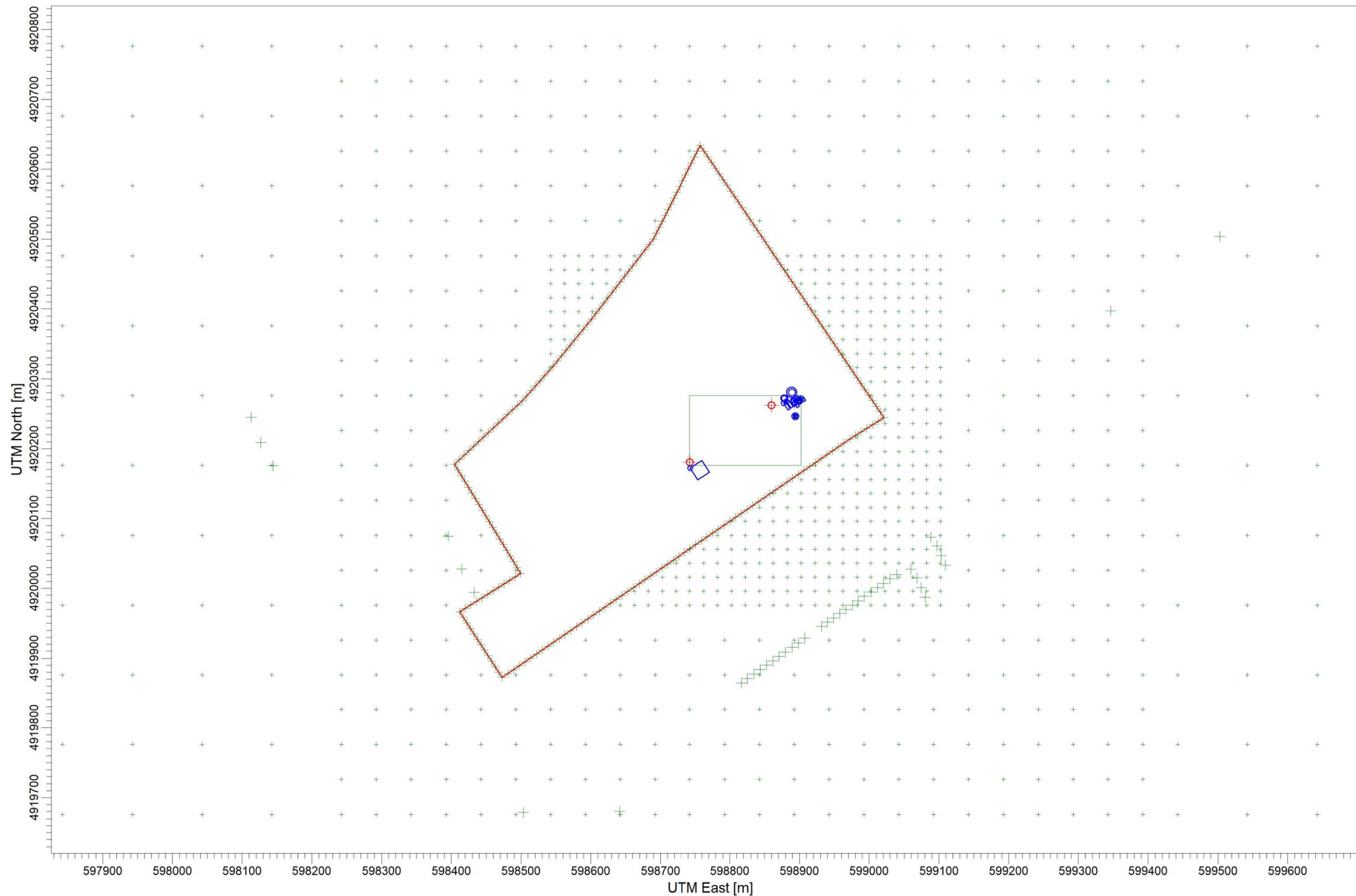
SITE LAYOUT - OVERVIEW		N
Midhurst Interim Water/Wastewater Treatment Plant 1432 Snow Valley Road, Springwater, Ontario, L0L 1Y3		File No.: 1365-01.01
 Environmental Compliance Approval (ECA) (Air & Noise)		Dwg: 1365-01.01_2A
		Date: July 2020
		Drawn By: JS
		FIGURE 2A

LEGEND	
Source I.D.	3



SITE LAYOUT - WWTP			
Midhurst Interim Water/Wastewater Treatment Plant 1432 Snow Valley Road, Springwater, Ontario, L0L 1Y3		File No.:	1365-01.01
		Dwg.:	1365-01.01_2B
		Date:	July 2020
		Drawn By:	JS
	Environmental Compliance Approval (ECA) (Air & Noise)	FIGURE	
		2B	

PROJECT TITLE:
Figure 3A: Dispersion Modelling Configuration



COMMENTS:
 Midhurst Facility
 1432 Snow Valley Road
 Springwater, Ontario
 LOL 1Y3

SOURCES:

5

RECEPTORS:

1798

COMPANY NAME:

MODELER:

DATE:

2020-08-18

SCALE:

1:5,839

0 0.1 km

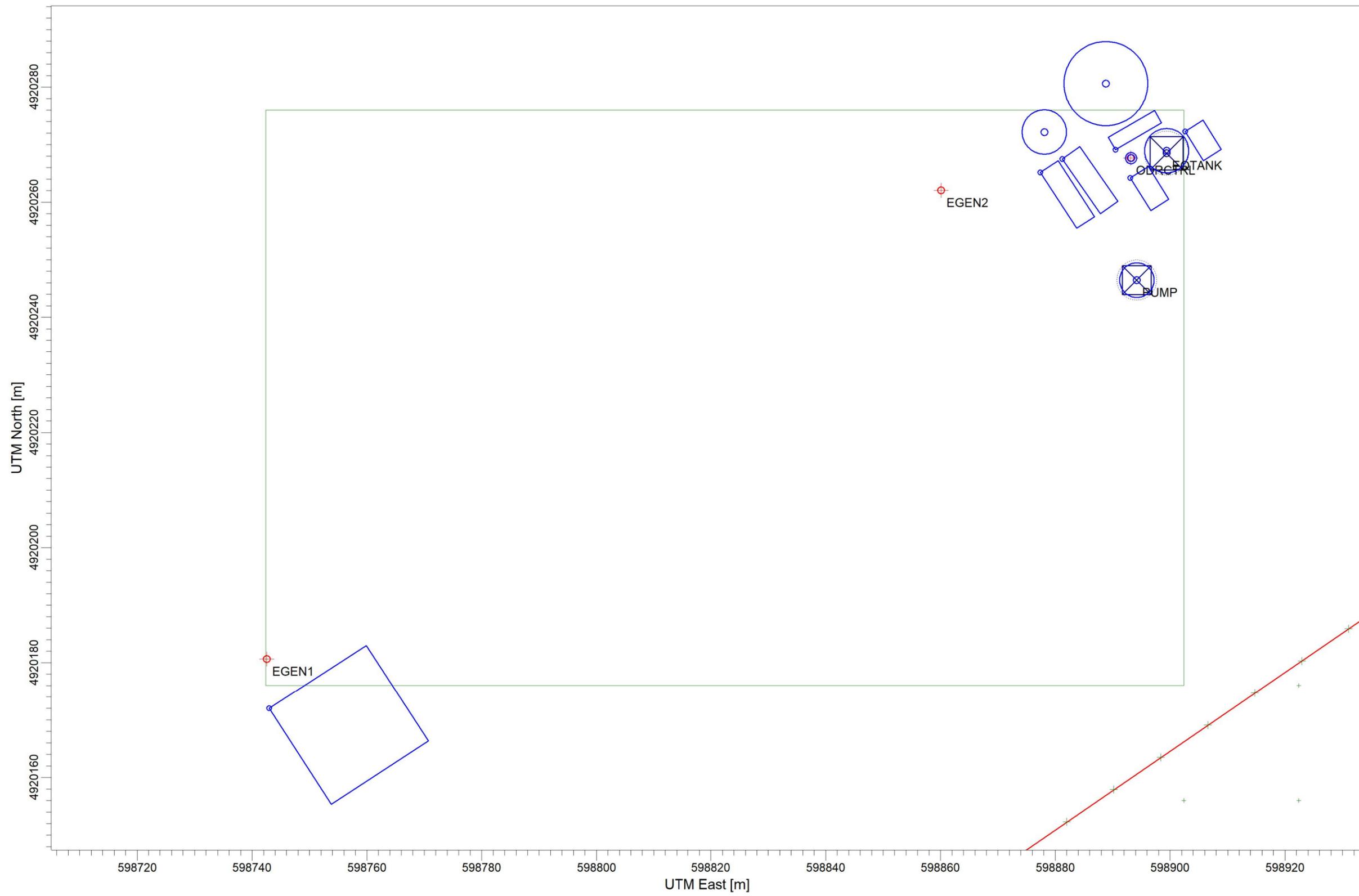


PROJECT NO.:

1365-01.01

PROJECT TITLE:
Figure 3B: Dispersion Modelling Configuration

COMMENTS:
 Midhurst Facility
 1432 Snow Valley Road
 Springwater, Ontario
 LOL 1Y3



SOURCES:
5

RECEPTORS:
1798

COMPANY NAME:

MODELER:

DATE:
2020-08-18

SCALE: 1:706
 0 0.02 km



PROJECT NO.:
1365-01.01

Midhurst



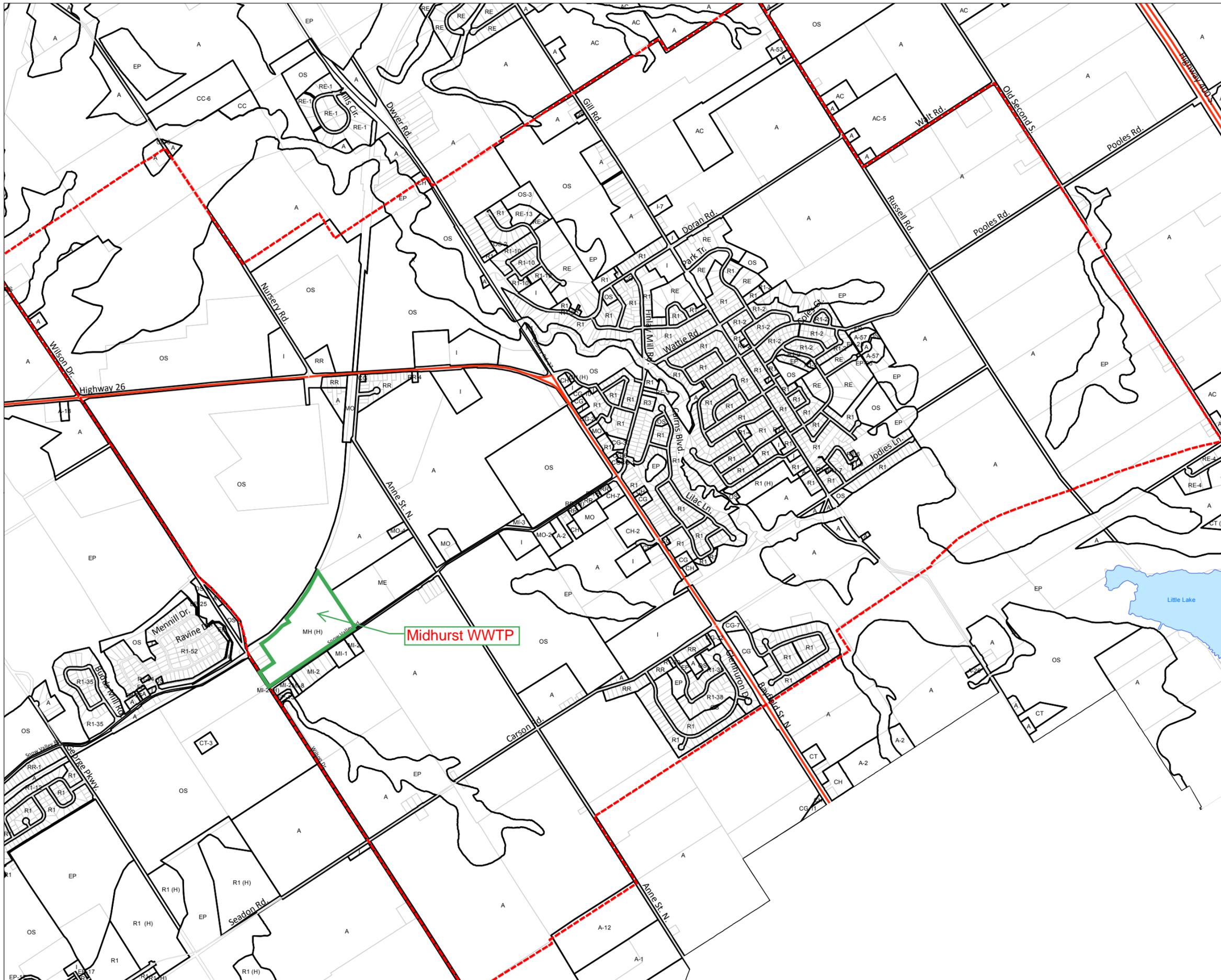
Legend

-  County Road
-  Local Road
-  Private Road
-  Provincial Road
-  Settlement Area Boundary
-  Zone Boundary
-  Lakes
-  Parcels

- A - Agricultural Zone
- CG - General Commercial Zone
- CH - Highway Commercial Zone
- CT - Tourist Commercial Zone
- EP - Environmental Protection Zone
- I - Institutional Zone
- MI - General Industrial Inside Storage Zone
- MO - General Industrial Outside Storage Zone
- R - Residential Zone

Disclaimer - This map is provided in draft form for reference only. Due to the scale and detail of the map, some site specific zoning labels may not be visible. For further clarification on any mapping discrepancies, please contact the Township of Springwater Planning Department.

0 250 500 1,000 Meters

Appendix B
Emission Calculations



**Calculation Sheet 1
Emission Rates - Operations**

Odour emission rates are calculated using source testing results completed on the screen building and equilibrium tanks of a similar membrane bioreactor (MBR) WWTP facility (Newterra), prorated to the Midhurst WWTP maximum capacity. It was assumed that emissions from the Midhurst Influent Pumping Station are the same as those from the Comparable WWTP Equalization Tank. The Comparable WWTP is configured such that the equalization tank precedes the screen building and is, therefore, most representative of odour from raw wastewater.

The emission rate for potential odour-causing compounds (hydrogen sulphide, methyl mercaptan, dimethyl sulphide, carbon disulphide) were estimated by prorating the hydrogen sulphide emission rate from similar sources at another WWTP (Duffin Creek Air Emissions Study Report, Earth Tech Canada Inc., May 2006). Emission rates from the other compounds were calculated using a ratio of concentrations from the headworks operations at an anaerobic wastewater treatment plant (Odor Control - Solutions for Managing Emissions from Wastewater Treatment Facilities by Simon, Alix and Arrebola, January 2010). The inlet concentrations for the headworks in this reference study: H₂S = 39,000 ppbv, Methyl Mercaptan = 310 ppbv, Dimethyl Sulphide = 10 ppbv, Carbonyl Disulphide = 4 ppbv. Total reduced sulphur emissions are calculated to be the sum of hydrogen sulphide, methyl mercaptan, dimethyl sulphide and carbonyl disulphide.

$$\text{Midhurst Emission Rate (Odour) (OU/s)} = \text{Comparable WWTP Odour Emission Rate, Uncontrolled (OU/s)} \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right)$$

$$\text{Midhurst Emission Rate (Hydrogen Sulphide) (g/s)} = \text{Comparable WWTP H}_2\text{S Emission Rate, Uncontrolled (OU/s)} \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right)$$

$$\text{Midhurst Emission Rate (Methyl Mercaptan, Dimethyl Sulphide, Carbon Disulphide) (g/s)} = \text{Comparable WWTP H}_2\text{S Emission Rate, Uncontrolled (g/s)} \times \left(\frac{\text{Concentration of Contaminant}}{\text{Concentration of H}_2\text{S}} \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right) \right)$$

$$\text{Midhurst Emission Rate (TRS) (g/s)} = \text{Emission Rate, Hydrogen Sulphide (g/s)} + \text{Emission Rate, Methyl Mercaptan (g/s)} + \text{Emission Rate, Dimethyl Sulphide (g/s)} + \text{Emission Rate, Carbon Disulphide (g/s)}$$

Source ID	Source Description	Contaminant	CAS#	Comparable WWTP (Source Testing)				Comparable WWTP (Odour Study)		Midhurst WWTP						Data Quality	Emission Technique
				Emission Rate, Controlled (OU/s)	Additional Control Efficiency (%)	Emission Rate, Uncontrolled (OU/s)	Maximum Capacity (m ³ /day)	Emission Rate, Uncontrolled (g/s)	Maximum Capacity (m ³ /day)	Maximum Capacity (m ³ /day)	Prorated Emission Rate, Uncontrolled		Additional Control Efficiency (%)	Prorated Emission Rate, Controlled			
											Value	Unit		Value	Unit		
Wastewater Treatment Plant																	
2-1	Influent Pumping Station	Hydrogen Sulphide	7789-06-4	-	-	-	-	7.69E-04	246025.0	3523.0	1.10E-05	g/s	0%	1.10E-05	g/s	Average	EC
		Methyl Mercaptan	74-93-1	-	-	-	-	6.11E-06	246025.0	3523.0	8.75E-08	g/s	0%	8.75E-08	g/s	Average	EC
		Dimethyl Sulphide	75-18-3	-	-	-	-	1.97E-07	246025.0	3523.0	2.82E-09	g/s	0%	2.82E-09	g/s	Average	EC
		Carbon Disulphide	75-15-0	-	-	-	-	7.89E-08	246025.0	3523.0	1.13E-09	g/s	0%	1.13E-09	g/s	Average	EC
		Total Reduced Sulphur	TRS	-	-	-	-	-	-	3523.0	1.11E-05	g/s	0%	1.11E-05	g/s	Average	EC
		Odour	-	28.82	90%	288.22	500.0	-	-	3523.0	2030.78	OU/s	0%	2.03E+03	OU/s	Average	EC
2-2	Screen Building, venting through a Biofilter unit	Hydrogen Sulphide	7789-06-4	-	-	-	-	8.57E-03	369038.0	3523.0	8.18E-05	g/s	95%	4.09E-06	g/s	Average	EC
		Methyl Mercaptan	74-93-1	-	-	-	-	6.81E-05	369038.0	3523.0	6.50E-07	g/s	95%	3.25E-08	g/s	Average	EC
		Dimethyl Sulphide	75-18-3	-	-	-	-	2.20E-06	369038.0	3523.0	2.10E-08	g/s	95%	1.05E-09	g/s	Average	EC
		Carbon Disulphide	75-15-0	-	-	-	-	8.79E-07	369038.0	3523.0	8.39E-09	g/s	95%	4.20E-10	g/s	Average	EC
		Total Reduced Sulphur	TRS	-	-	-	-	-	-	3523.0	8.25E-05	g/s	95%	4.12E-06	g/s	Average	EC
		Odour	-	7.71	90%	77.15	500.0	-	-	3523.0	543.58	OU/s	95%	2.72E+01	OU/s	Average	EC
2-3	Equalization Tank	Hydrogen Sulphide	7789-06-4	-	-	-	-	8.57E-03	369038.0	3523.0	8.18E-05	g/s	0%	8.18E-05	g/s	Average	EC
		Methyl Mercaptan	74-93-1	-	-	-	-	6.81E-05	369038.0	3523.0	6.50E-07	g/s	0%	6.50E-07	g/s	Average	EC
		Dimethyl Sulphide	75-18-3	-	-	-	-	2.20E-06	369038.0	3523.0	2.10E-08	g/s	0%	2.10E-08	g/s	Average	EC
		Carbon Disulphide	75-15-0	-	-	-	-	8.79E-07	369038.0	3523.0	8.39E-09	g/s	0%	8.39E-09	g/s	Average	EC
		Total Reduced Sulphur	TRS	-	-	-	-	-	-	3523.0	8.25E-05	g/s	0%	8.25E-05	g/s	Average	EC
		Odour	-	28.82	90%	288.22	500.0	-	-	3523.0	2030.78	OU/s	0%	2.03E+03	OU/s	Average	EC

Hydrogen Sulphide Sample Calculation - Influent Pumping Station

$$\text{Midhurst WWTP Emission Rate (g/s)} = \text{Comparable WWTP H}_2\text{S Emission Rate, Uncontrolled (OU/s)} \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right)$$

$$= \frac{7.69\text{E-04 g}}{\text{s}} \times \frac{3523.0 \text{ m}^3}{\text{day}} \times \frac{\text{day}}{246025.0 \text{ m}^3} = \frac{1.10\text{E-05 g}}{\text{s}}$$

Methyl Mercaptan Sample Calculation - Influent Pumping Station

$$\text{Midhurst WWTP Emission Rate (g/s)} = \text{Comparable WWTP H}_2\text{S Emission Rate, Uncontrolled (OU/s)} \times \left(\frac{\text{Concentration of Methyl Mercaptan}}{\text{Concentration of H}_2\text{S}} \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right) \right)$$

$$= \frac{7.69\text{E-04 g}}{\text{s}} \times \frac{310.0 \text{ ppbv}}{39000.0 \text{ ppbv}} \times \frac{3523.0 \text{ m}^3}{\text{day}} \times \frac{\text{day}}{246025.0 \text{ m}^3} = \frac{8.75\text{E-08 g}}{\text{s}}$$

Odour Sample Calculation - Influent Pumping Station

$$\text{Midhurst WWTP Emission Rate (OU/s)} = \text{Comparable WWTP Odour Emission Rate, Controlled (OU/s)} / (1 - \text{Additional Control Efficiency (\%)}) \times \left(\frac{\text{Midhurst WWTP Capacity (m}^3/\text{day)}}{\text{Comparable WWTP Capacity (m}^3/\text{day)}} \times (1 - \text{Additional Control Efficiency (\%)}) \right)$$

$$= \frac{2.88\text{E+01 OU}}{\text{s}} \times \frac{1}{(1 - 0.9)} \times \frac{3523.0 \text{ m}^3}{\text{day}} \times \frac{\text{day}}{500.0 \text{ m}^3} = \frac{2.03\text{E+03 g}}{\text{s}}$$

Calculation Sheet 2
Emission Rates - Emergency Generators

Emission factors for NO_x were taken from U.S. EPA Emission Standards for a Tier 2 and 3 Engine. While testing of the emergency generators will occur between 9:00 AM and 5:00 PM, not concurrently, modelling conservatively assumed that the generators run simultaneously for testing.

Hourly Emissions (g/s) = Emission Factor (g/kW-hr) x Power Rate (kW) x (1hr/3600s)

Source I.D.	Source Description	Contaminant	CAS #	Averaging Period	U.S. EPA Tier	Power Rate		Emission Factors		Emissions (g/s)	U.S. EPA AP-42 Data Quality	ESDM Data Quality	Estimation Technique
						Value	Units	Value	Units				
Water Treatment Plant													
1-4	Emergency diesel-fired generator for WTP	NO _x	10102-44-0	1 hr	2	500.0	kW	6.03E+00	g/kW-hr	8.38E-01	A	Above Average	EF
Wastewater Treatment Plant													
2-11	Emergency diesel-fired generator for WWTP	NO _x	10102-44-0	1 hr	3	300.0	kW	3.75E+00	g/kW-hr	3.13E-01	A	Above Average	EF

Sample Calculation - Emergency Diesel Fired Generator for WTP

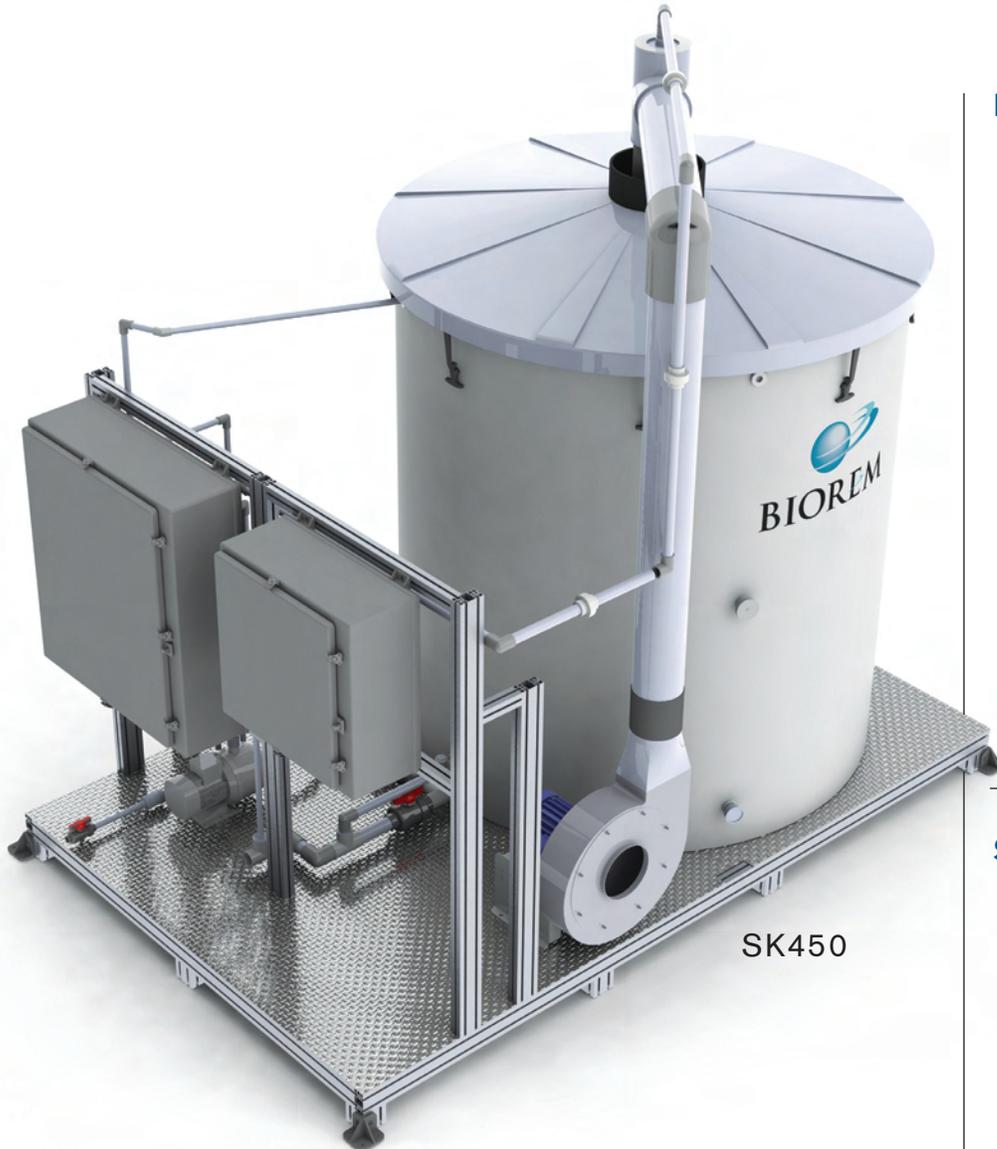
$$\begin{aligned}
 &\text{Emission Rate (g/s) = Emission Factor (g/kW-hr) x Power Rate (kW) x (1hr/3600s)} \\
 &= \frac{6.03 \text{ g}}{\text{kW-hr}} \times 500 \text{ kW} \times \frac{1 \text{ hr}}{3600 \text{ s}} = \frac{0.8375 \text{ g}}{\text{s}}
 \end{aligned}$$

Appendix C
Equipment Specifications





SK SERIES SKID MOUNTED BIOFILTER



SK450

Small footprint, high performance two-stage biofilter is skid mounted for simple installation and perfect for sites with limited space requirements.

APPLICATION

Specifically designed for low air flow applications typically found at pump and lift stations where high concentrations of H₂S are found and total odor removal is required.



SK250

FEATURES

- Small footprint for tight space requirements
- Simple installation as skid mounted unit is shipped complete to site
- High performance permanent media(s)
- Total odor removal >95%
- H₂S removal of >99%
- Available in two sizes:
 - Up to 250 cfm (425 m³/h)
 - Up to 450 cfm (765 m³/h)
- Tank material: High Density Polyethylene with UV inhibitors
- NFPA 70 and NFPA 820
- Nema 4x control panel
- Nema 4x water box

SPECIFICATIONS

POWER REQUIREMENTS

- 380VAC / 3ph/50Hz – 24 A
- 480VAC / 3ph/60Hz – 20 A
- 575VAC / 3ph/60Hz – 16 A

WATER REQUIREMENTS

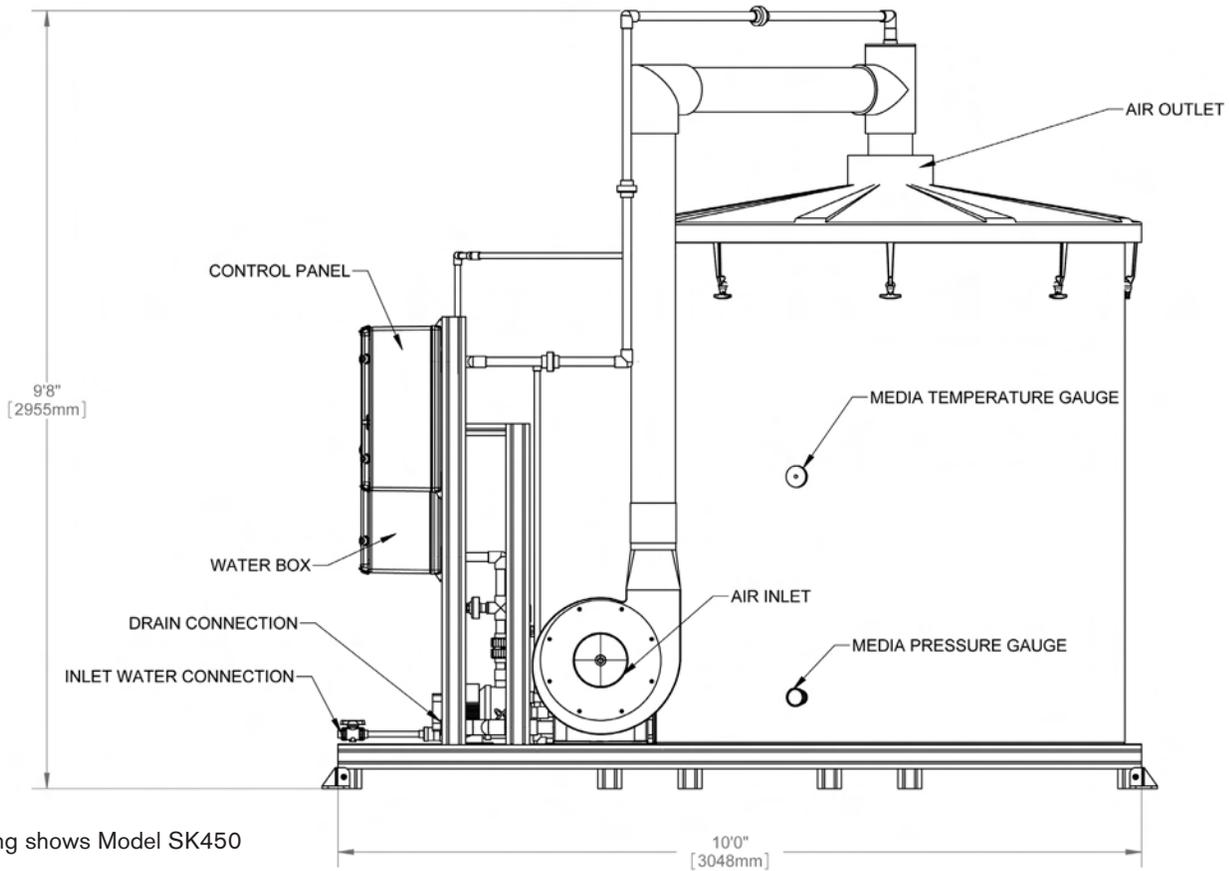
- Water connection: 1/2"
- Drain connection: 1 1/2"
- Water supply: 0.16 GPM

AIR REQUIREMENTS

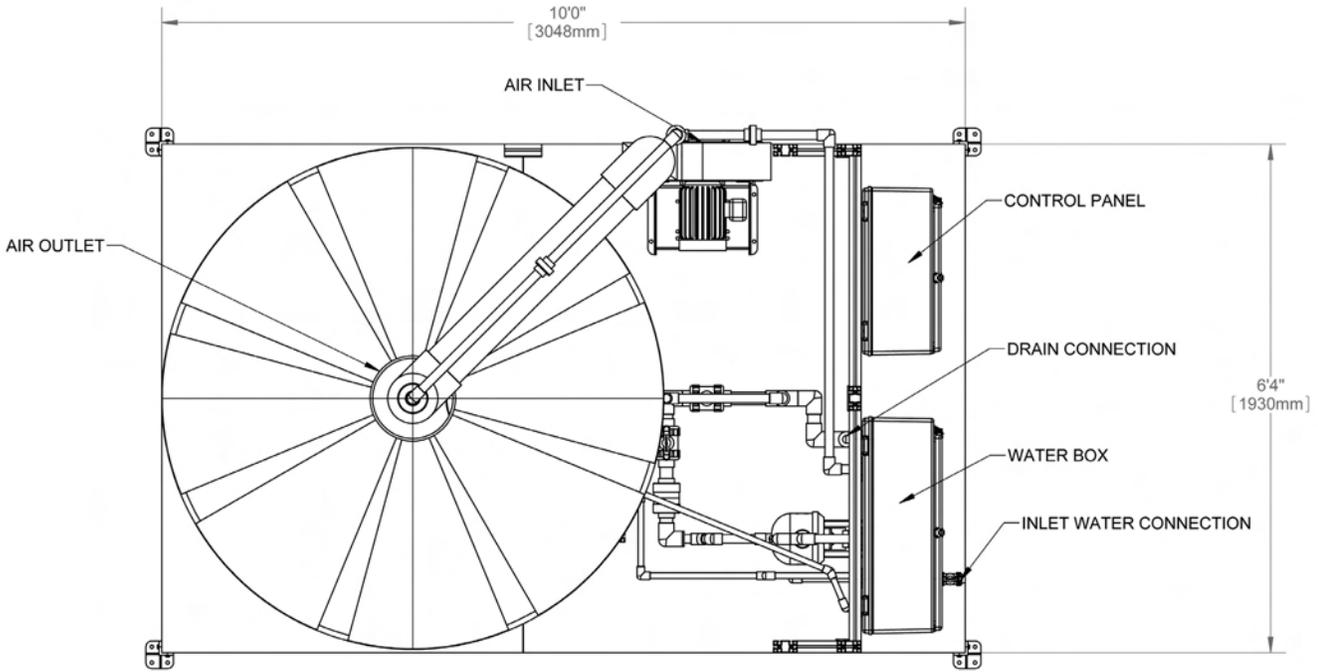
- Fan Inlet:
 - 6" ANSI Flange

OPTIONAL EQUIPMENT

- Winterization package
- Sound attenuation package
- Nutrient feed



Drawing shows Model SK450



MODEL	LENGTH	WIDTH	HEIGHT	OPERATING WEIGHT approx.	SHIPPING WEIGHT approx.
SK250	10' (3048 mm)	6' 4" (1930 mm)	7' 10" (2392 mm)	5390 lbs (2445 kg)	3130 lbs (1420 kg)
SK450	10' (3048 mm)	6' 4" (1930 mm)	9' 8" (2955 mm)	6850 lbs (3107 kg)	3800 lbs (1724 kg)



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UNITED STATES
 100 Rawson Road, STE 239
 Victor, NY, 14564
 Toll Free: 1.877.299.2108
 Tel: 585.924.2220 • Fax: 585.924.8280

www.biorem.biz

Standby & Prime: 60Hz



Image shown might not reflect actual configuration

Engine Model	Cat® C9 ACERT™ In-line 6, 4-cycle diesel
Bore x Stroke	112mm x 149mm (4.4in x 5.9in)
Displacement	8.8 L (538 in³)
Compression Ratio	16.1:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	HEUI
Governor	Electronic ADEM™ A4

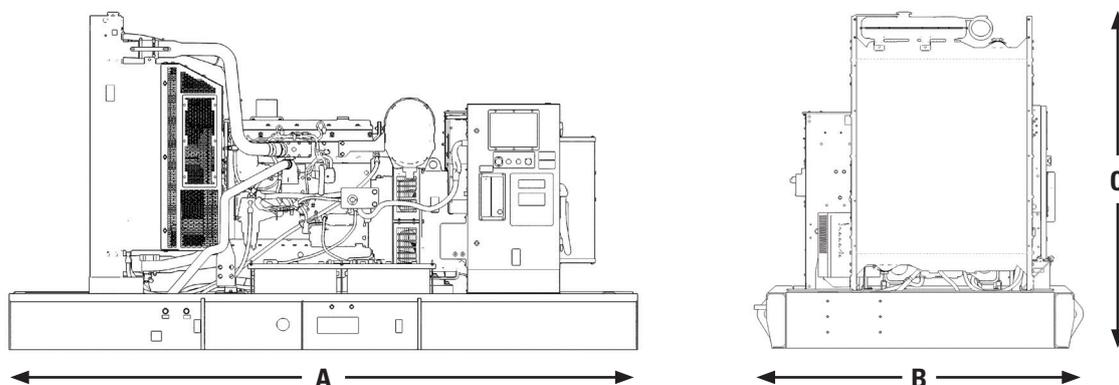
Model	Standby	Prime	Emission Strategy
C9	300 ekW, 375 kVA	275 ekW, 344 kVA	TIER III Non-Road

PACKAGE PERFORMANCE

Performance	Standby	Prime
Frequency	60 Hz	
Genset Power Rating	375 kVA	344 kVA
Genset power rating with fan @ 0.8 power factor	300 ekW	275 ekW
Emissions	TIER III Non-Road	
Performance Number	DM8168-04	DM8500-05
Fuel Consumption		
100% load with fan, L/hr (gal/hr)	86.0 (22.7)	80.5 (21.3)
75% load with fan, L/hr (gal/hr)	66.8 (17.6)	64.0 (16.9)
50% load with fan, L/hr (gal/hr)	51.5 (13.6)	50.5 (13.3)
25% load with fan, L/hr (gal/hr)	33.1 (8.7)	32.8 (8.7)
Cooling System¹		
Radiator air flow restriction (system), kPa (in. Water)	0.12 (0.48)	0.12 (0.48)
Radiator air flow, m3/min (cfm)	497 (17551)	497 (17551)
Engine coolant capacity, L (gal)	13.9 (3.7)	13.9 (3.7)
Radiator coolant capacity, L (gal)	43 (11.5)	43 (11.5)
Total coolant capacity, L (gal)	57 (15)	57 (15)
Inlet Air		
Combustion air inlet flow rate, m³/min (cfm)	26.0 (916.6)	25.3 (891.8)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	50 (123)	51 (124)
Exhaust System		
Exhaust stack gas temperature, °C (°F)	497.3 (927.2)	495.7 (924.2)
Exhaust gas flow rate, m³/min (cfm)	69.7 (2460.9)	67.4 (2379.6)
Exhaust system backpressure (maximum allowable) kPa (in. water)	10.0 (40.0)	10.0 (40.0)
Heat Rejection		
Heat rejection to jacket water, kW (Btu/min)	120 (6838)	113 (6431)
Heat rejection to exhaust (total) kW (Btu/min)	320 (18223)	307 (17454)
Heat rejection to aftercooler, kW (Btu/min)	92 (5239)	83 (4726)
Heat rejection to atmosphere from engine, kW (Btu/min)	23 (1312)	18 (1009)

Emissions (Nominal) ²	Standby		Prime	
NOx, mg/Nm ³ (g/hp-hr)	2196.0 (4.0)		1975.0 (3.6)	
CO, mg/Nm ³ (g/hp-hr)	115.5 (0.2)		103.9 (0.2)	
HC, mg/Nm ³ (g/hp-hr)	23.1 (0.06)		23.2 (0.06)	
PM, mg/Nm ³ (g/hp-hr)	12.7 (0.03)		10.5 (0.03)	
Alternator ³				
Voltages	480V	600V	480V	600V
Motor starting capability @ 30% Voltage Dip	683 skVA	754 skVA	683 skVA	754 skVA
Current	451 amps	361 amps	414 amps	331 amps
Frame Size	LC5014J	LC5024J	LC5014J	LC5024J
Excitation	SE	AR	SE	AR
Temperature Rise	150 ° C	150 ° C	125 ° C	125 ° C

WEIGHTS & DIMENSIONS



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
3091 (122)	1622 (64)	2066 (82)	2313 (5100)

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.

Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

PRIME: Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated kW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

DEFINITIONS AND CONDITIONS

¹ For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

² Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

³ UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

LET'S DO THE WORK.™

LEHE1568-02 (05/20)

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Standby & Prime: 60Hz



Image shown might not reflect actual configuration

Engine Model	Cat® C15 ACERT™ In-line 6, 4-cycle diesel
Bore x Stroke	137mm x 171mm (5.4in x 6.8in)
Displacement	15.2 L (928 in ³)
Compression Ratio	16.1:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	MEUI
Governor	Electronic ADEM™ A4

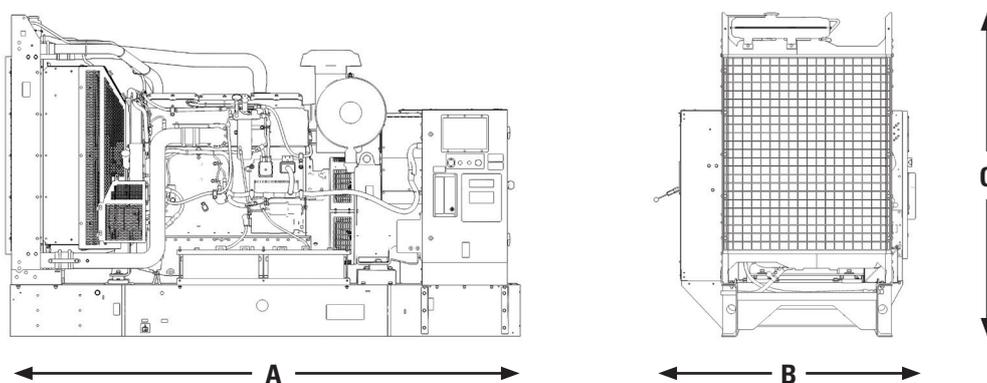
Model	Standby	Prime	Emission Strategy
C15	500 ekW, 625 kVA	455 ekW, 569 kVA	TIER II Non-Road

PACKAGE PERFORMANCE

Performance	Standby	Prime
Frequency	60 Hz	
Genset Power Rating	625 kVA	569 kVA
Genset power rating with fan @ 0.8 power factor	500 ekW	455 ekW
Emissions	TIER II Non-Road	
Performance Number	DM8155-04	DM8154-05
Fuel Consumption		
100% load with fan, L/hr (gal/hr)	137.0 (36.2)	129.8 (34.3)
75% load with fan, L/hr (gal/hr)	110.5 (29.2)	99.9 (26.4)
50% load with fan, L/hr (gal/hr)	71.3 (18.8)	65.6 (17.3)
25% load with fan, L/hr (gal/hr)	41.9 (11.1)	39.3 (10.4)
Cooling System¹		
Radiator air flow restriction (system), kPa (in. Water)	0.12 (0.48)	0.12 (0.48)
Radiator air flow, m ³ /min (cfm)	720 (25426)	720 (25426)
Engine coolant capacity, L (gal)	20.8 (5.5)	20.8 (5.5)
Radiator coolant capacity, L (gal)	54 (14)	54 (14)
Total coolant capacity, L (gal)	75 (20)	75 (20)
Inlet Air		
Combustion air inlet flow rate, m ³ /min (cfm)	38.2 (1347.7)	38.2 (1349.2)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	49 (120)	49 (120)
Exhaust System		
Exhaust stack gas temperature, °C (°F)	531.1 (988.0)	524.4 (975.9)
Exhaust gas flow rate, m ³ /min (cfm)	102.1 (3605.5)	101.2 (3573.4)
Exhaust system backpressure (maximum allowable) kPa (in. water)	10.0 (40.0)	10.0 (40.0)
Heat Rejection		
Heat rejection to jacket water, kW (Btu/min)	182 (10375)	172 (9792)
Heat rejection to exhaust (total) kW (Btu/min)	493 (28039)	483 (27453)
Heat rejection to aftercooler, kW (Btu/min)	121 (6860)	120 (6827)
Heat rejection to atmosphere from engine, kW (Btu/min)	91 (5182)	87 (4936)

Emissions (Nominal) ²	Standby		Prime	
NOx, mg/Nm ³ (g/hp-hr)	2129.1 (4.6)		1554.5 (3.6)	
CO, mg/Nm ³ (g/hp-hr)	301.5 (0.6)		362.9 (0.8)	
HC, mg/Nm ³ (g/hp-hr)	8.8 (0.03)		12.2 (0.04)	
PM, mg/Nm ³ (g/hp-hr)	9.5 (0.03)		11.9 (0.03)	
Alternator ³				
Voltages	480V	600V	480V	600V
Motor starting capability @ 30% Voltage Dip	1428 skVA	1714 skVA	1428 skVA	1714 skVA
Current	752 amps	601 amps	684 amps	547 amps
Frame Size	LC6114F	LC6124F	LC6114F	LC6124F
Excitation	SE	AR	SE	AR
Temperature Rise	130 ° C	130 ° C	105 ° C	105 ° C

WEIGHTS & DIMENSIONS



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
3476 (137)	1628 (64)	2128 (84)	4365 (9623)

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.

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RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

DEFINITIONS AND CONDITIONS

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² Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

³ UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

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LEHE1577-03 (05/20)

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Appendix D

AERMOD Supporting Files



**Ministry of the Environment,
Conservation and Parks**

Environmental Monitoring and
Reporting Branch

125 Resources Road
Etobicoke ON M9P 3V6
Tel.: 416 235-6300
Fax: 416 235-6235

**Ministère de l'Environnement, de
la Protection de la nature et des
Parcs**

Direction de la Surveillance
Environnementale

125, chemin Resources
Etobicoke ON M9P 3V6
Tél. : 416 235-6300
Télééc. : 416 235-6235



July 13, 2020

Vimal Patel, Senior Project Manager
Carson Road Development Inc.
3190 Steeles Avenue East, unit 300
Markham, Ontario
L3R 1G9

Dear Madam/Sir:

**Re: Request for Approval under Paragraph 3 of section 13(1) of Regulation 419/05
For use of Site-specific Meteorological Data:
Carson Road Development Inc. - Midhurst Wastewater Treatment Plant (located at 1432 Snow
Valley Road, Springwater, Ontario)**

In accordance with the application for approval under s.13(1) of Regulation 419/05 for use of site-specific meteorological data, I am approving the use of site-specific data for the above-referenced site as requested by Carson Road Development Inc. in the application dated June 4, 2020.

The site-specific meteorological data referenced as the Borden data is a reasonable reflection of the meteorological conditions for the proposed modelling assessment.

A fully-processed 5-year (2012 to 2016) meteorological data set has been prepared by the Ministry of the Environment, Conservation and Parks with wind-sector dependent land use specific to the site identified in the application, upper air data from the U.S. National Weather Service's Buffalo station and surface data from the Environment and Climate Change Canada's Borden station, with missing cloud cover data filled with those from the Toronto international airport station.

This fully-processed site-specific meteorological data was prepared in response to a request submitted under O. Reg. 419/05 and is approved for use at this specific facility until such time as there are significant land use changes in vicinity of the facility.

This meteorological dataset was prepared using the AERMET 19191 meteorological pre-processor computer program. It is to be used in conjunction with the corresponding version of AERMOD to model discharges from the above-referenced facility. You are reminded that this dataset must be reprocessed when the Ministry adopts a newer version of AERMET. The Ministry can provide reprocessed meteorological data upon request.

This s.13(1) approval expires on February 28, 2022.

Should you have any comments or questions relating to the above site specific meteorological dataset, please send an e-mail to MetDataENE@ontario.ca within 30 days of the date of this correspondence with details, so that this dataset can be modified, if necessary.

Yours truly,

A handwritten signature in black ink, appearing to be 'YH' or similar initials, written in a cursive style.

Yvonne Hall
Director, Section 13, O. Reg. 419/05

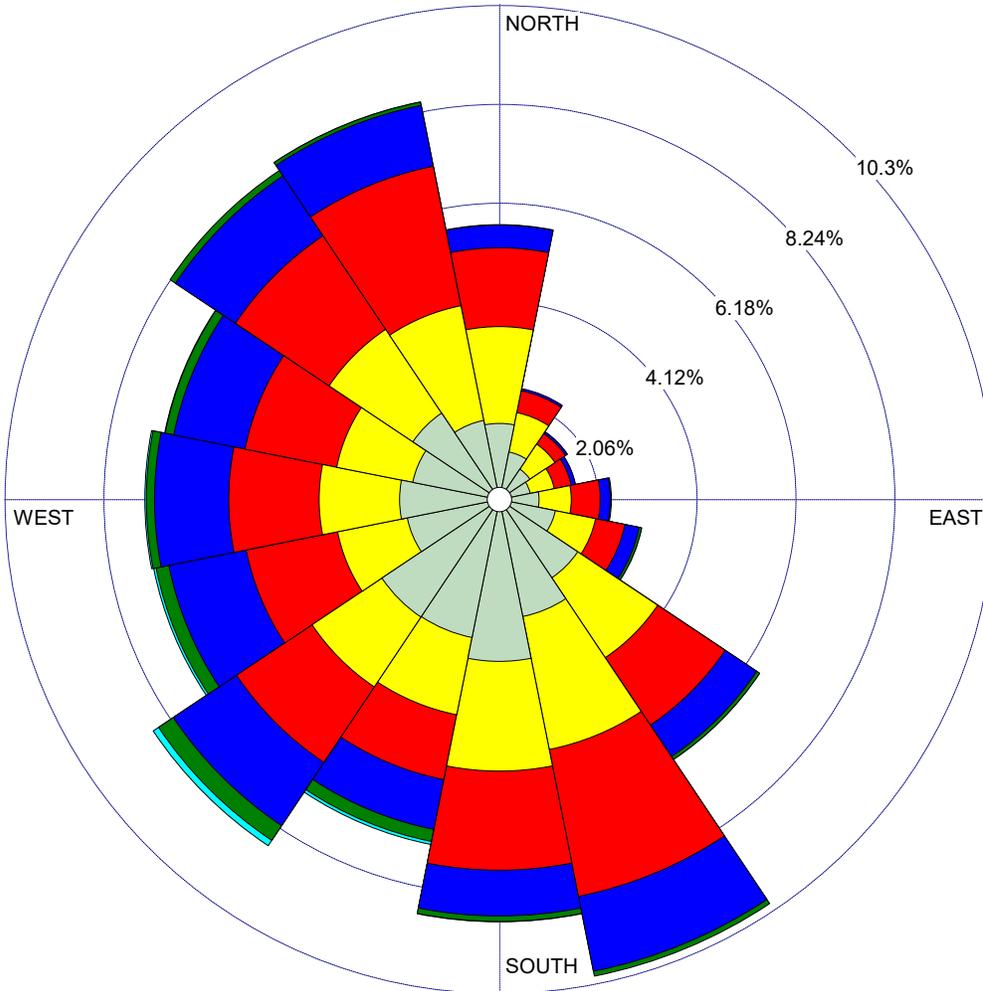
cc: District Manager, Barrie District Office
Director, Section 9, Environmental Protection Act
Environmental Assessment and Permissions Branch
BCX Environmental Consulting

WIND ROSE PLOT:

Midhurst Interim WTP and WWTP - 1432 Snow Valley Rd, Springwater, ON
Site Specific Meteorological Data

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.10
 - 8.80 - 11.10
 - 5.70 - 8.80
 - 3.60 - 5.70
 - 2.10 - 3.60
 - 0.50 - 2.10
- Calms: 0.00%

COMMENTS:

AERMET 19191

DATA PERIOD:

Start Date: 2012-01-01 - 00:00
End Date: 2016-12-31 - 23:59

COMPANY NAME:

BCX Environmental Consulting

MODELER:

JS

CALM WINDS:

0.00%

TOTAL COUNT:

42338 hrs.

AVG. WIND SPEED:

3.35 m/s

DATE:

2020-07-17

PROJECT NO.:

1364-01.01



Appendix E

ESDM Report Checklist

