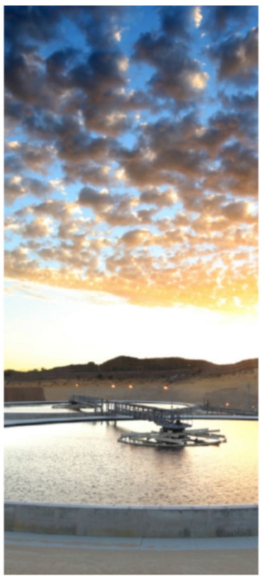



County of Simcoe
Environmental Resource Recovery Centre
Facility Characteristics Report

- **Conceptual Site Plan**
- **Functional Servicing Study**
- **Stormwater Management Study**
- **Noise Assessment**
- **Odour Assessment**

County of Simcoe

Solid Waste Management Department

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Executive Summary

The County of Simcoe (County) is proposing the development of a co-located Materials Management Facility (MMF) and Organics Processing Facility (OPF) to address needs for the consolidation, transfer, and processing of waste materials. The OPF, MMF, and ancillary facilities (e.g., truck servicing facility, materials recovery facility, administrative facility and public education space, access roads, stormwater management pond) will collectively be referred to as the Environmental Resource Recovery Centre (ERRC).

Through a detailed site evaluation and selection process, the preferred site for the development of the ERRC was identified as 2976 Horseshoe Valley Road West (Site) in the Township of Springwater (Springwater).

The current County Official Plan (OP) designation for the Site is Greenlands (Schedule 5.1), while Springwater's OP designates the majority of the Site as Rural, with the southwest portion of the Site designated as Agricultural. The Site is currently zoned Agricultural under Springwater's Zoning By-Law (ZBL).

Following a pre-consultation meeting with Springwater Planning staff in December 2015, a number of studies were identified that would be required in support of amending the Springwater OP and ZBL. This report includes and summarizes the findings of the following studies:

- Conceptual Site Plan
- Functional Servicing Study
- Stormwater Management Study
- Noise Assessment
- Odour Assessment

A description of the Site based on the findings from these and other additional studies is provided, as are details surrounding the siting and sizing of the ERRC footprint, components, proposed layout, and the provision of Site servicing. An overall development strategy is also presented, outlining the anticipated approach and staging/timing of procurement, Site Plan approval, building permits, construction, and operations.

Preliminary details have also been provided on how the ERRC will obtain environmental compliance approval (ECA) from the Ministry of the Environment and Climate Change (MOECC), and how regulations surrounding the management of stormwater, noise, and odour will be met.

This report demonstrates how the development of the proposed ERRC at 2976 Horseshoe Valley Road West is a suitable use for the Site, and how the proposed facilities will be able to satisfy applicable guidelines and regulations through careful design, operation, and the implementation of best management practices.

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1. Introduction

The County of Simcoe (County) Solid Waste Management Strategy sets a framework for collection, diversion and disposal of waste materials from across the County, which in turn defines facility needs for consolidation, transfer, and processing of the waste materials. The County is proposing a co-located development to provide a Materials Management Facility (MMF), an Organics Processing Facility (OPF), and ancillary facilities (e.g., truck servicing facility, materials recovery facility, administrative facility and public education space, access roads, stormwater management pond), which will collectively be referred to as the Environmental Resource Recovery Centre (ERRC).

Through a detailed site evaluation and selection process, the preferred site for the development of the ERRC was identified as 2976 Horseshoe Valley Road West (Site) in the Township of Springwater (Springwater). The Site is located approximately 15 kilometres (km) north of Barrie, roughly 3 km west of Highway 400, on the north side of Horseshoe Valley Road West. A Site Location Plan is provided as Figure 1.1.

The current County Official Plan (OP) designation for the Site is Greenlands (Schedule 5.1), while Springwater's OP designates the majority of the Site as Rural, with the southwest portion of the Site designated as Agricultural. The Site is currently zoned Agricultural under Springwater's Zoning By-Law (ZBL).

Following a pre-consultation meeting with Springwater Planning staff in December 2015, a number of studies were identified that would be required in support of amending the Springwater OP and ZBL. This report includes and summarizes the findings of the following studies:

- Conceptual Site Plan.
- Functional Servicing Study.
- Stormwater Management Study.
- Noise Assessment.
- Odour Assessment.

The remaining studies are presented under separate cover, and will be referenced herein as required.

2. Site Description

The Site at 2976 Horseshoe Valley Road West is described as Lot 2, Concession 1 in the Township of Springwater (Springwater), County of Simcoe. The Site is identified as the Freele County Forest Tract and is covered by a forest with the exception of an access road/trail extending from Horseshoe Valley Road West at the frontage (south/southeast boundary) to Rainbow Valley Road East at the rear-flankage (north/northwest boundary). The overall Site is roughly 84 hectares

(207 acres) in area, rectangular in shape, with approximate dimensions of 625 metres wide and 1,370 metres deep (2,050 feet by 4,500 feet).

Key features of the Site and surrounding area are presented in Figure 2.1. Select details of the various planning and engineering studies that have been undertaken are summarized in the sections that follow.

2.1 Hydrogeology

The Site is located in the Simcoe Uplands physiographic region, which is characterized by a drumlinized till plain and sand plain. The topography on the Site ranges from an elevation of 265 metres above mean sea level (mAMSL) near the west side of the Site to 245 mAMSL on the east boundary. At the north end of the Site, the topography is relatively flat at an elevation of approximately 240 (mAMSL), which is coincident with a wetland area.

The Site topography slopes from west to east toward Matheson Creek, which is steeply incised into the sand plain at an elevation of 220 mAMSL. Two tributaries of Matheson Creek are mapped on the Site, as identified by the Natural Heritage Information Center (NHIC) and NVCA mapping resources. One watercourse originates at the wetland area near the northeast corner of the Site. A minor water course flows west to east, originating at the east-boundary of this area, and another similar watercourse just north of the Site is situated on the opposite side of Rainbow Valley Road East. The second watercourse crosses the south portion of the Site. This south watercourse could not be located during site visits and investigations completed at the Site.

Overburden underlying the Site is approximately 120 metres (m) thick, and is generally described as a thick sequence of Pleistocene glacial deposits overlying limestone and shale bedrock of the Middle Ordovician, Simcoe Group Formations.

The Site and surrounding lands are underlain by sandy deposits and foreshore basinal deposits (sand and silt) encountered to a depth of up to 30 metres below ground surface. The water table within the ERRC footprint area and surrounding area is present within the sand deposit at depths ranging from 9 to 26 metres below ground surface. In general, the sandy overburden forms a thick unconfined aquifer overlying bedrock.

Additional details are provided in the Hydrogeological Assessment Report (GHD, November 2016).

2.2 Ecology

The Study Area is comprised of the Freele County Forest tract, an approximately 65 year old mixed species plantation managed by County foresters. It represents approximately 84 hectares (ha) of a greater than 475 ha contiguous woodland area. Wetlands are present in both the northeast and southeast corners of the Site. There are no Areas of Natural or Scientific Interest or Significant Ecological Areas identified on-Site.

Field investigations conducted in 2016 included wetland boundary delineation, verification of watercourse presence, vegetation inventory, calling amphibian surveys, breeding bird surveys, and incidental wildlife observations. Nottawasaga Valley Conservation Authority (NVCA) verified wetland boundaries were field delineated and mapped. The field data was used to assign Ecological Land

Classification (ELC) units to the vegetation units present, and describe the available habitats and natural features of the Site for a total of seven upland and four wetland ELC units. Unique within the Site is an older-growth hemlock stand present in the southeast corner.

Based on the determination of Site habitats, targeted surveys for Species at Risk (SAR) were conducted for forked three-awned grass (*Aristida basiramea*). Suitable habitat was not present within the Site for whippoorwill or Hine's emerald dragonfly SAR that secondary source information indicated may be present in the area. Therefore targeted surveys for the presence of these species were not conducted. Two bird species with provincial Special Concern status were observed within the Site, but no SAR were observed.

The development of the ERRC will not result in a negative impact, which is defined under the PPS as "degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities". This is based on the proposed location of the ERRC, the plantation history of the Site, the actively managed nature of the Site, and the implementation of the recommended mitigation measures, which adequately avoid, compensate and replace natural features (i.e., vegetation/ plantings) within the wider woodlot feature. No net environmental impacts on the larger woodlot feature are anticipated from the development of the proposed ERRC.

Additional details are provided in the Scoped Environmental Impact Study (GHD, November 2016).

2.3 Archaeology

Archaeological Services Inc. (ASI) conducted a Stage 1 & 2 Archaeological Assessment of the proposed footprint and access road for the ERRC.

The Stage 1 background research and property inspection determined that one previously registered archaeological site is located within one kilometre of the study area, and there is a historical cemetery in the southwest corner of the Stage 1 study area, however the proposed project impacts will not impact the cemetery lands. A review of the historical and archaeological contexts of the study area suggests that it has potential for the identification of archaeological resources, depending on the conditions of soils and the extent of previous disturbance.

The Stage 2 property assessment was conducted on the proposed project limits, which consists of a 4.5 hectare area for the ERRC footprint and a 3.8 hectare area for the proposed access road. Approximately 0.6 hectares were found to have no potential due to deep and pervasive disturbance while the remainder of the project study corridor (10.7 ha) was assessed by test pit survey at five metre intervals.

During the course of the Stage 2 survey, one Euro-Canadian archaeological site was identified that met criteria for sufficient cultural heritage value or interest. A Stage 3 assessment was subsequently carried out in order to clarify the nature and extent of the cultural deposits.

The Stage 3 assessment included the excavation of one metre square test units over the locations of positive Stage 2 test pits. Euro-Canadian historical artifacts were recovered and one potential feature was documented within an area of approximately 40 m x 40 m.

Given the relatively compact size and location of the archaeological site, and the fact that the County already owns the property, the archaeological site is an excellent candidate to be subject to a Stage 4 Avoidance and Protection strategy. A minimum setback distance of 10 m was applied surrounding this area. Protection of this area in-situ and relocation of the footprint was considered to be preferred over excavation.

Additional details are provided in the Stage 1 & 2 Archaeological Assessment Report (ASI, November 2016), and the Stage 3 Site Specific Assessment Report (ASI, November 2016).

2.4 Surrounding Area

There are a limited number of residential units within 200 metres of the overall Site boundary: adjacent to the south/southwest corner of the Site is a farm-residential property; to the south across the road from the Site is a rural-residential property; and to the east of the Site is another rural-residential property (all three of these units front onto Horseshoe Valley Road West).

Within 500 metres of the overall Site boundary, there are three additional rural/farm-residential units to the northwest (fronting along Rainbow Valley Road East), two more residential units to the south (fronting along Gill Road), one rural-residential unit south/southeast of the Site at the end of Ohara Lane, and two more rural-residential homes situated southeast of the Site fronting on Pine Hill Drive.

Within one kilometre of the overall Site boundary there are roughly 30 to 40 additional residential units, located primarily to the southeast. Adjacent to the south/southwest corner of the Site is a small cemetery (Apto Cemetery).

3. Conceptual Site Plan

A conceptual site plan for the ERRC is provided in Figure 3.1. Details surrounding the various components of the ERRC, sizing and siting of the overall ERRC footprint, and the rationale behind the proposed ERRC layout are provided in the sections that follow.

In order to build and operate the waste management facilities proposed for the ERRC, the County will require approvals from the Ministry of the Environment and Climate Change (MOECC) that describe design and operations, air and noise controls, and surface water and groundwater controls.

The conceptual site plan has been developed based on the information that is currently known about the ERRC, including:

- The current and projected material tonnages that will be transferred through the MMF.
- The current tonnage of organic material along with growth projections for the County and an understanding of other areas within the County that also generate organic materials that are managed separately (for example, Barrie and Orillia).
- The typical types of technologies that are utilized for organics processing facilities, taking into account technologies that are currently being successfully utilized in Ontario.

- The associated regulatory motivators for waste management projects in the province, such as the newly implemented Climate Change and Low-Carbon Economy Act and the Waste-Free Ontario Act.

A conceptual site plan identifies space allocations and ancillary facilities that form the initial steps of a design and procurement process. A conceptual site plan is intended to define the extent and limits of the individual facilities, while taking into account the different technologies and approaches that could be proposed during the detailed design and procurement stages.

For the MMF, the design and technology range is very limited as this is a conventional waste management facility that is mostly reliant on space for consolidation of waste from smaller vehicles into larger vehicles with limited or no processing of the waste.

For the OPF, the technology range encompasses two main variants: anaerobic digestion and composting (as described in Section 3.2.2). The conceptual site plan thus allocates space that would be suitable for either type of OPF technology based on a range of facilities that are currently in operation in Ontario.

As noted above, the conceptual site plan is based on preliminary information and will be further refined and built upon during the design and approvals process.

3.1 Development Strategy

While both the MMF and OPF will be situated within the same ERRC footprint, they will differ in terms of technology, procurement method, approvals, and development timelines. However, there are also many synergies that can be realized during the development of these facilities in terms of aligning the overall development schedule. It is important to understand the various dimensions of permitting and approvals, procurement, design and construction, and how they inter-relate between the two facilities and the overall schedule.

GHD met with County staff on April 1, 2016 to discuss the scope of work and to lay out a potential framework for the development of these facilities, with the following key aspects being identified:

- Planning studies required in support of Official Plan Amendments (OPAs) at the County and municipal (Township of Springwater) level, and a Zoning By-Law Amendment (ZBA) at the municipal level.
- Engineering studies required in support of facility design.
- Different procurement delivery methods for the MMF and OPF.
- Permits and approvals, including supporting information and application process.
- Development of a business case for the OPF and providing updated, site-specific costing analysis for the MMF.
- Development timeline including detailed design, construction and commissioning.

A memorandum to the County dated May 11, 2016 summarized all of these aspects and presented an overall strategy for the development of both the MMF and the OPF. The timeline was later revised on October 24, 2016 to account for a change in the submission date for the planning application package.

In general, the strategy contemplates initially developing the MMF to transfer the County's materials from local collection vehicles to transfer vehicles. This would include waste, recyclables and organics. The OPF would be developed subsequently to specifically accommodate the organic materials, eliminating the need for a transfer activity for this waste stream.

3.1.1 Procurement Method

GHD has recommended that the MMF proceed under a conventional design-bid-spec process wherein an engineer undertakes the design of the facility and develops construction specifications that are then used in a competitive procurement process to retain a contractor for construction.

The OPF will follow a design-build-operate (DBO) approach, as recommended by GHD. This is a standard procurement approach for OPFs, and is largely predicated on the fact that the technologies utilized to treat organic materials aerobically (composting) or anaerobically (digestion) are largely proprietary and require detailed involvement of technology providers. As a result, a DBO mechanism allows for single-point contracting between the County and an entity that will include both the technology component and the operating component of the facility.

3.1.2 Permits and Approvals

3.1.2.1 Site Plan Approval & Building Permits

Given the complexity of the overall ERRC, the Site Plan approval process will follow a staged approach. The site plan presented herein has been developed to a conceptual level of detail, and is submitted in support of the planning approvals process.

Following the initial approval of the conceptual site plan and the receipt of appropriate zoning designation, formal Site Plan approval will be sought on two separate occasions once the detailed designs for the MMF and subsequently the OPF have been completed. The formal Site Plan will also include the other ancillary facilities (e.g., weigh scale, administrative building, etc.) noted in this report, and will be developed based on any zoning-related items pertinent to the facilities.

The formal Site Plan will also underpin the building permits required for the individual facilities. Building permits for the MMF and OPF will be submitted and approved separately prior to the construction of each facility.

3.1.2.2 Environmental Compliance Approvals

The MMF and the OPF are both regulated under the Environmental Protection Act and will require an Environmental Compliance Approval (ECA) issued by the Ministry of the Environment and Climate Change (MOECC). An ECA is overseen and enforced by the province and will cover waste operations, air and noise, and surface water and groundwater monitoring and control for the entire Site. It will govern how each of the facilities are operated and monitored with respect to preventing off-Site impacts.

Given the anticipated development timelines for both facilities, the ECA process will be undertaken using a staged approach. The initial ECA application will cover the MMF, and will subsequently be amended at a later date to incorporate the OPF. Pre-consultation with the MOECC and other stakeholders will be key to ensuring a seamless ECA process that will allow for the uninterrupted operation of the overall ERRC.

It is not possible to operate either the MMF or the OPF until the MOECC issues the required approvals, which generally involves the stipulation of terms and conditions that specify operating parameters and required environmental performance. The ECA is a legal document that will be held in the County's name and that will create performance obligations on the County and, through the County, to the operations of the MMF and OPF. The MOECC will have the right at any time to inspect the facilities, and the County will be required to report on ECA terms and conditions on a regular basis. Contravention of the ECA constitutes a contravention of the Environmental Protection Act.

3.1.3 Construction Timing

The construction of the ERRC will also follow a staged approach. The MMF will be commissioned first in 2019, and the OPF will follow in 2021. The majority of the Site works (i.e., access road, grading, scale area, stormwater management facility, and administrative facility) will be designed and constructed at the same time as the MMF.

3.2 ERRC Components

3.2.1 Materials Management Facility

A Materials Management Facility (MMF), also known as a transfer station, is a location for the consolidation of waste (garbage, recyclables, and organics) from multiple collection vehicles into larger, higher-volume transfer vehicles for more economical shipment to disposal or processing locations. This is a conventional waste management activity that is common to all municipalities.

An MMF is a very conventional type of waste management facility employed by most municipalities. In the context of the County, curbside collection vehicles collect waste from residents, but the ultimate processing or disposal of wastes generally occur outside of the County. For example, residual waste/garbage is currently exported to the Emerald Energy-from-Waste facility in Brampton for processing and to produce an energy stream; recyclable containers (e.g., plastics, bottles, etc.) are currently exported to the City of Guelph's material recovery facility (MRF) for sorting and segregation so that the recyclables can enter the re-use market; recyclable fibres (e.g., paper) are exported to a private facility in Toronto for processing into re-use products; and source-separated organics (SSO; residential food waste primarily composed of kitchen wastes) are transported currently to a composting facility in Hamilton. Given the travel distances between the point-of-origin and these processing facilities, it is not feasible to send curbside collection vehicles carrying between 1 to 10 tonnes per load over these long distances, as this would involve excessive logistics and significant diesel fuel consumption. To mitigate this necessity, a transfer function is generally used to consolidate materials from the smaller curbside trucks into large transfer trailers that can carry between 30 and 40 tonnes per load to the final processing destinations. This is a very normal and efficient component of any waste management system. Currently, the County is reliant on private sector transfer capacity and does not manage a significant transfer component of its own.

It is noted that the proposed MMF will need to transfer SSO for a period of time. This transfer activity will cease upon development of the OPF, which would then allow export of SSO outside of the County to be discontinued, and would further allow the County to benefit from energy and/or fertilizers/compost that can be generated from organic materials.

The MMF will likely consist of a pre-engineered steel frame structure with exterior walls constructed of concrete and steel sheeting. The use of internal support columns will be minimized in order to provide clear spans that allow for the unrestricted movement of materials and vehicles inside the building. The overall construction of an MMF is typically concrete, thus avoiding the use of combustible materials.

In terms of specific construction, multiple bays with roll-up doors will provide vehicle access inside the building where materials will be unloaded. A concrete tipping floor and push walls will allow for materials to be moved around using a wheeled loader. While there will be no long-term storage of materials within the MMF, the tipping floor will be sized to accommodate the temporary storage of materials as a contingency for temporary service disruption at downstream facilities.

The MMF will likely be a multi-storey building approximately 10 to 15 metres high depending on the expected truck flow and final design. The unloading area/tipping floor will be on the upper level, while the lower level will allow for the passage and loading of transfer vehicles from above. All unloading/loading operations will occur inside of the building.

The MMF will also incorporate a truck servicing facility for the County’s fleet of Solid Waste Management vehicles. The truck servicing facility will consist of a workshop, storage area, and at least one service bay.

3.2.2 Organics Processing Facility

An OPF is a location where source-separated organics (i.e., green bin material) and potentially materials such as leaf and yard waste, pet waste, and diapers are processed under controlled conditions and converted into other valuable products, such as compost, fertilizer and/or biogas for energy production.

The County’s procurement process for the OPF will be open to all types of aerobic composting and anaerobic digestion technologies, as these are common in the industry and there are many examples of both technologies in-place across Ontario. Both are engineered biochemical conversion processes involving the decay of organic materials using biological processes, but involve different conditions and produce different outputs, and have differing cost factors. Composting is the controlled decomposition of organic material by introducing oxygen, to produce a value-added compost product; anaerobic digestion is an oxygen-free process that also decomposes organic material using natural biological processes but that further produces biogas and fertilizer products.

In terms of selection of technology, given that both are established in Ontario, it is generally left to a competitive procurement process with stipulated performance conditions to establish the optimal solution. In either case, overall performance would be stipulated by the County and the successful vendor would need to comply with the performance envelope created therefrom. This performance envelope would be stipulated by contract.

Either type of facility will generally include the following components:

- Receiving area for incoming materials.
- Handling area.
- Processing area.
- Storage area.
- Loading area for outgoing materials.
- Environmental control facilities (e.g., odour abatement and water control features)

Conventional OPFs in Ontario generally include the following main features:

- Waste tipping activities indoors, with doors closed and fully protective surfaces with coatings to accommodate the movement of heavy traffic and the liquids that emanate from SSO. Tip floors are sloped to capture any liquids and prevent their egress through doors when they are open.
- Overall indoor facility ventilation controls such that negative air pressure is maintained. In this context, the facility is maintained under constant suction, such that when doors do open to admit trucks, airflow is in an inwards direction to the facility (i.e., fugitive emissions from door openings are minimized).
- Odour control of collected air. In this configuration, negative air pressure systems will collect outside fresh air and draw it into the facility as a matter of course for ventilation, further supplemented by door openings which provide additional air volume. This airflow will then have been drawn over organic materials in storage or processing, thus generating a potentially odorous air stream. This air stream is then treated through a complex set of odour abatement systems that could be comprised of biological filters (biofilters), chemical scrubbers, activated carbon systems, air cooling systems, or ionization systems. These systems are specifically developed to allow OPFs to comply with MOECC guidelines for odour and air quality. Odour control systems are generally paired with a release point such as a stack that allows for dispersion of the treated air. The design and requirement of a stack is predicated on dispersion modelling as would be required by the MOECC to demonstrate compliance with odour regulations.
- Main equipment is lodged indoors or in noise-attenuated enclosures in order to mitigate noise emissions. The MOECC provides specific direction on noise control, which will be provided at the OPF by housing the main processing equipment indoors, in addition to blowers, pumps, and other noise sources.
- Processing of organic materials in contained environments. This could include housing the main processing equipment indoors, such that odour and noise control can be fully established. Outdoor composting technologies are only envisioned if controlled covers with inherent odour control (such as Gore composting systems) are utilized; these systems are common in Ontario. Anaerobic digestion may include outdoor enclosed tanks that process organics in an oxygen-free environment; any outdoor tanks are further coupled, per MOECC requirements, with secondary containment to impound and control spills should a tank rupture occur.

- For anaerobic digestion systems, biogas (an energy-rich gas product mostly comprised of methane) is created from the organic materials. This biogas has typically been used to produce electricity using reciprocating engines at a level that is generally more than sufficient to address the electrical demands of an OPF, MMF, and ancillary facilities, with additional electricity for export. This would require having reciprocating engines on-Site, generally in enclosed containers or buildings to facilitate noise control and maintenance functions. Biogas may also be used to produce renewable natural gas, which can then be injected into the natural gas distribution grid to offset fossil fuel use.
- Final product storage, if a liquid fertilizer is created, is generally in enclosed and covered tanks. If a compost material is produced, it is generally stored indoors until trucks are able to transport this material to its final use in land application programs.
- Rainwater capture systems, particularly roof water capture systems, to provide a source of water for cleaning and processing activities.
- Fire control systems generally comprised of standpipe and/or sprinkler systems depending on building classification to ensure that fires, should they occur, do not propagate. It is noted that SSO is largely comprised of water (between 70 and 75% water by weight) and is itself not normally combustible under usual operating conditions. Coupled with the non-combustible nature of this style of building construction, there is limited opportunity for fire. Notwithstanding this, the Ontario Building Code prescribes exactly what kinds of fire suppression are required depending on building footprint area and occupancy.
- OPFs normally have sophisticated computerized control systems, up to and including SCADA (supervisory control and data acquisition) systems. This allows operators to modulate each aspect of the OPF based on feedback from a number of sensors and other instrumentation, and to track historic trending data. Typically, these systems can be remotely controlled from off-site terminals, where operators can monitor and control systems even after hours. Alarm systems are built into the controls to generate immediate call-out in emergency conditions. OPFs also have data storage servers that allow for tracking of SCADA data over time, coupled with uninterrupted power supplies to ensure that data is not lost due to power outages, as well as to make sure that control and alarm systems continue to operate in the event of power outage.
- Control room where operators monitor the system, admit trucks to the facility, schedule maintenance and monitor alarms. This is generally the area where data is retained. Additionally, an OPF will contain a separate electrical room and generally a pump room.

There are many different technologies available that can differ significantly in design, construction, and operations. The sections that follow present a range aerobic and anaerobic processing technologies that may be implemented for the County’s OPF.

3.2.2.1 Aerobic Digestion Technologies

There are three main techniques used in aerobic composting: static piles, aerated static piles, and in-vessel systems. In its simplest form, composting is achieved using static piles called windrows, which are turned periodically using mobile equipment to aerate the material. These are simple piles that are often exposed to outdoor weather elements, and the level of overall process control is quite low.

Aerated static piles incorporate vented floors or perforated pipes into the windrows. Ambient air is introduced to the piles using pressure to push, or a vacuum to pull, air through the piles. There is a greater potential for odours using these techniques compared to in-vessel or anaerobic digestion techniques, so they are usually conducted indoors, or under a specially designed cover system. Introduction of controlled airflow accelerates the composting process and allows for more even and consistent distribution of oxygen within the organic mass, which is a prime consideration for composting.

More sophisticated systems include in-vessel composting plants which use mechanical means to introduce air and aerate the material in enclosed, controlled environments. The most common systems include: beds or bays with mechanical agitation, horizontal basin reactors, modular tunnels/biocells with or without aeration, and vertical reactors. At this level of technology, process control is advanced, reducing composting times, environmental emissions, and producing high quality compost.

One of the key features of composting systems is the presence of so-called process air. In any composting regime, oxygenation of the material, either through mechanical turning or active aeration, is required. The air that has passed through and contacted the composting material thus contains odorous compounds that are then treated or filtered.

3.2.2.2 Anaerobic Digestion Technologies

Anaerobic digestion occurs in the absence of oxygen, and uses naturally occurring microorganisms to break down complex organics with the addition of heat. The outputs from this process include significant amounts of methane and carbon dioxide, other gases such as ammonia and hydrogen sulfide, and digestate which can be further composted using aerobic processes or potentially marketed as a fertilizer. A key advantage with anaerobic digestion is that a significant amount of energy can be recovered with the capture and utilization of the methane.

Anaerobic digestion processes are described as either wet or dry, depending on the ratio of solids to moisture in the feedstock. Anaerobic digestion technologies are also distinguished by the number of stages (single or two-stage), operating temperature (mesophilic or thermophilic), process flow (continuous or batch), and the mixing regime (completely mixed, plug flow, or static).

As opposed to composting, anaerobic digestion does not generate specific process air streams, as the odorous compounds are captured in the biogas produced in the unaerated environment. One key difference between composting and anaerobic digestion is the presence of a utilization facility to uptake the biogas. This could take the form, for instance, of reciprocating engines to generate electricity, or an upgrading system to produce renewable natural gas (RNG).

3.2.3 Administrative Facility

The administrative facility will serve as a centralized location for the administration staff and resources required to operate the ERRC. The administrative building can be established as either a standalone structure, or incorporated as part of another facility such as the MMF or OPF. The administrative facility will include offices, meeting spaces, washroom and change room facilities, a lunchroom/kitchen, and potentially a public education area. To best isolate the administrative and support functions from the processing operations, it is recommended that the Administrative Facility be constructed in a manner that is equivalent to a fully-exposed exterior structure, complete with air barriers, vapour barriers, exterior moisture protection systems (all walls/roof), and provided with air-lock passageways between odourous and lesser-odourous areas.

It is expected that the administrative facility may need to accommodate approximately 20 administration and operations staff on a regular basis, and could see up to 50 additional people on a short-term basis for meetings or educational tours.

3.2.4 Materials Recovery Facility

The ERRC will include an area which is reserved for the potential establishment of a Materials Recovery Facility (MRF) in the future. The County's current material tonnages do not make this a viable alternative at this time; however, secured funding for the overall MMF is contingent on allotting space for this component.

A MRF is a location for the processing and separating of commingled recyclable material into its core components (e.g., paper, glass, metals, plastic) for marketing and shipping to end-users. A typical MRF operates using a wide range of processing and sorting equipment including, but not limited to:

- Conveyors.
- Compactors.
- Screens.
- Magnetic separators.
- Eddy current separators.
- Air sorters.
- Optical sorters.

The MRF may also share common elements with the MMF such as loading and unloading areas, ventilation control systems, and weigh scales.

Processing activities are undertaken indoors and overall sizing of the facility will accommodate the peak volume of incoming curbside vehicles to prevent queueing, while also allowing for outbound transfer vehicles to be stored indoors while they are being loaded.

3.2.5 Stormwater Management Facility

The ERRC will include a stormwater management facility for the capture and treatment of surface runoff from impervious areas such as rooftops and paved roadways. Some of the surface water can be used as process water or cleaning water in the OPF or the MMF, enhancing the sustainability features of these facilities.

Surface water quality and quantity will be managed through the implementation of the following potential controls:

- Vegetated filter strip.

- Rock check dams.
- Stormwater management pond.
- Infiltration basin.
- Catchbasins, manholes, and piping.
- Overflow weir.
- Drainage ditch.

Additional details on the proposed design and operations of the stormwater management facility are presented in Section 5.

3.2.6 Scale Area

The scale area is a location where inbound and outbound vehicles can be weighed on scales to determine material tonnages arriving at or leaving the facility. Weigh scales serve to monitor and record all materials for health, safety, environmental compliance, and also for data management purposes (tracking inbound and outbound tonnages).

The scale area will likely consist of a number of decks resting on a series of load cells and mounted on a concrete foundation. Scales will be monitored remotely using a keycard system and software capable of printing tickets and providing reporting features.

3.2.7 Parking Areas

Parking areas will need to be provided for staff and visitor vehicles, as well as for trucks from the County's solid waste management fleet (noting that curbside collection vehicles will not be housed at this facility but will return to the collection contractor's facility for fueling). These areas may incorporate additional features such as charging stations, and may also serve secondary functions such as providing areas for snow storage.

3.3 ERRC Footprint Sizing

The overall footprint of the ERRC must be large enough to accommodate each of the components noted in Section 3.1. Minimum size requirements for the overall Site as well as the ERRC footprint were determined by GHD during the siting phase of the project.

Based on previous experience and a review of similar facilities, the footprint required for the ERRC was determined to be 4.5 hectares (ha). Further details on how this area is distributed amongst the various components of the ERRC are presented in Section 3.4. For context, a footprint of 4.5 ha would represent a square measuring approximately 212 m on each side, and would cover approximately 5.5% of the overall 84 ha Site area. Maintaining a regularly shaped footprint (i.e., rectangular or square) for the overall ERRC will also allow for maximum flexibility during the design of each facility.

3.4 ERRC Footprint Siting

The evaluation criteria identified during the siting process were used to create a preliminary map of the Site identifying potential constraints such as source water protection areas, wetlands, and distance to sensitive receptors. Based on this mapping, an elevated area of the Site to the northwest of the mid-point was identified as having relatively few constraints, representing the best potential location for the development of the ERRC.

A number of field investigations were carried out at the Site starting in April 2016 in order to confirm Site conditions and to provide guidance on the siting of the ERRC footprint. Key studies included: an environmental impact study, a hazard land assessment, a hydrogeological study, an agricultural impact assessment, and archaeological investigations. Based on these studies and a review of additional information, the following constraints were used to determine the optimal location for the ERRC footprint:

- Wetlands were identified in the northeast area of the Site. The Ontario Wetland Evaluation System (OWES) identifies the significance of wetlands (regionally significant or provincially significant) as well as minimum setback distances. In determining the location of the footprint, the wetlands on-Site have been considered as if they were provincially significant (although they remain *unevaluated* in accordance with OWES), and a minimum setback distance of 120 m was applied to the ERRC footprint.
- Previously disturbed areas of the Site (i.e., access road, trail) were encompassed within the ERRC footprint to minimize potential impacts.
- An archaeologically significant area was identified on the Site. Investigations were carried out to map its extents, and a minimum setback distance of 10 m was applied surrounding the area. Protection of this area in-situ and relocation of the footprint was considered to be preferred over excavation.
- A minimum separation distance of 100 m was maintained between the ERRC footprint and all property lines, and the maximum separation distance possible was maintained from sensitive receptors. Maintaining a buffer to separate the facility from sensitive receptors is used in combination with good design and operational practices to mitigate impacts such as odour and noise.
- Topography was sought that would minimize the amount of grading required and maximize the usage of existing slopes for drainage and operations.

The setbacks noted above were used as minimum guidelines only. Setbacks were increased between the ERRC footprint and identified constraints wherever possible.

Based on the application of these setbacks to the originally proposed area, the footprint for the ERRC was shifted approximately 100 m towards the southeast, remaining just to the northwest of the Site mid-point.

3.5 Proposed ERRC Layout

A conceptual layout of how the various facilities will be situated within the ERRC footprint is presented in Figure 3.1. The rationale behind the layout of each component is discussed below.

These details are provided for context at the overall Site level; it is important to note that the design of each facility will be refined in the future following additional Site investigations and further stakeholder consultation.

3.5.1 Site Access

The main access to the ERRC will be from Horseshoe Valley Road West in the south. The access road will have two lanes approximately 3.5 m wide with 1 m shoulders. An additional turning lane approximately 3.2 m wide will be provided for trucks leaving the Site and turning onto Horseshoe Valley Road.

The access road will follow the general alignment of the existing trail through the Site to minimize additional disturbance. A total clearing width of approximately 15-20 m will be established to accommodate the access road, drainage ditch, and utility corridor that will run along the west side of the road. Trees will be maintained on both sides of the access road.

The entrance to the Site jogs toward the east immediately north of Horseshoe Valley Road West in order to improve sightlines for turning vehicles and increase visibility of the entrance. This jog will also prevent a direct line of sight into the Site for passing motorists on Horseshoe Valley Road West. Additional recommendations surrounding the Site entrance are provided in the Traffic Impact Study prepared MMM Group.

An emergency access route will also be established along the alignment of the existing trail to Rainbow Valley Road East in the north.

The ERRC footprint will be fully enclosed with a chain link fence, with gates allowing entry from both the south and north access points. Additional gates will also be established closer to the Site boundary with Horseshoe Valley Road West in the south and Rainbow Valley Road East in the north.

3.5.2 Traffic Flow

The flow of traffic within the ERRC footprint is a key design consideration as it will determine, in part, how the facilities operate. Traffic flow will generally be one-way in a counter-clockwise direction. This is considered to be the safest approach for large trucks since it maximizes visibility for the drivers and eliminates oncoming traffic.

The backing-up of trucks will also be eliminated wherever possible. Drive through operations where vehicles are always traveling in a forward direction will be incorporated wherever feasible. Traffic flow for staff and visitor vehicles will be kept separate from truck traffic wherever possible.

Traffic flow has been determined at the overall Site level, and will be refined at the facility level during the detailed design stage.

3.5.3 Scale Area

The scale area will be situated along the eastern edge of the ERRC footprint, in line with the proposed access road. An area of approximately 0.1 ha has been reserved for the scale area, which will include parallel scale decks and by-pass lanes. The scales will be monitored remotely so there is no need for a building to house an attendant.

3.5.4 Stormwater Management Facility

The stormwater management facility will be located along the east side of the ERRC footprint in an existing low area. The current topography generally slopes from west to east, which will minimize the amount of changes required to the existing grading to maintain surface flow to the stormwater management facility.

An area of approximately 0.6 ha has been reserved for the stormwater management facility, which will include a vegetated filter strip, enhanced vegetated swale, and stormwater management pond. An overflow drainage ditch approximately 5 m in width will run along the west side of the access road, discharging to the existing ditch on the north side of Horseshoe Valley Road West.

3.5.5 MMF

The MMF will be situated in the southwest corner of the ERRC footprint. The existing topography in this area supports a multi-level facility, with the grade dropping at least 3 m form west to east. A multi-level facility will have the receiving area on the top floor with the transfer area below. This will improve facility operations as it permits the top-loading materials into transfer vehicles and separates the different traffic streams. A series of bays with roll-up doors will be situated along the west side of the facility, allowing curbside vehicles to drop off their materials on the tipping floor inside the building.

An area of approximately 0.4 ha has been reserved for the MMF, which will include the transfer station as well as the truck servicing facility, and will accommodate projected material tonnages at the 30 year design capacity. An additional area of approximately 0.4 ha has been reserved for the potential future MRF, adjacent to the MMF in the northwest corner of the ERRC footprint. The MRF may share common elements with the MMF such as the tipping floor, so the layout of the MRF should be developed in conjunction with the MMF.

3.5.6 OPF

The OPF will be situated in the middle of the ERRC footprint. An area of approximately 1.0 ha has been reserved for the OPF, although the actual footprint requirements may vary depending on technology selection. The land within the OPF footprint will be graded flat, creating a large open area that provides design flexibility to accommodate a wide range of different technologies. A 1.0 ha parcel, based on other OPFs in Ontario operating at the scale envisioned for the County, should accommodate a range of aerobic and anaerobic digestion technologies.

3.5.7 Administrative Facility

The administrative facility will occupy an area of approximately 0.1 ha over several storeys. The administrative facility will serve as a hub for MMF and OPF operations, so the proposed footprint has been shown adjacent to both. This will provide easy access to common elements such as change rooms and lunchrooms, and will permit the integration of other design elements such as viewing areas into both facilities.

3.5.8 Parking Areas

An area of approximately 0.2 ha has been reserved for parking along the south side of the ERRC footprint. Parking for both staff vehicles and facility vehicles may be provided within this area. Additional parking areas will also be established during the design of each facility once a more detailed layout of the ERRC footprint has been established.

4. Functional Servicing

4.1 Purpose

A Functional Servicing Study identifies the services required to support development (i.e., water, sewer, electric power, natural gas, communications, etc.), and compares that against available public or other available services at or near to the proposed development. Where there is unavailability of a required service, the Functional Servicing Study identifies how the provision of that service will be made.

4.2 Required Services

The highest priorities for a facility of this nature are health & safety for workers and visitors, property protection (fire risk), and ongoing/general operations. To fulfill these priorities, fire protection water supply, domestic potable water supply, domestic wastewater disposal, electric power, and off-site communication are required services that need to be provided. To support efficient facility operations, process water supply, process wastewater disposal and stormwater management are beneficial services that should be provided.

4.3 Adjacent / Nearby Services

Adjacent to the site, along Horseshoe Valley Road, there is overhead 3-phase electric power service; there is also overhead and buried telephone cable servicing, and buried natural gas service. East of the site there are a series of three overhead high voltage transmission lines, part of the Provincial Grid system; it is likely not an available resource for connectivity, as these lines typically provide city/township/community level service, not lot/site/local level service. Being fairly remote from municipally serviced communities, there is no public water or public sewer services adjacent to or nearby the proposed site (nearby residential homes and businesses are reported to be on well water and septic sewage systems).

4.4 Provision of Services

4.4.1 Fire Protection Water

There are two basic approaches to be addressed with fire protection: protect life, and minimize losses. Both of these metrics are addressed by how a facility is constructed: layout planning, materials of construction, provision of protective measures such as sprinklers and/or standpipe hoses and smoke monitoring, and by day-to-day operations which establish a culture of operations and maintenance that is protective of the workers, visitors, equipment, and facilities as a whole.

The determination of fire protection water quantity required is directly tied to the type of operations being conducted, how those operations are or could be carried out, and the style of construction implemented for the facility. If sufficient water volume and pressure is not supplied by a municipally sourced water distribution system, additional assessment is required to make provisions for onsite storage and supply of the required water quantity.

An active protection system provides the best means of defense; a fire protection water system is pressurized and the water is ready to be delivered to point of need when required, automatically and without user intervention – this is the most common form of protection for larger multi-unit residential, institutional, commercial and industrial (ICI) facilities, typically offered by sprinklers. A passive protection system requires confirmation and/or active intervention by one or more persons, such as standpipe fire hose systems, or pumper-truck fire hose systems – this is the form of protection most common in un-sprinklered facilities, such as most single family residential homes, lower-risk ICI facilities, and many rural structures (farm buildings, etc.).

For the proposed facility, the materials being collected, segregated, and stored, are generally deemed to be a “higher risk”, due to the potential combustible energy content in the materials being processed (paper/fibre, wood/organics, plastics, etc.). The Ontario Building Code (OBC) establishes minimum requirements based on the industrial occupancy categorization, combustible content, and process activity, and will be adhered to in terms of building code classification and the required fire protection measure. This could range from a standpipe system through to a full sprinkler system for the facility.

Most facilities of this nature are classified as a medium hazard industrial occupancy (OBC Group F, Division 2), having a combustible content of more than 50 kg/m^2 or 1,200 MJ/m^2 floor area; some facilities may have operations that elevate classification to a high hazard industrial occupancy (Group F, Division 1), if containing sufficient quantities of highly combustible and flammable or explosive materials to constitute a special fire hazard (indoor storage of large quantities of paper/wood fibre and/or plastics). This determination will be made through the design process and in full accordance with the OBC.

4.4.1.1 Fire Protection Water Supply Rate & Volume

As noted above, the specific determination of fire protection water quantity required is directly tied to the type of operations being conducted, how those operations are or could be carried-out, and the style of construction implemented for the facility. Most facilities comparable to that proposed for this site have an active water sprinkler system, sized and zoned by type of area being protected, supplied under pressure from a source containing a sufficient volume of water to provide a design target flow rate for a specified duration, resulting in a determinable supply volume.

The specific design criteria to be applied will vary based on material types and quantities stored, and how high they are piled; however, most facilities will be adequately protected with a zoned system that can provide up to 3,785 litres per minute or 1,000 US gallons per minute (gpm) for 3 hours, or roughly 700 m^3 available water volume. This is a typical maximum value used for facilities of this nature, and may be decreased if risk can be reduced through design and operations.

Some organics processing technologies may require higher sprinkler coverage rates, while others could require minimal fire protection (wet-processing or digestion in tanks or other enclosed vessels). Fire suppression systems are commonly provided for both OPFs and MMFs and determination of the specific requirements will be made depending on the selected technology in order to fully comply with the OBC.

4.4.1.2 Provision of Fire Protection Water

For the proposed development, onsite storage of water and onsite pumping-pressurization of water from the storage location is recommended. The storage location could be a specifically constructed storage tank (steel or concrete, elevated or buried), or it could be in the form of a dedicated pond, or combined with a stormwater management facility (extra permanent pool depth). As a stormwater management pond is already contemplated for the design, this is a likely source of water.

Supply of water to fill the storage reservoir can be from collected rainwater runoff, from an externally supplied source (pumped/trucked from a pond, lake, or municipal system), or from an onsite well if developed supply volume (rate) is sufficient.

It is further recommended that the determined volume of water is stored and ready to use (24 hrs/ 365 days), and that the pumping facility to deliver the water is automated and provided with back-up emergency power (i.e., reservoir with directly-connected pump suction intake connected to a sprinkler header). As discussed in Section 5.5.3, the provision of fire protection water has been accounted for in the proposed stormwater management pond, although this may also be accomplished through a dedicated reservoir below grade following detailed design. A supplemental or backup provision for fire protection such as a dry-hydrant connection should also be incorporated into the detailed design.

Reference to Fire Underwriters Survey (FUS) guidelines and to their publication “Alternative Water Supplies for Public Fire Protection” is recommended for detailed design, together with reference to National Fire Protection Association (NFPA) document-1142 “Standard on Water Supplies for Suburban and Rural Fire Fighting”, current edition 2017 (previous edition 2012, and previously NFPA-1231/’93), and to the most current version of the OBC and the Ontario Fire Code.

4.4.2 Domestic Potable Water Supply

For hygiene purposes and general washing up (toilets, hands, showers, dishes, floors, etc.), it is recommended that a source of potable water be provided. This could be from an onsite well, or via trucked-in options into a purpose-dedicated storage tank.

It is expected that the proposed facility will employ between 10 to 20 staff on a regular basis, and depending on the extent of the proposed facility and/or school or other educational tours, could see up to 50 additional people for short-term domestic water demands. Utilizing a design flowrate of 125 litres per employee per day and 30 litres per tour-visitor per day (both from OBC, Table 8.2.1.3.B – ranges typically considered can vary from a low of 20 up to 300 litres per person per day, and in some cases could be as high as 450 depending on a variety of factors), a load of 20 staff yields an estimated demand of 2.5 m^3/day, with potential for an additional 1.5 to 3.0 m^3/day for short-term tour groups.

For facilities utilizing bulk stored chemicals (e.g., for odour treatment), the provision of emergency eyewash fountains, facewash stations, or full-body showers is recommended (and in some cases required); the best systems provide tempered potable water for irritant flushing. The requirements for these provisions vary between jurisdictions, and in many cases do not exist, so the common go-to reference in the absence of local guidance is American National Standards Institute (ANSI) Standard Z358.1 "Emergency Eyewash and Shower Equipment", or reference can also be made to Canadian Centre for Occupational Health and Safety guidance documents. Eyewash fountain demands typically begin at about 1.5 litres per minute (0.4 US gpm), and full-body showers can range up to 76 litres per minute (20 US gpm), for durations of typically 15 minutes, and in some cases up to 60 minutes may be recommended (i.e., certain corrosive or penetrating chemicals). This can add an emergency demand from 1.2 to 3.5 m^3 per event for potable water.

From a supply perspective, the provision for minimum 3.0 and possibly up to 10 m^3 per day is an average demand on a supply source of up to 6.9 litres per minute (1.8 US gpm), but peaked into an 8 hour work period can translate into a delivery rate of around three times this flow rate (i.e., “max-day” rate), and peaked again into a smaller demand period of say 2 hours, can further peak the delivery rate to as much as twelve times the daily average demand rate (i.e., “peak-hour” rate).

The design of a potable water supply and distribution system should consider realistic “max-day” and “peak-hour” conditions, and provide a certain amount of stored water in addition to the refill/supply rate. The expected daily demand volumes are not excessive and should be easy to provide. The provision of water from a drilled well is a fairly common system (this is what is done on the adjacent residential and farm properties), and can be readily implemented for the ERRC. Alternatively, potable water can also be provided from an on-Site storage tank.

4.4.3 Domestic Wastewater Disposal

The volume that gets supplied by the domestic potable water supply side is usually directed to domestic sanitary service, so a system capable of managing at least 3.0 m^3 per day, and possibly up to 10 m^3 per day (varies with services provided for) should be considered – a more precise sizing is warranted once final facility details are determined (i.e., confirmed staff numbers, provision of tour-group services, etc.).

Collection and disposal of domestic wastewater could be done by pump-and-haul methods, but is generally not preferred due to a number of reasons, and may be limited or restricted in some jurisdictions.

Disposal of domestic wastewater is commonly done with septic tanks, distribution tiles, and shallow buried trenches or dispersal beds. Where soil conditions are suitable, buried systems can be implemented, and where soil conditions may be marginal (tight silts/clays, or where elevated groundwater conditions exist), then raised-bed systems can be considered.

The disposal of domestic wastewater with a septic system is a fairly common practice (this is what is done on the adjacent residential and farm properties), and could likely be implemented for the ERRC once proper sizing is determined and additional geotechnical investigations are undertaken.

4.4.4 Electric Power Supply

There are a few circuits of 3-phase power already in place along Horseshoe Valley Road West that service adjacent properties. The demand load required by the ERRC is not expected to be in excess of 1,500 kVA, and should be readily serviced from existing power lines adjacent to the site.

If it is determined that power demand in excess of available capacity is required, then additional capacity may need to be extended from an available source; there are additional power circuits located along County Road 27 to the west, and also along County Road 93 to the east (Penetanguishene Road).

4.4.5 Off-Site Communications

Telephone communication cables are already in place along Horseshoe Valley Road West, although it is unclear if these are local service lines or regional feeder lines. Given that adjacent properties appear to be serviced by these lines, it is assumed that the ERRC can also be serviced by these lines provided that there is adequate capacity adjacent to the Site. If limitations are identified during the detailed design stage, alternate arrangements can be made through the establishment of cellular services.

With respect to internet service (i.e., for remote system monitoring), provisions through existing telephone lines or service via cellular connection or broadband can be established. Given the typical demands for facilities of this nature, it is not expected that high-capacity fibre-optic services will be required.

4.4.6 Process Water Supply

Most organic waste processing facilities do not require excess amounts of supplemental water to be added to the process, especially those focused on bulking and re-shipping. For the processing of organic materials, some processes may require the addition of supplemental process water, while others extract water from the incoming feedstock that can be recycled back into the process.

For those processes that do require supplemental water (i.e., no specific processing technology has been pre-selected at this stage), the required volume of added water can typically be provided from internal wash water processes, fed from storm runoff capture or from liquids extracted from the incoming feedstock. Where excess water requirements do exist (to be determined by process-technology provider), these needs will be met through the provision of internal process water recycling, supplemental rainwater collection and use, through supplemental well-water supply, or other means (i.e., trucked-in clear water).

It is not expected that the supply of supplemental process water will be required, and if so, that the volumes required will be manageable from onsite or imported resources.

4.4.7 Process Wastewater Disposal

Each organics processing technology has different output waste streams, and one of these is usually process wastewater. Incoming feedstock characteristics (i.e., source, condition, and makeup) and how it is processed are very large determinants on how much liquid comes out from the process – at times there might be none, and at other times there can be excess volumes.

Most facilities processing organics have a waste liquid residue that needs to be disposed of, that can range from being a "weak-wastewater" through to a "strong-wastewater" (in excess of typical sewage discharge bylaw limits); and there are some instances where the wastewater stream can be directly utilized, or processed, to become a beneficial use product, such as a liquid fertilizer.

The selected processing technology will need to assess (the lack of) municipal sewage disposal, and make provisions for management of any excess volumes. Subsurface (septic-style) disposal of process wastewater is not an acceptable option and will not be permitted; surface disposal direct to the environment is also not a viable option as it would need to meet MOECC disposal requirements, which will likely involve advanced treatment processes – since there is no nearby receiving water body to assimilate the discharge, it is likely that this option will not be considered. Use of liquid discharges as part of the final fertilizer product or on an export basis (trucking to a pump station) are the main possible outlets for these liquids, if they are generated by the technology.

4.4.8 Other Servicing

In support of the proposed development, there will be a number of other "services" required, such as construction erosion controls, pole lines, parking spaces, on-Site walkways, lighting, snow storage, landscaping, etc. Each of these is typically addressed at the design stage, being incorporated into Site Plan drawings and detailed facility construction drawings, and are not further elaborated on herein.

4.5 Summary

There are no site services required for the proposed development that cannot be provided for through traditional means; the proposed ERRC can be suitably serviced in all respects, provided that appropriate design parameters are implemented, and that utilization demands fall within the design criteria.

5. Stormwater

5.1 ECA Application Process

An Environmental Compliance Approval (ECA) for Sewage Works will be required by the Ministry of Environment and Climate Change (MOECC) for stormwater discharge from the Site under Section 53 of the Ontario Water Resources Act (OWRA), R.S.O. 1990. Section 53 covers industrial sewage works "for the collection, transmission, treatment or disposal of wastewater generated from industrial activities, including works to handle stormwater runoff".

The proposed impervious surfaces within the ERRC footprint will produce peak flow discharge rates and runoff volumes higher than those produced by the pre-development conditions. It is assumed that additional water quality treatment will be required to address possible increases in total suspended solids (TSS) and oil/grease in the surface runoff. The design and operation of these measures will be detailed in the ECA.

The ECA permit application package for Sewage Works will be prepared during the detailed design of the stormwater management system, and will consist of a signed, stamped copy of a Stormwater

Management Plan report, with any applicable drawings and supporting calculations. MOECC approval of the ECA will need to be in place prior to construction of any components of the stormwater management facility.

5.2 Regulatory Overview

Guidelines and requirements of the local municipality (Springwater Township), regional/county government (County of Simcoe), and those of the local conservation authority (NVCA), and any provincial or federal requirements will be implemented. In short, post-development conditions will not exceed pre-development conditions for peak discharge flow rate, and provisions for erosion control and discharge water quality management will be implemented to ensure that any impacts to the environment as a result of the proposed development will be mitigated (reduced or eliminated). It is noted that parts of the Site are classified as NVCA regulated areas, and may necessitate NVCA permitting approval for the proposed stormwater management facility.

5.3 Drainage Conditions

Existing drainage conditions at the Site involve surface runoff generally flowing from west to east. Within the proposed ERRC footprint, the northern portion currently flows towards a wetland area in the northeast, while the southern portion flows towards the southeast. Two tributaries of Matheson Creek are mapped on the Site, as identified by the Natural Heritage Information Center (NHIC) and NVCA mapping resources. One watercourse originates at the wetland area near the northeast corner of the Site, and the second watercourse crosses the southern portion of the Site.

The southern watercourse was found not to exist following multiple Site visits by GHD ecologists and NVCA staff. This was also confirmed by County staff who visited the Site during the 2016 spring freshet. There were also no signs of surface runoff from within the proposed ERRC footprint discharging off-Site as overland flow. Based on these observations, it is assumed that surface runoff generally infiltrates into the ground surface shortly after a rainfall event.

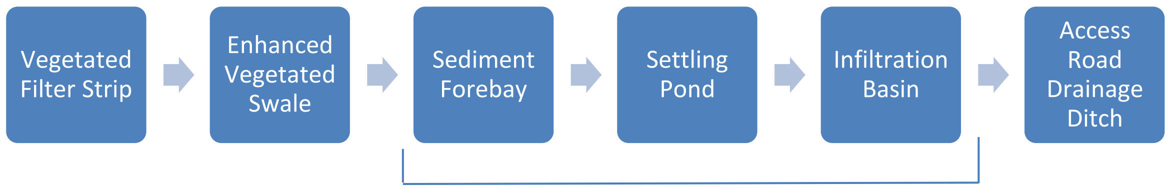
During post-development conditions, all runoff from within the footprint of the proposed ERRC will be contained within its limits and will need to meet quality and quantity objectives before being discharged via infiltration. It is expected that TSS and oil/grease will be the main concerns with respect to water quality.

No runoff from within the ERRC footprint will discharge overland towards the wetland in the northeast portion of the Site. Existing drainage conditions beyond the ERRC footprint will be maintained, with the majority of rainfall absorbed by the land cover and infiltrating into the underlying soils. Additional consideration will be given to the wetland to ensure that surface drainage patterns beyond the ERRC footprint provide similar hydrologic contributions to this feature.

5.4 Proposed Stormwater Management Approach

The proposed stormwater management facility will mitigate the increase of surface runoff from the impervious areas, maintain existing water quality and quantity conditions, and address the water balance deficit. Given the presence of a wetland on the Site, hydrological conditions of the downstream surface water features will be maintained and impacts to local habitat will be minimized.

To accommodate the proposed ERRC and address these requirements, GHD proposes the following 'treatment train' approach:



5.5 Proposed Stormwater Management Controls

5.5.1 Vegetated Filter Strips

Surface runoff will drain overland from impervious areas within the ERRC footprint towards the east and into vegetated filter strips. Vegetated filter strips are designed to capture sediment and hydrocarbons in the runoff. In general, they will remain unmaintained with shallow slopes approximately 3 to 5 metres in width.

5.5.2 Enhanced Vegetated Swale

Once through the vegetated filter strip, surface runoff will discharge into an enhanced vegetated swale to convey the runoff to the downstream stormwater management pond (SWMP). The enhanced vegetated swale will have a slope of 0.5%, and a minimum depth of 0.5 m with 3H:1V side slopes. Rock check dams will be spaced as required to further dissipate sediment within the surface runoff and encourage infiltration.

5.5.3 Stormwater Management Pond

The SWMP will be sized to capture, store, and infiltrate all rainfall events, up-to and including the 100-year storm event (excluding events greater than the 100-year storm event and large concurrent storm events). In addition, the SWMP will provide sufficient storage for fire protection water, as outlined in Section 4.4.1.

Since the underlying soil conditions consist of highly infiltrative soils (sand to sandy silt) and existing land conditions consist of a forested area, pre-development peak surface flows are assumed to be minimal. As such, it is recommended that all treated surface runoff from within the ERRC footprint also be infiltrated.

The SWMP will consist of the following three components:

- Sediment Forebay.
- Settling Pond.

- Infiltration Basin.

The stormwater management pond will be designed in accordance with MOECC guidelines. The runoff volume for the 100-year storm event was calculated based on the ERRC footprint and the interpolated rainfall depth from the Ministry of Transportation (MTO) Intensity/Duration/Frequency Curve Lookup website. Preliminary storage volume calculations for the SWMP in accordance with MOECC guidelines and requirements for fire protection water are provided in Appendix A.

5.5.3.1 Sediment Forebay

The sediment forebay will be designed to dissipate sediment and improve water quality. The sediment forebay will facilitate maintenance and improve pollutant removal by trapping larger particles near the inlet of the pond. The forebay will be designed to minimize the potential for re-suspension and to prevent the conveyance of re-suspended material to the pond outlet.

5.5.3.2 Settling Pond

The settling pond will provide storage for surface runoff from storms up-to and including the 100-year event. The settling pond will be able to provide 24 hours of detention for a 25 mm storm event.

The permanent pool within the settling pond and the sediment forebay will provide storage for fire protection water. As such, the bottom of the SWMP will be lined with a clay-based or geosynthetic liner to prevent infiltration and maintain adequate storage volume. The sizing of the permanent pool is such that the required storage volume for fire protection water accounts for sediment build-up and ice formation in the winter.

5.5.3.3 Infiltration Basin

An infiltration basin will be incorporated into the SWMP to allow for the slow discharge of runoff to replicate the slow contribution of groundwater to the adjacent watercourses. The infiltration basin will be designed and maintained per TRCA/CVC Guidelines for Low Impact development (TRCA, 2010). The infiltration basin will likely consist of clear stone bedding and underground storage/infiltration chambers.

It is assumed that sediment will be filtered through the treatment train prior to discharging to the infiltration basin, therefore it is expected that the storage/infiltration chambers will not be clogged by sediment and will require minimal maintenance until at least 10-20 years in operation. Given the sandy underlying soils, the infiltration basin is expected to provide sufficient dissipation time in the SWMP to accommodate storage for subsequent large rainfall events.

5.5.4 Access Road Drainage Ditch

Any overflow from the SWMP will discharge via a weir into a proposed drainage ditch along the west side of the access road, flowing towards the south and discharging into the existing drainage ditch along the north side of Horseshoe Valley Road West and ultimately to Matheson Creek.

The drainage ditch will convey overflow from the SWMP as well as any drainage from the access road. The proposed ditch will have a shallow slope (maximum 0.5% slope), and a minimum depth of

0.5 m with 3H:1V side slopes. The proposed ditch will also be heavily vegetated and fitted with rock check dams to further dissipate sediment in the surface runoff and encourage infiltration.

5.5.5 Other Potential Measures

Additional water quality measures may be required to address increased sediment from vehicular traffic or other contaminants from the materials on-Site. The need for additional measures will be assessed during the detailed design stage, and may vary based on the technology selection for the OPF. Additional measures may include the following:

- An oil/grit separator (OGS) upstream of the SWMP to provide additional sediment and oil removal.
- A membrane filtration system upstream of the SWMP to provide the removal of additional contaminants (e.g., phosphorus, metals, nitrogen) from the surface runoff.
- Aerators may be required within the settling pond section of the proposed SWMP for the treatment of additional contaminants (e.g., organic compounds, ammonia) in the surface runoff.

Additional measures may also be implemented as required in order to meet the water quality requirements developed as part of the ECA.

5.6 Erosion and Sediment Controls

The purpose of erosion and sediment controls (E&SC) is to minimize the potential release of pollutants, primarily sediments, directly or indirectly into downstream receiving waters during construction. Typical ESC measures include the following:

- Silt fencing around disturbed areas.
- Construction mud mat entrance.
- Rock check dams.
- Vegetated exposed areas.

ESC measures will be inspected, modified, and maintained as required during the construction period. Inspection logs will be utilized to document the condition of the installed measures and any requirements for modification or maintenance on a bi-weekly basis, and within 24 hours of any rainfall event of 25 mm or more. In the event that sediments migrate off-Site, additional ESC measures should be implemented as required and any sediment that has migrated off-Site shall be removed.

The ESC measures should be maintained until all construction is complete and vegetation has been established. The ESC measures may be removed once stabilized conditions have been reached and the Site is assessed by a qualified person.

5.7 Operations and Maintenance

GHD recommends that the following proposed measures should be performed to monitor and maintain the stormwater management system:

- The vegetated filter strip, check dams, and enhanced vegetated swales should be inspected to ensure no areas have signs of sediment accumulation or erosion. Any affected areas will be re-graded and re-vegetated as required.
- The SWMP should be checked regularly to ensure that excessive sediment build-up does not occur, as no forebay has been incorporated into the SWMP. The pond should be cleaned on an as-required basis or when sediment accumulation is on average over 100 mm in depth, to ensure that sediment accumulation does not decrease the available storage volume.
- An inspection pipe should be installed within the infiltration basin to monitor standing water in the chamber and the current infiltration rate. The infiltration basin should be maintained in accordance with MOECC requirements to ensure sufficient infiltration is achieved.
- The pond overflow weir should be inspected on a regular basis to assess its stability.
- The membrane filtration system or OGS unit if and when implemented should be operated and maintained per the manufacturer's specifications.
- The access road drainage ditch should be inspected to ensure no areas have signs of sediment accumulation or erosion. Any affected areas should be re-graded and re-vegetated as required.

6. Noise

6.1 ECA Application Process

In accordance with Section 9 of the Environmental Protection Act (EPA), all sources of emissions of air & noise contaminants to the atmosphere must be regulated through an ECA issued by the MOECC. The emissions from all sources must meet their applicable air & noise quality criteria under the EPA, R.S.O. 1990.

Based on the preparation of the conceptual Site plan, GHD has determined that the proposed ERRC will have the sources of noise detailed in Section 6.4 and will therefore require that an ECA application be submitted demonstrating compliance with the applicable noise criteria before the ERRC is constructed. Given that this is a preliminary evaluation of compliance with the applicable MOECC noise criteria, a subsequent noise assessment will need to be undertaken once the finalized design has been prepared.

6.2 Regulatory Overview

The MOECC regulates noise emissions in Ontario and has issued Guideline NPC-300, "Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning", which sets out limits for sound levels due to stationary sources (including on-site movement of trucks and trailers). Limits are assessed at points-of-reception (PORs), which include noise-sensitive land uses such as dwellings, educational facilities, day nurseries, hospitals, health care facilities, community centres, certain places of worship, and detention centres. These limits vary depending on the character of the area that surrounds the POR. All facilities applying for an ECA must demonstrate that they will meet the limits set out in NPC-300. Noise emissions will also comply with all municipal noise by-laws including Springwater by-law 2012-015.

The Site and surrounding PORs are located in a Class 3 area, which is defined in NPC-300 as a rural area with an acoustical environment that is dominated by natural sounds, having little or no road traffic.

Table 6.1 identifies the minimum sound level limits associated with Class 3 Areas, expressed as a 1-hour Leq (equivalent sound level) that can be applied to assess the sound levels emitted by the on-Site noise sources.

The applicable noise criteria at the PORs are based on the higher of the background sound level and the MOECC's minimum sound level limits. The MOECC Class 3 minimum limits were used for this assessment to be conservative. Given the volume of road traffic on Horseshoe Valley Road West to the south, completion of a background noise assessment in the future could justify higher ERRC-specific limits.

6.3 Methodology

The worst case assessment of steady state noise sources at the selected PORs was based on equipment manufacturer specifications and data from GHD’s extensive sound level library. GHD identified comparable and representative noise sources typically found at ERRC facilities based on previous noise impact studies conducted at similar facilities in order to conservatively evaluate the potential noise impact from significant sources of noise (i.e., large fans, blowers, traffic). All significant sources of noise at typical MMF and OPF facilities identified in Table 6.2 were considered for this evaluation.

Cadna A Acoustical Modelling Software (Cadna A), version 4.6, was used to model the potential impacts of the significant noise sources. Cadna A calculates sound level emissions based on the ISO 9613 2 standard "Acoustics – Attenuation of Sound during Propagation Outdoors".

6.4 Assumptions

GHD has prepared a conceptual site plan based on a preliminary concept and experience with other ERRC facilities. The layout, noise source identification and building tier heights are presented in Figure 6.1.

Noise sources included in the model were representative of all on-site equipment expected to produce a significant noise impact. Noise from trucks is expected to be the most significant contributor to noise emissions from the ERRC.

While specific operating hours will be outlined in the ECA, it is anticipated that the ERRC will generally operate six days per week (Monday through Saturday) from 6:00 a.m. to 7:00 p.m. Collection vehicles will utilize the MMF Monday through Friday and offload when routes are completed (currently averaging between 2:00 p.m. and 6:00 p.m.). County-owned trucks, managing divertible material collected at drop-off facilities, will leave the facility around 6:30 a.m. and generally return by 4:30 p.m. Garbage and recycling will be sent outbound for processing during working hours Monday through Saturday.

A worst-case scenario reflecting truck volumes projected to the year 2049 was modeled for noise emissions. Peak hourly inbound and outbound truck volumes were based on information provided by the County and verified by GHD. Peak daytime (7:00 a.m. to 7:00 p.m.) hour volumes in the year 2049 reflect 61 inbound trucks and 62 outbound trucks, for a total of 123 trucks.

The peak AM outbound volume of 41 trucks in the year 2049 was also considered to account for trucks leaving the Site between 6:30 a.m. and 7:00 a.m. This is considered to be a conservative approach as it is very unlikely that the peak outbound traffic volume would occur during this time.

It is assumed that there will be no truck movements between 7:00 p.m. and 6:30 a.m.

Additional noise sources included in the model were as follows:

- Biofilter fan.
- Exhaust stack.
- Biogas combustion engines, intakes, and radiators.
- Comfort heating equipment.
- Backup flare.
- General ventilation exhausts.

A comprehensive list of sources and associated Sound Power Levels (SPL) is provided in Table 6.2.

The worst-case cumulative ERRC-wide un-attenuated sound levels estimated at the PORs included attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity.

Assumptions used in the Cadna A modelling included:

- ***Noise Sources***: All sources were modelled using the 1/1 octave band data from GHD's standard reference library.
- ***Reflection Order***: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from one reflecting surface.
- ***Ground Absorption***: The model was set up with a ground absorption factor of 1.0 because the ERRC is surrounded predominately by forest. A ground absorption factor of 0.25 was used for the hard surfaces within the ERRC footprint.
- ***Foliage***: Forested areas were modelled with an average height of 8.5 meters. This value is considered to be conservative as most on-Site tree species are expected to reach heights of 20-25 m.
- ***Receptor Elevation***: POR receptor heights were modelled to represent the worst-case elevation.

- ***Time-Weighted Adjustment***: Time-weighted adjustments for the proposed truck route were included in the model.
- ***Building Surfaces***: The buildings were modelled as reflective surfaces.

6.5 Results

The ERRC noise levels at the most-impacted existing POR, a residence located approximately 370 m southeast of the ERRC footprint, are 44.7 dBA during the day and 38.6 dBA during the night. A daytime noise contour plot for the worst-case hourly scenario projected to 2049 is presented in Figure 6.2. As expected, the primary contributor to noise impacts at the PORs is inbound and outbound truck traffic.

It should be noted that this is a preliminary noise assessment to determine if the impact at existing PORs surrounding the proposed ERRC would meet NPC-300 noise limits. The noise assessment will be revisited in more detail once the ERRC design has been finalized. GHD recommends that the equipment selected during the final design phase does not exceed the SPLs presented in Table 6.2, and that any additional equipment contributes less than 35 dBA at the worst-case POR in order to meet the MOECC noise limits.

6.6 Conclusions

The un-attenuated steady state sound levels estimated at the existing PORs are below the MOECC's minimum exclusionary sound level limits as applicable and as summarized in Section 6.2 and Table 6.3. This analysis demonstrates that the facilities, using typical noise levels, can comply with MOECC limits.

7. Odour

7.1 ECA Application Process

In accordance with Section 9 of the Environmental Protection Act, sources of air emission releases to the atmosphere must obtain an Environmental Compliance Approval (ECA). The emissions from all sources must meet their applicable air quality criteria under the Environmental Protection Act, R.S.O. 1990.

GHD understands that the proposed ERRC has the potential to emit odour and other air emissions. Odour from the MMF may result from the loading of organics and other odorous materials. Odour in the OPF may result from the receiving, handling, and processing (e.g., composting or anaerobic digestion) of organic materials. The ERRC will therefore require an ECA application that demonstrates compliance with applicable odour and other air emission criteria before it is constructed. Given that this is a preliminary evaluation of compliance with the applicable MOECC odour criteria, a subsequent air and odour assessment will need to be conducted in more detail once the finalized design has been prepared.

Based on the actual technology selected for the facility, as well as detailed equipment specifications, a more detailed air and odour assessment, called an Emission Summary and

Dispersion Modelling (ESDM) Report, will need to be completed as part of the future ECA application process. The ESDM report will assess the ERRC's emissions and impacts in greater detail than this preliminary report.

7.2 Regulatory Overview

Air emissions in Ontario are regulated by Ontario Regulation 419/05 (O. Reg. 419/05) established under the Environmental Protection Act, 1990 (EPA). O. Reg. 419/05 sets point-of-impingement concentration limits for specific contaminants. Odorous substances typically have a standard with a 10-minute averaging time. Although there is no standard for odour impacts due to exposure to a mixture of unspecified odorous substances, the Ministry of the Environment and Climate Change (MOECC) has typically accepted an approach based on odour units (OU) in relation to adverse effects as defined in Section 14 of the EPA. The typical assessment guideline is 1 OU, which is defined as the concentration of odour that can be detected by 50% of the population.

According to the MOECC's technical bulletin, "Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines under O. Reg. 419/05" dated April 2008, the MOECC accepts a tiered analysis process, with increasing levels of detail, to assess modelled odour compliance.

Modelling can be undertaken using models such as SCREEN3 or AERMOD over the entire modelling domain (typically a radius of 10 km around the facility). If this assessment shows that the 1 OU guideline is met at all locations within the modelling domain, no further assessment is necessary. However, if the guideline is not met at all locations, the concentrations at locations where activities regularly occur (sensitive receptors) are then examined.

Sensitive receptors for odour assessment include residences, health care facilities, senior citizen's residences, long-term care facilities, child care facilities, camping grounds, schools, community centres, day care centres, recreational centres, sports facilities, outdoor public recreational areas, and other locations as specified by MOECC.

If the guideline is met at all sensitive receptors, no further assessment is necessary. However, if the guideline is not met at all sensitive receptors, then a frequency analysis to determine the frequency of exceeding the guideline is performed. If the modelled number of exceedances is below 0.5% of the time on an annual basis, then the facility is deemed to meet the guideline.

This report uses a similar methodology to conduct a preliminary analysis to evaluate odour emissions and impacts. A full analysis will be performed as part of the ECA application process once the technology selection and design process is completed. As noted throughout this report, the facilities will not be operated until such time as the ECA is approved, demonstrating that environmental performance is in accordance with MOECC regulations.

7.3 Methodology

Dispersion modelling for the concentration of odour was performed using the United States Environmental Protection Agency (USEPA) multi source dispersion model AERMOD, as prescribed by O. Reg. 419/05. AERMOD is an advanced steady state plume model that has the ability to incorporate building cavity downwash, actual source parameters, emission rates, terrain and historical meteorological information to predict ground level concentrations (GLCs) at specified locations.

Odour-based dispersion modelling was performed for both a tiered receptor grid and discrete sensitive receptors, as described by O. Reg. 419/05, and the MOE technical bulletin entitled, "Methodology for Modelling Assessments with 10 Minute Average Standards and Guidelines under O. Reg. 419/05" dated April 2008.

As per the April 2008 technical bulletin, a series of models were performed to determine odour compliance, as described below:

- ***Step 1***: An air dispersion model, constructed as prescribed by O. Reg. 419/05, using a tiered receptor grid, is modelled for a 1 hour averaging period at ground level. All modelled results are then converted to a 10-minute averaging period. The removal of meteorological anomalies is allowed to determine the maximum compliance odour value. After this is done, if the odour based guideline of 1 odour unit (OU) is not exceeded at any modelled point, no further modelling is required. If the odour based guideline is exceeded, further modelling is required.
- ***Step 2:*** An air dispersion model, with discrete receptors located at all locations where human activities may occur, is modelled for a 1 hour averaging period. All modelled results are then converted to a 10-minute averaging period. After this is done, if the odour based guideline of 1 OU is not exceeded at any discrete receptor, no further modelling is required. If the odour based guideline is exceeded, further modelling is required.
- ***Step 3***: An air dispersion model, with a discrete receptor located where human activities may occur, is modelled for a 1 hour averaging period. All modelled results are then converted to a 10-minute averaging period. A frequency analysis by year, based on the 99.5th percentile, is then performed to determine the maximum compliance odour value. The 99.5th percentile is equivalent to removing the highest 44 modelled concentrations per year.

7.4 Assumptions

GHD has conducted an assessment based on a conceptual site plan and experience with other ERRC facilities, including operations similar to the MMF and OPF. Odour from the MMF may result from loading of organics and other odorous materials. Odour from the OPF may result from receiving, handling, and processing (e.g., composting or anaerobic digestion) of organic materials.

The assumed layout and building heights used in the modelling are shown in Figure 6.1. The estimated building heights are tall to allow for conservative modelling results, and do not necessarily correspond to the building heights of the final facility; the actual facility configuration will be utilized to make an application to the MOECC for the final dispersion modeling that will support an ECA application and that will form the basis of the terms and conditions thereunder.

GHD has assumed that a biofilter will be used to control odour emissions from the organics processing portion of the facility. Exhaust parameters for the biofilter have been selected based on GHD experience at similar sites.

GHD evaluated a range of facility and source parameters through several different scenarios, as described below. Scenarios are undertaken to estimate the configuration of the final discharge points from the facilities and how they would operate with respect to the odour limits noted. Specific parameters for sources are shown in Table 7.1.

1. High flow, tall stack. The biofilter stack exhausts 30 meters above ground level and operates with a relatively high flow. The MMF portion of the ERRC also includes odour-emitting dust collectors and general ventilation exhausts.
2. Low flow, tall stack. The biofilter stack exhausts 30 meters above ground level and operates with a relatively low flow. The MMF portion of the ERRC also includes odour-emitting dust collectors and general ventilation exhausts.
3. High flow, dust collectors only. The dust collectors from the MMF portion of the ERRC are routed to a single stack 20 meters above ground level, with some odour treatment. This scenario is representative of the ERRC before the addition of the OPF, and does not include odour from a biofilter.
4. High flow, dust collectors, and short biofilter stack. The dust collectors from the MMF portion of the ERRC are routed to a single stack 20 meters above ground level, with some odour treatment. The biofilter stack exhausts 20 meters above ground level and operates with a relatively high flow.
5. High flow, dust collectors, low-odour short biofilter stack. The dust collectors from the MMF portion of the ERRC are routed to a single stack 20 meters above ground level, with some odour treatment. The biofilter stack exhausts 20 meters above ground level and operates with a relatively high flow and low odour levels.
6. High flow, dust collectors, very low-odour short biofilter stack. The dust collectors from the MMF portion of the ERRC are routed to a single stack 20 meters above ground level, with some odour treatment. The biofilter stack exhausts 20 meters above ground level and operates with a relatively high flow and very low odour levels.

7.5 Results

GHD modelled the different scenarios using AERMOD. The detailed results are shown in Table 7.1. In general, it is possible for the ERRC to operate within the odour guideline of 1 OU.

In Scenarios 1 and 4, the ERRC would exceed 1 OU at sensitive receptors more than 0.5% of the time, which indicates a taller stack, or additional treatment, is required to comply with the guideline.

Scenario 3, which does not include emissions from the OPF, complies with the odour guideline of 1 OU.

Scenarios 2, 5, and 6 show compliance for the ERRC after a sensitive receptor analysis or frequency analysis.

7.6 Conclusions & Recommendations

The modelling results show that it is possible for the facilities to be located at the site to comply with the 1 OU guideline. However, meeting the guideline requires the ERRC to be carefully designed and operated, and the implementation of an odour management plan. The MMF and OPF will need to be operated using best management practices, with care taken to reduce odour impacts. For example, the ERRC should keep bay doors closed when possible, and not allow unprocessed materials to be stored or handled outdoors.

Once a technology solution is selected for the OPF, this impact report can be refined to reflect a footprint and odour emissions associated with that particular technology and provide a more accurate assessment of odour impacts. However, the basic principles identified in this report should underpin the County’s procurement process to establish environmental performance.

Odour modelling should be considered during the final design process when the air flows and building heights are known, and the stack location is determined. A refined, iterative modelling process can determine the required stack height and diameter to meet the odour guideline requirements.

Emissions from general exhaust and other untreated sources tend to have lower dispersion and result in disproportionately high ground-level concentrations at sensitive receptors. When possible, air should be treated in the biofilter and routed to the biofilter exhaust stack to aid dispersion and decrease ground-level concentrations at sensitive receptors.

All of Which is Respectfully Submitted,

GHD

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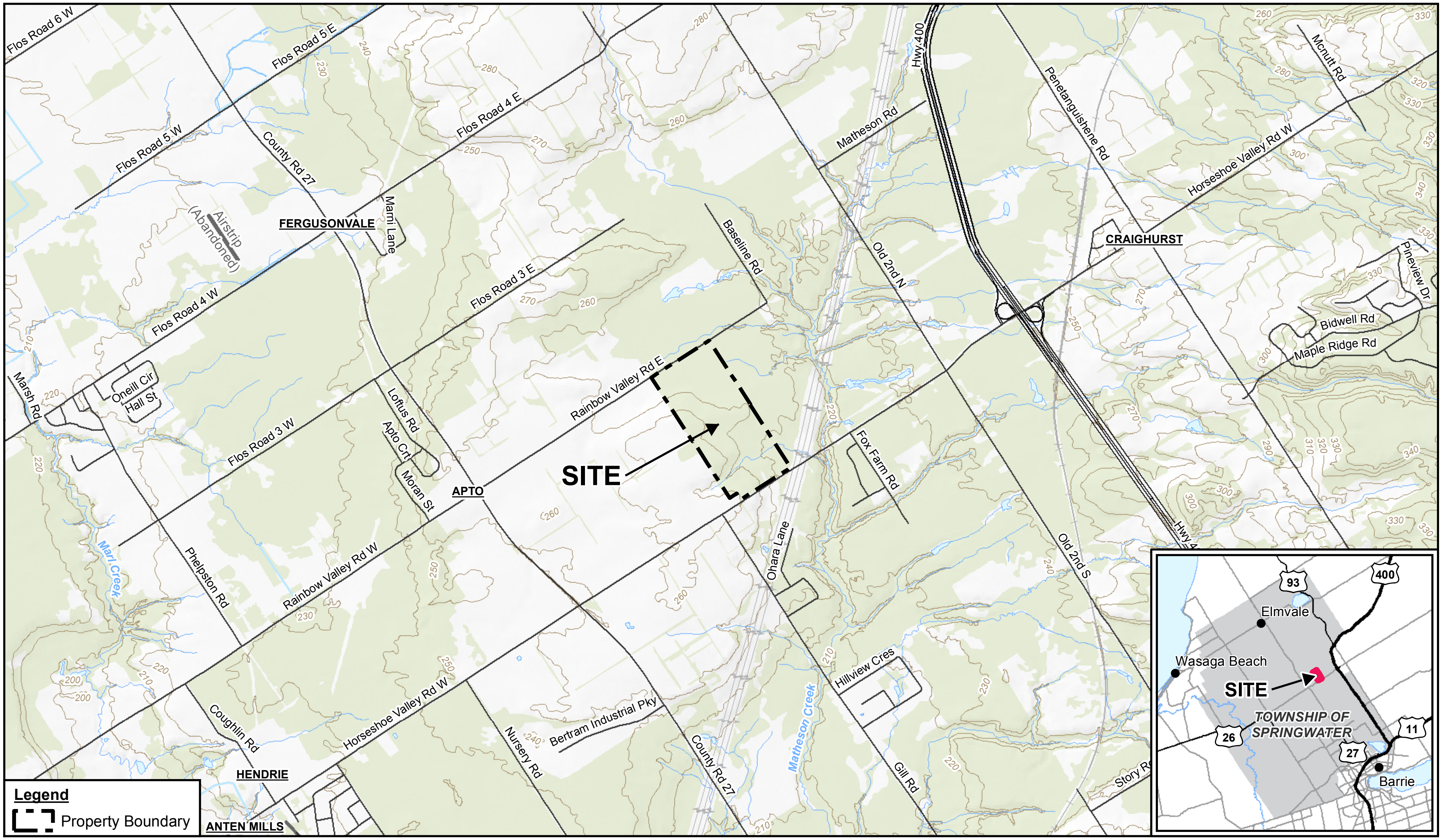
Peter Tremblay, B.A.Sc., EIT.

Figures



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016;

0 500 1,000 1,500
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

N

GHD

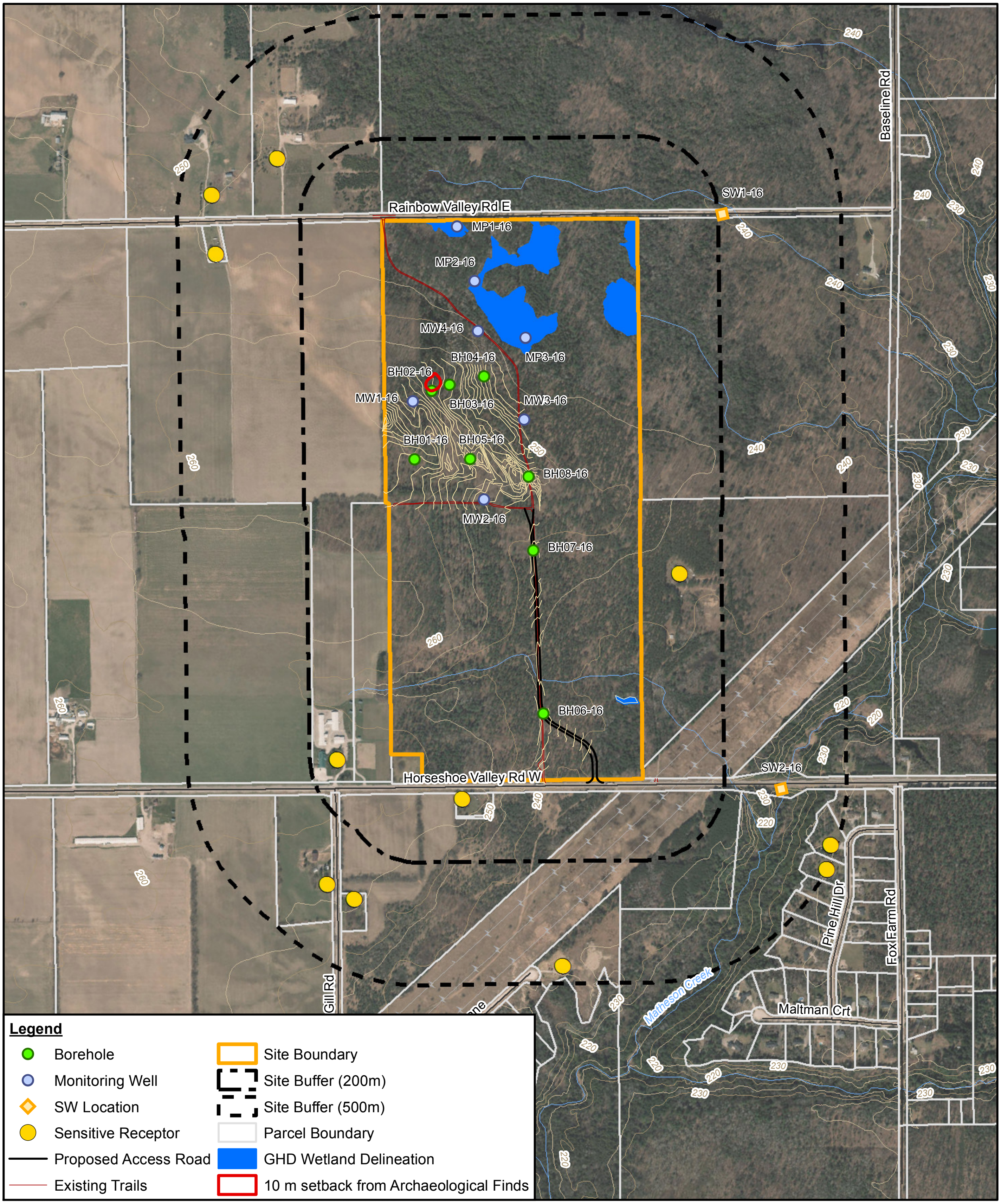
COUNTY OF SIMCOE
2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER
ENVIRONMENTAL RESOURCE RECOVERY CENTRE

86822
Nov 16, 2016

SITE LOCATION MAP

FIGURE 1.1

GIS File: Q:\GIS\PROJECTS\86000s\86822\Layouts\010\086822-03(010)GIS-WA002.mxd



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 120 240 360
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

COUNTY OF SIMCOE
ENVIRONMENTAL RESOURCE
RECOVERY CENTRE

SITE FEATURES AND
SURROUNDING AREA

086822
Nov 17, 2016

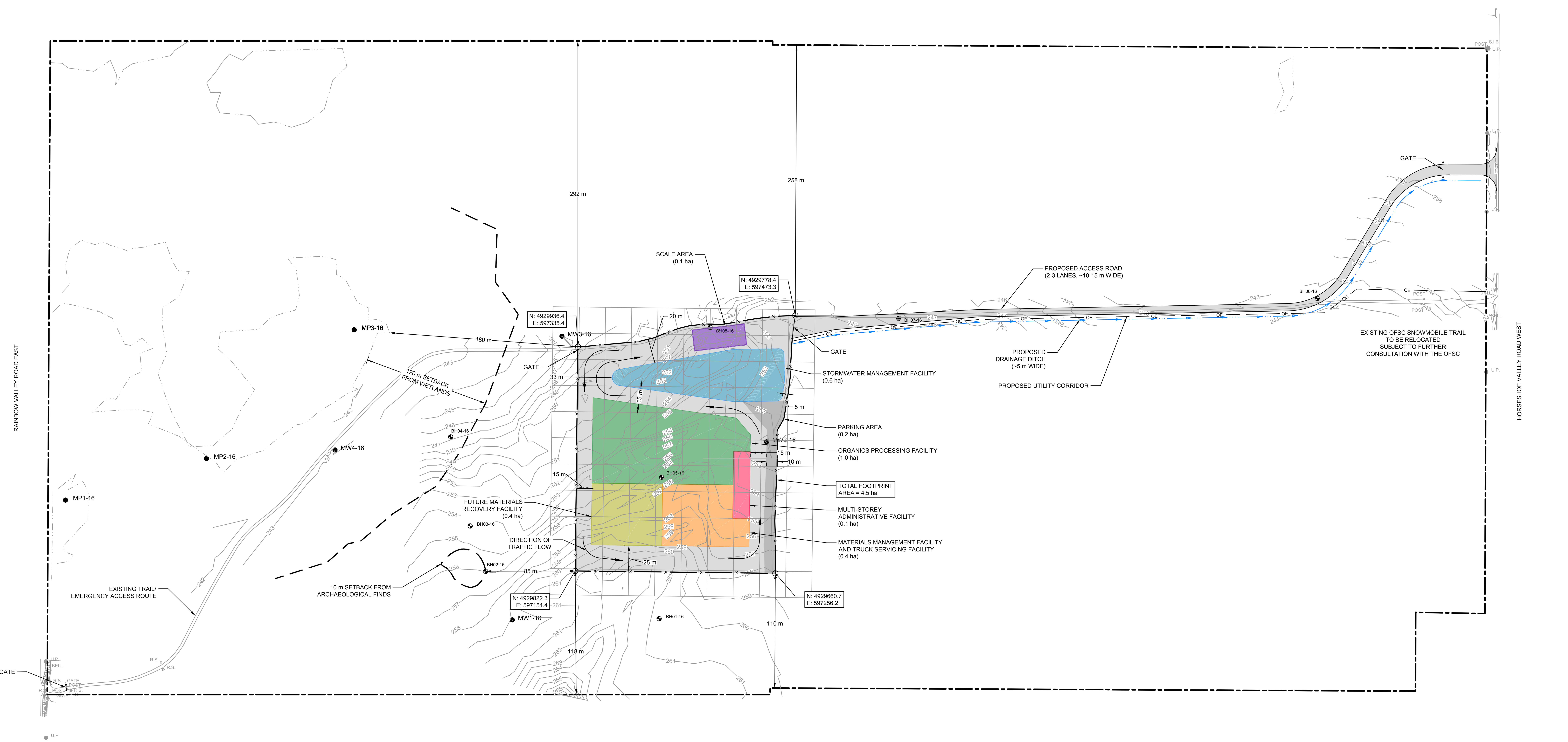
FIGURE 2.1

GIS File: Q:\GIS\PROJECTS\86000s\86822\Layouts\010\086822-03(010)GIS-WA001.mxd

LEGEND

- PROPERTY LINE
- 244 CONTOUR ELEVATION
- WETLAND DELINEATION
- 01-16 MONITORING WELL
- 02-16 BOREHOLE
- U.P. UTILITY POLE
- BELL TELEPHONE PEDESTAL
- R.S. SIGN
- POST GATE POST
- PROPOSED CHAIN LINK FENCE
- 25 x 25 GRID

SOURCE: TOPOGRAPHIC SURVEYS COMPLETED BY GHD (AUGUST - OCTOBER 2016)



FINAL

No.	Issue	Drawn	Approved	Date
-	-	-	-	-

0 20 40 60m

Bar is 20mm on original size drawing
0 20mm

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Drafting Check	BP	Design Check	DS
Project Manager	BD	Date	Nov 15, 2016
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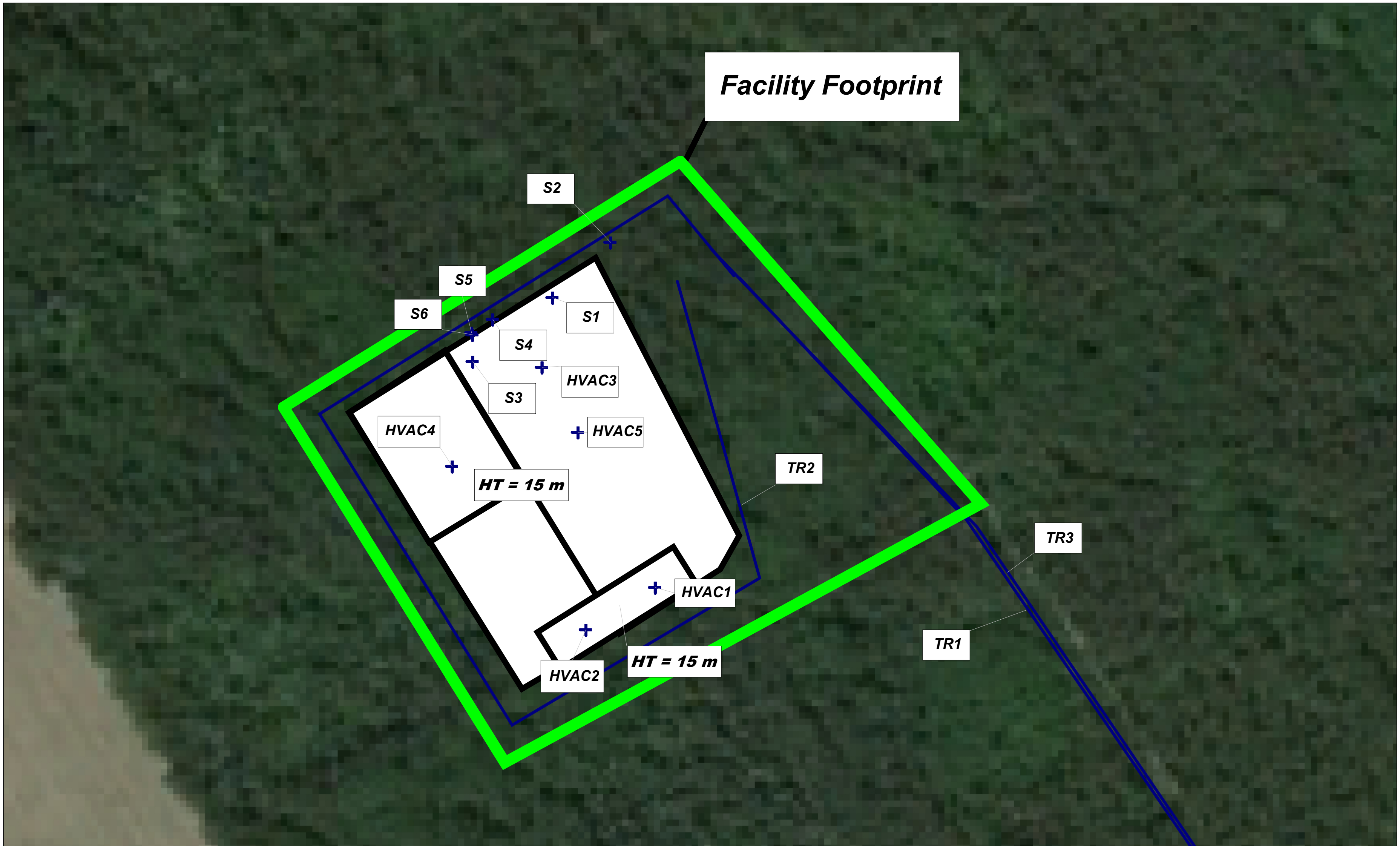
Client **COUNTY OF SIMCOE**
Project **ENVIRONMENTAL RESOURCE RECOVERY CENTRE**
Title **CONECEPTUAL SITE PLAN**
Project No. **86822-00**
Original Size **ANSI D** Sheet No. **FIGURE 3.1** Sheet 1 of 1

Plot Date: 15 November 2016 - 10:48 AM Plotted By: Matt Wolfer CAD File: P:\drawings\86000s\86822\86822-PRES\86822-00(PRES001)\86822-00(PRES001)CI\86822-00(PRES001)CI-WA006.dwg

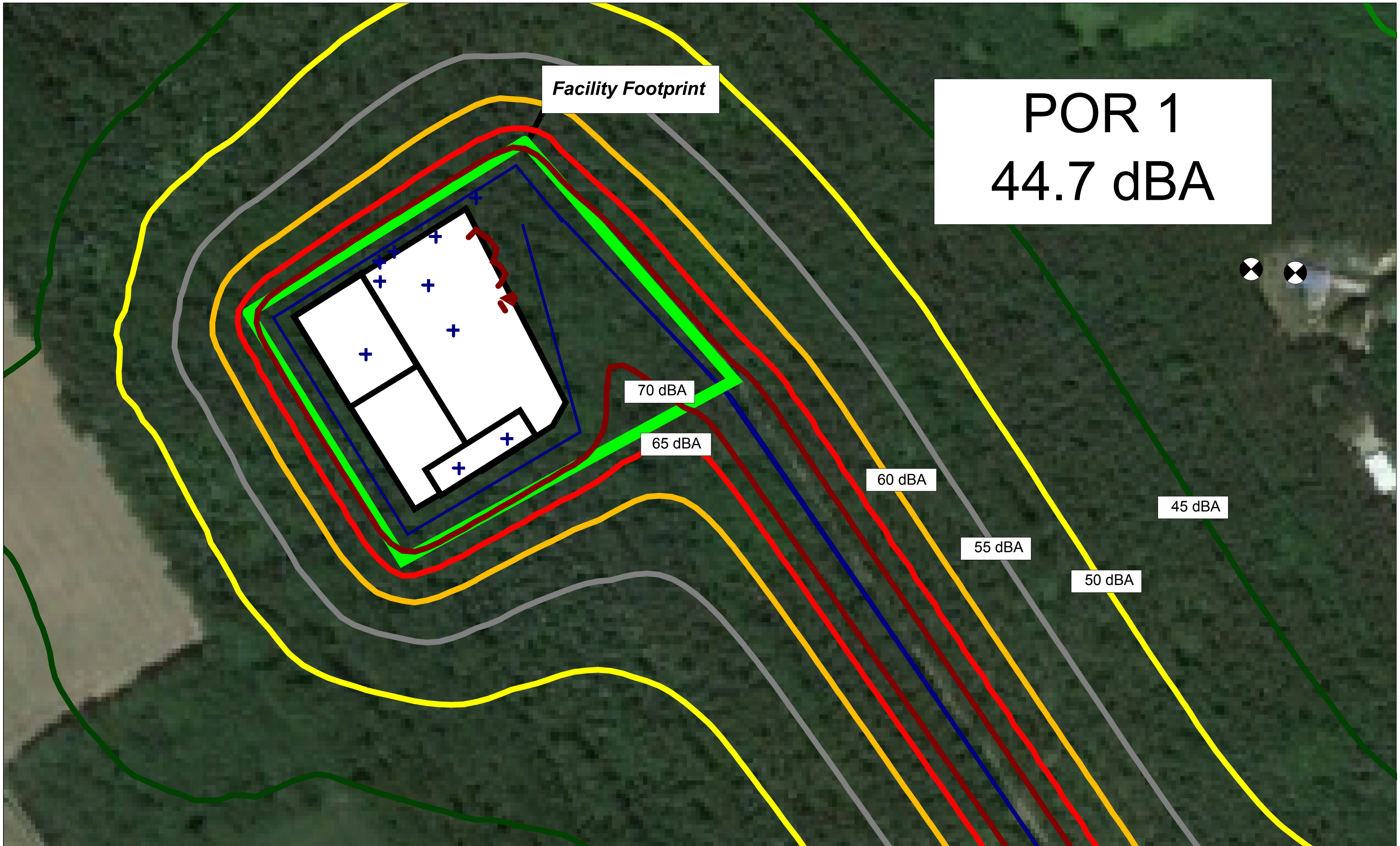


Point Source
Line Source
Building

>	35.0 dB
>	40.0 dB
>	45.0 dB
>	50.0 dB
>	55.0 dB
>	60.0 dB
>	65.0 dB
>	70.0 dB

NOISE ASSESSMENT REPORT
SIMCOE COUNTY, ONTARIO

FIGURE 6.1
NOISE SOURCE LOCATION PLAN
1.5 M AG



Point Source
Line Source
Building
Receiver

> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB

NOISE ASSESSMENT REPORT
SIMCOE COUNTY, ONTARIO

FIGURE 6.2
NOISE CONTOUR PLOT - DAYTIME
1.5 M AG

Tables

Table 6.1

Class 3 Minimum Sound Level Limits
Simcoe ERRC

	Minimum Sound Level	
Time of Day	Plane of Window	Outdoor
7:00 a.m. to 7:00 p.m.	45 dBA	45 dBA
7:00 p.m. to 11:00 p.m.	40 dBA	40 dBA
11:00 p.m. to 7:00 a.m.	40 dBA	-

Table 6.2

Noise Source Summary
Simcoe ERRC

Source ID	Source Description	Source Facility	Sound Power Level (dBA)
S1	Biofilter exhaust stack	OPF	98.8
S2	Biofilter fan	OPF	85.5
S3	Flare	OPF	82.0
S4	Biogas Combustion Engine radiator	OPF	85.9
S5	Biogas Combustion Engine intake	OPF	89.8
S6	Biogas Combustion Engine discharge	OPF	89.8
HVAC 1 - HVAC 2	Comfort heating – administrative area	Administrative	88.0
HVAC 3 - HVAC 5	Comfort heating – operations area	MMF/OPF	97.7
TR1	Inbound and Outbound Truck Traffic (7:00 a.m. to 7:00 p.m.)	-	109.9
TR2	Inbound Truck Traffic within Facility Footprint (7:00 a.m. to 7:00 p.m.)	-	109.9
TR3	Outbound Truck Traffic (6:30 a.m. to 7:00 a.m.)	-	109.9

Table 6.3

Steady State Sound Levels
Simcoe ERRC

Point of Reception ID	Point of Reception Description	Sound Level at Point-of-Reception (Leq) Source	Verified by Acoustic Audit Yes/No	Performance Limit [1] (Leq)	Compliance with Performance Limit (Yes/No)
Daytime Operations - 7 a.m. to 7 p.m.					
POR1	Worst-Case Existing Residence	44.7 (dBA)	No	45 (dBA)	Yes
POR1-OPR	Worst-Case Existing Residence - Outdoor POR	42.5 (dBA)	No	45 (dBA)	Yes
Nighttime Operations - 7 p.m. to 7 a.m.					
POR1	Worst-Case Existing Residence	38.6 (dBA)	No	40 (dBA)	Yes
POR1-OPR	Worst-Case Existing Residence - Outdoor POR	36.4 (dBA)	No	40 (dBA)	Yes

Notes:

(1) Minimum MOECC sound level limits defined in NPC-300.

Table 7.1

Odour Source Parameters and Modelling Results
Simcoe ERRC

	Scenario						
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**Units**
Biofilter Stack							
Height above grade	30	30	–	20	20	20	m
Flow rate	15	3.86	–	15	15	15	m³/s
Temperature	14	14	–	14	14	14	°C
Exit diameter	0.87	0.54	–	0.87	0.87	0.87	m
Exit velocity	25.2	16.9	–	25.2	25.2	25.2	m/s
Emission rate	30,000	7,720	–	30,000	15,000	7,500	OU·m³/s
Odour concentration	2,000	2,000	–	2,000	1,000	500	OU
Dust collector							
Height above grade	18.2	18.2	20.0	20.0	20.0	20.0	m
Flow rate	4.73	4.73	9.47	9.47	9.47	9.47	m³/s
Temperature	27	27	27	27	27	27	°C
Exit diameter	0.5	0.5	0.75	0.75	0.75	0.75	m
Emission rate	1,420	1,420	2,840	2,840	2,840	2,840	OU·m³/s
Odour concentration	300	300	300	300	300	300	OU
General exhaust							
Height above roof	2.0	2.0	–	–	–	–	m
Flow rate	4.73	4.73	–	–	–	–	m³/s
Temperature	27	27	–	–	–	–	°C
Exit diameter	0.5	0.5	–	–	–	–	m
Exit velocity	24.1	24.1	–	–	–	–	m/s
Emission rate	1,420	1,420	–	–	–	–	OU·m³/s
Odour concentration	300	300	–	–	–	–	OU
Modelling results							
Full receptor grid	3.25	1.98	0.43	4.64	2.46	1.39	OU
Sensitive receptors	2.06	1.21	0.23	2.72	1.47	0.85	OU
Frequency of Exceedance[1]	0.95%	0.24%	–	1.08%	0.49%	–	%

Note:

[1] Determined at worst-case sensitive receptor on an annual basis

Appendices

Appendix A
Stormwater Management Pond Storage Calculations

Appendix A1

MOECC Pond Storage Requirements
Facility Characteristics Report
Environmental Resource Recovery Centre
County Of Simcoe, Ontario

Data Needed for Calculations

Site Area	44944	m^2
Impervious	42696.8	m^2
Impervious	95%	%

Protection Level Wet Pond	***Storage Volume (m^3/ha) for Impervious Level 35%***	***55%***	***70%***	***85%***
Enhanced	140	190	225	250
Normal	90	110	130	150
Basic	60	75	85	95

Pond Size Requirement: Wet Pond

Protection Level	***Storage Volume (m^3) Requirement per ha***			***Storage Volume Requirement (m^3)***		
	Total	***Permanent Pool***	***Active Storage***	***Total***	***Permanent Pool***	***Active Storage***
Enhanced	**267**	**227**	**40**	**1199**	**1019**	**180**
Normal	163	123	40	734	554	180
Basic	102	62	40	457	277	180

Conclusion: The wet and dry volumes provided in the design meet MOECC enhanced pond storage requirements.

Appendix A2

Stormwater Management Pond Storage Volume Calculation
Facility Characteristics Report
Environmental Resource Recovery Centre
County of Simcoe, Ontario

Depth Interval =	0.10	m	
Permanent Pool Depth =	1.40	m	
Active Storage Depth =	1.7	m	
Top of Pond Depth =	3.1	m	
Forbay W =	50	m	
Forbay L =	125	m	
Settling Pond W =	50	m	
Settling Pond L =	25	m	
Infiltration Chamber W =	50	m	
Infiltration Chamber L =	20	m	
Side Slope (P.P) =	3	:1	H:V
Side Slope (elsewhere) =	5	:1	H:V
Total Length =	170.0		
Legth-to-Width Ratio =	3.4	:1	L:W

Total Runoff Volume (by storm event):

Runoff C = 0.95

Catchment Area= 44,944 m2

Storm Event	Rainfall Amount (mm)	Runoff Volume (m3)
25mm	25	1067
5-year	72.2	3083
25-year	99.5	4248
100-year	122.8	5243

Protection Level	*Storage Volume Requirement (m^3)* Total	Wet	Dry
Enhanced	1,199	1,019	180
Normal	734	554	180
Basic	457	277	180

Fire Water Storage

Sediment Depth (m):	0.30
Ice Zone Depth (m):	0.50
Fire Storage (m3):	750

Depth Interval	Elevation (m)	Forebay Area (m^2)	Settling Pond Area (m^2)	Infiltration Area (m^2)	Area (m^2)	Depth (m)	Total Storage (m^3)	Fire Storage (m^3)	Live Storage (m^3)
0	0.00					0.00	0	0	
1	0.10	1370	219	380	1589	0.10	79		
2	0.20	1410	240	380	1650	0.20	241		
3	0.30	1451	261	380	1712	0.30	409		
4	0.40	1492	284	380	1775	0.40	584	174	
5	0.50	1533	306	380	1840	0.50	765	355	
6	0.60	1575	330	380	1905	0.60	952	542	
7	0.70	1617	354	380	1971	0.70	1146	736	
8	0.80	1660	379	380	2039	0.80	1346	937	
9	0.90	1703	405	380	2108	0.90	1553		
10	1.00	1746	431	380	2177	1.00	1768		
11	1.10	1789	459	380	2248	1.10	1989		
12	1.20	1833	487	380	2320	1.20	2217		
13	1.30	1878	515	380	2393	1.30			
14	1.40	1922	545	380	2467	1.40			
15	1.50	1989	578	408	2975	1.50			272
16	1.60	2056	613	438	3106	1.60			576
17	1.70	2124	648	468	3240	1.70			893
18	1.80	2192	685	500	3376	1.80			1224
19	1.90	2261	722	532	3515	1.90			1569
20	2.00	2330	761	566	3656	2.00			1927
21	2.10	2400	800	600	3800	2.10			2300
22	2.20	2470	841	636	3946	2.20			2688
23	2.30	2541	882	672	4095	2.30			3090
24	2.40	2612	925	710	4246	2.40			3507
25	2.50	2684	968	748	4400	2.50			3939
26	2.60	2756	1013	788	4556	2.60			4387
27	2.70	2829	1058	828	4715	2.70			4850
28	2.80	2902	1105	870	4876	2.80			5330
29	2.90	2976	1152	912	5040	2.90			5826
30	3.00	3050	1201	956	5206	3.00			6338
31	3.10	3125	1250	1000	5375	3.10			6867

Notes:
1. Volume for an interval calculated by Average End Area Method.
2. Assumptions
   A. The forbay is a triangle
   B. The pond (not including the forbay) is a rectangle.
   C. There are no rounded edges.
3. Please check MOE guidelines for pond design.
4. If zeros or negative numbers show up, the pond cannot be any deeper. Increase size of pond
5. Please check to make sure all the calculations are working correctly and the correct numbers are being produced.

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