Miller Waste Systems Inc.
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Project Description Report

Zooshare Anaerobic Digester Project

Prepared by Riepma Consultants, August 2013

Revised by Miller Waste Systems Inc., September 2018

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1.0 Introduction

1.1 Purpose

The purpose of this draft Project Description Report is to outline the proposed digester project to be located at the Toronto Zoo as required in the Renewable Energy Approval process.

1.2 Approvals Required

The Project has received a FIT contract (F-003038-BIG-211-203). The project has met their COD deadline and has successfully connected to the grid as of July 18 2018. A City of Toronto Building permit has been issued for a limited scope of the project (Phase 1) consisting of the power transformer, CHP container and foundation, and control room and foundation. Permit number: 18143714 BLD 00 NB. Building permit applications are currently being prepared for the remaining scope of construction (Phase 2, balance of the anaerobic digestion facility). As part of the city of Toronto permit application process, the Toronto Region Conservation Authority is being consulted their approval is required before issuance of the final permit.

1.3 Federal Approvals

No federal government approvals are required.

1.4 Water Taking

No water taking is required for this project.

1.5 Project Location

The location of the proposed 500kW biogas plant is shown on the drawing in Appendix 1. The land required is currently part of the Zoo's composting operation and will occupy an area of approximately 5,000 m^2 (or 1.3 acres) of the site. The digester will replace the zoo's current composting operation. It is located on the east side of Meadowvale Road, south of the access road to the former Beare Road land fill site and is described as Lot 4, Concession 3, Scarborough.

The point of common coupling for the grid connection is located at the northeast corner of Meadowvale Road and the Beare landfill access road, approximately 200 meters north of the project site. (GPS coordinates: 43o49'06.16"N, 79o10'23.76"W). Underground conduits were dug and encased in concrete from the new digester, along the existing access road to the connection point.

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1.6 Property Ownership

The property on which the Biogas plant is to be constructed is owned by the Toronto Region Conservation Authority (TRCA) and is leased to the City of Toronto for the purpose of operating a Zoo. The Zoo Board has agreed to enter into a ground lease with the Zoo Biogas Co-op for the facility. TRCA has approved the construction of the plant on the site and will be reviewing the project design before final construction permits are issued. The City of Toronto has also confirmed their approval of the project.

1.7 Project Ownership

On completion the Biogas plant will be owned by a community owned co-operative organization called ZooShare Biogas Cooperative Inc.

2.0 Project Description

2.1 Site Description

The site is located on an isolated peninsula of land located between wooded slopes down to Meadowvale Road on the west, the existing composting operation and a hydro corridor in the valley to the south and the Rouge River valley to the east. See also the air photo located in Appendix 1. To the north is a vacant field used for overflow parking and further north are additional parking lots associated with the zoo.

The site of the Biogas plant is located on the lands currently used for the Zoo's composting operation. It is flat and devoid of vegetation cover and has been modified to accommodate the composting operation. The site is surrounded by a 2 meter high berm that was constructed as part of the compost operation. The area slopes slightly to the south and is over 200 meters from the water's edge of the Little Rouge River.

2.2 Surrounding Land Uses

The nearest structure is a restored brick farmhouse (Pearce House) located some 230m to the north east and is used as the Rouge Valley Conservation Centre. The nearest residential area is located 750 meters to the south west on the opposite side of Meadowvale Road. The nearest home is located 420 meters to the southwest. Appendix 1 demonstrates the land use within 300m of the site. Lands immediately to the north of the site have been graded and are used for overflow parking for the Zoo.

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2.3 Land Use History

Discussions with Zoo and TRCA staff indicate that the composting operation to the south of the site commenced in the late 1980's. Prior to that time the land was vacant and historically had been used for agricultural purposes.

2.4 Anaerobic Digestion

As organic materials decompose in an anaerobic (non-oxygen) environment, they produce a gas called biogas. Biogas is composed of between 55% to 65% methane (CH_4), with the remainder being carbon dioxide (CO_2) and traces of other gases. Biogas is flammable and can be used to run a combined heat and power (CHP) engine to produce renewable electricity and heat.

2.5 Project Description

The biogas plant to be built at the Toronto Zoo site consists of one 16m diameter concrete digester vessel, one 36m diameter concrete digestate storage vessel, one CHP engine container, one control building, on manure storage shed, and one pasteurization building, as well as two in-ground receiving pits.

2.6 Site Design

The design of the site is shown in Appendix 2. The major components of the biogas plant include:

- 1 control room with electrical switchgear, metering panels, and control panels. Also includes a small standby backup generator with automatic transfer switch.
- 1 sealed concrete digester with concrete roof
- 1 sealed concrete digestate storage vessel with double membrane gas holder roof.
- 2 in-ground input tanks
- Pasteurization system including a tube-in-tube heat exchanger and 3 sealed stainless steel holding tanks.
- Automatic flare
- 1 solid zoo manure storage shed with roll-up door and roof
- Underground PVC conduit (encased in concrete) high voltage line to Toronto Hydro's Grid.

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2.7 Input Materials

The total amount of Biomass approved to be accepted at the Facility will not exceed 17,000 tonnes per year.

2.7.1 Solids

Solid material will be approximately 2,000 tonnes of manure provided by the Zoo annually from their current operations. This manure is currently composted on the site.

2.7.2 Liquids

12,000 tonnes of liquid, pre-processed organic slurry will be provided by grocery stores and other sources in (such as industrial, commercial, and institutional (IC&I) facilities in the area). Furthermore, an additional 2,000 tonnes per year of Fats, Oils and Greases (FOG) may be accepted at the facility.

2.7.3 Roof Water Collection

The building is designed to collect much of the roof water. While this water is not generally used in the process, it is used for general cleanup and for washing down equipment.

2.8 Engine Design

2.8.1 Engine

The CHP will export 500kW to the grid. The CHP was supplied by Total Power and features a Jenbacher engine. A small (60kW) diesel/natural gas/propane powered genset with an Automatic Transfer Switch is also included in the building. This engine operates as a backup should access to the grid not be available. This engine will keep the essential pumps, sensors, flare and control system powered in the event of a power outage.

2.8.2 Heat Recovery

The engine will produce approximately 500kW of thermal energy in addition to the electrical energy produced. In order to utilize the heat produced, the engine will be equipped with a heat recovery system. The receiving pits, pasteurizer and digester will require approximately 200 kW of heat to maintain optimal temperature. Additional heat will be used to heat other parts of the facility.

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2.8.3 Control System

The digester system is electronically controlled. The control room has desk space for a computer that controls and records all aspects of the operation of the system. The system is also capable of being remotely controlled over the internet or by smart phone.

2.8.4 Switchgear

The control room also contains the electrical switchgear and metering equipment for power generation.

2.9 Pasteurization

2.9.1 Pasteurization System

Material requiring pasteurization will be heated to 70°C and held at that temperature for one hour. The pasteurizer consists of a tube-in-tube heat exchanger to heat the material and 3 holding tanks to hold and maintain a temperature of 70°C in the material for one hour. From the buffer tank the material will be pumped into the digester on a pre-programmed schedule.

2.10 Input System

2.10.1 Solids

Zoo staff will deliver solid manure approximately three times per week by truck to the site. The manure will be dumped into the covered manure shed. From there it will be fed slowly into the receiving pits where it will be chopped and mixed with liquid food waste.

2.10.2 Liquid

Liquid materials will be received in the in-ground receiving tanks. This tank will be heated and equipped with a chopper pump and/or mixer. The tank has a large opening to allow a variety of materials to be delivered. The lid can be sealed when not in use and vented air will be directed to an activated carbon filter.

2.11 Design

2.11.1 Structure

The digester is constructed of reinforced concrete and has a concrete roof. It is 16 meters in diameter and 10 meters tall. Total volume is 2,010 m^3; operating capacity is 1,900 m^3. Design retention time is 41 days. It is insulated and metal clad and the floor is roughly 2 m below finished grade. Interior exposed concrete in the headspace is sealed with a gas-tight, cast in place membrane (or a spray-applied coating)

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to prevent corrosion. Structural drawings have been designed and stamped by a Professional Engineer and regular inspections during construction are required.

2.11.2 Foundation drainage

Foundation design is by the structural engineer based on the geotechnical report. All in-ground vessels are provided with a foundation drainage system that is connected to a pump in a shallow well. This permits the well to be examined daily to determine if any leaks are occurring.

2.11.3 Heating

Hot water heat lines are embedded in the walls and floors of the digester. Mixing valves and a computer controlled pump system controls the temperature of the vessel. Temperature control is critical to ensure a productive and healthy biology in the digester.

2.11.4 Roof

The digester will have a reinforced concrete roof where agitators and other equipment are mounted. The interior surface of the roof and walls are sealed with a gas-tight membrane to protect the concrete from corrosion.

2.11.5 Over/under pressure relief

The digester will be equipped with an over/under pressure relief valve in the event of a malfunction as per TSSA requirements.

2.11.6 Sulfur Removal

Hydrogen Sulphide (H_2S) in the biogas is controlled by the continuous addition of ferric chloride to the digester. This system can reliably maintain H_2S levels in the digester to below 100 ppm.

2.12 Storage

The digestate storage vessel is a 36 m diameter, 8 m tall circular reinforced concrete tank. The tank will have a dual membrane gas storage membrane to store biogas from the digester. The tank is equipped with piping for filling and emptying and mixers for agitation. Digestate storage volume is sufficient for approximately 180 days before it is field applied.

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2.13 Flare

The flare is designed with a blower, flame arrester and an automatic start with the capacity to burn 150% (400 cubic meters per hour) of the biogas expected from the plant. The flare is used only when the engine is down and the gas storage is full.

2.15 Transformer

The transformer used in this application will be a 500KVA dry type transformer with no oil and therefore requiring no secondary containment.

2.16 Outputs

2.16.1 Liquid

The liquid digestate is a low-odour, nutrient rich fertilizer. It will be field-applied at local farms. Several members of the Reesor family operate farms in the area and have indicated their interest in receiving the liquid material. They operate in excess of 1,000 acres of cash crops, which is more than sufficient to handle the annual digestate output from the biogas plant.

2.16.3 Electrical Grid Connection

The location of the point of common coupling is at the northeast corner of Meadowvale Road and the Beare road landfill access road. The underground line will be constructed along the existing access road to the compost site.

2.16.4 Biogas

The biogas is used to fuel the CHP engine. Between the digester and the engine, the gas flows through an in-ground cooling field. This field functions to cool the gas and remove the moisture in the gas. Should the cooling field be insufficient to cool the gas, a pad-mounted fan-cooler will be used to cool the gas (by cycling a cold water-glycol mix). The moisture that is removed is collected in a condensate pit and pumped into the receiving tanks for recycling into the digester.

2.16.5 Heat

The engine produces approximately 500kW of thermal energy. Approximately 200 kW is needed to heat the digester and pasteurizer system. The remainder of the heat is available for use to heat parts of the facility or for external users. The Zoo is considering the construction of a greenhouse immediately

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adjacent to the digester site. Surplus heat from the engine can be used to offset natural gas required to heat the greenhouse.

3.0 Construction

3.1 Timing

Construction of the project is scheduled to commence in summer 2018 and be completed in the summer of 2019. Start up and commissioning will require an additional two months and full power is expected shortly after that.

3.2 Excavation

The first construction activity on site will be the excavation for building footings and the vessels. No stripping, clearing or grubbing is required because the site is clear and the topsoil has been removed as part of the composting area construction. Excavated material is not expected to be transported off site. All materials will be stored and used as part of the final grading.

3.3 Construction

3.3.1 Building

Construction of the control building and CHP foundation will commence first. The intent is to complete the control room so that it can be used as the construction office.

3.3.2 Vessels

The concrete for the vessels will be poured after the control room is completed. The digester will then be completed with its mixers, insulation and cladding. Electrical and piping work will be completed in the next step and the interior equipment in the building will be completed last.

3.3.3 Electrical Grid Connection

The electrical grid connection will be constructed as soon as the CHP foundation and control room is completed.

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3.4 Completion

Final grading, cleanup, topsoil and seeding will happen after construction of all structures. Disturbed soil left for extended periods of time during construction will be covered with suitable silt-control measures to prevent excessive erosion and silt runoff.

3.5 Start Up and Commissioning

All biogas plant components will be tested to ensure that they work according to specification. The digester will be filled with liquid dairy manure or digestate and heated with a portable boiler over a period of time, to start the biological process. Slowly, solid zoo manure and food waste will be added until full biogas production is achieved. Unsuitable gas will be flared until it meets engine specifications. When the gas quantity and quality is suitable, the engine will be started and commissioned.

4.0 Facility Operation

4.1 Input materials

4.1.1 Solids

The solid manure (13.6 cubic meters per day) used in the digester will arrive via zoo truck and will be dumped into the manure storage building. From there it will be slowly added to the liquid receiving tanks to ensure a suitable feed mixture for the digester.

4.1.2 Liquids

Liquid food waste will be received via tanker truck in one the two receiving tanks. Liquid manure, used to start the digester, will also be received in a receiving tank. From there it is pumped into the pasteurizer system and then into the digester.

4.1.3 Pasteurization

Incoming materials requiring pasteurization will be pumped into the pasteurizer and held at 70 degrees C for 1 hour. The system is currently designed for all material to pass through the pasteurization system.

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4.2 Output materials

4.2.1 Solids

As the digestate continuously leaves the digester it passes through a solids separator unit (screw press). The solid fraction is separated out and piled on a concrete slab or into a roll off box.

4.2.2 Liquids

After separation, the liquid fraction is stored in the digestate storage vessels. Twice per year (in the spring and fall) the vessels will be emptied and the material delivered to local farmers (or the Zoo) for field application. Liquid digestate is a desirable organic substitute for fertilizer. Its nutrient value is dependent on the input materials.

4.3 Hazardous materials

4.3.1 Disposal

No hazardous materials are used or produced in the digestion process. Engine oil and filters are changed regularly and will be disposed of in accordance with applicable requirements.

4.4 Groundwater Monitoring

4.4.1 Groundwater

All in-ground tanks are equipped with foundation drains. These drains are connected to monitoring wells which are inspected daily. Should a leak occur in a vessel, it will be readily apparent in the monitoring well. In that event, the vessel can be emptied and the monitoring well pumped out to ensure that groundwater is not affected.

4.5 Air Emissions

4.5.1 Digester

The digester gas membrane will have a porosity of less than 500cm3/m2/day/bar. As the nearest odour receptor is over 125 meters to the north, the requirements of Regulation 359/09 are satisfied.

4.5.2 Engine

Engine emissions are provided by the engine manufacturer. Emissions and dispersion modeling will conform to applicable provincial standards.

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4.5.3 Flare

The operation of the flare will only occur when the engine is down and the gas storage is full. The flare will also be designed to conform to provincial standards. The location of the flare exceeds the setback distances required in regulation 359/09.

4.5.4 Input materials

Solid input materials on the site will be dumped directly into manure storage shed before being slowly mixed with liquid food waste in the receiving tanks. No manure will be stored on site in the open. Any odour generated will be considerably less than that currently occurring as a result of the existing composting operation. There are no sensitive receptors in the vicinity. Liquid inputs are delivered on site by truck and received in the input tanks. These tanks are sealed when not in use to prevent odour emissions and displaced air will be filtered through an activated carbon filter.

4.5.5 Output materials

The output materials are generally odour free. As the nearest receptor (office) is over 230 meters to the north and the nearest residence is 430 meters to the southwest, odour concerns are unlikely. Any odour generated will likely be considerably less than is currently generated by the compost operation.

4.6 Noise

4.6.1 Engine

The CHP has been designed to meet the noise emission levels described in the Acoustic Assessment Report. It is equipped with an exhaust stack silencer capable of meeting the require noise reductions. The engine room, heat dump radiators and exhaust stacks will be designed to meet provincial standards.

4.6.2 Operations

The only noise generated by the operation of the biogas plant is produced by the small motors, pumps, and pneumatic valves.

4.7 Traffic

4.7.1 Truck Movement

Solid zoo manure (on average approximately 14 cubic meters per day) will be delivered by truck 2 or 3 times per week. Liquid inputs (45 cubic meters per day) will be delivered by truck once or twice per day.

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In the spring and fall the digestate storage vessels will be emptied. This will result in approximately 185 truck trips each time the vessels are emptied. It is expected that the work would occur over a six to eight week period resulting in an average of 3 or 4 truck trips per day. As access is directly to the former Beare Road landfill site access road and Meadowvale Road, the volume of truck traffic can easily be accommodated and will not impact the surrounding uses.

5.0 Environmental Effects

5.1 Manure Treatment

Currently the Zoo's manure is composted. Anaerobic Digestion will result in a liquid digestate that is superior in nutrient quality and desirable for field application. This reduces the need for chemical fertilizers in agricultural operations.

5.2 Methane Destruction

The other waste materials are currently shipped to landfill or out of province for disposal. Both result in the use of fossil fuels and the creation of leachates and greenhouse gases. Anaerobic digestion replaces fossil fuels used in electricity and heat production while consuming methane (CH_4, that would be emitted from food waste sent to landfill) which has a global warming potential 25 times greater than CO_2.

5.3 Landfill Diversion

Currently many organics are sent to landfill. Anaerobic digestion offers a productive alternative use for these waste resources.

5.4 Weed Seed Destruction

All weed seeds in the manure are destroyed as a result of the heat used in Anaerobic Digestion. This reduces the amount of herbicides required by the agricultural industry to control weeds.

5.5 Pathogen Destruction

Almost all pathogens, particularly E. Coli, are destroyed by the heat in the pasteurizer. As a result, the potential for ground water contamination is reduced.

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5.6 Surface Water

The composting site is completely surrounded by an earthen berm which will be maintained. Existing grades will be maintained to the extent possible. As all input materials will be in sealed tanks, no impact on surface water quality is anticipated. All areas of the site that were disturbed during construction will be top soiled and seeded. The existing man made shallow pond in the northeast corner of the site will not be affected by construction or operations. Surface water management features includes grassed swales on the reclaimed portions of the site to increase infiltration of stormwater compared to existing conditions. Also, a portion on the south end of the site has been reserved for native tree planting which will also improve the surface water management of the site.

5.7 Ground Water

The Zoo had drilled one borehole within the construction area previously. In August 2011 four test pits were excavated to examine local soil conditions. Throughout the construction area the materials are relatively consistent. The top 1 to 2.5 feet is a layer of imported gravel that is dense and compacted. From 2.5 feet to 3 feet below the surface is a layer of topsoil. Below 3 feet is a silty-sand with some stones, representative of a former shoreline feature. The material at this elevation is looser than the material above. In only one test hole was groundwater encountered in a small gravel vein at a depth of 5 feet. This is considered a localized condition.

All in-ground vessels are equipped with foundation drains and monitoring wells. This ensures that any potential ground water contamination can be detected. There are no domestic wells in the vicinity that could be impacted. The construction and operation of the biogas facility is not expected to have any impact on the ground water environment.

5.8 Air Emissions

Air emissions, including noise and other emissions from the engine and flare, will conform to current Ontario regulations. Separate odour and ESDM reports have been provided for MOE approval. Odour and noise emissions will be controlled in the design of the project to minimize any potential negative environmental effects from air emissions.

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6.0 Cultural Heritage Assessment

6.1 Assessment

Part of the site has been filled and the area is heavily impacted by the current composting operation. As a result, there is a low probability of locating archeological materials on the site. Should materials be found as construction proceeds, work will cease and the appropriate experts will be retained to undertake retrieval operations. The archeological study prepared for the site concludes that no further assessment is required.

6.2 Heritage Resources

Heritage Toronto and the Ministry of Culture and Tourism have confirmed that there are no cultural or archeological heritage resources in the vicinity that would be affected by the project.

7.0 Natural Heritage

7.1 Existing Site Conditions

The site is heavily impacted by the existing parking lots and the composting operation. It is also well removed from the top of the valley slopes. No trees will be removed (save for those trees identified in the Tree Preservation Report prepared by Branching Out Forestry Consulting, 2016), and changes to existing grade will be minimal. The site is not suitable as a wildlife habitat as a result of current human activity. A Species At Risk (SARA) review has concluded that there is no suitable habitat for endangered mammals or birds at the site or in the immediate vicinity of the project. MNR has confirmed this assessment.

7.2 Impact

There are no water bodies, watercourses, wetlands, woodlots, slopes or other significant natural features in the vicinity of the project structures. The new facility will take up less footprint than the existing composting operation. As a result no impact on Natural Heritage resources is likely.

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8.0 Ground and Surface Water Regimes

8.1 Ground Water

Initial boreholes conducted by the Zoo suggest that the water table is approximately 1 meter below grade at this location. This is considered to be a localized perched condition and additional testing is required to confirm site soil and groundwater conditions. Construction will be undertaken so that there will be no impact of the ground water regime.

All in-ground vessels are equipped with foundation drains and monitoring wells. This ensures that any potential ground water contamination can be detected. There are no domestic wells in the vicinity that could be impacted.

8.2 Surface Water

There are no creeks or watercourses in the vicinity of the proposed structures. Existing grades will be maintained to the extent possible. As all input materials will be in sealed tanks, no impact on surface water quality is anticipated.

The site's final grading will incorporate silt control features, grassed swales, and new trees. The stormwater management design was prepared by a Professional Engineer to achieve meet applicable surface water quality parameters.

All areas of the site that were disturbed during construction will be topsoiled and seeded and perimeter siltation fencing will be installed prior to construction.

9.0 Land Use Considerations

9.1 Land Use Policy

9.1.1 Provincial Policy

9.1.1.1 Provincial Policy Statement 2005

The Provincial Policy Statement in Sections 1.7 and 1.8 supports the provision of renewable energy systems and alternative energy systems in both settlement and rural areas. The statement indicates that long term economic prosperity and improved air quality is supported by these uses.

9.1.1.2 Greenbelt Plan

The subject lands are designated as Protected Countryside in the Greenbelt Plan. They are not part of the Natural Heritage designation in this area. The Greenbelt Plan includes renewable energy systems within the definition of infrastructure. New infrastructure is permitted throughout the Protected Countryside and within Natural Heritage Areas provided impacts on the natural environment are minimized.

9.1.2 Municipal Official Plan

The City of Toronto Official Plan designates the general area as Parks and Open Space. Utilities, the zoo and its accessory uses are permitted uses in the designation. A change to the Official Plan is not required to permit the Biogas project to proceed.

9.1.3 Municipal Zoning

The subject property is zoned I-ZG in the City of Toronto Bylaw 218-2008. Renewable Energy projects are specifically permitted in all zones. The City has confirmed that the anaerobic digester project is permitted pursuant to the bylaw.

9.1.4 Conservation Authority

The Toronto and Region Conservation Authority will review the facility design and is required to issue an approval before a City of Toronto building permit will be issued.

9.2 Surrounding Land Uses

The only nearby structure is an office use that is some 230 meters north distant from the proposed digester. The nearest residential neighbour is 320 meters to the south west on the other side of Meadowvale Road which is a major 4 lane roadway. The system is designed to meet all provincial standards with respect to emissions, noise, setbacks and odour. As well, truck traffic for the operation of the site is minimal and well within the capacity of the roadway and does not impact any neighbouring uses. Consequently negative impacts on surrounding land uses are not likely.

9.3 Setbacks

Pursuant to Regulation 359-09, a separation distance to the nearest odour receptor of 250 meters is required. Alternatively this distance may be reduced to 125 meters if the membrane porosity required is maintained. As the total volume of liquid storage is 6,500 cubic meters, regulation 359/90 requires a setback of 230m for the storage vessels.

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The digester is located approximately 250m from the nearest odour receptor (Pearce House) and meets the membrane porosity standard. All of the storage vessels and the bunker also exceed the minimum 230 meter setback requirement from Pearce House.

10.0 Public Health and Safety

10.1 Explosion Control

The explosive range for methane is between 5% and 15 %. Concentrations of methane in the biogas plant are between 55% and 65% which is well beyond the explosive limits. As a result there is very little potential for explosion. Notwithstanding this, all equipment within the explosion zones is required to be explosion proof. Also, all piping with the potential to contain biogas shall only be opened after and approved venting procedure to ensure that no explosive biogas mixture is present.

10.2 Emissions

Emissions from the engine will meet provincial standards. Noise standards will also be met in the design of the engine building.

10.3 Fire

Methane is a non-toxic, flammable gas. However the gas storage membrane can only store approximately 10,000 cubic meters of biogas. The digester is designed to produce only 260 cubic meters per hour which would not be enough to support sustained combustion.

11.0 Decommissioning

11.1 Plant Removal

The concrete components of the biogas plant have a life expectancy exceeding 50 years. As a result decommissioning of the plant is not likely in the near term. Should decommissioning be required, the equipment can be removed and reused or scrapped and the building and structures can be demolished. Concrete and steel can be recycled, and the site re-graded and restored to its current condition.

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12.0 Appendices

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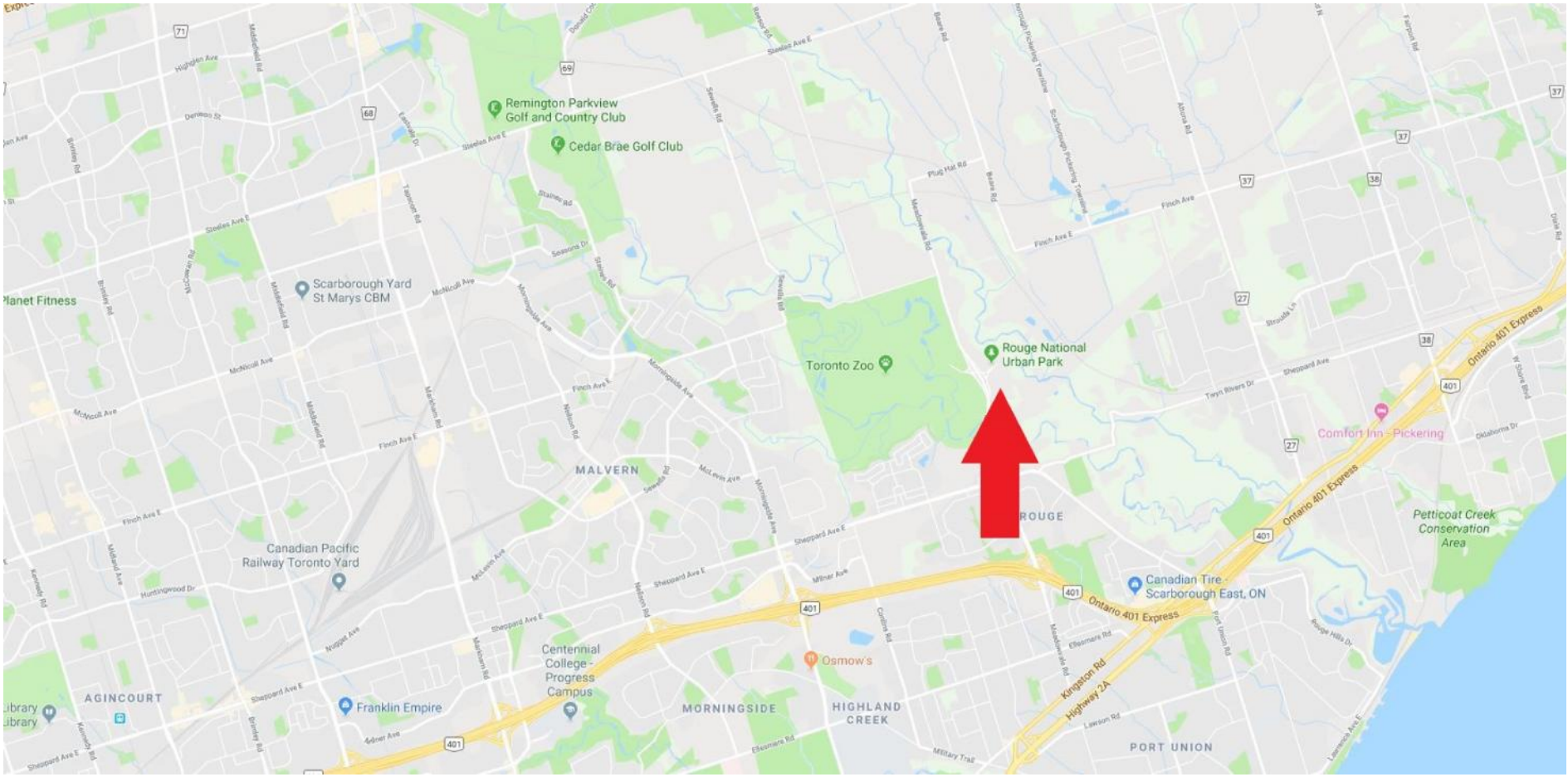
12.1 Project Location Map

The project is located on the east side of Meadowvale road in Scarborough, across from the Toronto Zoo.



A close-up of the project location is shown below. The site is currently used as a composting facility for the Toronto Zoo animal manure and bedding.

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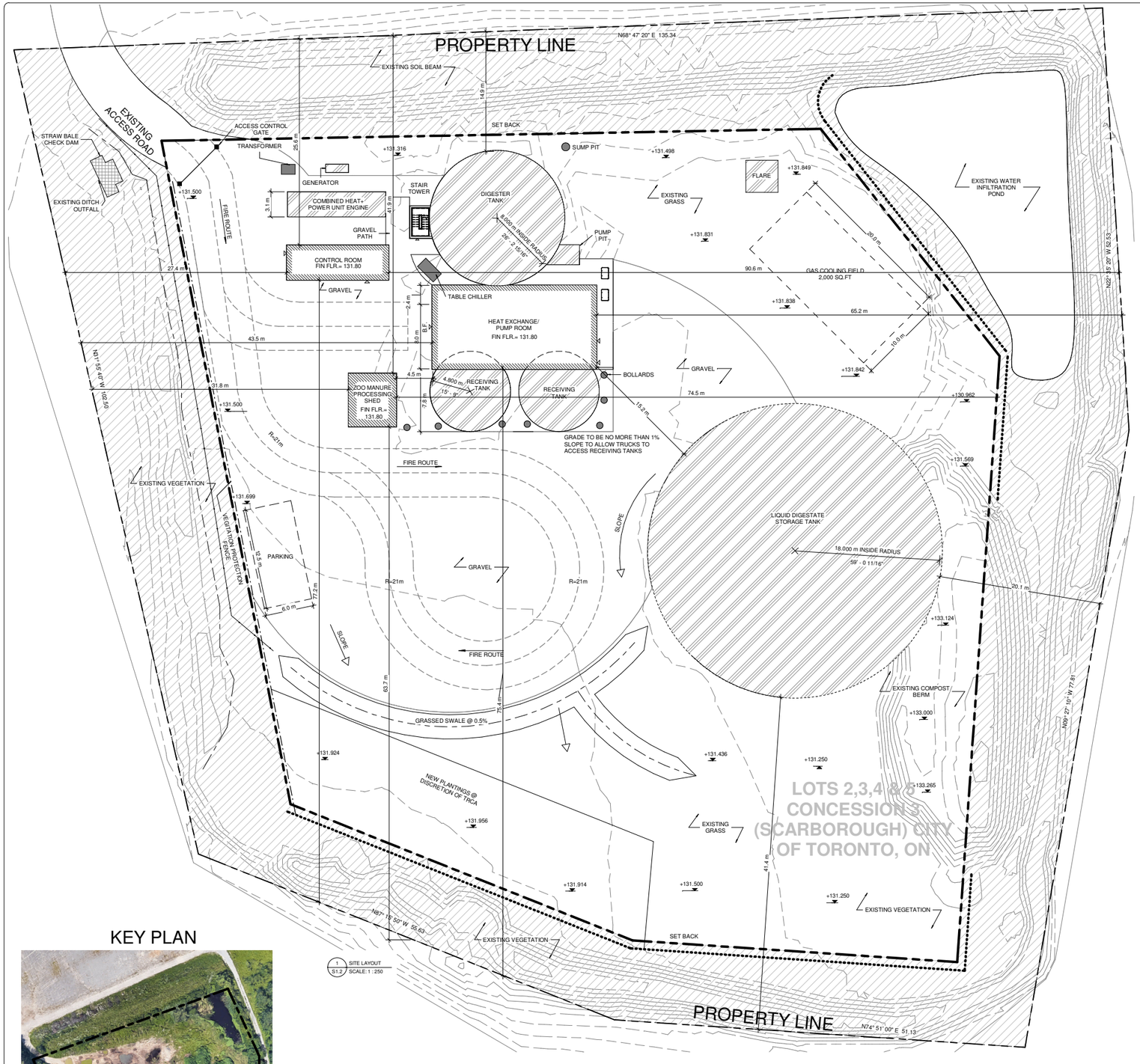
12.2 Site plan



1 SITE LAYOUT
S1.2 SCALE: 1 : 250

KEY PLAN

SITE LEGEND

- DECIDUOUS TREE
- CONIFEROUS TREE
- UNIVERSAL PARKING SPACE
- PARKING SPACE TAG
- FIRE ROUTE SIGN LOCATION
- DRY HYDRANT
- REQUIRED EXIT DOOR
- UNOBSTRUCTED FIRE FIGHTER ACCESS DOOR/WINDOW OR PANEL (B.F. DENOTES BARRIER FREE)
- PROPERTY LINE
- FIRE TRUCK ROUTE
- SILTATION FENCE
- OVERHEAD HYDRO LINE
- SITE LIGHTING
- WALL LIGHT PACK (TYP)
- PROTECTED VEGETATION
- COMPOST AREA
- REMOVED FILL HOLDING AREA
- DIGESTER TANK/RECIEVING PIT/ STORAGE TANK/ STRUCTURE
- BUILDING
- PROPERTY LINE
- EXISTING DITCH
- WORKSITE BOUNDARY
- EROSION CONTROL FENCE

SITE NOTES

NOTE:
FIRE ROUTE ACCESS REQUIRES FIRE PERSONNEL ACCESS AS REQUIRED BY OBC.

FIRE ROUTE TO BE POSTED AND DESIGNATED UNDER MUNICIPAL BYLAW DESIGN REQUIREMENTS AS FOLLOWS:
• MIN. 6m WIDE, 12m CENTRELINE TURNING RADIUS AND MAX. 8% SLOPE

FIRE ROUTE SIGNS ARE TO BE PLACED AT INTERVALS OF NOT LESS THAN 15.2m (50') AND NOT MORE THAN 45.7m (150') ALONG THE DESIGNATED FIRE ROUTE, AND AT A HEIGHT OF NOT LESS THAN 1.8m (6') - ALL SIGNS MUST BE STANDARD CITY OF TORONTO FIRE ROUTE SIGNS.

GARBAGE / RECYCLING STORAGE MAY BE INCLUDED IN THE BUILDING DESIGN.

ANY SITE FENCING TO BE CONFIRMED WITH OWNER PRIOR TO CONSTRUCTION.

YARD LIGHTING LOCATION AND ORIENTATION TO BE INSTALLED TO PROVIDE DOWNWARD LIGHTING, AND LIGHTING TO BE ON ONLY WHEN WORKERS ARE PRESENT

ANY AREA LABLED EXISTING GRASS THAT ARE DAMAGED DURING CONSTRUCTION SHALL BE RESEEDED WITH A MIX OF OATS PERENIAL RYE AND NATIVE GRASSES.

ZONING:
OPEN ZONE: OR ZONING

ZONING BY-LAW INFORMATION TABLE

	PROPOSED	ZONING BY-LAW
LOT AREA	14467.1 m²	MIN. 3700 m²
LOT FRONTAGE	133.9m	MIN. 40.0m
SETBACK	57.5m	MIN. 20.0m
FRONT YARD DEPTH	25.6m	MIN. 15.0m
INT. SIDE YARD WIDTH	35.0m	MIN. 5.0m
EXT. SIDE YARD WIDTH	15.0m (EXIST.)	MIN. 15.0m
REAR YARD DEPTH	42.5m	MIN. 12.0m
LOT DEPTH	123.9m	MIN. 50.0m
LOT COVERAGE	12%	N/A
GROSS FLOOR AREA	310 m²	N/A
HEAT EXCHANGE / PUMP RM FLOOR AREA	200 m²	N/A
BUILDING HEIGHT	12.3 m	MAX. 15.0m
NUMBER OF PARKING SPACES	4	
BARRIER FREE SPACES	1	
NUMBER OF LOADING SPACES	3	MIN. 2 (3.5m x 9.0m x 4.0m H)
LANDSCAPED AREA	30%	MIN 10%

PARKING:
**REFER TO TABLE 200.5.10.1.OF THE ZONING BYLAW*
WAREHOUSE PARKING = 1 PER 28 SQ. M. = 46 / 28 = 1.6 =2
BUILDINGS WILL NOT BE OCUPPIED ON A REGULAR OR ON GOING BASIS. WAREHOUSE PARKING HAS BEEN DEAMED AS CLOSEST PARKING TO INTENDED USE

TOTAL REQUIRED PARKING SPACES = 2 SPACES
TOTAL BARRIER FREE PARKING SPACES = 1

NOTES:

THIS DRAWING SET IS TO BE READ IN CONJUNCTION WITH SPECIFICATION PACKAGE

NO.	DATE:	DESCRIPTION:

LEGEND:
- SPOT ELEVATION
- D1 DOOR IDENTIFICATION TAG
- W1 WALL IDENTIFICATION TAG
- F1 FOOTING IDENTIFICATION TAG
- WN WINDOW IDENTIFICATION TAG
- C1 COLUMN IDENTIFICATION TAG

LEGAL DESCRIPTION:
PART OF LOTS 2,3,4 & 5 CONCESSION 3 (SCARBOROUGH) & PART OF THE ORIGINAL ROAD ALLOWANCES BETWEEN LOTS 2 & 3 AND LOTS 4&5, CONCESSION 3 (SCARBOROUGH) CITY OF TORONTO, REGIONAL MUNICIPALITY OF METROPOLITAN TORONTO

PIN: 06054-0872 (LT)

REGISTERED EASEMENTS:
SUBJECT TO - SC568292, TB131457, TB141985, TB443326, TB982089 & TR29575

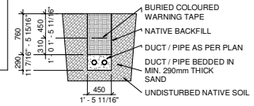
CURRENT OWNER: THE METROPOLITAN TORONTO & REGION CONSERVATION AUTHORITY

SITE SURVEY PROVIDED BY DOLLIVER SURVEYING INC.

NOTE THAT ANY AND ALL SERVICES ARE SHOWN IN APPROXIMATE POSITIONS ONLY AND ALL SERVICES INCLUDING BUT NOT LITED TO NATURAL GAS, BELL CANADA, HYDRO, SANITARY AND STORM SEWERS MUST BE LOCATED BY THE RESPECTIVE UTILITY PRIOR TO CONSTRUCTION OR EXCAVATION OF ANY KIND.

THE DEPTH AND SIZES OF BURIED SERVICES CANNOT BE GUARANTEED AND MUST BE EXCAVATED TO DETERMINE SIZES, LOCATIONS AND DEPTH.

NOTE: ALL CONCRETE APRONS AROUND BUILDING AND LOADING DOCKS TO BE FLUSH WITH GRAVEL LOT GRADES.



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STONECREST ENGINEERING
SHAKESPEARE, ONTARIO, CANADA
PH: (519)-625-8025
FX: (519)-625-8966

CONTRACTOR TO CHECK ALL DIMENSIONS AND ELEVATIONS AND REPORT ANY DISREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK

DO NOT SCALE THE DRAWINGS

CLIENT: TORONTO ZOO

LOCATION: LOTS 2,3,4 AND 5, CONCESSION 3 (SCARBOROUGH) CITY OF TORONTO, ONTARIO

PROJECT TYPE: ZOOSHARE BIOGAS - CONTROL ROOM

PROJECT STATUS AND VERSION: CONSTRUCTION DRAWINGS

DRAWN BY: PC.
PRINT DATE: APRIL 10, 2018
PAGE DESCRIPTION: SITE LAYOUT
SCALE: AS NOTED
FILE: 6039
PAGE NUMBER: S1.2