



Surface Water Assessment Report

Grimsby Anaerobic Digestion Site

Escarpment Renewables

January 25, 2022

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Executive summary

This Surface Water Assessment Report has been prepared in accordance with Table 1 of Ontario Regulation 359/09. A summary of where information is contained in this report as it relates to these requirements is provided below.

Table E.1 Ontario Regulation 359/09 Compliance Summary

Requirements	Location in Report
Set out a description of the following in respect of the renewable energy project:	
1. Plans, specifications and descriptions of the surface water features at the project location and any surface water features that will receive a direct discharge of sewage as part of engaging in the project.	Figure 2
2. An assessment of the suitability of the facility for the handling, storage and processing of biomass, source separated organics or farm material, taking into account, A. the design of the facility, including features that will be implemented to control the expected production of leachate, the flow of surface water and erosion and sedimentation resulting from the flow of surface water,	Section 3
B. the surface water features within 300 m of the location where biomass, source separated organics or farm material will be handled, stored or processed, any surface water features that will receive a direct discharge of sewage from the facility and the surface water features of the project location,	Section 2
C. the ability to identify any negative environmental effects of leachate production on the surface water by monitoring, and	Section 4
D. the feasibility of contingency plans that can be implemented to control the negative environmental effects on surface water resulting from the production of leachate in a quantity greater than expected or with a quality worse than expected.	Section 4

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1. Introduction

1.1 Purpose

This Surface Water Assessment Report has been prepared as a partial fulfillment of the Renewable Energy Approval (REA) requirements as set out in Ontario Regulations (O. Reg.) 359/09 and 521/10. The anaerobic digestion (AD) facility currently operates under REA No. 8541-9HSGG3, as amended. The project has received a Feed-In Tarrif (FIT) Contract No. F-000610-BIG-130-302.

1.2 Project Location

The project construction will occur on lands owned by Escarpment Renewables at 424 Sobie Road in the Town of Grimsby, Ontario (Site). The project will be located on the northwestern 5.4 hectares (ha) of a 10.5-ha property located on the south side of Sobie Road approximately 300 metres (m) east of Park Road South. The legal description of the property is part of Lots 1 and 2, Concession 6, Former Township of North Grimsby being Part 1 on Plan 30R-13677.

The Site location is shown on Figure 1.

1.3 The Project

The project will include expansion to the existing Site. The AD Facility processes source-separated organics (SSO) and industrial, commercial, institutional (ICI) organic materials. The AD facility is currently operating at a maximum of 23,000 tonnes per year of incoming organic waste and will be upgraded to accommodate a capacity of 159,000 tonnes per year. A new organics pre-processing building will be constructed with the necessary equipment to receive, temporarily store, and process solid organic material for digestion by removing inert contaminants such as plastic packaging. New digesters will be added to the existing AD facility and thereby a significant increase of biogas production is anticipated. Escarpment Renewables is proposing to build a new renewable natural gas (RNG) upgrading system on Site to produce RNG from the additional biogas generated. The RNG will be compressed and temporarily stored in tube trailers adjacent to the RNG upgrading system for off-Site transportation. The proposed Site expansion is shown on Figure 2 and 3.

2. Surface Water Features

The Site location, including nearby surface water features, is provided in Figure 1.

O. Reg. 359/09 requires determination if the project location is:

- In a water body
- Within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity
- Within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity
- Within 120 m of the average annual high water mark of a permanent or intermittent stream or
- Within 120 m of a seepage area

Through review of the Niagara Peninsula Conservation Authority (NPCA) online GIS mapping tools, the project is confirmed not to be within a water body or within the above setbacks from annual high water marks or within a seepage area. Appendix A provides a figure obtained from the NPCA GIS tool showing the approximate boundary of

the floodplain for the closest water body, Spring Creek, to the south. The boundary of the flood plain is more than 120 m south of the southern limit of the developed project area. The southern limit of development will not change as a result of the proposed expansion.

There is an unnamed drainage swale along the western property boundary that was assessed during the initial REA application. The assessment included field investigation and discussions with the NPCA and Ministry of Natural Resources and Forestry (MNRF). The NPCA confirmed the unnamed drainage swale is not a Type 2 Important Fish Habitat and both the NPCA and MNRF concurred with proposed mitigation measures for development up to approved setbacks from the unnamed drainage swale. These setbacks and mitigation measures are maintained as part of the proposed development. In fact, the proposed development removes the nearby outdoor waste storage bunkers and this area serves only for vehicle movement on Site. Mitigation measures that were previously proposed are reproduced in Section 4.

3. Project Impacts to Surface Water Features

3.1 Site Conditions

3.1.1 Soils

A hydrogeological assessment report is prepared under separate cover.

The surficial geology in the regional area is comprised of fine-textured glaciolacustrine deposits, consisting of silt and clay and minor sand and gravel (Ontario Geologic Survey, 2003¹). Boreholes drilled on the Site (by others) indicated the overburden material consisted of varved silty clay (Landtek, 2014²; Story Environmental, 2019³).

Bedrock of the Lockport Formation underlies the Site, consisting of shale, dolomitic limestone, and limestone. Drilling activities completed for previous studies encountered the top of bedrock at approximately 8.5 to 11.5 m below ground surface (mbgs), or at an elevation of approximately 179.7 to 181.9 m above mean sea level (AMSL).

The silty clay underlying the Site acts as an aquitard overlying the bedrock. The bedrock underlying the Site is part of a confined bedrock aquifer, which is regionally extensive. The bedrock aquifer is reported to be approximately 10 to 20 m thick and is commonly used for potable water supply in the area. Generally, regional flow within the bedrock aquifer is towards the Niagara Escarpment to the north – northeast of the Site. During previous investigations, the hydraulic gradient within the bedrock aquifer was relatively flat on Site, although appeared to flow towards the northeast (Story Environmental, 2019).

3.1.2 Topography and drainage

The Site includes a perimeter access road with the AD equipment contained in the interior. A perimeter swale conveys runoff from the access road to the existing east stormwater pond along the south of the Site. Runoff from southwest portions of the Site drains into the existing west stormwater pond. Discharge from the stormwater ponds is conveyed west to the existing unnamed drainage swale and then south toward Spring Creek approximately 500 m south. The unnamed drainage swale is dry most of the year. The original REA supporting documentation identifies that, while the Region of Niagara indicates that the swale is a Type 2 watercourse, subsequent field review by the NPCA confirmed that the swale is not a Type 2 feature.

¹ Surficial Geology of Southern Ontario, Ontario Geological Survey, 2003

² Hydrogeologic Investigation, 442 Sobie Road, Grimsby, Ontario, prepared for Grimsby Energy Inc, prepared by Landtek Limited, dated July 7, 2014

³ Groundwater Site Investigation – Grimsby Anaerobic Digester, prepared for Miller Waste Systems Inc., prepared by Story Environmental Inc., dated October 2019

3.2 Facility Design

Figure 2 shows the existing Site layout. The proposed Site layout for the project is depicted on Figure 3. The conceptual organics pre-processing building layout is shown in Figure 4.

The Site consists of an organics processing facility, which will be capable of receiving and processing up to 159,000 tonnes of organic waste per year by AD. The existing solids storage bunkers will be decommissioned. A new organics pre-processing building will be constructed with all the necessary equipment to receive, temporarily store, and process solid organic material for digestion. Liquid receiving tanks are located near the existing pump and pasteurization building and will continue to receive liquid organic material for processing. The AD facility, which is currently operational, will be expanded with additional digester tanks and additional pre-processing equipment. Digestate management currently consists of two storage tanks which will remain. Two additional digestate storage tanks will be constructed. The new above grade tanks will be located in a new secondary containment system designed in accordance with the Guidelines for Environmental Protection Measures at Chemical and Waste Storage Facilities. The secondary containment system provides capacity to collect and contain spills from the digestate storage tanks to prevent discharge to the environment.

The existing biogas management area consists of a combined heat and power (CHP) engine, flare, and biogas storage area. The Site will continue to utilize biogas in the existing CHP. The existing temporary biogas storage will be decommissioned in favour of storing biogas in double membrane roof systems on the new digestate storage tanks.

Biogas will also be upgraded to RNG for temporary storage on Site in tube trailers prior to transportation off Site. The existing administration buildings, which consist of an office and staff building will remain but be relocated. Air treatment will be managed by a new air treatment system, managing potentially odour-impacted air generated within the organics pre-processing building. There are also two stormwater management ponds located at the south end of the Site, which will be unchanged. The Site access consists of a gravel road which will be realigned to make space for additional tanks and equipment.

The REA requires stormwater management in the form of a sediment basin with a total capacity of 675 cubic metres (m³). The two existing ponds, includes a west pond and an east pond that are interconnected by a series of culverts between them. The east pond drains into the west pond. The estimated total volume of the two ponds is approximately 3,000 m³.

The ponds currently receive runoff from the perimeter ditch and the central area around the existing digesters, servicing the currently developed portion of the property (approximately 4.8 hectares). The discharge from the west pond is directed along a swale running to the southwest corner of the Site and discharging to existing drainage features consistent with the historical use of the property as an agricultural field.

A secondary containment system will be constructed for the new above-grade tanks, with a total area of approximately 0.8 ha. This area will contain stormwater, which will either be used in the AD process, or manually pumped to the head of the east stormwater management pond if not needed and deemed to not be impacted by Site operations. This pumping will be done during periods where the stormwater ponds have capacity to manage the volume of water to be pumped. Therefore, the total area that the stormwater ponds will be servicing post-expansion is approximately 4.6 ha, which is less than the current conditions (approximately 4.8 ha). Given the reduction in direct-flow service area and the fact that the existing ponds are larger than that required by the current REA, no changes are proposed to the stormwater management ponds.

Silt fencing is installed and will be maintained along the western property line a minimum 3 m from the edge of an existing drainage area to prevent migration of sediment during construction of the Site. The existing drainage is vegetated, and any vegetation removed as part of the construction will be restored following construction and prior to any silt fence being removed. The stormwater management ponds collect runoff from the Site and provide sedimentation. A silt sock exists in the effluent ditch from the existing stormwater management ponds to further protect the downstream receiving environment from potential sediment migration from the stormwater management ponds.

3.3 Suitability

The Site will receive feedstock in the form of bulk solid, non-hazardous organic waste and liquid organic waste. Liquid organic waste will be directly unloaded into the existing waste receiving tanks. All solid organic waste will be received within the new organics pre-processing building. All digestate will be stored in digestate storage tanks.

Therefore, no waste will be stored outdoors, exposed to the atmosphere. No leachate will be generated from digestate or incoming liquid waste as it is all stored within tanks. Minimal leachate, present within the solid waste that is received at the indoor tip floor, will be contained within the organics pre-processing building in floor trenches and sumps. This leachate will be collected and mixed with the rest of the organic waste prior to being fed to the digesters.

The existing REA allows for the storage of biomass in outdoor bunkers, which significantly increases the potential for generation of leachate. Therefore, the proposed expansion serves to reduce the potential for exposure of surface water to leachate.

As noted in Section 3.1, stormwater runoff from the Site is collected in the existing stormwater management ponds prior to discharge to the environment. This provides for a controlled release and a suitable location to monitor should the need arise. Furthermore, the stormwater management ponds provide for sedimentation of suspended solids prior to discharge and a silt sock is provided to mitigate any minor solids in the final effluent.

4. Potential Environmental Effects and Mitigation

The NPCA established mitigation requirements to limit potential impacts to the western unnamed drainage swale during the initial REA development, including:

- Silt fencing must be installed along the unnamed drainage swale
- A vegetation buffer strip that is left to naturalize must be left between the unnamed drainage swale and the area of the fill
- Fill to be placed up to where the existing field is now, which is approximately 3 to 4 m away from the unnamed drainage swale
- All works should be conducted during dry conditions. At no time shall muddy water be allowed to discharge from the site
- Sediment and erosion control measures should be implemented prior to work, and maintained during the work phase to prevent the discharge of sediment or debris into the water course
- All disturbed areas should be stabilized and revegetated as required upon completion of work and restored to a pre-disturbed state or better
- Sediment and erosion control measures should be left in place until all disturbed areas have been stabilized
- All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, debris, etc.) from entering the water course
- Any stockpiled materials should be stored and stabilized away from the water course
- Vehicle and equipment re-fuelling and maintenance should be conducted away from the water course
- Any equipment maintenance and refuelling operations shall be set back sufficiently to prevent spills from entering the watercourse
- Absolutely no fill materials of any kind generated from this project, or from another site (including but not limited to: fill, garbage, grass clippings, construction material/waste equipment, etc.) are to be placed or temporarily stored within the water course

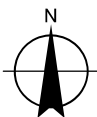
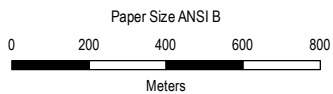
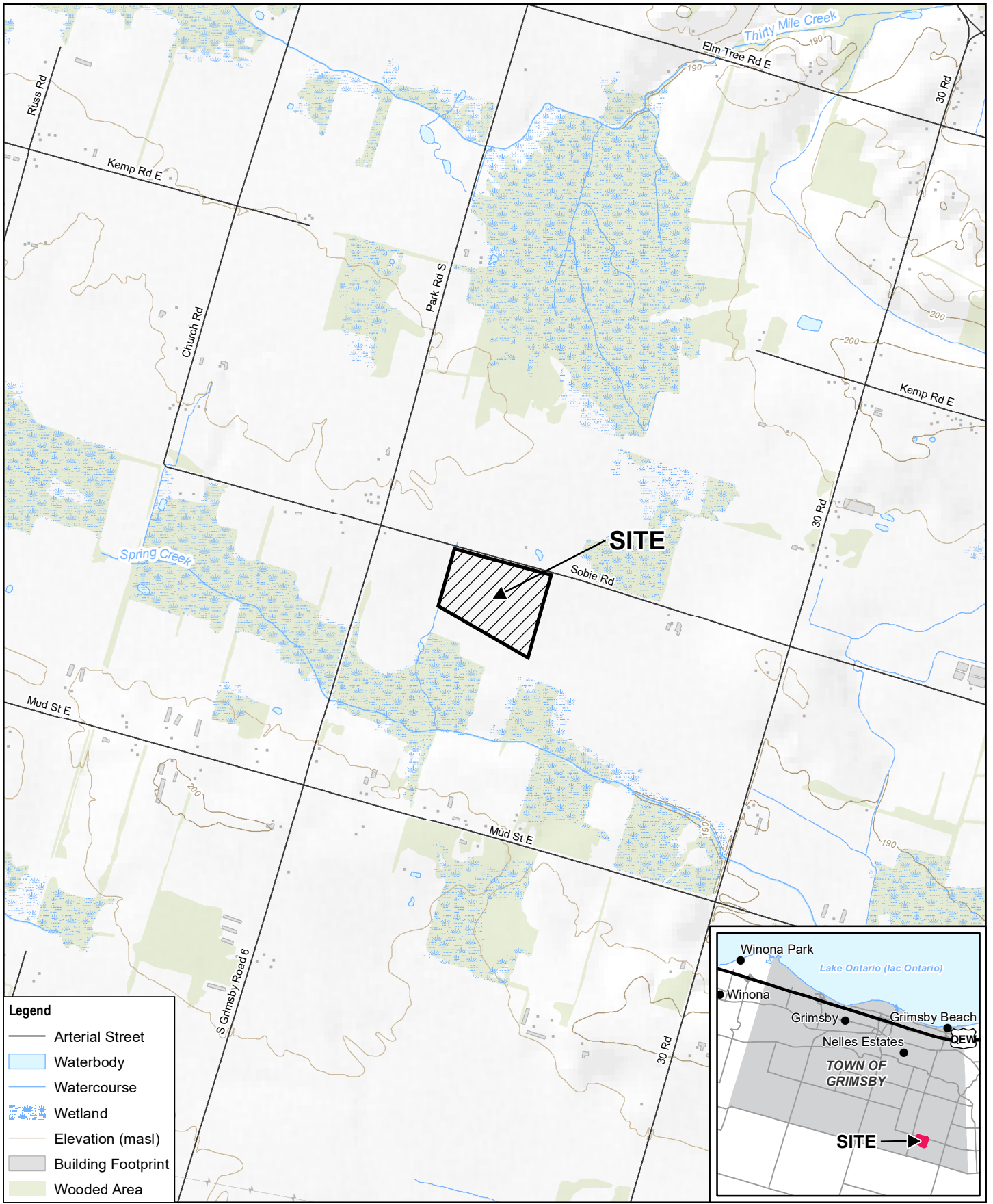
- Absolutely no site alterations (including but not limited to: disturbance to the existing grades, etc.) are to occur within the 3 to 4 m next to the water course or the water course itself

These conditions will continue to be complied with during the expansion. Silt fencing will be installed along the western extent of the Site to prevent discharge of sediment to the western drainage swale. The Site expansion removes the exterior storage bunkers along the western extent of the property and eliminates exterior waste storage. Areas disturbed by construction activities will be re-seeded and erosion control measures left in place until vegetation is established.

Leachate is not produced at the Site since no waste is stored in an area where it can contact precipitation. The potential negative environmental effects on surface water are limited to erosion and sedimentation from runoff. Runoff from the Site is collected in the existing stormwater management ponds prior to discharge to the environment. This provides for a controlled release and a suitable location to monitor should the need arise. Furthermore, the stormwater management ponds provide for sedimentation of suspended solids prior to discharge and a silt sock is provided to mitigate any minor solids in the final effluent.

The digestion process requires an estimate 7,500 m³ of water to be added annually to achieve the desired solids content for the digester feedstock. In the event of water being impacted due to high sediment or a discharge of a contaminant from an indoor waste storage area, water from the stormwater management ponds can be used in the digestion process.

Monitoring and inspection of the surface waters features will be completed quarterly. This will consist of inspecting the surface water features around the Site for increased levels of sedimentation and removing the sedimentation as required. Additionally, surface water samples will be taken from the stormwater management pond discharge to ensure the water quality is compliant with the NPCA requirements.



Map Projection: Transverse Mercator
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 Grid: NAD 1983 UTM Zone 17N

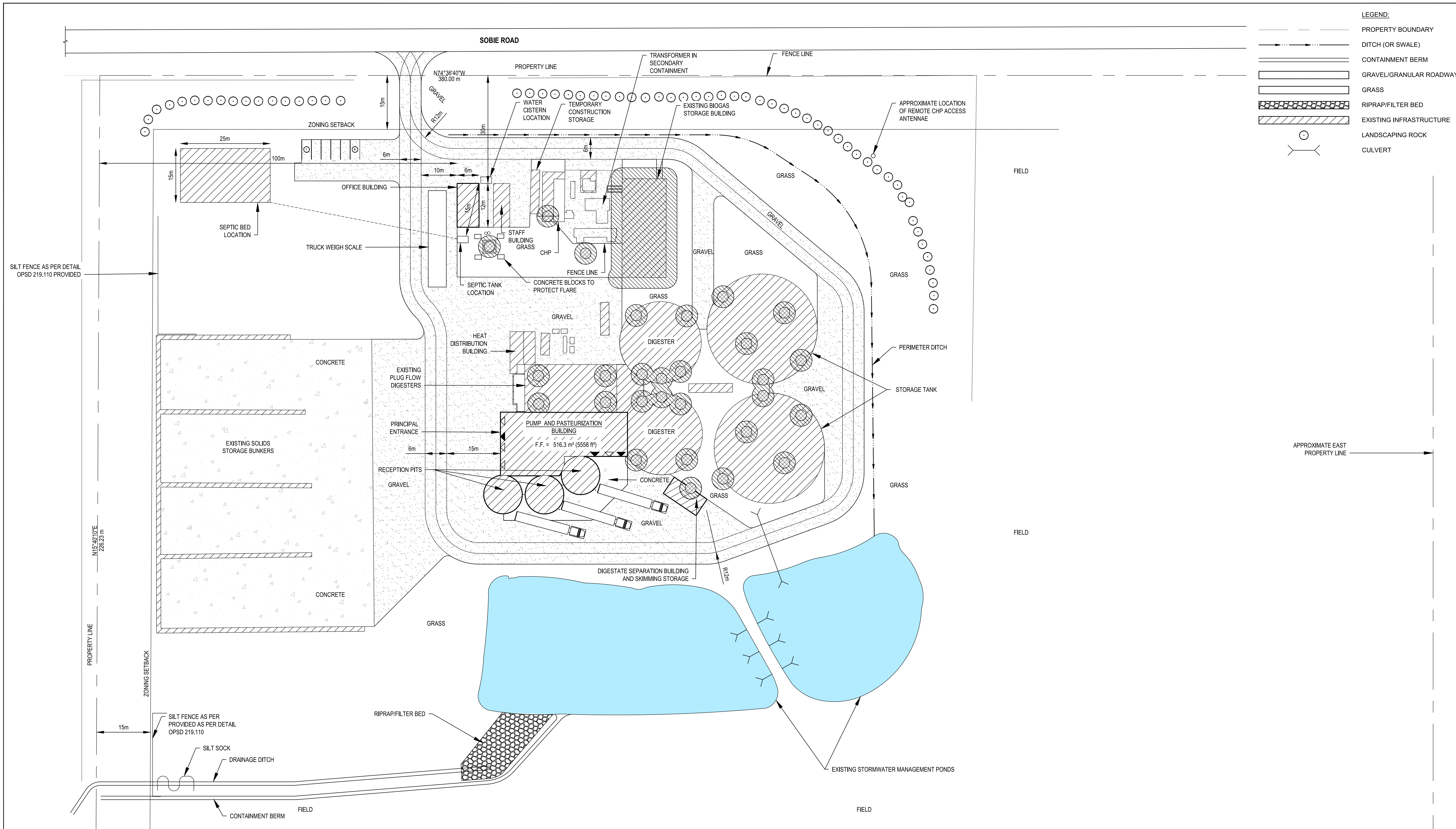


ESCARPMENT RENEWABLES
 442 SOBIE ROAD, TOWN OF GRIMSBY, ONTARIO

Project No. 11226032
 Date Jun 9, 2021

SITE LOCATION MAP

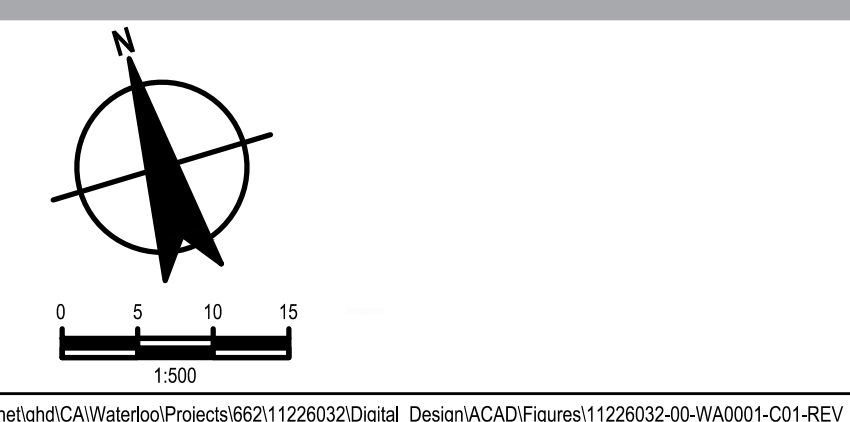
FIGURE 1



- LEGEND:**
- PROPERTY BOUNDARY
 - - - DITCH (OR SWALE)
 - ==== CONTAINMENT BERM
 - ==== GRAVEL/GRAVULAR ROADWAY
 - ==== GRASS
 - ==== RIPRAP/FILTER BED
 - ==== EXISTING INFRASTRUCTURE
 - LANDSCAPING ROCK
 - |— CULVERT

PRELIMINARY

No.	Issue	Checked	Approved	Date
				2022-01-17
Author	SPENCER H	Drafting Check	KALJINDER D	Project Manager
Designer	JASON W	Design Check	RYAN L	Project Director
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			VICTORIA S	



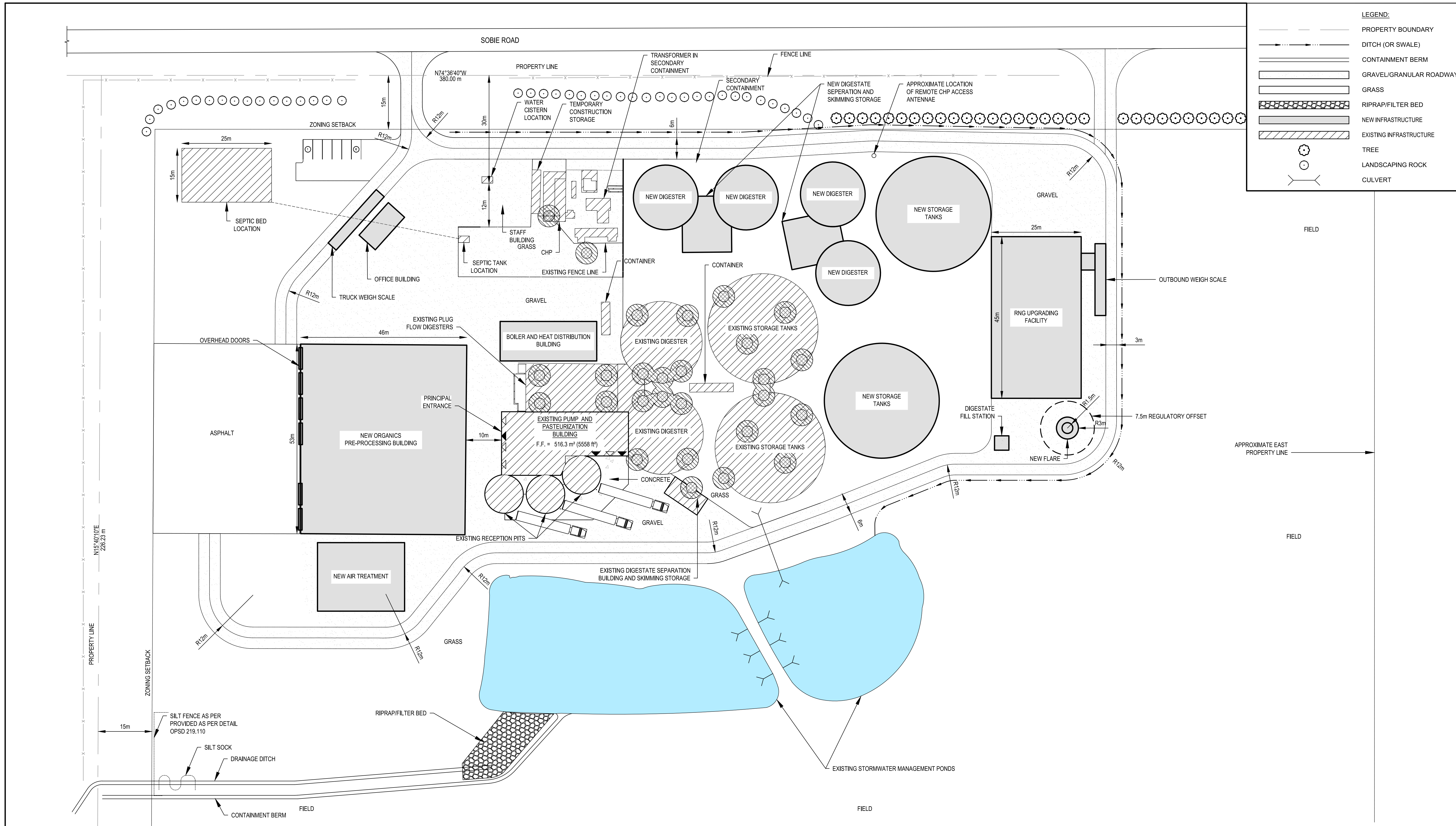
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Client	ESCARPMENT RENEWABLES		Title
Project	ESCARPMENT RENEWABLE ENERGY APPROVAL AMENDMENT		EXISTING CONDITIONS
Project No.	Date	Scale	Sheet No.
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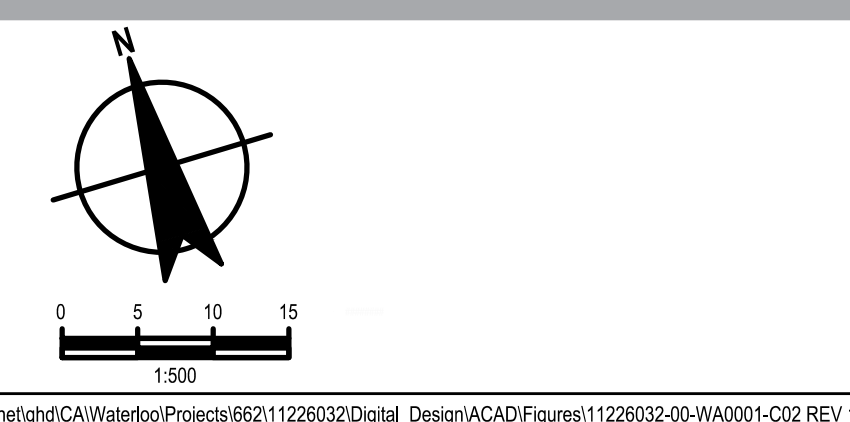


LEGEND:

- PROPERTY BOUNDARY
- - - DITCH (OR SWALE)
- ==== CONTAINMENT BERM
- ==== GRAVEL/GRANULAR ROADWAY
- ==== GRASS
- ▨ RIPRAP/FILTER BED
- ▨ NEW INFRASTRUCTURE
- ▨ EXISTING INFRASTRUCTURE
- ⊙ TREE
- ⊙ LANDSCAPING ROCK
- |— CULVERT

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			JASON W	
			VICTORIA S	



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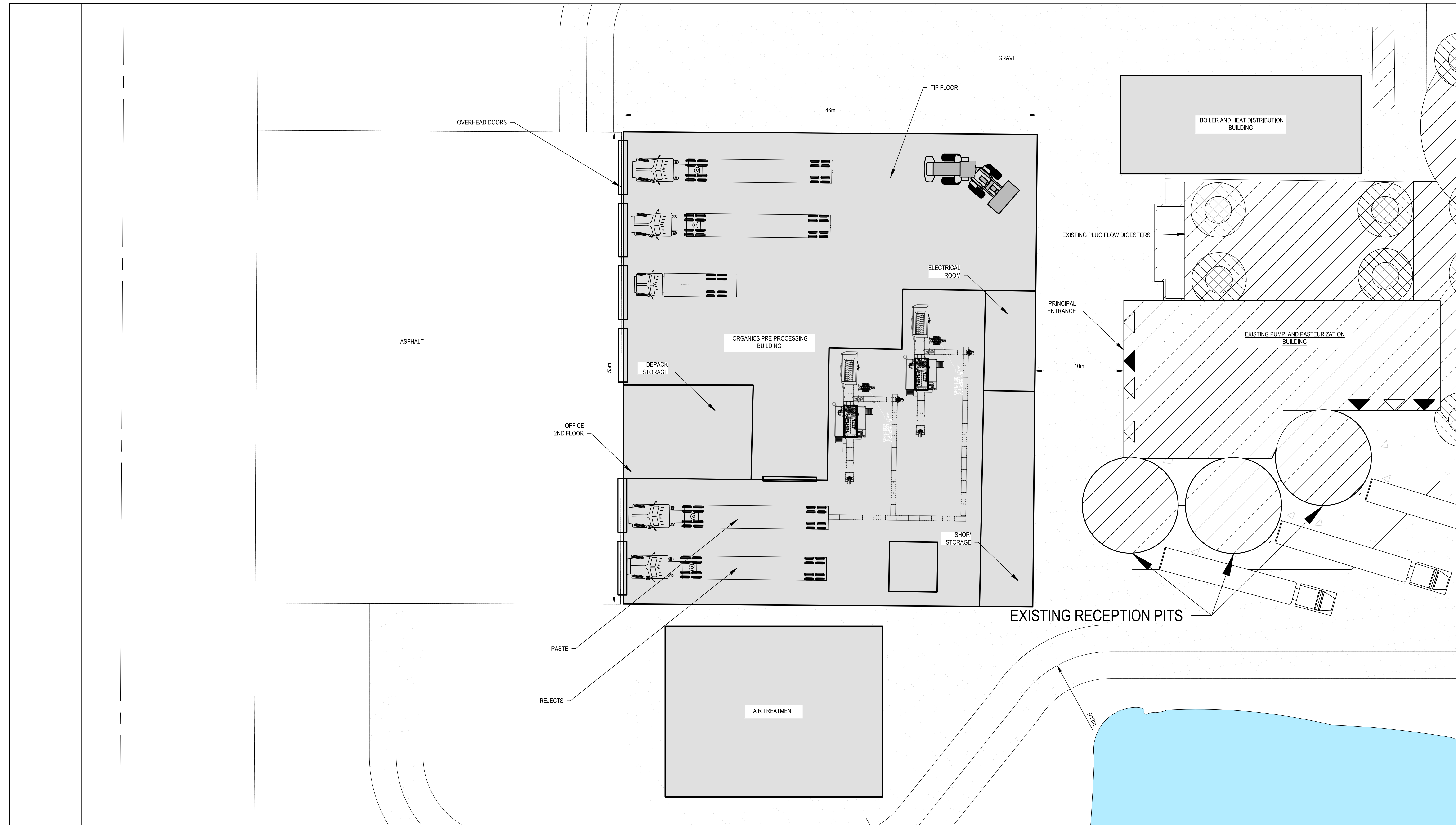


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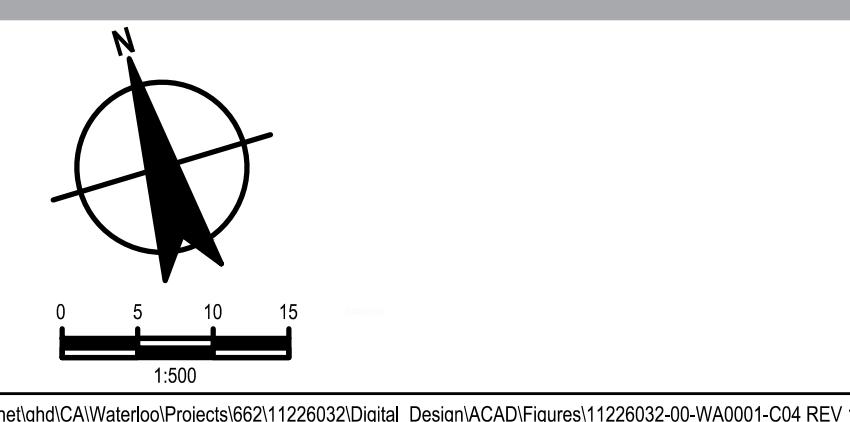
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Project No.	11226032	Date	2022-01-17
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Sheet No.	FIGURE 3
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PRELIMINARY

No.	Issue	Checked	Approved	Date
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				JASON W
Designer	JASON W	Design Check	RYAN L	Project Director
				VICTORIA S



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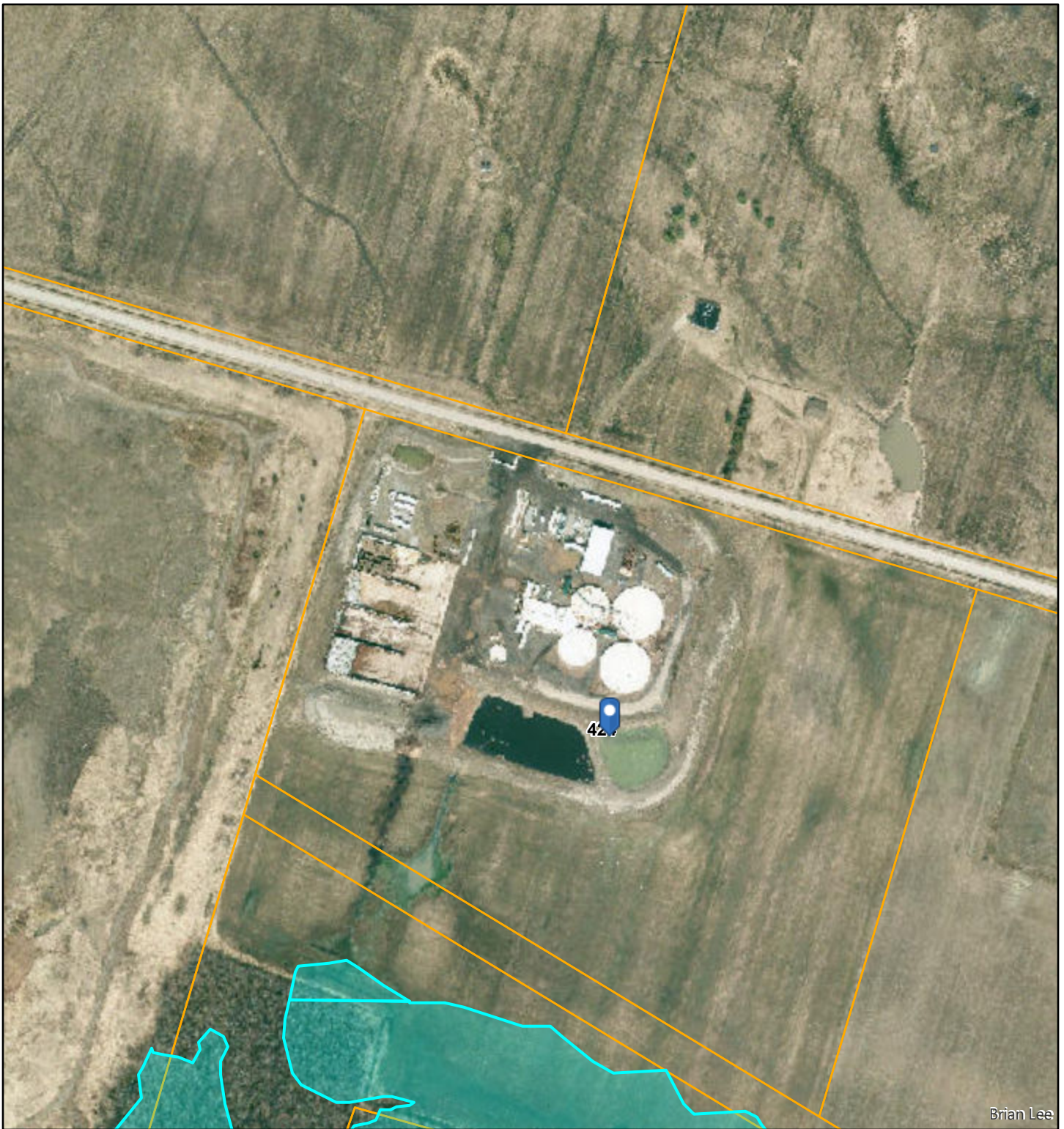
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Sheet No.	FIGURE 4
Size	ANSI D

Appendices

Appendix A

NPCA Floodplain Mapping

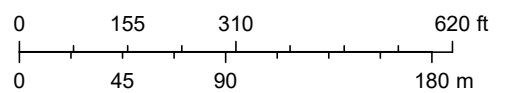
ArcGIS Web Map



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 Assessment Parcels

1:4,514



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