Springfield Mixing Plant Development Project

Environmental Act Proposals for Bulk Material Handling Facility

Presented to

Environmental Assessment and Licensing Branch
Manitoba Conservation and Climate

Prepared by

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July 2020

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Table of Content

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Figures

Tables

Annex

1. Introduction

1.1. Project Overview

Berger Peat Moss Ltd (Berger) is proposing to construct and operate a horticultural mixing plant near the town of Oakbank, in the Rural Municipality of Springfield. The Project consists of the reception and screening of loose peat on site. The screened peat will then be mixed with different additives in order to produce specialized and personalized horticultural growing media. Products will then be compressed and bagged in different formats. Final products will be stored directly on site until loaded on trucks for delivery.

The proposed development includes the construction of a peat screening, mixing and bagging plant. Several other existing buildings on site will also be reconditioned for either storage, equipment maintenance and reparations or administrative purposes. Operations will include the utilization of fuel-powered equipment such as loaders and lifts as well as the incorporation of water in the production line and for domestic usages, which will require the installation of two new wells around the facility. Wastewater will be generated by three different facilities on site, each with their corresponding wastewater management system. Finally, profiling as well as ditching operations will be carried out to ensure proper stormwater drainage and create adequate storage areas for both the loose peat, additives and final bagged products.

This application for a License as per the Environmental Act will explain in details the production processes on site, from the reception of loose peat to the truck loading of final products for client delivery. Construction operations as well as decommissioning and reclamation of the site will also be discussed. Finally, potential impacts from the development on the environment as well as related mitigations measures will be identified.

1.2. Corporate Information

Berger was founded at Saint-Modeste by Mr. Alcide Berger and Ms. Huguette Théberge in 1963, and the company is now managed by the third generation of Berger's family members. After more than 50 years of development, the company has become a leader in the production of value-added horticultural substrates and currently harvests 17 peat bogs in Quebec, New Brunswick, Manitoba, and Minnesota, and has 8 processing facilities in Canada and the United States of America (USA). Berger employs nearly 500 people in Canada and the USA, and contributes to the economic well-being of many local communities. Berger sells horticultural mixes primarily to professional greenhouse growers and producers in Canada, the USA, Mexico, Central and Southern America, Asia, and Europe.

The mission of Berger is to harvest and process sphagnum peat moss in a responsible way, to offer a range of high quality products and services, designed for the needs of commercial horticultural customers located in international markets. Berger's vision is to be recognized by horticulture professionals as their preferred partner and achieves this through the following corporate values:

- Commitment – to providing employees an encouraging and supportive workplace and to delivering high quality products and service to customers;

- Proximity – maintain close relationships with employees, customers, and business partners through sharing information, actively engaging with stakeholders, and being accessible and available;
- Harmony – create trusting and collaborative working relationships with customers, and partners through attentiveness, openness, respect, humility, and sincerity; and
- Performance – seek optimal results through continuous improvement of products, employees, operations, and finances, and extend this to customers to help them be the best in their respective markets.

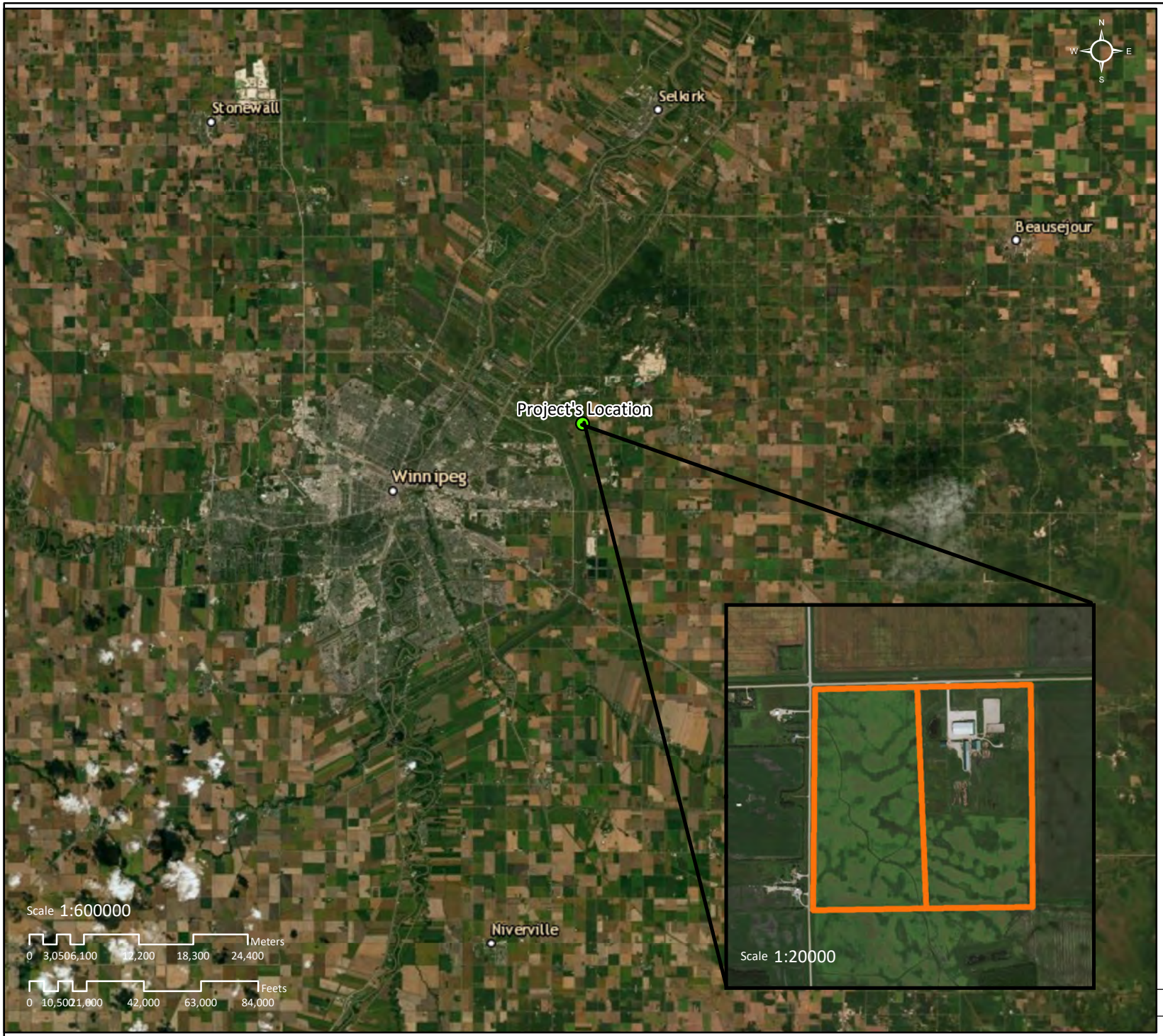
Berger's operations for this Project will incorporate the same commitments to social responsibility as Berger's operations in other provinces. This includes maintaining respect for the environment (incorporating sustainability) and demonstrating corporate social responsibility. Strong relationships with provincial and municipal regulatory agencies and communities surrounding the Project will be key factors to success. Concerns raised by regulatory agencies or the community will be investigated, and if necessary, changes will be incorporated into how the Project is managed.

1.3. Location

The Project is located at 22054 Oakwood Road 64N, R.M. of Springfield (NW ¼ Section 23-11-4 EPM, figure 1), about half an hour from Winnipeg. Lands were acquired from Sandpiper Stock Farms Ltd in March 2019 and include:

- Certificate of Title No. 2286830/01 (Tax Roll Number 98300)
- Certificate of Title No. 2286829/1 (Tax Roll Number 98350)

Total area purchased is approximatively 71,905 square feet. The northeastern part of the parcel was previously used as an equestrian facility with multiple buildings and basic services (electricity, water and sewage) already in place. Much of the infrastructures in place will be reconditioned for the Project. The rest of the land was used for agricultural purposes.



Site Boundaries

Berger's Property

Berger

CARTOGRAPHE	Pierre-Olivier Sauvageau
DATE	2020/04/16
PROJECTION	WGS 1984 Web Mercator Auxiliary Sphere
SOURCES	Berger (2020) ESRI (2016) Basemap

Figure 1 : Project Localisation |

Oakbank Mixing Plant

1.4. Land use

Most of the regional area is either residential or agricultural. The town of Oakbank is located about 8 km to the east of the Project, while most of the western area are occupied by the outskirt residential areas of Winnipeg. The Project's main access will be through Road 207. Railroad is also passing through the land about 1 km south of the area. The closest first nations community is the Brokenhead Ojibway Nation, located about 30 km northeast of Oakbank.

The area of the project is currently zoned as "AG" (Agriculture General Zoning District). The RM of Springfield initially wanted, by resolution (see Annex 1) to add "peat moss" as a permitted use under the Zoning By-law, thus granting the Project the status of "permitted use". Nevertheless, the process to amend the Zoning By-Law was never actually carried out by the RM. Indeed, it was determined the Project falls under the category "Agriculture Support Industry", which is defined by the Zoning By-Law as:

> *An industry, commercial service or retail business in which the major product or service being bought, sold or processed is intended mainly for, from or by farmers.*

The Project, by processing and selling horticultural products to worldwide professional growers (flowers, fruits and vegetables) is in accordance with the definition of an agriculture support industry, thus being accorded a permitted use for this particular zoning. The Department of Municipal Relations reviewed the development permit issued by the RM of Springfield and deemed that the Development Officer acted within his autority

1.5. Public Consultations

Berger has already had several exchanges with representatives of the RM of Springfield, Conservation and Climate, Agriculture and Resource Development and other departments of Manitoba government. Berger was also planning to do a presentation of the Project combined with a job-fair in the town of Oakbank closest to the project in the spring of 2020, but this activity was rescheduled until the situation related to COVID-19 is better suited for such an event.

Throughout the years of operations of Berger's plant in Hadashville, the company has made sure to be transparent and collaborative with the local communities. Several visits to Hadashville plant and associated peatland were organized for the general public as well as government representatives to show the operations and respond to any interrogations. Berger is always proactive regarding the well-being of the communities and people around its facilities by taking adequate measures to respond to inquiries, comments or complaints. Berger aims to continue this collaboration with the existing land users around the proposed Project.

2. Description of Development

2.1. Permits needed

Table 1 shows a list of the permits needed for the project as well as their status.

Table 1: Required Permits for the Development

Permits	Permit ID	Obtained
Water Use License		Within the current EAL
License to Construct Drainage Works		Within the current EAL
Onsite Wastewater Management		Within the current EAL
Electrical Permit		In application
Building Permit	17645-189-20	2020/05/07
Occupancy Permit		To be applied for
Development Permit	DX 2020-21	2020/06/09
Lot Grade Permit	LGP 2020-05	2020/02/19
Environmental License		In application

Please be advised that a fuel storage permit was not added to this list since the fuel tank on site will only have a volume of 1,000 gallon or lower each, which does not require a license.

2.2. Schedule and Timeframe

As of June 2020, the renovations of existing buildings for administrative and storage purposes have already begun. Construction of the new plant will begin as soon as all the appropriate permits and licenses are obtained. Construction of the building as well as the installation of the indoor equipment will last from April 2020 through May 2021. Berger is aiming to officially start the operations at the plant by April 2021. Production will slowly increase in the following years to reach full production capacity around 2025.

Nevertheless, this schedule may be subject to modifications due to unforeseen circumstances. Berger will make sure to notify Conservation and Climate should any changes to this current schedule are made.

2.3. Services Usages

Current services on the land include electricity, water and septic installations, which are only disserving the buildings already in place (formerly an equestrian business). Nevertheless, the construction of the new plant will also include a new electric entrance and related installations, two new wells and a new separate sceptic infrastructure. Appropriate permits will be acquired prior to the installation of these services. All existing and proposed new infrastructures are detailed in figure 2. Please refer to section 2.4.4 for information about the wells and section 2.4.5 for the wastewater management.

2.4. Chain of Processes

2.4.1. Screening, Mixing and Packaging Process

Two different categories of products will be manufactured by the proposed plant, one will be raw peat and the other will be peat mixed with different additives. Both will ultimately be used by growers for various type of culture. Figure 3 and 4 show the interior of the facilities as well as a rough flow of the material within the plant.

The first step for either of these products is the screening of the raw material (peat). Whether it be loose peat coming directly from the harvesting fields or already packaged peat. The peat will be loaded in conveyors from exterior uppers and will go through different screening mechanisms to separate the granulometry of the particles. If the peat is sold without any additives, then the product will go straight to the packaging section (explained in the following paragraph). On the other hand, if those additives are needed, the product will need to go through the mixing line.

The mixing line will go through several sections separated within the addition of solid entrants, liquid entrants and lime. The complete list of entrants is detailed in sections 2.4.2 and 2.4.3. The quantity and types of additives will change with the type of product. The mixing line then goes through a drum mixer that will be responsible for mixing all the ingredients together. The growing media will then proceed to the packaging section.

Whether it be raw peat or mix, the product will end up in the packaging room where it will be compressed and bagged in different formats according to the customer needs. Once packaged, the product can be kept outdoor, the plastic wrapping will prevent any adverse effects from the weather. The product will then be either stored on wood pallet in the designated storage areas in figure 2 or loaded directly on truck for delivery. At peak operations, it is expected that the plant could process up to 1.5 million bags of loose peat (6 cubic feet compressed to a factor ½, roughly equivalent to 510,000 m^3) and 2.5 million bags of growing media (4 cubic feet compressed to a factor ½, roughly equivalent to 570,000 m^3).

2.4.2. Raw material Inputs

The most important raw material for the process is the peat itself. Between May through October, peat will be harvested on Berger's already existing harvesting sites. The loose peat will be loaded on truck, transported to the plant and discharged into a peat bunker near the uppers for loose peat. The peat bunker will consist of a concrete slab of 150' X 170', large enough to adequately store the loose peat. The slab will also be surrounded on all sides by a 16 feet concrete wall, allowing just enough space for the trucks to actually discharge the peat within the bunker. Peat particles being very volatile, this wall will limit the propagation of those particles in the atmosphere. At peak operations, up to 500,000 m^3 should be hauled each year from the harvesting sites to the plant.

Other raw material will include perlite and vermiculite additives as well as wood fiber. Perlite and vermiculite are inert, rock-like substance that are added to the mix for their drainage properties. Wood fiber, as the name implies, is a material directly extracted from selected species of trees. Both additives will be delivered on site and stored in plastic bags at the designated area in figure 2. The perlite, vermiculite and wood fiber will be added to the mix through uppers located along the main mixing line.

Finally, other materials such as plastic wrappers and wood pallets will be needed for the packaging and storage of both the products and entrants. Those materials will be stored in part in the plant itself, or with the chemical additives.

2.4.3. Chemical Inputs

Chemical additives for the mixing line can be divided in three main categories: fertilizers, wetting agent, and lime. The bulk of the fertilizer and wetting agent additives will be stored within the existing building in the northeast of the property. This building is isolated and heated during the winter, which will prevent freezing and other harmful effects from the weather. There will be also a small storage room directly above the mixing line for the immediate consumption of those additives into the mixing process. This area is identified in figure 4. All the fertilizer products used by Berger comes in solid form while the wetting agent comes in liquid form. Calcium or dolomitic lime will be stored in appropriate silos located close to the mixing lime since most of the mixed products necessitate this kind of additive. Those silos are also identified in figure 4.

It is difficult to pinpoint an exact quantity of each additives that will be stored on site at this time. Production is schedule regarding the need of the clients, which can be varied through the year. Inventory will also vary greatly depending on the need for each additive at a specific time. Nevertheless, quantity of additives will never be over each additive's dedicated storage capacity on-site.

2.4.4. Water Inputs and Wastewater

Berger has contracted Friesen Drillers to conduct a hydrogeological investigation of the groundwater supply on site (Annex 2). Following are some of the conclusion and recommendations of the report:

- The capacity of two new supply wells, completed into the Carbonate Aquifer, is likely sufficient to support groundwater pumping at a rate of 80 U.S.G.P.M.
- The projected groundwater level fluctuations resulting from operation of the new water supply are expected to be less than natural seasonal and climatic fluctuations.
- Groundwater quality at the site appears to be fresh (TDS~300 mg/L) and is likely acceptable for use without significant treatment.

As recommended in the report, Berger will dig two new wells, as identified in figure 2, in order to support the new plant. Be advised that 80 U.S.G.P.M per well would be the absolute maximum volume taken during the operations and will rarely be attained.

Site Boundaries

- Perilease

Infrastructures

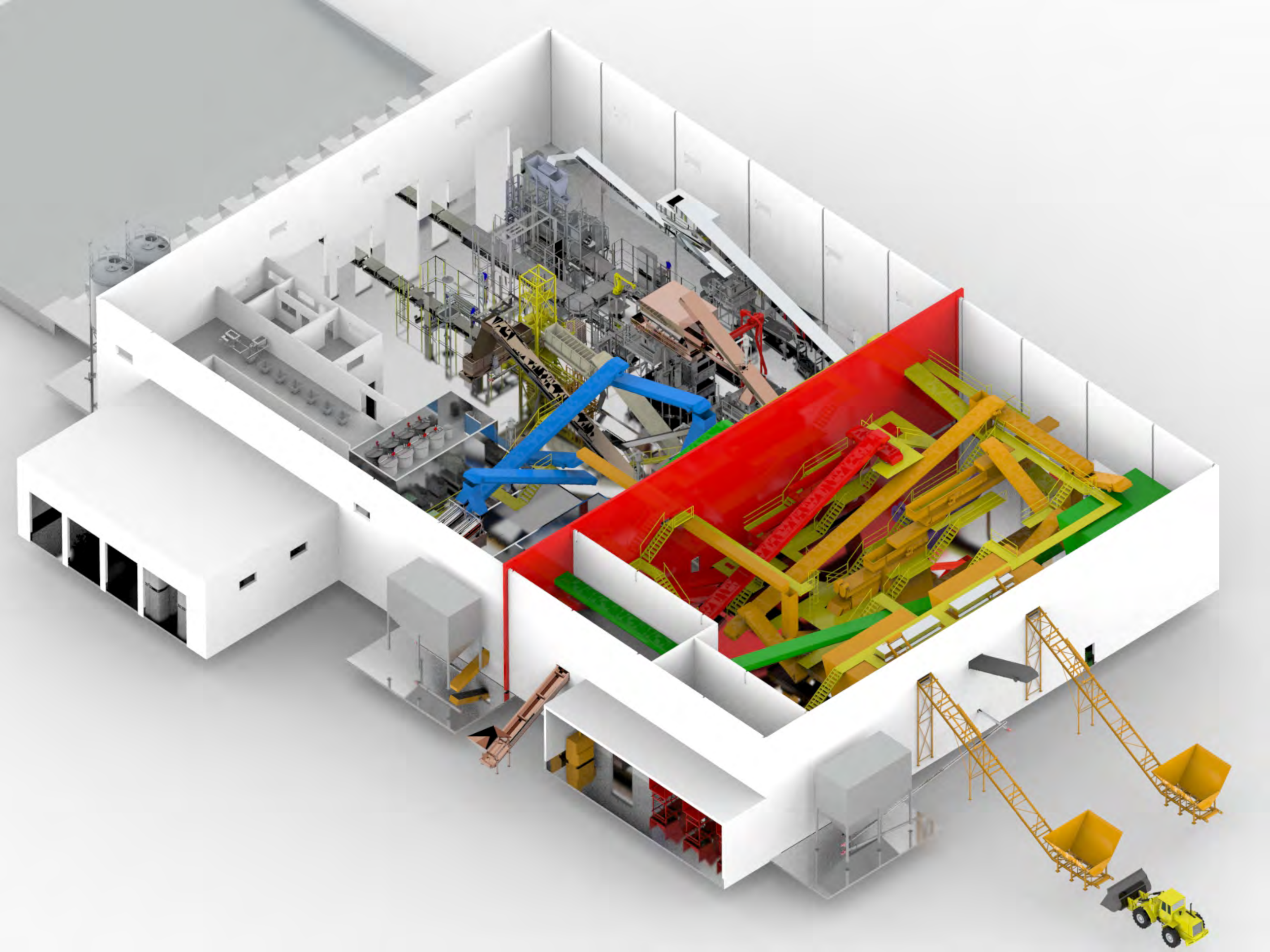
- Electric Post
- Tree
- Existing Water Well
- New Water Well
- Drainage
- Electric Line
- Gate
- Parking
- Road (Planning)
- Septic Installation
- Water Line
- Existing Septic Installation
- New Septic Installation
- Parking
- Pond
- Storage - MIX
- Storage - Peat (PRO)
- Storage - Peat for MIX
- Storage - Perlite
- Existing Buildings
- New Buildings

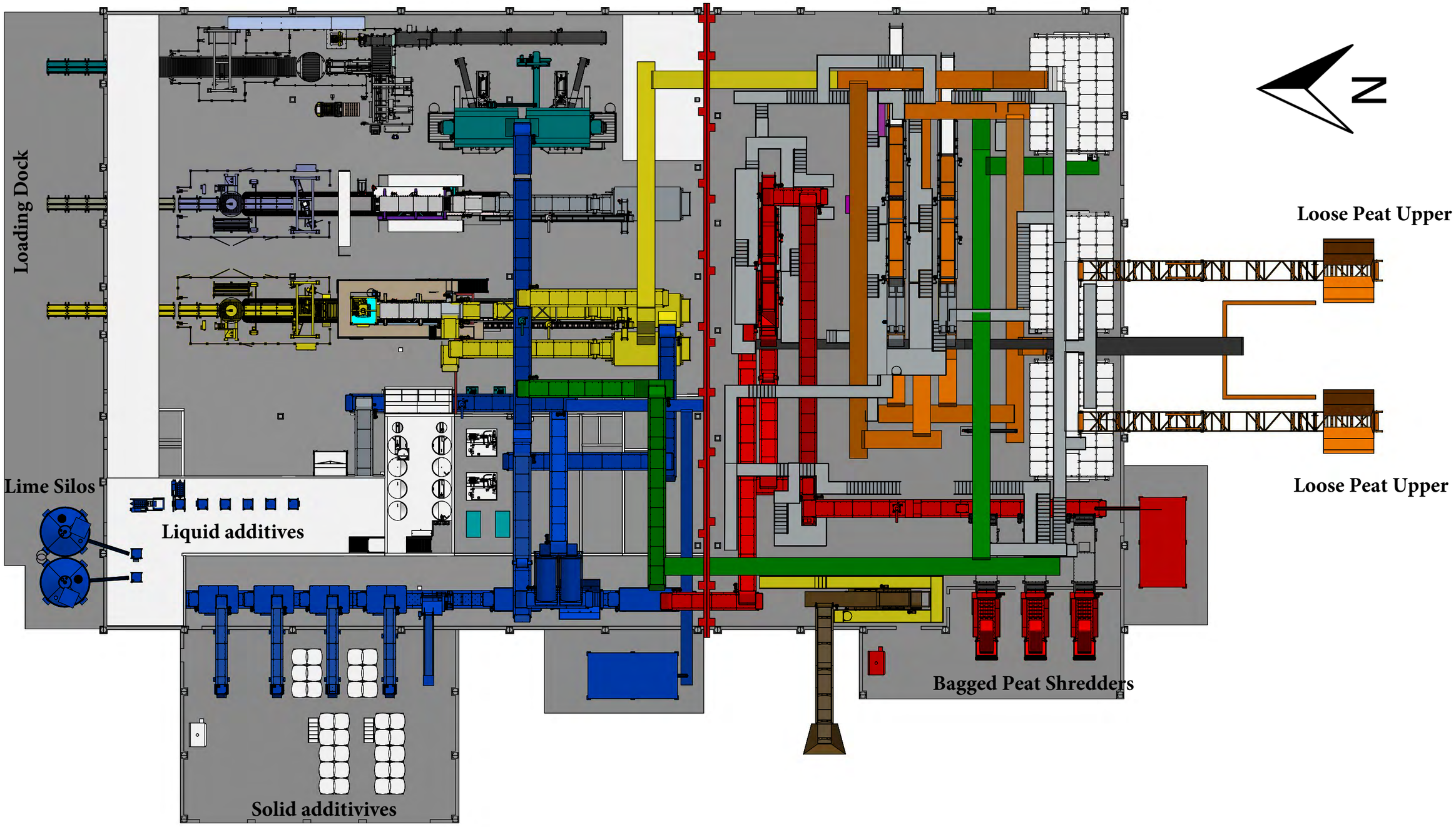
Berger

CARTOGRAPHE	Pierre-Olivier Sauvageau
DATE	2020/06/18
PROJECTION	NAD 1983 CSRS UTM Zone 14N
SOURCES	Berger (2020) ESRI (2016) Basemap

Figure 2: Mixing Facilities General Plan |

Oakbank Mixing Plant





In red : Peat Mixing from bagged peat
In yellow : Peat direct bagging line
In brown/orange : Screening lines
In blue : Mixing line

TOLERANCES		DESCRIPTION:	
usinage / machining	autres / others	- Top View	Berger
1/X ± 1/32"	1/X ± 1/16"	ASSEMBLAGE / ASSEMBLY:	
X.XX ± .015"	X.XX ± .015"	# equip	
X.XXX ± .001"	ANGLE ± 2°	Dessiné par / drawn by: andrel	DATE: 11/03/20
ANGLE ± 1°	PROJECTION :	PAGE: 5 / 5	Numéro / number : Layout of the mixing plant
unité : pouces, sauf indication contraire unit : inches, unless otherwise specified			REV.:

Z:\0_SITE\29-OAK\layout usine\DFT_46_electro.dft Print : 2020/03/23

2.4.5. Wastewater Management

Berger has retained the services of Stantec to prepare a on site wastewater management plan in accordance with the regulation (annex 3). Two facilities on site will produce only domestic wastewater while one other will produce both industrial and domestic wastewater. Each of these facilities will have a dedicated wastewater management system, all identified in figure 2:

- **Arena**: The arena is an existing facility previously used to host equestrian shows and competitions. This building will be reconditioned mainly as a warehouse with several offices. The arena has an existing septic system consisting of an underground septic tank connected to a septic field. Berger will make sure to hire certified personnel in order to assess the capacity and design of this existing installation to ensure its suitability for the propose purpose of the facility. A total peak flow of 368 L/day was calculated for this septic installation. Should the existing system be not adequate, Berger will make sure to either modify the current septic installation or build a new one.
- **House**: The house is also an existing facility that will be used to house Berger's employees from other sites/provinces coming for short trips to the plant. Many of the rooms within the house will be reconditioned in bedroom. The house will have a maximum capacity of 5 people after the renovations. Again, Berger will hire a qualified inspector to assess the capacity of the existing system and, should it be inadequate, modify the existing installation or build a new one. A total peak flow of 5,000L/day (with a safety factor of 2), was calculated for this septic installation.
- **Mixing Plant (domestic)**: The mixing plant will be a new building with a new septic installation dedicated to the facility. Regarding domestic wastewater, the peak number of employees within the plant will be 30 people, which will generate a calculated amount of 3,675 L/day. Berger plans on handling domestic waste from the facility by implementing a new onsite waste management system. Stantec has advised that due to the soil type and condition, that a pressurized sand mound design is recommended for the septic field, and that an underground fiberglass septic tank be implemented for equalization storage and pumping. The system will be registered under the Onsite Wastewater Management Systems Regulation.
- **Mixing Plant (industrial)**: While the mixing process does not outright generate wastewater (all the added water and additives are kept within the final product), cleaning of certain fertilizer drums and tanks will release industrial wastewater that Berger will handle through holding tanks. Please refer to the annex 4 regarding the exact composition of this industrial wastewater. A total peak flow of 500L/day was calculated for this cleaning process. Berger plans to establish an agreement with the North End Sewage Treatment Plant or other Class II sewage treatment facility and develop a scheduled liquid waste hauling plan to properly dispose of the industrial waste to be treated off site.

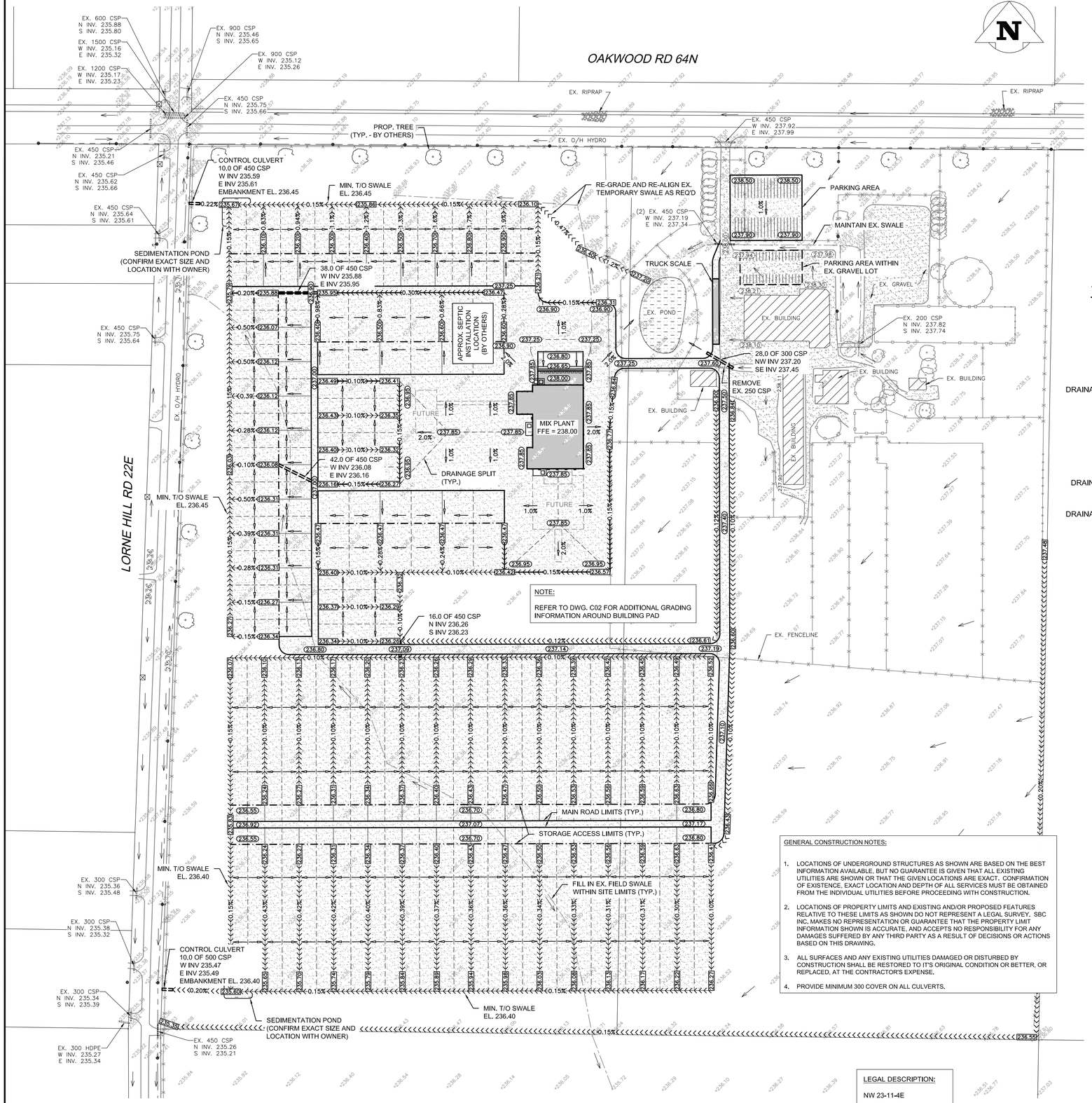
In summary, the Project will generate a calculated amount 9,543L/day. This total expected peak day flow being under 10,000 L/day, wastewater management for the Project should be managed and approved under the Onsite Wastewater Management Systems Regulation.

2.4.6. Stormwater Management

Finally, proper stormwater drainage around the plant and storage areas will be needed in order to allow for adequate circulation and prevent water damage to the bagged products and raw materials stored outdoor. Figure 5 shows a complete drainage and grading plan done by Sison Blackburn Consulting inc. (SBC) for the project (annex 4). Sedimentation ponds with control culverts were design at the end of the drainage system to allow for the sedimentation of any particles and control the flow in case of flooding events. The outlets of the drainage system are located to the west of Berger's property. Both the sedimentation ponds as well as the rest of the drainage system will be regularly inspected and maintained to limit erosion or blockage of the ditches. Be advised that a ditch will be dig within the pond present on site. This pond will be used as a water source in case of fire emergency. The ditch is solely to ensure a constant water level within the pond and prevent overflow, no water will be discharge within this pond.

2.5. Decommissioning and Reclamation

Should Berger choose to close the mixing plant, decommissioning and reclamation activities will be discussed with both the RM of Springfield and Conservation and Climate depending on the future usage of the land. It is expected, but subject to modifications, that the existing above ground infrastructures would be removed, and the site topography returned to its original state. The drainage system could be either left as is for future use or partially filled up. Finally, if needed, wells and sceptic infrastructures would be properly closed off as per regulations.



GENERAL CONSTRUCTION NOTES:

1. LOCATIONS OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE, BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE, EXACT LOCATION AND DEPTH OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.
2. LOCATIONS OF PROPERTY LIMITS AND EXISTING AND/OR PROPOSED FEATURES RELATIVE TO THESE LIMITS AS SHOWN DO NOT REPRESENT A LEGAL SURVEY. SBC INC. MAKES NO REPRESENTATION OR GUARANTEE THAT THE PROPERTY LIMIT INFORMATION SHOWN IS ACCURATE, AND ACCEPTS NO RESPONSIBILITY FOR ANY DAMAGES SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS OR ACTIONS BASED ON THIS DRAWING.
3. ALL SURFACES AND ANY EXISTING UTILITIES DAMAGED OR DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO IT'S ORIGINAL CONDITION OR BETTER, OR REPLACED, AT THE CONTRACTOR'S EXPENSE.
4. PROVIDE MINIMUM 300 COVER ON ALL CULVERTS.

LEGAL DESCRIPTION:

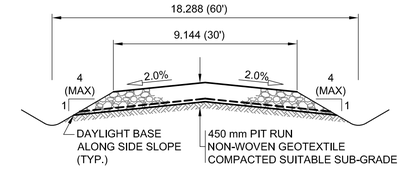
NW 23-11-4E

CIVIC ADDRESS:

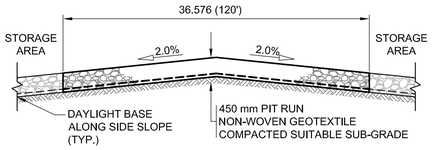
22054 OAKWOOD RD 64N

BENCHMARK 236.178m
MGSP AT THE SOUTHWEST CORNER OF THE INTERSECTION AT LORNE HILL RD 22E AND OAKWOOD ROAD 64N.

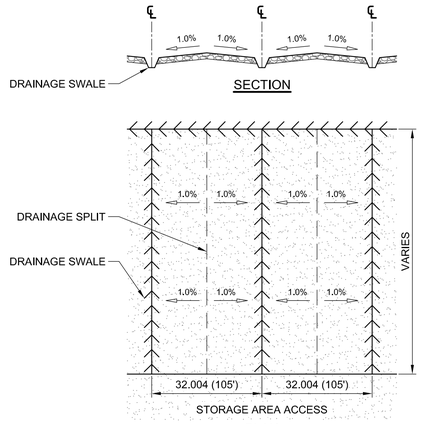
METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



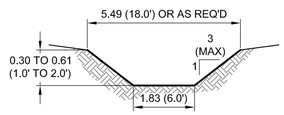
TYPICAL ROAD CROSS SECTION
N.T.S.



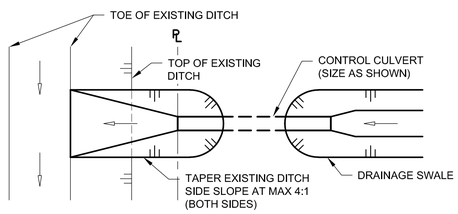
TYPICAL STORAGE AREA ACCESS CROSS SECTION
N.T.S.

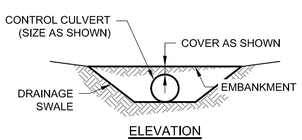


TYPICAL STORAGE AREA DRAINAGE
N.T.S.



TYPICAL DRAINAGE SWALE SECTION
N.T.S.





CONTROL CULVERT DETAIL
N.T.S.

SBC
SISON BLACKBURN CONSULTING INC.
Unit 10 - 5 Scurfield Boulevard
Winnipeg, MB, R3Y 1G3
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www.SBCinc.ca

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
Sison Blackburn Consulting Inc.
No. 5581

PROVINCE OF MANITOBA
J.L. TAPLIN
Member
38757
20.05.27
REGISTERED PROFESSIONAL ENGINEER

150 WM	WATERMAIN	150 WM
250 WWS	WASTEWATER	150 WWS
300 LDS	LAND DRAINAGE SEWER	300 LDS
	HYDRANT ASSEMBLY	
	GATE VALVE	
	CURB STOP	
	REDUCER	
	MANHOLE	
	CATCH BASIN	
	CATCH PIT	
	CLEAN OUT	
	TESTHOLE	
	SURVEY BAR	
	SIGN	
	UTILITY POLE	
	UTILITY PEDESTAL	
	HYDRO	
	GAS	
	MTS	
	TREE LINE	
	CULVERT	
	SWALE	
	DIRECTION OF FLOW	
235.380	GROUND ELEVATION	235.38
235.38	DITCH ELEVATION	235.38
235.400	ROAD ELEVATION	235.400
	BARRIER CURB	
	MOUNTABLE CURB	
EXISTING	LEGEND	PROPOSED

ISS	REV	DATE	DESCRIPTION
0	0	20/05/29	ISSUED FOR APPROVALS

CLIENT / PROJECT:

BERGER

PEAT PROCESSING PLANT SITE

RM OF SPRINGFIELD, MB

TITLE:

OVERALL GRADING PLAN

DISCIPLINE:
CIVIL

SCALE:	DRAWN:	DESIGNED:	CHECKED:
1:2000	J.L.T.	J.L.T.	R.E.S.

ISSUE:
ISSUED FOR APPROVALS
PROJECT START DATE: JUNE, 2019

PROJECT #:	DRAWING #:	REVISION:
19139-00	**C01**	0

SHT: 1 OF 2

3. Potential Impacts, Monitoring and Mitigations Measures

3.1. Emergency Response Plan

3.1.1. Fire

Peat particles being very volatile and highly flammable, Berger is endorsing strict prevention measures to limit the probability of fire within the operations. The measures include a strict smoking prohibition of smoking unless in designate area, a thorough and constant maintenance of mechanical and electrical equipment and active formation of all our on-site personnel on firefighting techniques. The plant itself will have a firewall between the screening room and the packaging room (see figure 4) and all the rolling equipment (lift, loaders, etc.) will be kept and maintained in a separate building.

Berger aims to be as self-reliant as possible regarding firefighting equipment and procedures. As such, a potential water source was identified in case of fire emergency. A pump will be installed in the lake located in the north of the property which will be able to function either on electrical power or diesel. This pump will be directly connected via a pipe to the plant, which will give Berger a good supply of water that will only be used in case of emergency. Additional firefighting equipment such as ABC extinguishers and fire blankets will also be strategically place around the site.

Berger will collaborate will local firefighting workforce to ensure they know the layout of the site and important locations/information in case of emergency. While a complete Emergency Response Plan has yet to be completed, annex 5 shows the actual Emergency Response Plan used in Hadashville plant. The one from Oakbank should have minimal changes in comparison. Figure 6 also show a potential Emergency Response Map that would identify all the necessary information in case of emergency.

3.1.2. Spills and Hazardous Substances

Annex 6 presents a Phase 1 environmental assessment by HLC Consulting Ltd of the site prior to the acquisition. The assessment was to validate if there were any environmental issues for due diligence purposes. While stressed vegetation (dead grass) was observed under an aboveground storage tank, lacking secondary confinement, located east of the house, there was no apparent leaking or malfunction from the tank, which was subsequently removed.

There are several potential sources of spill contaminant for the project, either from the leeching of the any chemical additives, the mishandling of hazardous substances or a malfunction from either an equipment or the fuel tanks themselves. As discussed in section 2.4.3, chemical additives, whether actively used or not, will be properly stored in an isolated and heated building to prevent any adverse effect from the weather. The additives will be stored either on a concrete surface or on a wood pallet to limit direct contact with the ground.

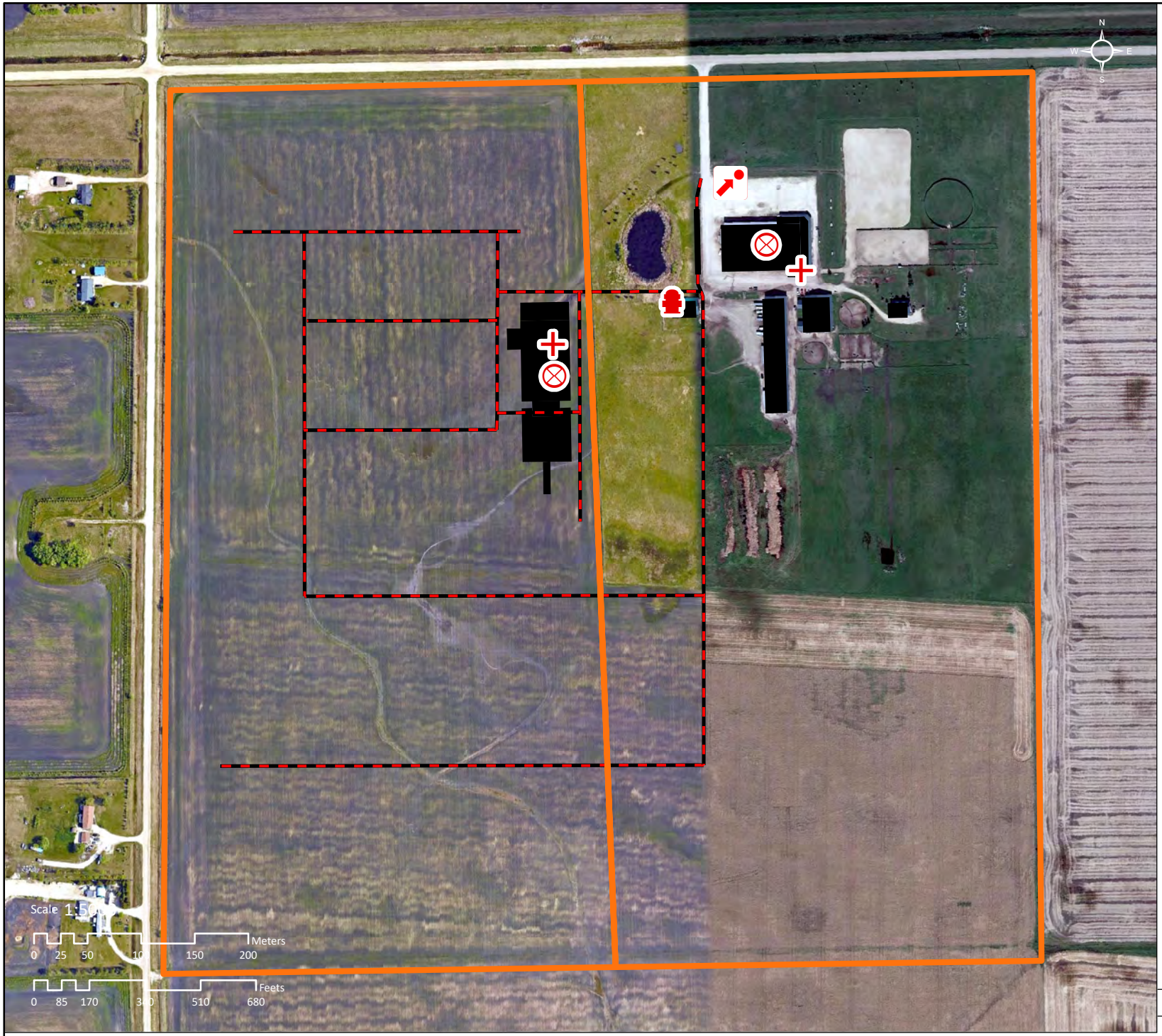
The Project include the reconditioning of one of the existing building into a garage which will allow for on-site routine inspection and maintenance of the equipment. Well maintained equipment will lower the risks of malfunction and associated spills. Moreover, both the garage's and the plant's floor will be in concrete, thus, in case of spill, limiting the contamination of the ground below. Finally, the fuel tanks on-site (2) will each be below 1,000 gallons, meaning that they will not require a fuel storage permit. One fuel tank will be dedicated to regular gas while the other will be for diesel. Both tanks will be above ground steel tanks, double-walled, with a concrete barrier to prevent any vehicular collision. Fuel tanks will be regularly inspected for spills and maintained, following applicable regulations

Finally, hazardous substances within the project will be limited to the chemical additives which have been discussed before and mechanical by-products such as filters, oil, etc. Berger is already collaborating with Notre-Dame Used Oil in order to adequately dispose of such material in Hadashville plant and will continue to do so for the proposed Project. Between pick-ups, hazardous material will be kept in the garage in designated areas to limit potential contamination. Domestic wastes are already handled on-site by GFL Environmental inc. and will continue to be throughout the operations.

Two separate spill kits will be available on-site, one will be located in the garage while the other will be located in the plant itself. Spill kit will include, at a minimum:

- An appropriate closed container for storing the spill kit components below, as well as for disposal of contaminated materials following a spill
- Quilted absorbent sheets
- 2-cubic-foot bags of peat fiber treated to absorb petroleum products
- Absorbent booms
- Bags of liquid absorbent granules
- Bags of vermiculite
- Plastic basins for catching spills
- Tarpaulins
- Rolls of paper towels
- Shovels, trowels, and mini-tool kit
- Personal protective equipment (safety goggles, respirators, masks, nitrile gloves).

The Manitoba Environmental Emergency line (204-944-4888) will be called in case of a spill that could create a hazard to human life or health, to other living organisms, or to the physical environment.



Site Boundaries

Perilease

Infrastructures

Road (Planning)

First Aid Kit

Spill Kit

Water supply

Evacuation Meeting Point

Contacts :

Plant Supervisor (Phone Number)

Director of Operations - MB (Phone Number)

Oakbank Fire Department (204 981-4042)

Manitoba Environmental
Emergency line (204-944-4888)

Berger

CARTOGRAPHE	Pierre-Olivier Sauvageau
DATE	2020/04/17
PROJECTION	NAD 1983 CSRS UTM Zone 14N
SOURCES	Berger (2020) ESRI (2016) Basemap

Figure 5: Emergency Response Plan |

Oakbank Mixing Plant

3.2. Workplace Health and Safety

Workplace health and safety is an integral part of Berger's corporate philosophy. Berger's focus is on prevention of safety, health, or environmental incidents through the development of a company-wide safety and environment culture, supported by policies and procedures implemented on-site. Components of the plan will include, but are not necessarily limited to, the following.

- New Employee Orientation – All new employees will attend an orientation session on safety, fire protection, environmental awareness, site rules, and other related topics.
- Safety Instructions – Safety instructions for each position will be prepared and the employee working in that position will be required to be familiar with its contents.
- Personal Protective Equipment – Efforts will be made to eliminate or reduce workplace hazards whenever and wherever possible. However, when this is not possible, approved personal protective equipment (PPE) will be provided for team member use. Any team member who is required to wear PPE will be trained in its use, maintenance, and capabilities (i.e., limitations).
- Lockout Procedures – Lockout procedures will be adhered to ensuring that machinery and other equipment (both electrical and fueled power tools) cannot be inadvertently used or started, jeopardizing the safety of any team member.
- Mobile Equipment Operation – Employees with duties that include the operation of mobile equipment will be trained in its safe operation, and inspection. The mechanic on-site will be responsible for maintenance of all equipment.
- Workplace Hazardous Materials Information System (WHMIS) – The types of hazardous materials on site will be limited (e.g., diesel fuel, gasoline, oil, lubricants, and antifreeze); however, to ensure the safety of all employees, a WHMIS program will be implemented on site. All employees will receive training; the program will include labeling of products by suppliers, submission of Material Safety Data Sheets (MSDS) by suppliers that will be available strategically throughout the site, and the labelling of workplace containers, tanks, and piping.
- First Aid – All site supervisors, foreman, and team leaders will be encouraged to obtain first aid certification; A minimum of one employee per shift will be required to have this kind of formation; in the event of a medical emergency, the sick/injured personnel will be transported to the either Oakbank or Winnipeg medical facilities.

3.3. Atmospheric Environment

The Project could have an impact on the atmospheric environment through the release of peat particles in the air. Berger has implemented several mitigation measures on-site in order to limit the amount of dust generated from the operations:

- The plant will be fitted with two dust collectors, responsible to filter the peat particles from the air coming out of the plant. Peat particles will be directly reintroduced in the mixing line.
- Loose peat deliver on site will be stored into a proper peat bunker surrounded with a 16 feet concrete wall to limit air emissions. Peat bunker was strategically placed on site to be against dominant winds (northwest), meaning that any aerial peat particles would be blown in a southeastern direction, away from the plant, office and residential areas.
- Roads around the facilities will be properly maintained and water will be applied as needed on rolling surfaces to limit the dust.
- Trucks used to haul peat from the Project site to the packaging plant will be covered with a tarp to limit dust and debris during transport.
- Operations will be stopped in the case of particularly strong winds.
- A double row of trees will be planted on the west and north border of the property to limit the propagation of peat particles, but also the sound from the operations.

Berger is confident that those mitigations will prevent efficiently any atmospheric pollution. Nevertheless, Berger's personnel on-site will regularly inspect for any significant plume coming either from the plant or the peat bunker.

3.4. Water Quality

The Project could have an effect on water quality through the contamination of the surface water and/or underground aquifer. Please refer to section 3.1.2 for the mitigation measures for hazardous substances as well as the prevention and emergency response for spills.

Surface water quality could also be affected by aerial peat particles depositing into open water areas. Thus, mitigation measures discussed in section 3.3 also applies to water quality. Berger also designed, in collaboration with SBC, sedimentation ponds at the end of the drainage system to ensure that any sediment would be retained within the site.

Finally, domestic and industrial wastewater will be handled through existing and new sceptic installations as described in section 2.4.5 to prevent any contamination of either surface waters or underground aquifers.

3.5. Vegetation/Wildlife

It is not anticipated that the Project will have a major effect on the regional flora and fauna. The site is located within an agricultural/residential area, with limited natural environment around the site. The Project does not include any tree cutting and there is no conservation area close to the project.

3.6. Noise

The noise coming from the operations is anticipated to be typical of agricultural operations currently carried out in the regional area. The plant is expected to be running 24 hours per day at peak operations. Berger designed the site so that the operations would mainly be centered around the plant itself, which is located about 500m from the closest residential building. The double row of trees mentioned in section 3.3 will also limit the sound propagation from the operations.

Berger will stay in close contact with the RM of Springfield and local residents to ensure that the noise coming from the operations are at acceptable levels.

3.7. Social Environment

At peak operations, the plant is planning on having a maximum of 30 employees per production shift. Since Berger will be mainly sourcing locally for its workforce, it will have a beneficial impact on the social environment through increase employment and local subcontracting. A significant increase of trucks along the 207 is also expected. At peak operations, an approximate 25 trucks per day will be coming in and out of the plant. Following one of the conditions of the development permit, Berger will enter into an agreement with the RM regarding maintenance and potential upgrade to the roads around the Project. As of now, road upgrades are not expected, but Berger will stay in close contact with the RM of Springfield should any improvements be necessary because of the Project.

4. Conclusion

Berger is applying for a license under the Environmental Act for a proposed horticultural mixing plant near Oakbank. The Project consists of the reception and screening of loose peat on site. The screened peat will then be mixed with different additives in order to produce specialized and personalized horticultural mixes. Products will then be compressed and bagged in different formats. Final products will be stored directly on site until loaded on trucks for delivery. The proposed operations include the renovations of existing facilities and the construction of the plant itself. As of April 2020, Renovations of existing buildings have already begun, and construction activities will begin as soon as all the approvals are obtained. It is expected that the plant will be fully operational by April 2021. Potential impacts from the Project on the environment could originate from the mishandling of hazardous substances, aerial contamination of peat particles, contaminant spills and fire. With the proper monitoring and mitigation measures, it is expected those potential impacts will be low to non-existent.

Pierre-Olivier Sauvageau, M. Sc.
Resource Advisor

Annex 1: Resolution of the RM of Springfield

Regarding Agricultural Zoning

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

Rural Municipality of Springfield

www.rmofspringfield.ca

June 7, 2019

Berger
121 1er Rang
Sainte-Modeste, Quebec
G0L 3W0

Attention: Frédéric Toubeau, Director

Dear Mr. Toubeau:

Re: Peat and Mix Plant in the RM of Springfield

Please be advised that Council of the Rural Municipality of Springfield is aware of the peat and mix plant operation proposed for 22054 Oakwood Road within the RM of Springfield and has no objections.

The property is currently zoned "AG" Agriculture General Zoning District in which peat moss is a defined agricultural activity. Please find a Resolution of Council to this effect attached.

We look forward to welcoming you into the Municipality.

Sincerely,

CDraper

Colleen Draper
Chief Administrative Officer

P.O. Box 219, 100 Springfield Centre Drive, Oakbank, Manitoba R0E 1J0
Phone (204) 444-3321 Fax (204) 444-2137

RM of Springfield
100 Springfield Centre Drive, Manitoba, R0E 1J0
Tel: 1- 204-444-3321
www.rmofspringfield.ca

25 April, 2019

RESOLUTION

Resolution # 19-195

Moved by: Howard Bredin

Seconded by: Rick Wilson

BE IT RESOLVED THAT the definition of agricultural activities within the Springfield Zoning By-law be amended to include peat moss.

Carried

Certified True Copy

Chief Administrative Officer

Annex 2: Hydrogeological Investigation Results by Friesen Drillers

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

Friesen DRILLERS

March 20, 2020

Mr. Bénédict Chénard-Soucy, ing.
Building Projects Manager
121, 1er Rang
Saint-Modeste, QC G0L3W0

Dear Bénédict,

Subject **Hydrogeological Investigation Results - Industrial Groundwater Supply**
22054 Oakwood Road (64 North) - NW 23-11-04 EPM, Rural Municipality of Springfield, Manitoba

Friesen Drillers is pleased to present this report to detail the results of our hydrogeological investigation completed for the Berger owned property at the above noted site.

The results of the investigation are detailed in the following paragraphs.

Project Background and Scope of Work

A peat processing plant is planned for the site located at section NW 23-11-04 EPM in the Rural Municipality of Springfield. A water supply developed from groundwater wells installed at the site will be required to support the operating processes. The site will require a peak flow rate of about 80 U.S.G.P.M. (300 L/min) with a total annual allocation of not more than 100 dam^3/year (~81 acre-ft./year). The groundwater supply is planned to be developed from the bedrock Carbonate Aquifer system which underlies the site. The water supply distribution system will include two supply wells for redundancy purposes.

The scope of work for this project is detailed below.

- Construct two, 5-inch diameter, PVC cased supply wells into the carbonate bedrock aquifer. The casing will be set through the overburden and into the top of the bedrock. The bedrock will then be drilled open hole with air and water to final depth.
- Conduct a short term capacity test on each new well to assess well yield potential.
- Complete a longer term (4-8 hr) pumping test to assess the overall system capabilities. During the pump test, groundwater levels would be monitored both manually and with automatic pressure sensing transducers in nearby wells.
- Collect water samples during the pumping test to be sent to an accredited laboratory for analysis. The water samples will be analyzed for routine major ion concentrations and stable environmental isotopes of ^{18}oxygen and deuterium.
- Complete a desktop inventory of existing wells within a one mile radius of the site.
- Generate a final report to detail the hydrogeological investigation results, and well inventory data. The report will be suitable for submission to Manitoba Sustainable Development – Water Use Licensing Section (MSD–WULS).

Site Setting

The site is located at 22054 Oakwood Road (64 North) on section NW 23-11-04 EPM, in the Rural Municipality of Springfield. The site lies directly east of the City of Winnipeg and the Red River Floodway. The community of Oakbank is located about 4 miles east of the site. Development around the site is relatively sparse and includes agricultural and rural residential land uses. The property includes facilities for equestrian activities. The location of the site is shown on the following page as Figure 1.

The site lies at an elevation of approximately 238 m (~780 ft.) geodetic. The topography of the region is generally of low relief and slopes gently to the west towards the Red River/Red River Floodway.

Site Setting (Cont'd)

Figure 1 – Location of the peat processing plant site, RM of Springfield. (Source - Google Earth, 2020)

Geology/Hydrogeology

The project site is located on the eastern fringes of the Western Canadian Sedimentary Basin. Bedrock in the area comprises Ordovician sedimentary rocks which include the Winnipeg Formation shale and sandstone and overlying Red River Formation dolomitic limestones. These formations were deposited upon Precambrian granites known as the Canadian Shield. The geology of southern Manitoba is shown below in Figure 2. Regionally, the bedrock formations dip gently to the west, where they become thicker and more deeply buried.

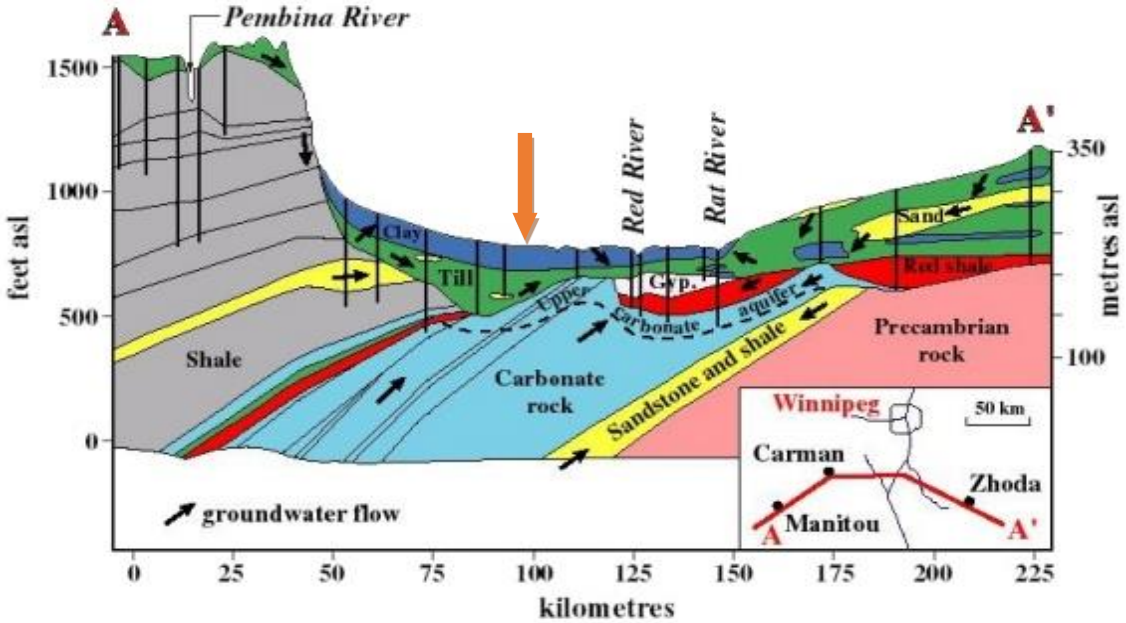


Figure 2 - Geology of southern Manitoba; orange arrow indicates approximate location of the Berger site. (Source - GSC, 2007)

Geology/Hydrogeology (Cont'd)

A complex distribution of glaciofluvial (sand and gravel) and glaciolacustrine (clay rich) deposits overlies the bedrock formations in the study area. Regionally, the overburden is composed of interlayered clay, silt and till with local deposits of sand and gravel. The regional surficial geology is illustrated below in Figure 3. The Berger site is located within an area of clay rich glaciolacustrine deposits.

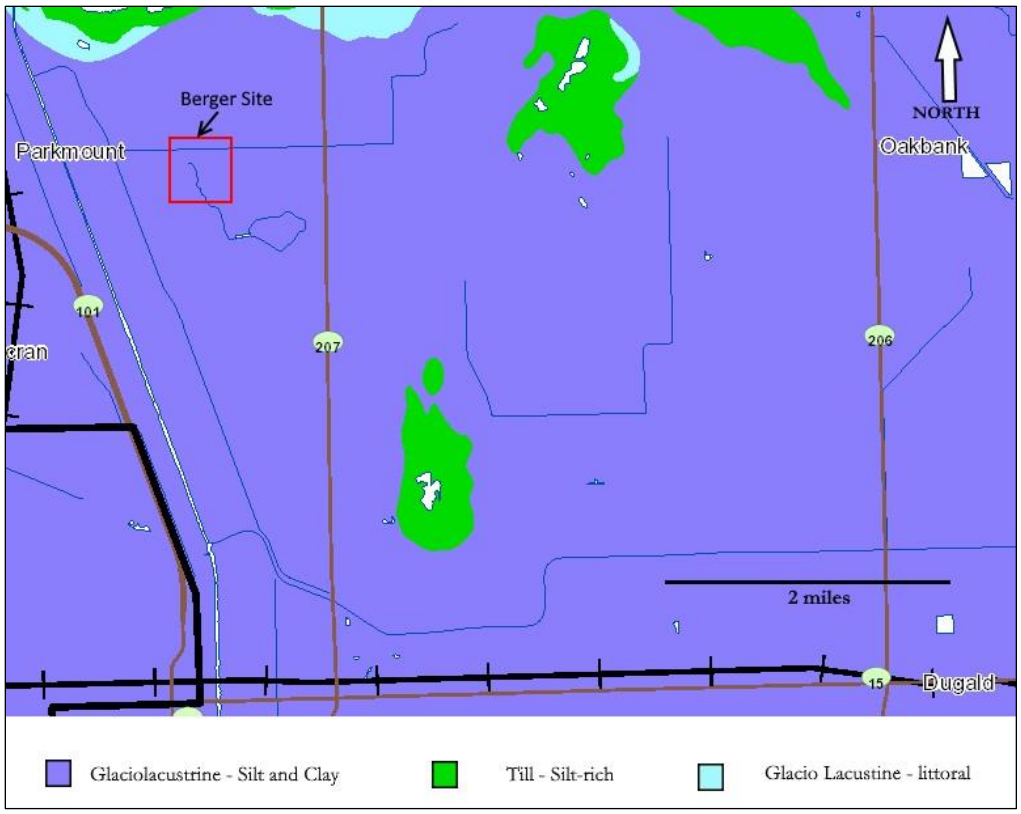


Figure 3 - Surficial geology of the Springfield region. (Source - Manitoba Mineral Resources, 2013)

The Carbonate Aquifer System forms the most geologically extensive and widely developed groundwater source in Manitoba, especially in the southeast and Interlake regions of the Province (Betcher et al., 1995). The Red River Formation composes the main carbonate aquifer unit in the RM of Springfield. Carbonate rock generally has very poor primary porosity of less than 1.0 % (Render, 1970). The main porosity within the carbonate bedrock occurs within the secondary joints, fractures, and karstic features that are common in many parts of the bedrock. Due to variability in the number, size, type and interconnected nature of the permeable features, well yields can vary substantially over relatively short distances depending on the fractures intersected by the well.

The carbonate aquifer system receives significant amounts of groundwater recharge through two large glacio-fluvial complexes (Sandilands and Birds Hill) located in eastern Manitoba (Betcher et al., 1995). These sedimentary complexes directly overly the carbonate aquifer and provide a conduit for recharge through the coarse sand and gravel deposits down into the bedrock (Render, 1970). It is also anticipated that the carbonate aquifer receives recharge, to a lesser extent, from downwards seepage through the overburden till and clay material.

Regional groundwater flow in the carbonate aquifer is westerly within the RM of Springfield, from the major groundwater recharge zones of the Sandilands moraines to the Red River Floodway. The direction of regional flow within the carbonate is shown to be well controlled by the major river and lake systems in southern Manitoba (Ferguson et al., 2003). The Birds Hill Glacio-Fluvial complex disrupts the regional westerly flow in the north western portion of the RM, as groundwater flows radially outward from the center of the recharge zone. Discharge in the carbonate aquifer occurs mainly through the Red River Floodway, on the eastern side of the RM, although the aquifer system is also shown to discharge into the Red River and Lake Winnipeg to the north (Render, 1970). After the construction of the floodway, water levels declined by up to 25 feet in some groundwater monitoring stations within the RM. Groundwater levels have remained relatively constant since equilibrating with the post floodway construction aquifer conditions.

Geology/Hydrogeology (Cont'd)

In general, water levels showed a marked decline after floodway construction, and fairly stable lower levels since. Figure 4, shown below, details a local chart located northeast from the Berger site.

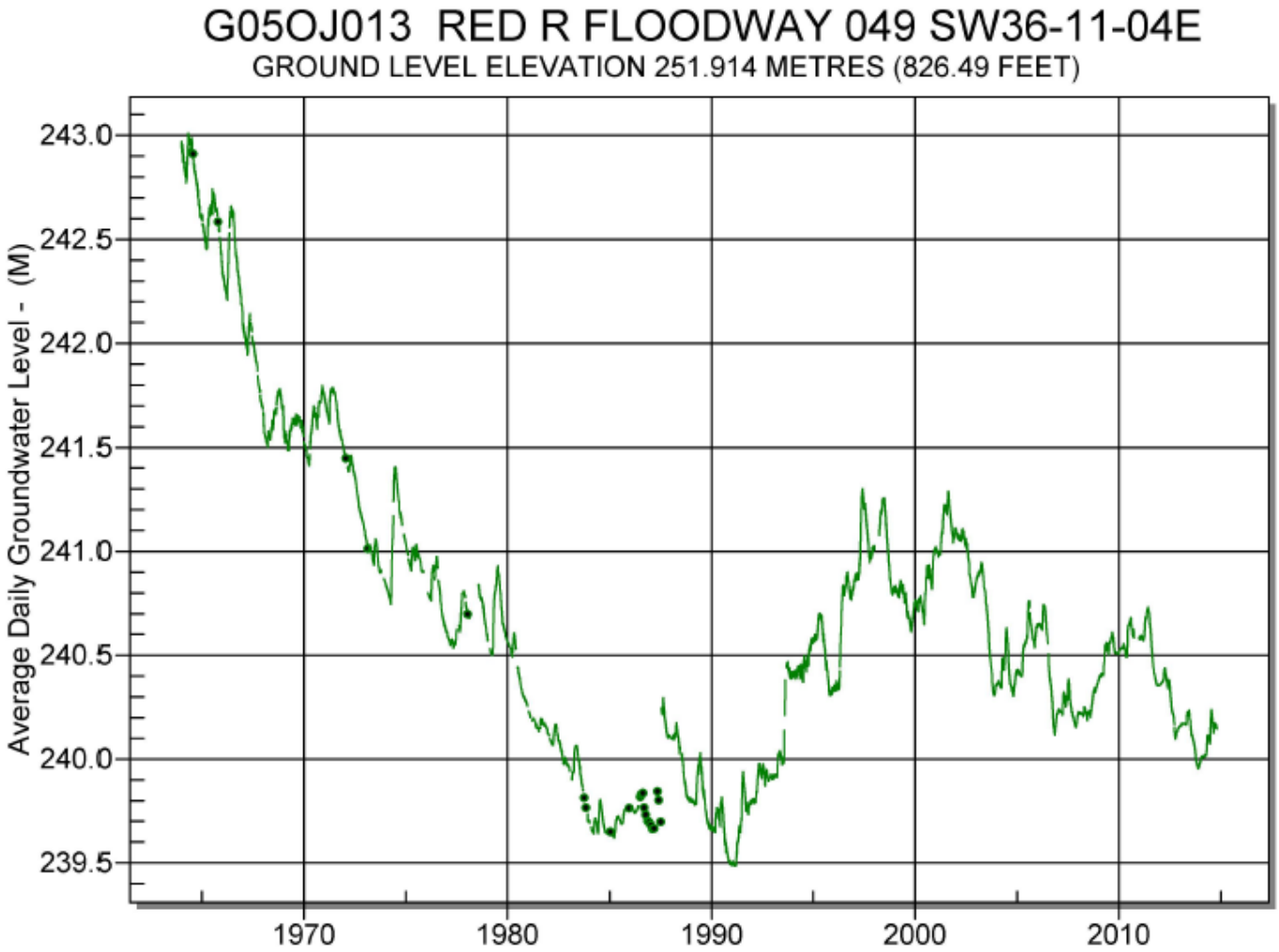


Figure 4 – G05OJ013 observation station. (Source – MSD, 2014)

Groundwater Geochemistry

The background groundwater geochemistry was reviewed from the available provincial monitoring stations in the Oakbank area. The water chemistry data from G05OJ013 and G05OJ014, completed in the carbonate aquifer, was obtained from MSD (C.Romano, 2014). A plot of the major ion concentrations is shown on the following page as Figure 5.

Based on these data, groundwater in the Carbonate Aquifer is relatively good quality, calcium/magnesium/bicarbonate type groundwater. TDS values are fairly low, the water is considered to be hard. It should be noted that nitrate concentrations were below detection limits in the samples.

Based on the available data, it expected that the groundwater quality at the Berger site is suitable for use without significant treatment. It is important to note that groundwater quality can change with pumping over time and should be monitored regularly.

Groundwater Geochemistry (cont'd)

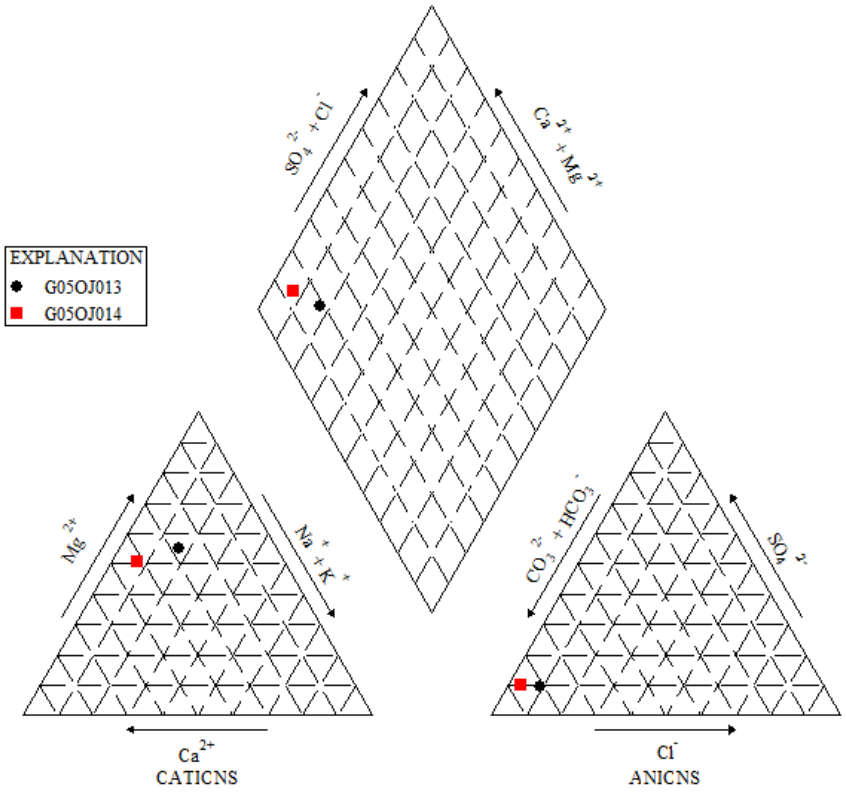


Figure 5 – Trilinear plot of provincial observation station G05OJ013/014. (Data source – MSD – C. Romano, 2014)

Investigations

Test Well Drilling

Friesen Drillers mobilized to site November 28 & 29, 2019 to complete the construction of two wells (Tag #3376 & #3377). The well locations, shown on the following page in Figure 7, were provided by Berger based on their site design.

Both wells were drilled to a final depth of 177 feet below grade. The boreholes intersected clay and till from surface to about 75 ft below grade. A layer of sand was intersected below the till in well #3376. Carbonate bedrock was intersected at about 75 feet until final depth. The hydrogeological conditions at the site appear to be confined.

Both wells were constructed with 5 inch diameter, PVC casing installed through the overburden and set into the top of the carbonate bedrock with a three tier step down socket. The 5 inch casing was grouted in place with bentonite. Drilling then proceeded open hole through the carbonate bedrock until sufficient water bearing fractures were intersected. A summary of the well construction details is given below in Table 1. Copies of the drillers logs are also attached.

Well locations were marked with a hand held GPS unit that is accurate to +/- 5 m.

Table 1
Well Construction Details - Berger, RM of Springfield

Well ID	UTM X	UTM Y	Total Well Depth	Well Casing
3376	647139.7	5534276.8	177 ft.	5 inch PVC; 0-75 ft.
3377	647138.0	5534418.1	177 ft.	5 inch PVC; 0-73 ft.

Table 1 – Well construction details – Berger, RM of Springfield.

Test Well Drilling (Cont'd)

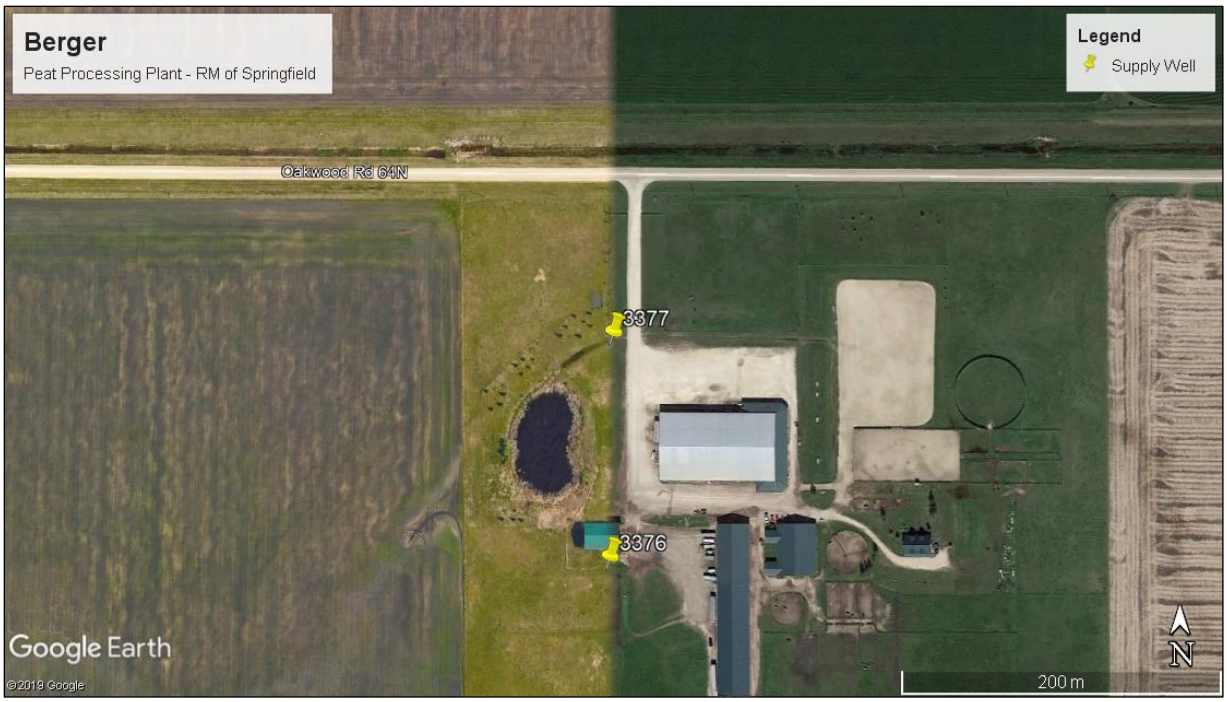


Figure 7 – Location of two supply wells; Berger, RM of Springfield (Source – Google Earth, 2020)

Well Capacity and Aquifer Testing

A short term pump test was completed on each well to assess well capacity. In addition, a 4 hour pumping test was conducted on well #3376 to assess the local aquifer parameters. The pumping test was conducted using a 5 HP submersible pump, with groundwater levels recorded manually with a depth sounder and automatically with a pressure transducer. The discharge rate was measured regularly with an orifice weir. Power was provided for the pumping test by means of a portable gasoline powered generator. Details of the pumping test results are provided below in Table 2. The pumping test drawdown data is also attached.

Table 2
Pumping Test Details - Berger, RM of Springfield

Well ID	Static Water Level	Pumping Water Level	Pumping Rate	Drawdown	Specific Capacity
3376	22.3 feet	31.6 feet	70 U.S.G.P.M	9.3 feet	7.53 U.S.G.P.M./ft.
3377	20.8 feet	21.0 feet	25 U.S.G.P.M	0.2 feet	125 U.S.G.P.M./ft

Table 2 - Pumping test details; Berger, RM of Springfield.

Desktop Well Inventory

An inventory of all private and commercial wells within a one mile radius of the site was conducted. The inventory was based upon the GWDRILL database (2018), maintained by MSD. The results of the inventory are attached as Table 3. In total, 45 wells were identified within a one mile radius of the site. With the exception of one well used for monitoring purposes, all of the wells were noted to be used for domestic purposes. The date of construction ranged from 1960 to 2008, with most of the wells constructed before 1990. The total well depth ranged from 70-297 ft. below grade, with an average of 135 ft. All of the wells were completed into the carbonate bedrock aquifer. It should be noted that the current status of the identified wells is not known and the locations of the wells were not verified.

Based on the results of the desktop well inventory, the closest well to the Berger site is approximately 2,000 feet away (GWDRILL, 2018).

Data Analysis

Aquifer Testing Analysis

The Theis (1935) method is the most common method for analyzing the results from aquifer pumping tests. Some critical assumptions of the method were noted during the development. They are detailed as follows:

- Darcy's law is valid
- The aquifer is horizontal and constant thickness
- The aquifer is infinite in areal extent
- The aquifer is bounded by impermeable strata above and below
- Uniform hydraulic conductivity
- Isotropic hydraulic conductivity
- Head always remains above the top of the pumped aquifer
- There are no water level changes that are not due to the pumping.
- Infinitesimal diameter of well
- Fully penetrating the aquifer formation
- Perfectly efficient well
- Single pumping well
- Constant pumping rate
- Constant storage properties through time
- The head is known everywhere prior to pumping.

Through a review of the assumptions, it can be seen that some of the conditions for the analysis of the pumping test conducted in this investigation are invalid for the Theis (1935) approach. However, the Theis (1935) approach is highly idealized to the assessment of the aquifer, and represents the state of the art for the determination of aquifer parameters. The conditions are also not being violated severely, so this approach will be used for the analysis.

The data from the pumping test was analyzed using Waterloo Hydrogeologic's Aquifer Test V2016.1. The Cooper-Jacob and Theis methods were both employed, although similar results were expected as the Cooper -Jacob (1946) method is a straight line approximation of the Theis (1935) method. The general hydraulic parameters determined from the analysis are shown below in Table 4. Plots of the Theis analysis and Cooper–Jacob analysis are shown on subsequent pages as Figures 8-10.

Table 4
Aquifer Parameters - Hydrogeological Testing –
Berger – RM of Springfield

Well Capacity		
Parameter	**Well 3376**	**Well 3377**
Static Water Level	22.3 feet	20.8 feet
Pumping Water Level	31.6 feet	21.0 feet
Drawdown	9.3 – 70 U.S.G.P.M. - 240 minutes	0.2 feet – 25 U.S.G.P.M. - 30 minutes
Specific Capacity	7.53 U.S.G.P.M./ft.	125.0 U.S.G.P.M./ft.
Aquifer Parameters		
Method	**Transmissivity**	**Storativity[3]**
Theis Method[1]	40,000 U.S.G./day/ft.	3.0×10^{-4}
Cooper-Jacob Method[2]	40,000 U.S.G./day/ft.	3.0×10^{-4}
Theis Recovery[1]	40,000 U.S.G./day/ft.	3.0×10^{-4}
Notes	[1] Theis (1935) method using graphical analysis. [2] Cooper-Jacob (1946) method using graphical analysis. [3] Storativity calculation not completed due to lack of monitoring wells.	

Table 4 – Aquifer Parameters – Berger – RM of Springfield; Waterloo Hydrogeologic's Aquifer Test V2016.1.

In general, the aquifer transmissivity was inferred from the data to be 40,000 U.S.G./ft. The storativity was inferred to be 3.0×10^{-4}, which is typical for confined fractured bedrock aquifers (Freeze and Cherry, 1979). During the analysis, the $t_{critical}$ was assumed to be less than approximately 15 minutes for casing storage; therefore, the data previous to 15 minutes was not used in the analysis. The Cooper-Jacob (1946) method was used, since emphasis is not placed on early time measurements.

Based on well logs for the area, the aquifer is not considered to be isotropic, and displays spatial variability. These conditions indicate a fundamental breech in the conditions of Theis (1935). Due to amount of data present and the lack of long term data from monitoring wells, the aquifer was assumed to be Theissian, although this may or may not be totally correct in this instance. This approach will be used for comparison purposes only in this evaluation. It was also assumed that skin effects for the supply well would be minimal after the developing and jetting procedures.

Aquifer Testing Analysis (Cont'd)

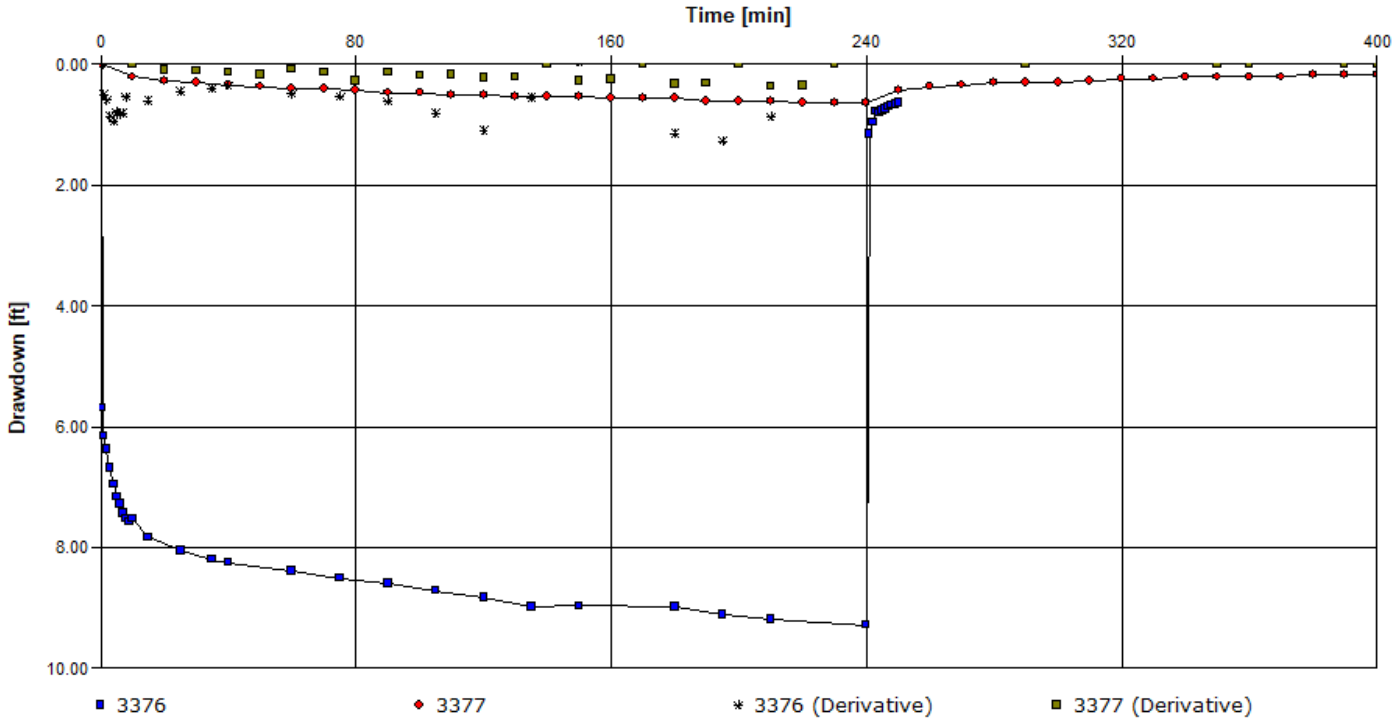


Figure 8 – Time-drawdown plot; pumping rate is 70 U.S.G.P.M.

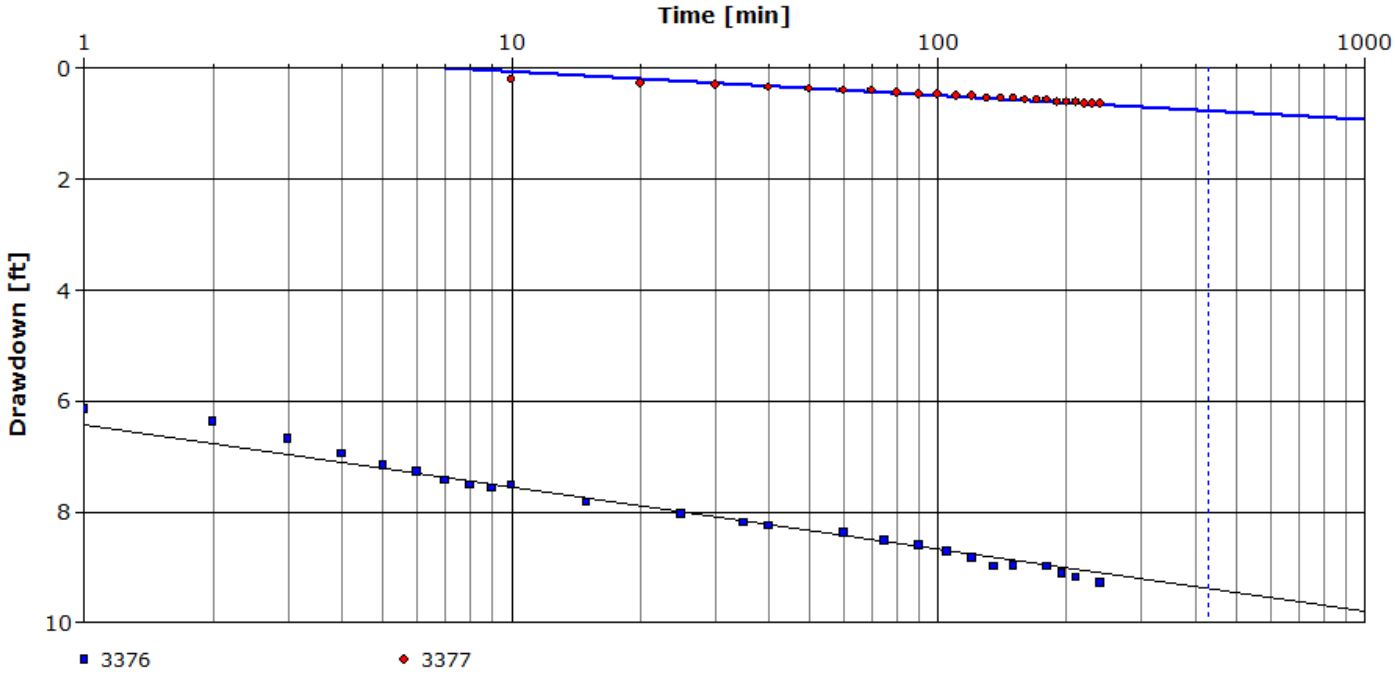


Figure 9 – Cooper-Jacob plot; pumping rate is 70 U.S.G.P.M.

Aquifer Testing Analysis (Cont'd)

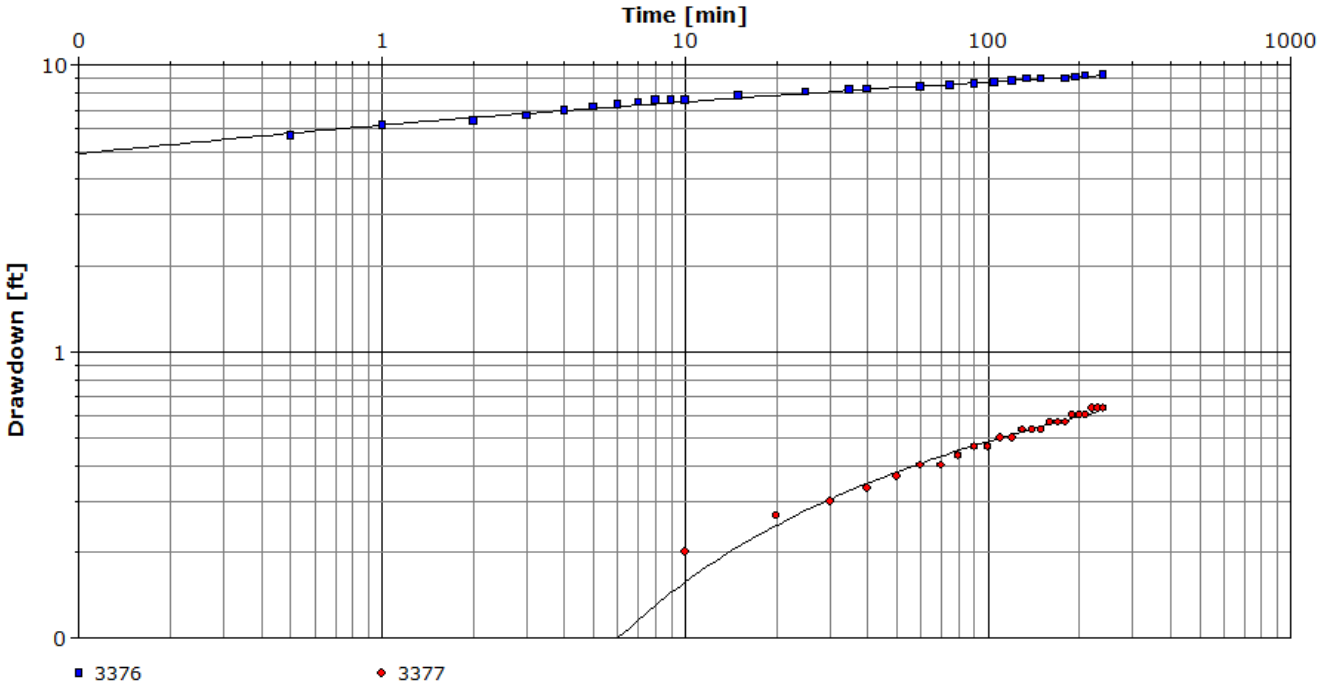


Figure 10 – Theis analysis plot; pumping rate is 70 U.S.G.P.M.

Water Supply Requirements and Long Term Aquifer Capacity

To support the operating processes, the site will require a water supply which is planned to be developed from the groundwater wells installed at the site. It is our understanding that the site will require a peak flow rate of about 300 L/min, or about 80 U.S.G.P.M. with a total annual allocation of not more than 100 dam^3/year (~81 acre-ft./year). The preferred distribution system design should include at least two supply wells for redundancy purposes.

To achieve the flow requirements for Berger site with redundancy, both supply wells will be required to produce the peak flow requirement of 80 U.S.G.P.M. per well. An annual water use volume of 100 dam^3/year equates to approximately 226 days of continuous pumping from one well at the peak rate of 80 U.S.G.P.M. This amount of pumping likely exceeds the actual operating water use for the site and will conservatively estimate the drawdown impacts generated by the site.

To estimate the effects of operating the site, the resulting drawdown was calculated at distance using the Theis equation, after 226 days of operation. The calculated drawdowns used the aquifer parameters inferred from the pumping test and follow all the assumptions of the Theis method. The results are summarized below in Table 5 and illustrated in Figure 11, shown on the following page.

Table 5
Calculated Drawdown at Distance from the Well Field
Pumping at a Rate of 80 U.S.G.P.M.
Berger – RM of Springfield
All calculations following the Theis (1935) equation and assumptions

	Distance								
Distance from well	**Well 3376 (0 ft.)**	**100 feet**	**250 feet**	**500 feet**	**750 feet**	**1,000 feet**	**1,500 feet**	**2,000 feet**	**2,640 feet (1/2 mile)**
Drawdown	10.6 feet	3.2 feet	2.7 feet	2.4 feet	2.2 feet	2.1 feet	1.9 feet	1.8 feet	0.6 feet

Table 5 – Estimated long term drawdown; pumping rate of 80 U.S.G.P.M. for 226 days (100 dam^3).

Water Supply Requirements and Long Term Aquifer Capacity (Cont'd)

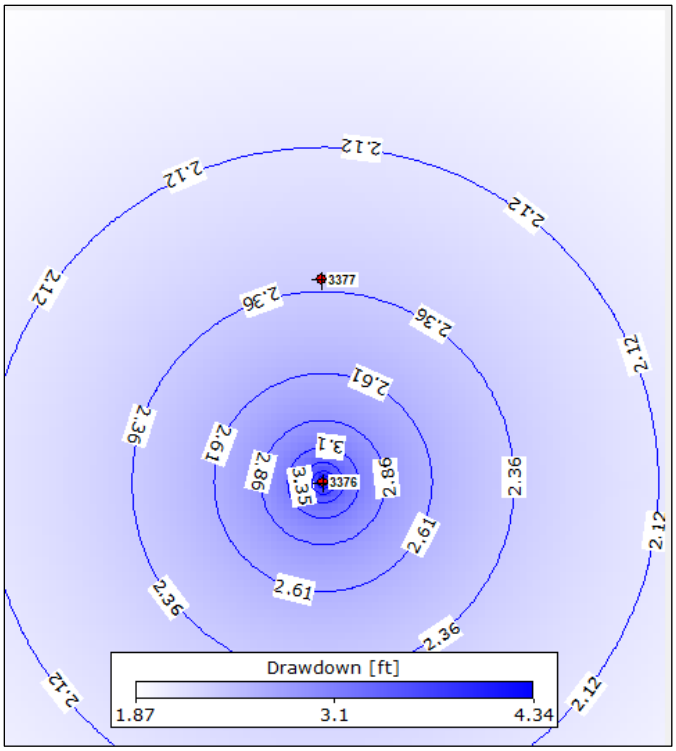


Figure 11 – Drawdown cone generated after 226 days pumping at 80 U.S.G.P.M. (total volume of 100 dam^3). (Plotted with AquiferTest V.2016.1)

Assuming a regional transmissivity of 40,000 U.S.G.P.D./ft., the drawdown at a radial distance of 2,000 ft. from the well field was calculated to be about 1.0 ft. after pumping at a rate of 80 U.S.G.P.M. (Walton, 1979/1983). This analysis is considered to be very conservative; it assumes that no recharge occurs during the pumping. This amount of drawdown is within the range of natural fluctuations shown on nearby hydrograph stations and is not anticipated to cause any issues for nearby groundwater users.

Local Groundwater Geochemistry

Table 6, shown below, details the results from the analytical sampling of the pump well during the pumping test. The complete results from ALS laboratories are attached (L2396645). A trilinear plot of the sample with nearby provincial monitoring stations is presented on the following page as Figure 12.

Overall, the water quality appears to be typical for the area, as evidenced by the similar data plots. The groundwater is of calcium/magnesium/bicarbonate type which is expected in the area. The groundwater quality is considered to be fresh, with TDS values below 500 mg/L, and hard (314 mg/L). It should be noted that groundwater quality may change with pumping over time

Table 6
Groundwater Quality – Berger Supply Well #3376

Parameter	Berger Supply Well (3376)
Total Dissolved Solids	312 mg/L
Chloride	19.8 mg/L
Sodium	10.5 mg/L
Nitrate	<0.02 mg/L
Hardness (as CaCO3)	314 mg/L
pH	8.22

Table 6 – Highlights of the local groundwater geochemistry. (Data source – ALS-L2396645, 2019)

Local Groundwater Geochemistry (Cont'd)

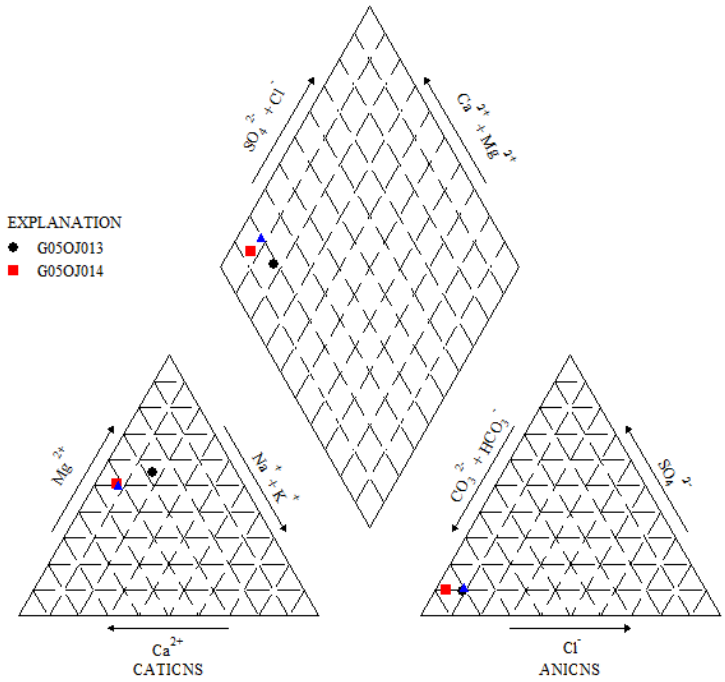


Figure 12 – Trilinear plot of Berger supply well (#3376) with nearby provincial stations. (Data source – ALS-L2396645, 2019; MSD – C. Romano, 2014)

Discussion and Recommendations

Based on the results of the hydrogeological analysis detailed in this report, the following recommendations are provided for a groundwater supply intended for irrigation purposes at the Berger site in the RM of Springfield.

- The capacity of the two supply wells, completed into the Carbonate Aquifer, is likely sufficient to support groundwater pumping at a rate of 80 U.S.G.P.M. per well under normal operating conditions.

- Each supply well could be mechanized to provide 80 U.S.G.P.M. per well. The pump intake should be set at 70 feet below grade. The wells should be connected using a full spool pitless unit.

- The projected groundwater level fluctuations resulting from operation of the new water supply are expected to be less than natural seasonal and climatic fluctuations. It is recommended that groundwater levels be monitored to assess for potential progressive drawdown impacts to groundwater levels in the local aquifer.

- Groundwater quality at the site appears to be fresh (TDS~300 mg/L) and is likely acceptable for use without significant treatment.

- The wells should be connected using full pitless units and connections should contain only stainless steel or brass fittings.

- The supply wells should remain permanently vented.

- The wells may require maintenance to clean out the fractures and well casing and inspect the pump and components. We typically recommend this to be undertaken every four years.

- A copy of this report should be forwarded to Manitoba Sustainable Development – Water Use Licensing Section in support of a Water Rights Licence application.

- The water supply system should be equipped with a flow meter to measure both instantaneous and cumulative groundwater usage.

Please let us know if you feel we have missed anything; our office number is 204-326-2485.

Sincerely,

Friesen Drillers Limited

Justin Neufeld, GIT
Groundwater Geologist

PROVINCE OF MANITOBA
J. J. BELL
Member
22621
REGISTERED PROFESSIONAL ENGINEER

Reviewed by,

Friesen Drillers Limited

Jeff Bell, P.Eng.
Hydrogeological Engineer

Certificate of Authorization
Friesen Drillers Limited
No. 4016 Date: Mar 20/2020

Attachments Driller's Logs – Friesen Drillers Ltd.
Table 3 – Well Inventory
Pumping Test Data – Friesen Drillers Ltd.
ALS Laboratory analysis - L2396645

References

Betcher, R.N., Grove, G., and Pupp, C, 1995. Groundwater in Manitoba. NHRI Contribution No. CS-93017

Cooper, H.H., Jr. and Jacob, C.E. 1946, A generalized graphical method for evaluating formation constants and summarizing well field history. Transactions, American Geophysical Union, Vol. 27., No. 4.

Freeze, R.A. and Cherry, J.A., 1979. *Groundwater*. Prentice Hall, Englewood Cliffs, New Jersey, U.S.A.

Manitoba Sustainable Development, 2018. GWDRILL database.

Manitoba Sustainable Development, 2014. Water Level Hydrographs G05OH032; provided bv C.Romano, MSD.

Manitoba Mineral Resources 2013: Bedrock geology, Manitoba; in Map Gallery – Geoscientific Maps, Manitoba Mineral Resources, URL <http://web33.gov.mb.ca/mapgallery/.html> [October 30, 2018].

Theis, C.V., 1935. The Lowering of the Piezometer Surface and the rate and discharge of a well using ground-water storage. Transactions, American Geophysical Union 16:519-24.

Walton, W., 1979. Progress in analytical modeling groundwater modeling, Journal of Hydrology 43:149-59.

Limitations

The scope of this report is limited to the matters expressly covered and is intended solely for the client to whom it is addressed. Friesen Drillers Limited makes no warranties, expressed or implied, including without limitation, as to the marketability of the site, or fitness to a particular use. The assessment was conducted using standard engineering and scientific judgment, principles, and practices, within a practical scope and budget. It is based partially on the observations of the assessor during the site visit in conjunction with archival information obtained from a number of sources, which is assumed to be correct. Except as provided, Friesen Drillers Limited has made no independent investigations to verify the accuracy or completeness of the information obtained from secondary sources or personal interviews. Generally, the findings, conclusions, and recommendations are based on a limited amount of data (e.g. number of boreholes drilled or water quality samples submitted for laboratory analysis) interpolated between sampling points and the actual conditions on the site may vary from that described above. Any findings regarding the site conditions different from those described above upon which this report was based will consequently change Friesen Drillers Limited's conclusions and recommendations.

Disclaimer

This Friesen Drillers Limited report has been prepared in response to the specific requests for services from the client to whom it is addressed. The content of this document is not intended to be relied upon by any person, firm, or corporation, other than the client of Friesen Drillers Limited, to who it is addressed. Friesen Drillers Limited denies any liability whatsoever to other parties who may obtain access to this document by them, without express prior written authority of Friesen Drillers Limited and the client who has commissioned this document.

Well Construction Report

Manitoba

Sheet 1 of 1 — **For PDF submission: Report must be printed on legal size paper (8.5 x 14 inches) and be signed in ink.** — Form No. WELLCON-V01-PDF

Owner Name: Berger (First) (Last)
Mailing Address: 121 1er Rong Est
Town/City: Saint-Modeste, QC
Postal Code: G0L 3W0 Phone:
Email:

Well Location: (see note 3; attach sketch if necessary)
Civic Address: 22054 Oakwood Road
(if different than mailing address)
Quarter_____ Section_____ Township_____ Range____ ☐E ☐W
Parish_____ Type & Lot No._____

Well Name: (if applicable)_____
Well Identification Tag Number: 3377
Location of Tag ☒ Attached to casing stick-up
☐ Other (specify)_____

GPS: (see note 4), Accuracy +/- 6 ☒ feet ☐ metres
Latitude (decimal degrees): 49.94398
Longitude (decimal degrees): 96.94923
Rockwood Sensitive Area: ☐ Yes - Permit No. _____ ☒ No

Test Hole (see note 5) - Sealed ☐ Yes ☐ No **or**
Well Use: ☐ test well - Sealed ☐ Yes ☐ No
☒ production/source ☐ recharge/return
☐ monitoring ☐ dewatering ☐ geotechnical
☐ other (specify)_____

Method of Construction:
☐ auger ☐ bored ☐ backhoe/dug
☒ rotary (mud) ☐ rotary (air)
☐ dual rotary ☐ driven ☐ jetted
☐ other (specify)_____

Water Use: (Check all that apply)
☐ domestic ☐ public/semi-public ☒ irrigation
☒ commercial/industrial ☐ livestock/poultry
☐ earth energy (heating/cooling)
☐ other (specify)_____

Lithologic Description: (see notes 6 and 7) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Colour	Material Description (use recommended names on guide)	Observations
0	1		Organics	
1	6	Grey	Clay	
6	12	Brown	Clay	
12	44	Grey	Clay	
44	77	Brown	Till	
77	177		Limestone	
177	-	-	-	Bottom of Hole
0				
0				
0				

Well Construction: (see note 8) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Borehole	Casing	Liner	Open Hole	Well Screen	Surface Seal	Annular Fill	Filter Pack	ID (inches)	OD (inches)	Type of Material (ex: casing and screen material, screen type and slot size, use of shale traps , packers, screen blanks or tail pipes, and type and size of surface seal/annular fill/filter pack material)	Method of Placement (ex: poured, tremie)
0	73	X									7 7/8		
0	73		X							5	5½	Insert Glued PVC	
73	177				X						4¾		
0	73						X					Envirogrout	Poured

Well Completion: Day 29 Month November Year 20 19
Top of casing 24 inches ☒ags ☐ bgs; Well vented: ☒ Yes ☐ No
Well disinfected: ☒ Yes ☐ No; Well cover installed: ☒ Yes ☐ No
Pitless adapter/unit installed at_____ feet bgs; ☒Not installed

Source of Drilling Water: ☒ Groundwater ☐ Surface water
Water contains a minimum of 10 mg/L free chlorine: ☒ Yes ☐ No
Name/Location of water source: Friesen Drillers Ltd.

Drilling Additives Used: ☒ Yes (list type & quantity) 6 Bags Wyo-Ben Extra High Yield Bentonite ☐ No

Well Yield Test (see note 9),
Date of Test: Day_____ Month_____ Year 20_____
☒ Same as date of well completion
Static Water Level Before Test 20.83 feet ☒ bgs ☐ ags
Method of Test: ☒pumping ☐air lift ☐bailing ☐recovery
☐ other (specify)_____
Water level at end of test 21.00 feet ☒ bgs ☐ ags
Length of test_____ hours 30 minutes
Estimated rate of discharge 21 ☒IGPM ☐ USGPM

Well Development: ☒ air lifting ☐ surging ☐ pumping ☐ jetting
☐ bailing ☐ hydrofracturing ☐ other (specify)_____
Water Quality Characteristics: ☒ fresh ☐ salty ☐ clear ☐ cloudy
☐ sediment ☐ odour (specify)_____

Flowing Artesian Well ☒ No ☐ Yes - If yes, estimated rate of artesian flow _____ ☐IGPM ☐ USGPM Annular space cemented: ☐ Yes ☐ No
Flow control device installed: ☐ Yes ☐ No
Does water leak from around the outside of the casing: ☐ Yes ☒ No

Recommended Pumping Rate:_____ ☒IGPM ☐ USGPM with pump intake at _____ feet bgs;
Will your company be installing a pump?: ☐ Yes ☒ No

Remarks (see note 10) Iron: 0.2 Grains Hardness: 17 Well must be vented.

Well Drilling Contractor: Company Name Friesen Drillers Ltd Licence No. 607-19
Well Driller: Print Name Jonathan Brelis / Stanley Flear Signature _____

Declaration: I certify that to the best of my knowledge the information provided herein is accurate and true and complies with The Groundwater and Water Well Act.

Well Construction Report

Manitoba

Sheet 1 of 1 — **For PDF submission: Report must be printed on legal size paper (8.5 x 14 inches) and be signed in ink.** — Form No. WELLCON-V01-PDF

Owner Name: Berger (First) (Last)
Mailing Address: 121 1er Rong Est
Town/City: Saint-Modeste, QC
Postal Code: G0L 3W0 Phone:
Email:

Well Location: (see note 3; attach sketch if necessary)
Civic Address: 22054 Oakwood Road
(if different than mailing address)
Quarter_____ Section_____ Township_____ Range____ ☐E ☐W
Parish_____ Type & Lot No._____

Well Name: (if applicable)
Well Identification Tag Number: 3376
Location of Tag ☒ Attached to casing stick-up
☐ Other (specify)

GPS: (see note 4), Accuracy +/- 6 ☒ feet ☐ metres
Latitude (decimal degrees) 49.94271
Longitude (decimal degrees) 96.94926

Rockwood Sensitive Area: ☐ Yes - Permit No. _____ ☒ No

Test Hole (see note 5) - Sealed ☐ Yes ☐ No **or**
Well Use: ☐ test well - Sealed ☐ Yes ☐ No
☒ production/source ☐ recharge/return
☐ monitoring ☐ dewatering ☐ geotechnical
☐ other (specify)

Method of Construction:
☐ auger ☐ bored ☐ backhoe/dug
☒ rotary (mud) ☐ rotary (air)
☐ dual rotary ☐ driven ☐ jetted
☐ other (specify)

Water Use: (Check all that apply)
☐ domestic ☐ public/semi-public ☒ irrigation
☒ commercial/industrial ☐ livestock/poultry
☐ earth energy (heating/cooling)
☐ other (specify)

Lithologic Description: (see notes 6 and 7) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Colour	Material Description (use recommended names on guide)	Observations
0	1		Organics	
1	5	Grey	Clay	
5	10	Brown	Clay	
10	48	Grey	Clay	
48	68	Grey / Brown	Till	
68	73		Sand & Gravel	
73	177		Limestone	
177	-	-	-	Bottom of Hole
0				
0				

Well Construction: (see note 8) - Measure From/To depths from ground surface. Attach another sheet if needed.

From (ft)	To (ft)	Borehole	Casing	Liner	Open Hole	Well Screen	Surface Seal	Annular Fill	Filter Pack	ID (inches)	OD (inches)	Type of Material (ex: casing and screen material, screen type and slot size, use of shale traps , packers, screen blanks or tail pipes, and type and size of surface seal/annular fill/filter pack material)	Method of Placement (ex: poured, tremie)
0	75	X									7 7/8		
0	75		X							5	5½	Insert Glued PVC	
75	177				X						4¾		
0	75						X					Envirogrout	Poured

Well Completion: Day 28 Month November Year 20 19
Top of casing 24 inches ☒ags ☐ bgs; Well vented: ☒ Yes ☐ No
Well disinfected: ☒ Yes ☐ No; Well cover installed: ☒ Yes ☐ No
Pitless adapter/unit installed at_____ feet bgs; ☒Not installed

Source of Drilling Water: ☒ Groundwater ☐ Surface water
Water contains a minimum of 10 mg/L free chlorine: ☒ Yes ☐ No
Name/Location of water source: Friesen Drillers Ltd.

Drilling Additives Used: ☒ Yes (list type & quantity) 6 Bags Wyo-Ben Extra High Yield Bentonite ☐ No

Well Yield Test (see note 9),
Date of Test: Day 11 Month December Year 20 19
☐ Same as date of well completion
Static Water Level Before Test 22.3 feet ☒ bgs ☐ ags
Method of Test: ☒pumping ☐air lift ☐bailing ☐recovery
☐ other (specify)
Water level at end of test 31.6 feet ☒ bgs ☐ ags
Length of test 4 hours 0 minutes
Estimated rate of discharge 58 ☒IGPM ☐ USGPM

Well Development: ☒ air lifting ☐ surging ☐ pumping ☐ jetting
☐ bailing ☐ hydrofracturing ☐ other (specify)
Water Quality Characteristics: ☒ fresh ☐ salty ☐ clear ☐ cloudy
☐ sediment ☐ odour (specify)

Flowing Artesian Well ☒ No ☐ Yes - If yes, estimated rate of artesian flow _____ ☐IGPM ☐ USGPM Annular space cemented: ☐ Yes ☐ No
Flow control device installed: ☐ Yes ☐ No
Does water leak from around the outside of the casing: ☐ Yes ☒ No

Recommended Pumping Rate: _____ ☒IGPM ☐ USGPM with pump intake at _____ feet bgs;
Will your company be installing a pump?: ☐ Yes ☒ No

Remarks (see note 10) Iron: 0.2 Grains Hardness: 14 Well must be vented.

Well Drilling Contractor: Company Name: Friesen Drillers Ltd Licence No. 607-19
Well Driller: Print Name: Jonathan Brelis / Stanley Flear Signature

Declaration: I certify that to the best of my knowledge the information provided herein is accurate and true and complies with The Groundwater and Water Well Act.

Table 3
Well Inventory – 1-mile radius
Berger, RM of Springfield – NW 23-11-04 EPM

No.	Location	Owner	Driller	Well Use	Date	Depth (ft.)	S.W.L. (ft.)	P.W.L. (ft.)	Rate igpm
1	23-11-4E	L H Craig	Aquarius Well Drilling	P	1974	101.9	23	N/A	49.9
2	SW26-11-4E	Lisa Douma	Echo Drilling Ltd.	P	1996	100	21	23	15
3	NE23-11-4E	Frank De Fehr Farms	Maple Leaf Enterprises Ltd.	P	1996	70	25	N/A	150
4	NE23-11-4E	Mika Sawatzky	Unknown	P	1900	N/A	N/A	N/A	N/A
5	NE22-11-4E	M Gavaga	Pruden Drilling Co. Ltd.	P	1992	109.9	20	N/A	19.9
6	SE-26-11-4E	A J Gavago	Pruden Drilling Co. Ltd.	P	1967	110.9	20	N/A	10
7	SE27-11-4E	Allan Akins	Unknown	P	2000	N/A	N/A	N/A	N/A
8	NE22-11-4E	Wayne Hiady	Hygaard's Well Drilling	P	1981	79.9	21	25	17.9
9	SW26-11-4E	Wendy Mcgraw	Unknown	P	2003	N/A	N/A	N/A	N/A
10	NE22-11-4E	Gerry Hoewen	Maple Leaf Enterprises Ltd.	P	2008	100	24	30	100
11	NE22-11-4E	Gerry Hoewen	Maple Leaf Enterprises Ltd.	P	2008	100	24	24	80
12	SE-27-11-4E	Perma Eng Sales Ltd	Paul Slusarchuk Well Drilling Ltd.	P	1975	124.9	0	19	15
13	SE-27-11-4E	Plan Build Service	Ford Drilling Ltd.	P	1976	139.9	0	29	24.9
14	SE-27-11-4E	G Braun	Paul Slusarchuk Well Drilling Ltd.	P	1988	176.9	21	N/A	29.9
15	SE-27-11-4E	G Braun	Friesen Drillers Ltd.	P	1974	279.8	24	50	2.4
16	SE23-11-4E	D W Morrish	D.C.L. Drilling	P	1968	70.3	20	N/A	19.9
17	SE23-11-4E	Helen Marsh	Unknown	P	1970	N/A	N/A	N/A	N/A
18	NW22-11-4E	WRB	Pruden Drilling Co. Ltd.	O	1963	93.9	5	N/A	50
19	SE-22-11-4E	K Pozulezoy	Stonewall Drilling	P	1986	122.9	26	N/A	7.9
20	SE23-11-4E	Adele Burelle	Unknown	P	1960	N/A	N/A	N/A	N/A
21	22-11-4E	G Gevoga	Paul Slusarchuk Well Drilling Ltd.	P	1976	124.9	26	N/A	15
22	22-11-4E	K Sample	Perimeter Drilling Ltd.	P	1992	93.9	32	N/A	39.9
23	NW-26-11-4E	K Biedrich	Echo Drilling Ltd.	P	1987	114.9	20	40	29.9
24	NW-26-11-4E	B Van Den Abeele	Stonewall Drilling	P	1986	122.9	17	N/A	49.9
25	NW-26-11-4E	A Bartel	Paul Slusarchuk Well Drilling Ltd.	P	1975	141.9	13	N/A	29.9
26	NW-26-11-4E	J J Zayshley	Hygaard's Well Drilling	P	1975	197.9	27	36	10
27	NW-26-11-4E	R Claeys	Paul Slusarchuk Well Drilling Ltd.	P	1985	227.8	28	N/A	29.9
28	NW-26-11-4E	K Holland	Friesen Drillers Ltd.	P	1985	114.9	28	40	19.9
29	NW26-11-4E	Al Tomiuk	Echo Drilling Ltd.	P	1996	120	12	15	15
30	NW-26-11-4E	B Tomivk	Stonewall Drilling	P	1985	102.9	17	N/A	99.9
31	NW-26-11-4E	E Koenig	Friesen Drillers Ltd.	P	1974	109.9	0	30	49.9
32	NW26-11-4E	Charlene Clayes	Echo Drilling Ltd.	P	2004	157	31	80	50
33	NW-26-11-4E	G Hilderman	Friesen Drillers Ltd.	P	1974	139.9	25	50	29.9
34	NW-26-11-4E	M Chunick	Paul Slusarchuk Well Drilling Ltd.	P	1980	165.9	29	N/A	29.9

35	NW-26-11-4E	W H White	Paul Slusarchuk Well Drilling Ltd.	P	1963	116.9	12	20	34.9
36	NW-26-11-4E	L Lotz	Pruden Drilling Co. Ltd.	P	1967	115.9	20	20	10
37	NW-26-11-4E	J Holland	Hunts Water Well Drilling	P	1995	92.9	25	50	10
38	NW-26-11-4E	D Bartel	Paul Slusarchuk Well Drilling Ltd.	P	1977	165.9	1	N/A	44.9
39	NW-26-11-4E	M Borowski	Paul Slusarchuk Well Drilling Ltd.	P	1968	133.9	19	21	34.9
40	SW24-11-4E	Berenice Bednar	Unknown	P	1900	N/A	N/A	N/A	N/A
41	27-11-4E	G Garnette	Aquarius Well Drilling	P	1974	123.9	25	N/A	15
42	27-11-4E	R W Zelinsky	Paul Slusarchuk Well Drilling Ltd.	P	1971	137.9	21	23	29.9
43	27-11-4E	Stratfield Properties	Echo Drilling Ltd.	P	2001	297	25	35	25
44	SW25-11-4E	Debbie Petrie	Echo Drilling Ltd.	P	2008	147	10	50	50
45	NW25-11-4E	Bill Sedo	Unknown	P	1993	N/A	N/A	N/A	N/A

Notes

All information sourced from Manitoba Sustainable Development – GWDRILL, (2018 edition)

Friesen Drillers Limited has not verified or field confirmed any data present in this table. All yields and static water levels are as reported and have not been verified by Friesen Drillers Limited. Current well use or operations are unknown for all wells listed.

S.W.L.-Static water level; P.W.L.–Pumping water level; N/A–Not Available; P - Production; O-Observation.

Pumping Test - Water Level Data

Project: Berger Peat Processing

Number: Berger2020

Client: Berger

Location: RM of Springfield	Pumping Test: Pumping Test 1	Pumping Well: 3376
Test Conducted by: FDL	Test Date: 12/11/2019	Discharge Rate: 80 [U.S. gal/min]
Observation Well: 3376	Static Water Level [ft]: 22.32	Radial Distance to PW [m]: -

	Time [d]	Water Level [ft]	Drawdown [ft]
1	0	22.32	0.00
2	0.0003	28.00	5.68
3	0.0007	28.47	6.15
4	0.0014	28.70	6.38
5	0.0021	29.00	6.68
6	0.0028	29.27	6.95
7	0.0035	29.48	7.16
8	0.0042	29.60	7.28
9	0.0049	29.75	7.43
10	0.0056	29.84	7.52
11	0.0063	29.89	7.57
12	0.0069	29.84	7.52
13	0.0104	30.15	7.83
14	0.0174	30.36	8.04
15	0.0243	30.52	8.20
16	0.0278	30.57	8.25
17	0.0417	30.70	8.38
18	0.0521	30.83	8.51
19	0.0625	30.92	8.60
20	0.0729	31.03	8.71
21	0.0833	31.15	8.83
22	0.0938	31.30	8.98
23	0.1042	31.29	8.97
24	0.125	31.30	8.98
25	0.1354	31.43	9.11
26	0.1458	31.50	9.18
27	0.1667	31.60	9.28
28	0.1674	23.47	1.15
29	0.1681	23.28	0.96
30	0.1688	23.10	0.78
31	0.1694	23.12	0.80
32	0.1701	23.09	0.77
33	0.1708	23.06	0.74
34	0.1715	23.02	0.70
35	0.1722	23.00	0.68
36	0.1729	22.98	0.66
37	0.1736	22.95	0.63

Pumping Test - Water Level Data

Project: Berger Peat Processing

Number: Berger2020

Client: Berger

Location: RM of Springfield	Pumping Test: Pumping Test 1	Pumping Well: 3376
Test Conducted by: FDL	Test Date: 12/11/2019	Discharge Rate: 80 [U.S. gal/min]
Observation Well: 3377	Static Water Level [ft]: 21.99	Radial Distance to PW [m]: 142

	Time [d]	Water Level [ft]	Drawdown [ft]
1	0	21.986	0.00
2	0.0069	22.187	0.201
3	0.0139	22.254	0.268
4	0.0208	22.287	0.301
5	0.0278	22.32	0.334
6	0.0347	22.354	0.368
7	0.0417	22.387	0.401
8	0.0486	22.387	0.401
9	0.0556	22.421	0.435
10	0.0625	22.454	0.468
11	0.0694	22.454	0.468
12	0.0764	22.487	0.501
13	0.0833	22.487	0.501
14	0.0903	22.521	0.535
15	0.0972	22.521	0.535
16	0.1042	22.521	0.535
17	0.1111	22.554	0.568
18	0.1181	22.554	0.568
19	0.125	22.554	0.568
20	0.1319	22.588	0.602
21	0.1389	22.588	0.602
22	0.1458	22.588	0.602
23	0.1528	22.621	0.635
24	0.1597	22.621	0.635
25	0.1667	22.621	0.635
26	0.1736	22.421	0.435
27	0.1806	22.354	0.368
28	0.1875	22.32	0.334
29	0.1944	22.287	0.301
30	0.2014	22.287	0.301
31	0.2083	22.287	0.301
32	0.2153	22.254	0.268
33	0.2222	22.22	0.234
34	0.2292	22.22	0.234
35	0.2361	22.187	0.201
36	0.2431	22.187	0.201
37	0.25	22.187	0.201
38	0.2569	22.187	0.201
39	0.2639	22.153	0.167
40	0.2708	22.153	0.167
41	0.2778	22.153	0.167
42	0.2847	22.153	0.167
43	0.2917	22.153	0.167
44	0.2986	22.12	0.134
45	0.3056	22.086	0.10
46	0.3125	22.086	0.10
47	0.3194	22.086	0.10
48	0.3264	22.086	0.10

Pumping Test - Water Level Data

Project: Berger Peat Processing

Number: Berger2020

Client: Berger

	Time [d]	Water Level [ft]	Drawdown [ft]
49	0.3333	22.086	0.10
50	0.3403	22.086	0.10
51	0.3472	22.086	0.10
52	0.3542	22.086	0.10
53	0.3611	22.086	0.10
54	0.3681	22.086	0.10
55	0.375	22.086	0.10
56	0.3819	22.053	0.067
57	0.3889	22.053	0.067
58	0.3958	22.086	0.10
59	0.4028	22.053	0.067
60	0.4097	22.053	0.067
61	0.4167	22.053	0.067
62	0.4236	22.053	0.067
63	0.4306	22.053	0.067
64	0.4375	22.053	0.067
65	0.4444	22.053	0.067
66	0.4514	22.02	0.034
67	0.4583	22.02	0.034
68	0.4653	22.053	0.067
69	0.4722	22.02	0.034
70	0.4792	22.02	0.034
71	0.4861	22.02	0.034
72	0.4931	22.02	0.034
73	0.5	22.02	0.034
74	0.5069	22.02	0.034
75	0.5139	22.02	0.034
76	0.5208	21.986	0.00
77	0.5278	22.02	0.034
78	0.5347	21.986	0.00
79	0.5417	21.986	0.00
80	0.5486	21.986	0.00
81	0.5556	21.986	0.00
82	0.5625	21.986	0.00
83	0.5694	21.986	0.00
84	0.5764	21.986	0.00
85	0.5833	21.986	0.00
86	0.5903	21.986	0.00
87	0.5972	21.986	0.00
88	0.6042	21.986	0.00
89	0.6111	21.986	0.00
90	0.6181	21.986	0.00
91	0.625	21.986	0.00
92	0.6319	21.986	0.00
93	0.6389	21.986	0.00
94	0.6458	21.986	0.00
95	0.6528	21.986	0.00
96	0.6597	21.986	0.00
97	0.6667	21.986	0.00
98	0.6736	21.986	0.00
99	0.6806	21.986	0.00
100	0.6875	21.986	0.00

Friesen Drillers Ltd
ATTN: PAULYNN ESTRELLA
307 PTH 12 N
Steinbach MB R5G 1L9

Date Received: 16-DEC-19
Report Date: 15-JAN-20 09:06 (MT)
Version: FINAL

Client Phone: 204-326-2485

Certificate of Analysis

Lab Work Order #: L2396645

Project P.O. #: NOT SUBMITTED
Job Reference: BERGER
C of C Numbers:
Legal Site Desc:

Hua Wo
Chemistry Laboratory Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2396645-1 WELL 1							
Sampled By: AF on 12-DEC-19 @ 15:19							
Matrix: WATER							
Miscellaneous Parameters							
Special Request	See Attached					10-JAN-20	R4969133
ROU4W total							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	303		1.2	mg/L		18-DEC-19	
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		18-DEC-19	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		18-DEC-19	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	249		1.0	mg/L		17-DEC-19	R4945513
Chloride in Water by IC							
Chloride (Cl)	19.8		0.50	mg/L		16-DEC-19	R4945299
Conductivity							
Conductivity	528		1.0	umhos/cm		17-DEC-19	R4945513
Fluoride in Water by IC							
Fluoride (F)	0.186		0.020	mg/L		16-DEC-19	R4945299
Hardness Calculated							
Hardness (as CaCO3)	314	HTC	0.20	mg/L		31-DEC-19	
Nitrate in Water by IC							
Nitrate (as N)	0.026		0.020	mg/L		16-DEC-19	R4945299
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		18-DEC-19	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		16-DEC-19	R4945299
Sulfate in Water by IC							
Sulfate (SO4)	29.9		0.30	mg/L		16-DEC-19	R4945299
TDS calculated							
TDS (Calculated)	312		5.0	mg/L		31-DEC-19	
Total Metals in Water by CRC ICPMS							
Calcium (Ca)-Total	57.8		0.050	mg/L	27-DEC-19	30-DEC-19	R4957842
Iron (Fe)-Total	0.187		0.010	mg/L	27-DEC-19	30-DEC-19	R4957842
Magnesium (Mg)-Total	41.1		0.0050	mg/L	27-DEC-19	30-DEC-19	R4957842
Manganese (Mn)-Total	0.00772		0.00010	mg/L	27-DEC-19	30-DEC-19	R4957842
Potassium (K)-Total	3.74		0.050	mg/L	27-DEC-19	30-DEC-19	R4957842
Sodium (Na)-Total	10.5		0.050	mg/L	27-DEC-19	30-DEC-19	R4957842
Turbidity							
Turbidity	10.5		0.10	NTU		16-DEC-19	R4944262
pH							
pH	8.22		0.10	pH units		17-DEC-19	R4945513

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

Sample Parameter Qualifier Key:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO3 2-/L.

ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L

ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION

The Alkalinity of water is a measure of its acid neutralizing capacity.Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.

ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B

The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.

CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

EC-WP	Water	Conductivity	APHA 2510B

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

ETL-SOLIDS-CALC-WP	Water	TDS calculated	CALCULATION
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

IONBALANCE-CALC-WP	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance (as % difference) cannot be calculated accurately for waters with very low electrical conductivity (EC), and is reported as "Low EC" where EC < 100 uS/cm (umhos/cm). Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020B (mod.)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
PH-WP	Water	pH	APHA 4500H
The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.			
SO4-IC-N-WP	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SPECIAL REQUEST-UW	Misc.	Special Request University of Waterloo	SEE SUBLET LAB RESULTS
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
Turbidity in aqueous matrices is determined by the nephelometric method.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
UW	UNIVERSITY OF WATERLOO
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Friesen Drillers Ltd
307 PTH 12 N
Steinbach MB R5G 1L9
Contact: PAULYNN ESTRELLA

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP	**Water**							
Batch R4945513								
WG3245335-10 DUP		**L2396645-1**						
Alkalinity, Total (as CaCO3)		249	245		mg/L	1.3	20	17-DEC-19
WG3245335-9 LCS								
Alkalinity, Total (as CaCO3)			101.1		%		85-115	17-DEC-19
WG3245335-6 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	17-DEC-19
CL-IC-N-WP	**Water**							
Batch R4945299								
WG3243517-3 DUP		**L2396645-1**						
Chloride (Cl)		19.8	19.9		mg/L	0.3	20	16-DEC-19
WG3243517-2 LCS								
Chloride (Cl)			100.7		%		90-110	16-DEC-19
WG3243517-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	16-DEC-19
WG3243517-4 MS		**L2396645-1**						
Chloride (Cl)			105.4		%		75-125	16-DEC-19
EC-WP	**Water**							
Batch R4945513								
WG3245335-10 DUP		**L2396645-1**						
Conductivity		528	528		umhos/cm	0.0	10	17-DEC-19
WG3245335-8 LCS								
Conductivity			97.8		%		90-110	17-DEC-19
WG3245335-6 MB								
Conductivity			<1.0		umhos/cm		1	17-DEC-19
F-IC-N-WP	**Water**							
Batch R4945299								
WG3243517-3 DUP		**L2396645-1**						
Fluoride (F)		0.186	0.181		mg/L	3.1	20	16-DEC-19
WG3243517-2 LCS								
Fluoride (F)			92.0		%		90-110	16-DEC-19
WG3243517-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	16-DEC-19
WG3243517-4 MS		**L2396645-1**						
Fluoride (F)			101.6		%		75-125	16-DEC-19
MET-T-CCMS-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP	**Water**							
Batch R4957842								
WG3249717-2 LCS								
Calcium (Ca)-Total			100.8		%		80-120	30-DEC-19
Iron (Fe)-Total			95.5		%		80-120	30-DEC-19
Magnesium (Mg)-Total			118.8		%		80-120	30-DEC-19
Manganese (Mn)-Total			104.6		%		80-120	30-DEC-19
Potassium (K)-Total			103.2		%		80-120	30-DEC-19
Sodium (Na)-Total			104.3		%		80-120	30-DEC-19
WG3249717-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	30-DEC-19
Iron (Fe)-Total			<0.010		mg/L		0.01	30-DEC-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	30-DEC-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	30-DEC-19
Potassium (K)-Total			<0.050		mg/L		0.05	30-DEC-19
Sodium (Na)-Total			<0.050		mg/L		0.05	30-DEC-19
NO2-IC-N-WP	**Water**							
Batch R4945299								
WG3243517-3 DUP		**L2396645-1**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-DEC-19
WG3243517-2 LCS								
Nitrite (as N)			102.2		%		90-110	16-DEC-19
WG3243517-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	16-DEC-19
WG3243517-4 MS		**L2396645-1**						
Nitrite (as N)			103.6		%		75-125	16-DEC-19
NO3-IC-N-WP	**Water**							
Batch R4945299								
WG3243517-3 DUP		**L2396645-1**						
Nitrate (as N)		0.026	0.027		mg/L	1.0	20	16-DEC-19
WG3243517-2 LCS								
Nitrate (as N)			104.0		%		90-110	16-DEC-19
WG3243517-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	16-DEC-19
WG3243517-4 MS		**L2396645-1**						
Nitrate (as N)			106.2		%		75-125	16-DEC-19
PH-WP	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WP	**Water**							
Batch R4945513								
WG3245335-10 DUP		**L2396645-1**						
pH		8.22	8.21	J	pH units	0.01	0.2	17-DEC-19
WG3245335-7 LCS								
pH			7.39		pH units		7.3-7.5	17-DEC-19
SO4-IC-N-WP	**Water**							
Batch R4945299								
WG3243517-3 DUP		**L2396645-1**						
Sulfate (SO4)		29.9	29.8		mg/L	0.5	20	16-DEC-19
WG3243517-2 LCS								
Sulfate (SO4)			104.4		%		90-110	16-DEC-19
WG3243517-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	16-DEC-19
WG3243517-4 MS		**L2396645-1**						
Sulfate (SO4)			107.0		%		75-125	16-DEC-19
TURBIDITY-WP	**Water**							
Batch R4944262								
WG3243788-3 DUP		**L2396645-1**						
Turbidity		10.5	10.2		NTU	2.9	15	16-DEC-19
WG3243788-2 LCS								
Turbidity			103.0		%		85-115	16-DEC-19
WG3243788-1 MB								
Turbidity			<0.10		NTU		0.1	16-DEC-19

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	1	12-DEC-19 15:19	16-DEC-19 14:00	3	4	days	EHTR
pH							
	1	12-DEC-19 15:19	17-DEC-19 12:00	0.25	117	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by IC							
	1	12-DEC-19 15:19	16-DEC-19 14:00	3	4	days	EHTR
Nitrite in Water by IC							
	1	12-DEC-19 15:19	16-DEC-19 14:00	3	4	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2396645 were received on 16-DEC-19 07:45.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

#	Sample	Lab#	$\delta^{18}O$	Result	Repeat	$\delta^{2}H$	Result	Repeat	pH	EC	AZD
			H_2O	VSMOW ± 0.2‰		H_2O	VSMOW ± 0.8‰			uS/cm	
1	L2396645-1	434827	X	-13.25	-13.21	X	-102.87	-102.72	8.22	528	

Rick Heemskerk
uwEILAB Manager
rkhmskrk@uwaterloo.ca
519 888 4567 ext 35838

To Contact uwEILAB:
519 888 4732

ALS Environmental

L2396645-COFC

COC #: OL-2858

Report To			Report	Service Requested
Company:	Friesen Drillers Limited		Distribution: ☐Fax ☐Mail ☑Email	◉Regular (Standard Turnaround Times - Business Days) - R
Contact:	Paulynn Estrella-Legal		☐Ciriteria on Report (select from Guidelines below)	○Priority (3 Days) - surcharge will apply - P
Address:	307 PTH 12 N Steinbach, MB Canada, R5G 1T8		Report Type: ☐Excel ☑Digital	○Priority (2 Days) - surcharge will apply - P2
			Report Format:	○Emergency (1-2 day) – surcharge will apply - E
			Report Email(s): Paulynn@friesendrillers.com Justin@friesendrillers.com Jeff@friesendrillers.com	○Same Day or Weekend Emergency - surcharge will apply - E2
				○Specify date required - X
Phone:	204-326-2485	Fax: 204-326-2483		

Invoice To	☑Email ☐Mail	EDD Format:	Analysis Requests
Company:	Friesen Drillers Limited	EDD Email(s):	
Contact:	Kim Friesen		
Address:	307 PTH 12 N Steinbach, MB Canada, R5G 1T8	Project Info Job #: Berger PO/AFE: LSD: Quote #:	
Email:	Accts@friesendrillers.com		
Phone:	204-326-2485		
Lab Work Order # (lab use only)		ALS Contact: Judy	Sampler: AF

Sample #	Sample Identification (This will appear on the report)	Coordinates Longitude	Coordinates Latitude	Date	Time	Sample Type	Number of Containers	ROU4W-T-WP	Deuterium	Oxygen-18	Please indicate below Filtered, Preserved or both(F, P, F/P)
	Well 1			Dec-12-2019	03:19 PM	Water	3	R	R	R	

Special Instructions/Comments	The questions below must be answered for water samples (check Yes or No)	Guidelines
	Are any sample taken from a regulated DW system? ☐Yes ☐No If yes, please use an authorized drinking water COC Is the water sampled intended to be potable for human consumption? ☐Yes ☐No	

SAMPLE CONDITION (lab use only)

☐Frozen ☐Cold ☐Ambient ☐Cooling Initiated

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: ☐Yes If Yes add SIF
				DEC 16 2019	745	17 °C		DEC 16 2019	745	

Annex 3: Wastewater Management Plan by Stantec Consulting Ltd

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

Stantec Consulting Ltd.
500–311 Portage Avenue, Winnipeg MB R3B 2B9

June 17, 2020

Attention: Derek Smith
Environmental Approvals Branch
Conservation and Climate
1007 Century Street
Winnipeg, MB R3H 0W4

Dear Derek Smith,

Reference: Berger Oakbank Peat Processing Plant Project – Amended License Proposal

Stantec was retained by Berger to provide supplemental information in regard to wastewater handling for Berger's Amended License Proposal for the Oakbank Peat Moss Processing Plant Project. The following information outlines Berger's plan for handling onsite domestic and industrial wastewater.

There are three separate facilities at the Oakbank property that will produce domestic wastewater, with each facility having its own designated onsite waste handling system. The facilities are described as follows:

1. Arena

    a. The arena is an existing facility on the property. Berger plans use the facility as a warehouse and to convert the kitchen into office space that will be used by a maximum of 3 employees. The arena has an existing septic system consisting of an underground septic tank connected to a septic field. The original use of the arena would have had a significantly higher number of persons contributing to wastewater generation and so it is assumed that the septic system has been sized to be more than adequate for the new use of the facility. However, Berger plans to hire qualified personnel to assess the condition. Berger intends to retain Stantec to complete an analysis on the existing system and given that it is approved as acceptable, Berger will submit a request to have Manitoba Conservation and Climate acknowledge this in writing. In the event that the conclusion of the analysis is that the system is not adequate, it will either need to be modified or will be properly abandoned in accordance with local regulations. In this case, Berger would hire Stantec to design a new or modified septic system for the building and have it registered under the Onsite Wastewater Management Systems Regulation.

    b. According to the Manitoba Supplementary Information Manual for Onsite Wastewater Management System Installations (2010), the expected wastewater for an office space is 49 lpcd (liters per capita per day). With a maximum of 3 employees, the resulting average day flow is 147 L/day. The typical peak day factor used in Manitoba according to Manitoba Water Services Board Guidelines is 2.5. By applying this factor, the peak day wastewater flow generated by the arena is **368 L/day**. This is the minimum required capacity of the septic system.

2. House

a. There is an existing house on the property that Berger plans on expanding to include 5 rooms which will each house one employee on a temporary basis. This facility also has its own existing septic tank and field. However, because the facility is expanding, it is imperative that the system be assessed to determine if it has adequate capacity, as well as if it is in adequate condition to treat wastewater. As mentioned previously, Berger plans to hire Stantec to complete the analysis of the existing system and receive acknowledgement in writing from Manitoba Conservation and Climate if the system is adequate as is or apply to have it registered as a new or modified system under the Onsite Wastewater Management Systems Regulation.

b. As indicated by the Environmental Approvals Branch at Conservation and Climate, this facility shall be classified as residential and that the expected wastewater generation is 500 L/room/day. The expected average day flow based on this value is 2,500 L/day with a safety factor of 2, a peak day flow of **5,000 L/day**. This is the minimum required capacity of the septic system.

3. Mix Plant (Domestic Waste)

a. The mix plant is a new facility that will soon be under construction. The plant processes peat moss on a daily basis but only produces dry waste during regular operation. The maximum expected number of employees for the 45,000 sq. ft facility is 30. Berger plans on handling domestic waste from the facility by implementing a new onsite waste management system. Stantec has advised that due to the soil type and condition, that a pressurized sand mound design is recommended for the septic field, and that an underground fiberglass septic tank be implemented for equalization storage and pumping. And again, the system will be registered under the Onsite Wastewater Management Systems Regulation.

b. According to Manitoba Conservation Guidelines, this facility is classified as an industrial building (domestic waste only) and the minimum flow rate is 49 lpcd. With 30 employees, this results in an average day flow of 1,470 L/day and the peak day flow is **3,675 L/day** which is what will govern the septic system design.

4. Mix Plant (Industrial Waste)

a. Within the mix plant are large tanks that acquire peat moss and fertilizer residue build up over time. Berger has a cleaning plan for the tanks that occurs three times per week. Berger uses a mixture of vinegar and water to clean the tanks. This results in an expected volume of 750 L/week or 200 L/day and a peak day flow of **500L/day** of industrial wastewater being generated. The composition of the industrial waste is characterized later in this letter. It has been determined that this wastewater can not be treated on site and hence will have its own designated wastewater holding tank that Berger has retained Stantec to design. An underground fiberglass tank is planned to be used. Berger plans to establish an agreement with the North End Sewage Treatment Plant or other Class II sewage treatment facility and develop a scheduled liquid waste hauling plan to properly dispose of the industrial waste to be treated off site.

Reference: Berger Oakbank Peat Processing Plant Project – Amended License Proposal

5. Additional Info:
    a. Fertilizer Concentrations (full specifications attached):
        i. Aqua-Gro, 100 L of water mixed with 9.5L of Aqua-Gro
        ii. Calcium Nitrate, 100 L of water mixed with 60.4 pounds of calcium nitrate powder
        iii. Magnesium Nitrate, 100 L of water mixed with 60.4 pounds of powder
    b. Vinegar Wash Concentrations (specification attached):
        i. 250 L of water mixed with 1.25 L of vinegar (5% acetic acid)
    c. Soil Type (test report attached):
        i. 70.4% Clay, “Heavy Clay”

In summary, the total peak daily wastewater flow is as follows:

Arena	368	L/day
House	5,000	L/day
Mix Plant (Domestic Waste)	3,675	L/day
Mix Plant (Industrial Waste)	500	L/day
Total	**9,543**	**L/day**

The total expected peak day flow is under 10,000 L/day and therefore the domestic wastewater from the Berger Peat Moss Processing Plant development will be managed and approved under the Onsite Wastewater Management Systems Regulation. I hope that this information adequately fills any gaps in Berger’s Amended License Proposal. Please do not hesitate to contact me for any questions.

Thank you,

Stantec Consulting Ltd.

Austin Church

Austin Church Engineer-in-Training

Phone: 204-228-0345
austin.church@stantec.com

Safety Data Sheet

1. Identification

Product Name: AquaGro 2000M

Manufacturer: Aquatrols Corporation of America

Street Address: 1273 Imperial Way

City/State: Paulsboro, NJ 08066

Company Contact #: (800) 257-7797

EMERGENCY CONTACT INFORMATION:

FOR EMERGENCIES INVOLVING SPILL, LEAK, FIRE, EXPOSUREOR ACCIDENT CONTACT: CHEMTEL 800-255-3924 withinthe United States and Canada, or 813-248-0585 for international collect calls.

2. Hazards(s) identification

Signal Word: "WARNING"

Hazard Statement:
H315 - Causes skin irritation
H319 - Causes eye irritation

Precautionary Statement:

(PREVENTION)

P264 - Wash thoroughly after handling.

P280 - Wear protective gloves.

(RESPONSE)

P302+P352 - IF ON SKIN: Wash with plenty of soap and water

P305+351+P338 - IF IN EYES: Rinse cautiously with water for 20 minutes Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 - If eye irritation persists: Get medical advice/attention.

GHS Hazard Pictograms:

WHMIS Hazard Symbols:

3. Composition / information on ingredients

Chemical Name: Proprietary

CAS Number: Proprietary

Components: Proprietary

4. First-aid measures

Routes of Exposure & Symptoms:

Ingestion: Overexposure may cause gastrointestinal irritation, diarrhea, nausea and vomiting.

Eyes: Overexposure causes excessive watering, redness and stinging.

Skin: Overexposure may cause itching and redness similar to a rash.

Firsts Aid Response:

Ingestion: Contact physician or poison control center. If victim is conscious and able to swallow, quickly give milk or water to dilute. Do not give sodium bicarbonate, vinegar, or fruit juices. Never give anything by mouth if victim is unconscious or having convulsions. Induce vomiting only upon advice of a physician.

Eye Contact: Flush immediately with copious amounts of water. Continue flushing for at least 15 minutes. Seek medical attention!!!

Skin Contact: Wash exposed areas with soap and water. If itching and redness persist, seek medical attention.

Continued...

5. Fire-fighting measures

Flash Point, F: > 200

NFPA Labeling:

Auto Ignition Temperature: N/A
Extinguishing Media: Water spray, Foam, Dry Chemical, Carbon Dioxide (CO2).
Special Procedures: Wear self contained breathing apparatus when fighting a fire.

6. Accidental release measures

Spill & Clean-up: Contain material by diking the area around the spill. If the product is in a solid form, shovel directly into recovery drums. If the product is a liquid, it should be picked up using a suitable absorbent material, then shoveled into recovery drums.

7. Handling and storage

Min/Max Storage Temperatures: No special requirements
Handling Precautions: No special requirements
Incompatible or Segregation: If this chemical is being stored around hazardous material ensure that each chemical is compatible with each other by follow the segregation practices that are set in place by the local, state, & federal regulating offices.

8. Exposure controls / personal protection

Respiratory Protection: The use of a NIOSH approved respiratory protection maybe needed if working in a poor ventilated area.
Ventilation: Ensure adequate ventilation, especially in confined areas.
Protective Gloves: Chemical resistant gloves
Eye Protection: Chemical goggles
Work / Hygienic Practices: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.
Other Equipment: Eye wash and safety shower in work area.

9. Physical and chemical properties

Physical State:	Liquid	**Specific Gravity:**	1.050
Color:	Light Yellow	**Evaporation Rate:**	N/A
Odor:	Slight Aromatic	**Vapor Pressure:**	N/A
pH.:	N/A	**Vapor Density:**	N/A
Melting Point:	N/A	**Solubility in Water:**	Soluble
Boiling Point:	N/A	**% Activity:**	85 Typ
Flash Point:	> 200	**Auto Ignition Temperature:**	N/A

10. Stability and reactivity

Stability: Stable
Incompatibility: Avoid contact with strong oxidizing agents.
Hazardous Polymerization: Will not occur.

11. Toxicological information

This product has not been tested. Information provided here has been derived from substances/products of a similar structure or composition.

Oral LD50 (mg/kg bodyweight): 50< Category 3 <300
Dermal LD50 (mg/kg bodyweight): 200 Category 3 <1000
Skin: Category 2 (Skin Irritant)
Eye: Category 2B (Fully reversible within 7 days)
Vapors (mg/l): No applicable information is available
Gases (ppmV): No applicable information is available
Dusts & Mists (mg/l): No applicable information is available
Carcinogenicity: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA

Continued...

12. Ecological information

Ecotoxicological Information: Not determined
Bioaccumulation: Not determined
Other Information:

13. Disposal considerations

Waste Disposal: Consult local, state and federal regulations before disposing of this material.

Spill: If material is released into the environment, the user should determine whether the spill should be reported to the appropriate local, state, and federal authorities.

14. Transportation information

US DOT:: NON-REGULATED MATERIAL

IATA:: NON-REGULATED MATERIAL
IMO/IMDG:: NON-REGULATED MATERIAL
Marine Pollutant:: N

15. Regulatory information

U.S Federal Regulation:

TSCA Registered: Yes
SARA Title III Section 313: Unknown
R&D Exemption: Unknown
Other:

Europe EU Requirement:

Europe Requirements: Unknown

International Regulations:

European EU Classification: Unknown
Australian (AICS) Listing: Unknown
Japanese (MITI) Listing: Unknown
Canadian (DSL) Listing: Unknown
Philippines (PICCS) Listing: Unknown
Korean Inventory List: Unknown
China Inventory List: Unknown

16. Other information

Date of Issue: 04/15/2002

HMIS Labeling:

Revision Date: 05/06/2015
Disclaimer: This information is supplied under the OSHA Hazardous Communication Standard, 29 CFR 1910.1200, and is offered in good faith based on data available to us that we believe to be true and accurate.

End of Safety Data Sheet

Cette Fiche de Données de Sécurité répond aux exigences de la norme ANSI Z400.1. - Canada

Fiche de données de sécurité

YaraLiva Calcinit Greehouse/Solution Grade

1. Identification du produit et de l'entreprise

Nom du produit	:	YaraLiva Calcinit Greehouse/Solution Grade
Type de produit	:	Solide [Granulés]
Code	:	PA34IU

Utilisations

Domaine d'application	:	Applications professionnelles
Utilisations	:	Engrais.

Fournisseur

Données relatives au fournisseur		Yara North America, Inc.

Adresse

Rue	:	100 North Tampa Street, Suite 3200
Code postal	:	33602
Ville	:	TAMPA
Pays	:	USA
Numéro de téléphone	:	+1 813 222 5700
N° de fax	:	+1 813 875 5735
Adresse email de la personne responsable pour cette FDS	:	Non disponible.
Numéro de téléphone d'appel d'urgence (avec les heures d'ouverture)	:	US: Chemtrec 24-hours Emergency Response: 1-800-424-9300 Canada: 24 Hour Emergency Service, (Canutec 613-996-6666)

Organisme de conseil/centre antipoison national

Nom	:	Poisons and Drug Information Service
Numéro de téléphone	:	+1 403 944 1414, (800) 332 1414 (Alberta only)
Date de validation	:	11/05/2013
Date d'impression	:	11/27/2013

2. Identification des dangers

Vue d'ensemble des urgences

État physique	:	Solide [Granulés]
Couleur	:	Blanc.
Odeur	:	Inodore.
Mention d'avertissement	:	Danger
Mentions de danger	:	NOCIF EN CAS D'INGESTION. PROVOQUE UNE GRAVE

IRRITATION DES YEUX.

Mesures de prudence : Ne pas ingérer. Éviter le contact avec les yeux. Laver abondamment après manipulation.

Éléments d'étiquetage SGH

Pictogrammes de danger :

Mention d'avertissement : Danger

Mentions de danger : Nocif en cas d'ingestion.
Provoque des lésions oculaires graves.

Effets aigus potentiels sur la santé

Inhalation : L'exposition aux produits de décomposition peut présenter des risques pour la santé. Les effets graves d'une exposition peuvent être différés.

Ingestion : Toxique en cas d'ingestion.

Peau : Peut provoquer une irritation de la peau.

Yeux : Irritant pour les yeux.

Effets chroniques potentiels pour la santé

Effets chroniques : Aucun effet important ou danger critique connu.

Cancérogénicité : Aucun effet important ou danger critique connu.

Mutagénicité : Aucun effet important ou danger critique connu.

Tératogénicité : Aucun effet important ou danger critique connu.

Effets sur le développement : Aucun effet important ou danger critique connu.

Effets sur la fertilité : Aucun effet important ou danger critique connu.

Organes cibles : Non disponible.

Conditions médicales aggravées par une surexposition : Aucun connu.

Voir Information toxicologique (section 11)

3. Composition/informations sur les composants

Nom	Numéro CAS	%
Nitrate de calcium anhydre	10124-37-5	>=70 - <80
nitrate d'ammonium	6484-52-2	>=7 - <10

Dans l'état actuel des connaissances du fournisseur et dans les concentrations d'application, aucun autre ingrédient présent n'est classé comme dangereux pour la santé ou l'environnement, et donc nécessiterait de figurer dans cette section.

4. Premiers secours

Contact avec les yeux : Rincer abondamment à l'eau courante. Vérifier si la victime porte des verres de contact et dans ce cas, les lui enlever.

Contact avec la peau : Laver avec de l'eau et du savon. En cas d'irritation, consulter un médecin.

Inhalation : En cas d'inhalation, déplacer à l'air frais. Consulter un médecin si des symptômes se développent. En cas d'inhalation de produits de décomposition lors d'un incendie, les symptômes peuvent être différés. La personne exposée peut avoir besoin de rester sous surveillance médicale pendant 48 heures.

Ingestion : Rincez la bouche avec de l'eau. Si une personne a avalé de ce produit et

est consciente, lui faire boire de petites quantités d'eau. Ne pas faire vomir sauf indication contraire émanant du personnel médical. Consulter un médecin immédiatement.

Protection des sauveteurs : Aucune initiative ne doit être prise qui implique un risque individuel ou en l'absence de formation appropriée. Si l'on soupçonne que des fumées sont encore présentes, le sauveteur devra porter un masque adéquat ou un appareil de protection respiratoire autonome. Il peut être dangereux pour la personne assistant une victime de pratiquer le bouche à bouche. Laver abondamment à l'eau les vêtements contaminés avant de les retirer, ou porter des gants.

Note au médecin traitant : Traitement symptomatique requis. Contacter immédiatement un spécialiste pour le traitement des intoxications, si de grandes quantités ont été ingérées ou inhalées. En cas d'inhalation de produits de décomposition lors d'un incendie, les symptômes peuvent être différés. La personne exposée peut avoir besoin de rester sous surveillance médicale pendant 48 heures.

5. Mesures de lutte contre l'incendie

Inflammabilité du produit : Aucun risque spécifique d'incendie ou d'explosion.

Moyens d'extinction

Utilisables : Utiliser de très grandes quantités d'eau pour l'extinction.

Non utilisables : Ne PAS utiliser d'extincteur chimique ni de mousse ou d'essayer d'étouffer le feu avec de la vapeur ou du sable.

Risques particuliers liés à l'exposition au produit : En présence d'incendie, circonscrire rapidement le site en évacuant toute personne se trouvant près des lieux de l'accident. Aucune initiative ne doit être prise qui implique un risque individuel ou en l'absence de formation appropriée.

Risque lié aux produits de décomposition thermique : Les produits de décomposition peuvent éventuellement comprendre les substances suivantes:
oxydes d'azote
Éviter de respirer les poussières, les vapeurs ou les fumées dégagées par la combustion des produits.
En cas d'inhalation de produits de décomposition lors d'un incendie, les symptômes peuvent être différés.

Remarque : Produit ininflammable.

Équipement de protection spécial pour le personnel préposé à la lutte contre l'incendie : Les pompiers devront porter un équipement de protection approprié ainsi qu'un appareil de protection respiratoire autonome avec masque intégral fonctionnant en mode pression positive.

Remarques spéciales sur les risques d'explosion : Aucun.

6. Mesures à prendre en cas de dispersion accidentelle

Précautions individuelles : Aucune initiative ne doit être prise qui implique un risque individuel ou en l'absence de formation appropriée. Évacuer les environs. Empêcher l'accès aux personnes non requises et ne portant pas de vêtements de protection. NE PAS TOUCHER ni marcher dans le produit répandu. Assurer une ventilation adéquate. Porter un appareil de protection respiratoire approprié lorsque le système de ventilation est inadéquat. Revêtir un équipement de protection individuelle approprié (voir Section 8).

Précautions pour la protection de l'environnement : Évitez la dispersion des matériaux déversés, ainsi que leur écoulement et tout contact avec le sol, les cours d'eau, les égouts et conduits d'évacuation. Informez les autorités compétentes en cas de pollution de l'environnement (égouts, voies d'eau, sol et air) par le produit.

Méthodes de nettoyage

Petit déversement accidentel : Écarter les conteneurs de la zone de déversement accidentel. Aspirer ou ramasser avec un balai le produit répandu et placer le tout dans un conteneur à déchets dûment étiqueté. Élimination par une entreprise autorisée de collecte des déchets.

Grand déversement accidentel : Écarter les conteneurs de la zone de déversement accidentel. S'approcher des émanations dans la même direction que le vent. Bloquer toute pénétration possible dans les égouts, les cours d'eau, les caves ou les zones confinées. Aspirer ou ramasser avec un balai le produit répandu et placer le tout dans un conteneur à déchets dûment étiqueté. Élimination par une entreprise autorisée de collecte des déchets. Nota : Voir section 1 pour le contact en cas d'urgence et voir section 13 pour l'élimination des déchets.

7. Manipulation et stockage

Manipulation : Il est interdit de manger, boire ou fumer dans les endroits où ce produit est manipulé, entreposé ou mis en oeuvre. Il est recommandé au personnel de se laver les mains et la figure avant de manger, boire ou fumer. Retirer les vêtements contaminés et les équipements de protection avant d'entrer dans un lieu de restauration. Ne pas mettre en contact avec les yeux, la peau ou les vêtements. Ne pas ingérer. Garder dans le conteneur d'origine ou dans un autre conteneur de substitution homologué fabriqué à partir d'un matériau compatible et tenu hermétiquement clos lorsqu'il n'est pas utilisé. Les conteneurs vides retiennent des résidus de produit et peuvent présenter un danger. Ne pas réutiliser ce conteneur. Voir également la section 8 pour plus d'informations sur les mesures d'hygiène.

Stockage : Stocker conformément à la réglementation locale. Stocker dans le récipient d'origine à l'abri de la lumière directe du soleil dans un endroit sec, frais et bien ventilé à l'écart des matériaux incompatibles (cf. la section 10). Garder le récipient hermétiquement fermé lorsque le produit n'est pas utilisé. Les récipients ayant été ouverts doivent être refermés avec soin et maintenus en position verticale afin d'éviter les fuites. Ne pas stocker dans des conteneurs non étiquetés. Utiliser un récipient approprié pour éviter toute contamination du milieu ambiant. Tenir éloigné de : Les substances organiques, huile et de graisse.

8. Contrôle de l'exposition des travailleurs et caractéristiques des équipements de protection individuelle

Limites d'exposition professionnelle

Aucune norme d'exposition affectée.

Consulter les responsables locaux compétents pour connaître les valeurs considérées comme acceptables.

Mesures techniques : Aucune ventilation particulière requise. Une bonne ventilation générale devrait être suffisante pour contrôler l'exposition du technicien aux contaminants en suspension dans l'air. Si ce produit contient des composants pour lesquels des contraintes liées à l'exposition existent,

utiliser des enceintes de protection, une ventilation locale par aspiration, ou d'autres moyens de contrôle automatiques intégrés afin de maintenir le seuil d'exposition du technicien inférieur aux limites recommandées ou légales.

Mesures d'hygiène : Se laver abondamment les mains, les avant-bras et le visage après avoir manipulé des produits chimiques, avant de manger, de fumer et d'aller aux toilettes ainsi qu'à la fin de la journée de travail. Laver les vêtements contaminés avant de les réutiliser. Une installation de lavage ou de l'eau doit être accessible pour le nettoyage des yeux et de la peau.

Protection individuelle

Respiratoire : Porter un appareil de protection respiratoire avec filtre à particules parfaitement ajusté et conforme à une norme en vigueur si une évaluation du risque indique que cela est nécessaire. Le choix de l'appareil de protection respiratoire doit être fondé sur les niveaux d'expositions prévus ou connus, les dangers du produit et les limites d'utilisation sans danger de l'appareil de protection respiratoire retenu. Recommandé: Lorsque la ventilation du local est insuffisante, porter un équipement de protection respiratoire. Le filtre P2

Mains : Le port de gants imperméables et résistants aux produits chimiques conformes à une norme approuvée, est obligatoire en tout temps lors de la manutention de produits chimiques si une évaluation des risques le préconise.
> 8 heures (temps avant transpercement) : Gants: Il est recommandé de porter des gants de protection lors de l'utilisation courante de ce produit., Viton, néoprène

Yeux : Utiliser une protection oculaire conforme à une norme approuvée dès lors qu'une évaluation du risque indique qu'il est nécessaire d'éviter l'exposition aux projections de liquides, aux fines particules pulvérisées ou aux poussières. lunettes de protection étanches contre les éclaboussures de produits chimiques. Recommandé: Lunettes étanches bien ajustées

Peau : L'équipement de protection personnel pour le corps devra être choisi en fonction de la tâche à réaliser ainsi que des risques encourus, et il est recommandé de le faire valider par un spécialiste avant de procéder à la manipulation du produit.

Contrôle de l'exposition de l'environnement : Il importe de tester les émissions provenant des systèmes de ventilation ou du matériel de fabrication pour vous assurer qu'elles sont conformes aux exigences de la législation sur la protection de l'environnement. Dans certains cas, il sera nécessaire d'équiper le matériel de fabrication d'un épurateur de gaz ou d'un filtre ou de le modifier techniquement afin de réduire les émissions à des niveaux acceptables.

9. Propriétés physiques et chimiques

État physique : Solide [Granulés]
Point d'éclair : Indéterminé.
Durée de combustion : Indéterminé.
Vitesse de combustion : Indéterminé.
Température d'auto-inflammation : Indéterminé.
Limites d'inflammablité : **Seuil minimal:** Indéterminé.
Seuil maximal: Indéterminé.
Propriétés d'explosivité : Aucun.
Propriétés comburantes : Aucun.
Couleur : Blanc.

Odeur	:	Inodore.
pH	:	5 - 7 [Conc.: 110 g/l]
Point d'ébullition/condensation	:	Indéterminé.
Température de sublimation	:	Indéterminé.
Point de fusion/congélation	:	400 °C (752 °F) Perd d'eau à 90 -100°C.
Densité apparente	:	1,100 kg/m3
Densité relative	:	2.05
Pression de vapeur	:	Indéterminé.
Seuil d'odeur	:	Indéterminé.
Vitesse d'évaporation	:	Indéterminé.
Viscosité	:	**Dynamique:** Indéterminé.
	:	**Cinématique:** Indéterminé.
Solubilité	:	100 g/l @ 20 °C(68 °F) Facilement soluble dans les substances suivantes: l'eau froide
Solubilité dans l'eau	:	> 100 g/l

10. Stabilité et réactivité

Stabilité chimique	:	Le produit est stable.
Conditions à éviter	:	Éviter toute contamination incluant celle par les métaux, la poussière ou les substances organiques.
Matières incompatibles	:	alcalis les matières combustibles matières réductrices les substances organiques acides
Produits de décomposition dangereux	:	Dans des conditions normales de stockage et d'utilisation, aucun produit de décomposition dangereux ne devrait apparaître.
Possibilité de réactions dangereuses	:	Dans des conditions normales de stockage et d'utilisation, aucune réaction dangereuse ne se produit.

11. Informations toxicologiques

Informations sur les effets toxicologiques

Toxicité aiguë

Nom du produit / composant	Résultat	Espèces	Dosage	Exposition	Références
Nitrate de calcium anhydre					
	DL50 Orale	Rat - Femelle	500 mg/kg 423 Toxicité orale aiguë - Méthode par classe de toxicité aiguë	-	IUCLID 5
	DL50 Cutané	Rat	> 2,000 mg/kg OECD 402	-	IUCLID 5
nitrate d'ammonium					
	DL50 Orale	Rat	2,950 mg/kg OECD 401	-	IUCLID 5

	DL50 Cutané	Rat	> 5,000 mg/kg OECD 402	-	IUCLID 5

Conclusion/Résumé : Nocif en cas d'ingestion.

Toxicité chronique

Nom du produit / composant	Résultat	Espèces	Dosage	Exposition	Références
Nitrate de calcium anhydre	Sub-aigüe NOAEL Orale	Rat	> 1000 mg/kg OECD 407	28 jours	IUCLID 5
nitrate d'ammonium	Chronique NOAEL Orale	Rat	256 mg/kg OECD 422	28 jours	IUCLID 5
	Sub-aigüe NOEC Poussière et brouillards Inhalation	Rat	> 185 mg/kg OECD 412	2 semaines 5 heures par jour	IUCLID 5

Conclusion/Résumé : Non toxique.

Irritation/Corrosion

Nom du produit / composant	Résultat	Espèces	Potentiel	Exposition	Observation	Références
Nitrate de calcium anhydre	Yeux - Irritant puissant OECD 405	Lapin		24 - 72 h	-	
nitrate d'ammonium	Yeux - Irritant OECD 405	Lapin			-	IUCLID 5

Conclusion/Résumé

Peau : Peut provoquer une irritation de la peau.

Yeux : Provoque des lésions oculaires graves.

Respiratoire : Aucun effet important ou danger critique connu.

Sensibilisation

Conclusion/Résumé

Peau : Non sensibilisant

Respiratoire : Indéterminé.

Cancérogénicité

Conclusion/Résumé : PAS d'effet cancérogène.

Mutagénicité

Conclusion/Résumé : PAS d'effet mutagène.

Tératogénicité

Conclusion/Résumé : Aucun effet important ou danger critique connu.

Toxicité pour la reproduction

Nom du produit / composant	Toxicité lors de la grossesse	Fertilité	Toxique pour le développement	Espèces	Dosage	Exposition	Références
Nitrate de calcium anhydre	-	Négatif	Négatif	Rat	Orale: > 1500 mg/kg	-	IUCLID 5

					bw/jour Dosage répété		
nitrate d'ammonium	-	Négatif	Négatif	Rat	Orale: > 1500 mg/kg bw/jour	28 jours	IUCLID 5

Conclusion/Résumé : Aucun effet important ou danger critique connu.

DIVS : Pas de données disponibles.

12.Informations écologiques

Écotoxicité : Aucun effet important ou danger critique connu.

Écotoxicité en milieu aquatique

Nom du produit / composant	Résultat	Espèces	Exposition	Références
Nitrate de calcium anhydre				
	Aiguë CL50 1,378 mg/l Eau douce OECD 203	Poisson - Labeo boga	96 h	IUCLID 5
	Aiguë CL50 2,400 mg/l Eau douce	Poisson - Lepomis macrochirus	4 Jours	Proc. Acad. Nat. Sci. Philadelphia106: 185-205
	Aiguë CL50 490 mg/l Eau douce	Invertébrés aquatiques.	48 h	IUCLID 5
	Aiguë CE50 > 1,700 mg/l L'eau salée	Plantes aquatiques - Heterosigma akashiwo	10 Jours	IUCLID 5
nitrate d'ammonium				
	Aiguë CL50 447 mg/l Eau douce	Poisson - Labeo boga	48 h	IUCLID 5
	Aiguë CE50 490 mg/l Eau douce	Invertébrés aquatiques.	48 h	IUCLID 5
	Aiguë CE50 1,700 mg/l L'eau salée	Plantes aquatiques - Heterosigma akashiwo	10 Jours	IUCLID 5

Conclusion/Résumé : Le produit ne montre aucun phénomène de bioaccumulation. Le produit n'est pas sensé causer d'effets sur l'environnement, s'il est utilisé correctement selon les recommandations.

Persistance/dégradabilité

Conclusion/Résumé : Facilement biodégradables par les plantes et le sol.

Coefficient de partage n-octanol/eau : Non disponible.

Mobilité : Ce produit peut être véhiculé par les infiltrations d'eau souterraines ou les ruissellements de surface car sa solubilité dans l'eau est de : élevée

Autres effets néfastes : Aucun effet important ou danger critique connu.

13. Considérations relatives à l'élimination

Produit

Méthodes d'élimination des déchets : Il est recommandé d'éviter ou réduire autant que possible la production de déchets. La mise au rebut de ce produit, des solutions et des sous-

produits devra en permanence respecter les exigences légales en matière de protection de l'environnement et de mise au rebut des déchets ainsi que les exigences de toutes les autorités locales. Élimination des produits excédentaires et non recyclables par une entreprise autorisée de collecte des déchets. Ne pas rejeter les déchets non traités dans les égouts, à moins que ce soit en conformité avec les exigences de toutes les autorités compétentes. Recycler les déchets d'emballage. Envisager l'incinération ou la mise en décharge uniquement si le recyclage est impossible. Ne se débarrasser de ce produit et de son récipient qu'en prenant toutes précautions d'usage. Manipuler avec prudence les récipients vides non nettoyés ni rincés. Les conteneurs vides ou les saches internes peuvent retenir des restes de produit. Évitez la dispersion des matériaux déversés, ainsi que leur écoulement et tout contact avec le sol, les cours d'eau, les égouts et conduits d'évacuation. Vider le sac en le secouant énergiquement pour enlever le maximum de son contenu. Les sacs vides peuvent être éliminés comme des déchets industriels banals (DIB) et peuvent être recyclés.

Il est impératif que l'élimination des déchets soit conforme aux lois et réglementations régionales, nationales et locales applicables.

Reportez-vous à Section 7 : MANUTENTION ET ENTREPOSAGE et à Section 8 : CONTRÔLES D'EXPOSITION/PROTECTION PERSONNELLE pour tout complément d'information sur la manipulation et sur la protection du personnel.

14.Informations relatives au transport

Regulation: UN Class	
14.1 UN number	Not regulated.
14.2 UN proper shipping name	
14.3 Transport hazard class(es)	
14.4 Packing group	
14.5 Environmental hazards	No.
Additional information	**: UN Class**
Environmental hazards	**:** No.

Regulation: IMDG	
14.1 UN number	Not regulated.
14.2 UN proper shipping name	
14.3 Transport hazard class(es)	
14.4 Packing group	
14.5 Environmental hazards	No.
14.6 Additional information	**: IMDG**
Marine pollutant	**:** No.

Regulation: IATA	
14.1 UN number	Not regulated.
14.2 UN proper shipping name	
14.3 Transport hazard class(es)	
14.4 Packing group	
14.5 Environmental hazards	No.

14.6 Additional information	**: IATA**
Marine pollutant	: No.

Réglementation: Classification pour le DOT	
14.1 Numéro ONU	Non réglementé.
14.2 Nom d'expédition des Nations unies	
14.3 Classe(s) de danger pour le transport	
14.4 Groupe d'emballage	
14.5 Dangers pour l'environnement	Non.
14.6 Autres informations	**: Classification pour le DOT**
Dangers pour l'environnement	: Non.

Réglementation: Classe TMD	
14.1 Numéro ONU	Non réglementé.
14.2 Nom d'expédition des Nations unies	
14.3 Classe(s) de danger pour le transport	
14.4 Groupe d'emballage	
14.5 Dangers pour l'environnement	Non.
14.6 Autres informations	**: Classe TMD**
Dangers pour l'environnement	: Non.

Précautions particulières à prendre par l'utilisateur : Transport avec les utilisateurs locaux : toujours transporter dans des conditionnements qui sont corrects et sécurisés. S'assurer que les personnes transportant le produit connaissent les mesures à prendre en cas d'accident ou de déversement accidentel.'

Remarque : Engrais NPK non susceptible de subir une Décomposition Auto-Entrentenue (non DAE) selon le test en auge défini dans le cadre de l'Organisation des Nations unies (ONU) (voir Recommandations des Nations unies relatives au transport des marchandises dangereuses: 'Manual of Tests and Criteria', partie III, sous-section 38).

IMSBC : Non disponible.

Transport en vrac conformément à l'annexe II de la convention Marpol 73/78 et au recueil IBC : Non applicable.

15.Informations réglementaires

Canada

SIMDUT (Canada) : Classe D-1B: Substance ayant des effets toxiques immédiats et graves (TOXIQUE).

Listes canadiennes

INRP canadien : Les composants suivants sont répertoriés:
Nitrate de calcium anhydre

nitrate d'ammonium

Substances toxiques au sens de la LCPE (Loi canadienne sur la protection de l'environnement) : Aucun des composants n'est répertorié.

Le produit a été classé conformément aux critères de danger énoncés dans le Règlement sur les produits contrôlés et la fiche signalétique contient tous les renseignements exigés par le Règlement sur les produits contrôlés.

Remarque : A notre connaissance, aucune autre réglementation nationale ou gouvernementale n'est d'application.

Listes internationales

Inventaire des substances chimiques des Philippines (PICCS): Tous les composants sont répertoriés ou exclus.
Inventaire néo-zélandais des substances chimiques (NZIoC): Tous les composants sont répertoriés ou exclus.
Inventaire de Corée: Tous les composants sont répertoriés ou exclus.
Inventaire du Japon: Tous les composants sont répertoriés ou exclus.
Inventaire des substances chimiques existantes en Chine (IECSC): Tous les composants sont répertoriés ou exclus.
Inventaire des substances chimiques d'Australie (AICS): Tous les composants sont répertoriés ou exclus.
Inventaire du Canada: Tous les composants sont répertoriés ou exclus.
Inventaire Malaisien (Registre HSE): Indéterminé.
Inventaire de Taiwan (CSNN): Indéterminé.
Inventaire des États-Unis (TSCA 8b): Tous les composants sont répertoriés ou exclus.
EINECS/ELINCS européen (Répertoire/Liste européen(ne) des produits chimiques commercialisés): Tous les composants sont répertoriés ou exclus.

16.Autres informations

Légende des abréviations :
ETA = Estimation de la Toxicité Aiguë
FBC = Facteur de bioconcentration
bw = Masse corporelle
CEPA = Canadian Environmental Protection Act
SGH = Système Général Harmonisé de classification et d'étiquetage des produits chimiques
IDLH = Immediately Dangerous to Life or Health
CVI = conteneurs en vrac intermédiaires
code IMDG = code maritime international des marchandises dangereuses
LogKoe = coefficient de partage octanol/eau
MARPOL 73/78 = Convention internationale pour la prévention de la pollution par les navires de 1973, telle que modifiée par le Protocole de 1978. ("MARPOL" = pollution maritime)
NPRI = National Pollutant Release Inventory
NU = Nations Unies

Références : EU REACH IUCLID5 CSR.
National Institute for Occupational Safety and Health, U.S. Dept. of Health, Education, and Welfare, Reports and Memoranda Registry of Toxic Effects of Chemical Substances.
IHS, 4777 Levy Street, St Laurent, Quebec HAR 2P9, Canada.

Date d'impression : 11/27/2013
Élaborée par : Yara Product Classifications & Regulations.
Date d'édition : 11/05/2013
Date de la précédente édition : 00/00/0000
Version : 1.0

|| Indique quels renseignements ont été modifiés depuis la version précédente.

Avis au lecteur

Au meilleur de nos connaissances, l'information contenue dans ce document est exacte. Toutefois, ni le fournisseur ci-dessus mentionné, ni aucun de ses sous-traitants ne peut assumer quelque responsabilité que ce soit en ce qui a trait à l'exactitude ou à l'intégralité des renseignements contenus dans le présent document. Il revient exclusivement à l'utilisateur de déterminer l'appropriation des substances ou préparations. Toutes les substances ou préparations peuvent présenter des dangers inconnus et doivent être utilisées avec prudence. Bien que certains dangers soient décrits dans le présent document, nous ne pouvons garantir qu'il n'en existe pas d'autres.

Safety Data Sheet

Issue Date no data available **Revision Date** 13-Feb-2018 **Version:** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Identifier:

Product Name: Magnific Water Soluble Magnesium Nitrate 11-0-0 +9.3% Mg

Other Means of Identification:

Product ID: 0899-040-0635

Synonyms: None

Recommended Use of the Chemical and Restrictions on Use:

Recommended Use: Fertilizer

Uses Advised Against: No information available

Details of the Supplier of the Safety Data Sheet:

Initial Supplier Identifier
ICL Premium Fertilizers NA
622 Emerson Road
St. Louis, MO 63141

Emergency Telephone Numbers:

Emergency Telephone CHEMTREC (U.S.): 1-800-424-9300
CHEMTREC (International): 1-703-527-3887
Non-Emergency Calls: 1-800-492-8255

2. HAZARDS IDENTIFICATION

Classification 67/548/EEC

Not a hazardous substance or mixture according to the Globally Harmonized System (GHS)

Label Elements:

Hazard statements

Not a hazardous substance or mixture according to the Globally Harmonized System (GHS)

Other Information:

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

The product contains no substances which at their given concentration, are considered to be hazardous to health

Chemical Name	CAS No	Weight-%	Hazardous Material Information Review Act registry number (HMIRA registry #)	Date HMIRA filed and date exemption granted (if applicable)
Magnesium nitrate hexahydrate; Mg(NO3)2+6H2O 13446-18-9	13446-18-9	80-100	-	-

4. FIRST AID MEASURES

First Aid Measures:

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash with soap and water. Wash contaminated clothing before reuse. If symptoms persist, call a physician.

Ingestion Rinse mouth. Drink 1 or 2 glasses of water. Consult a physician if necessary.

Most Important Symptoms and Effects (Acute and Chronic):

Symptoms No information available.

Indication of Any Immediate Medical Attention and Special Treatment Needed:

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Flood fire area with water from a distance.

Unsuitable extinguishing media Dry chemical. Foam.

Specific hazards arising from the chemical No information available.

Hazardous Combustion Products: Nitrogen oxides (NOx).

Specific methods:
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:

Personal precautions Ensure adequate ventilation.

Environmental Precautions:

Environmental precautions See Section 12 for additional Ecological Information.

Methods and Material for Containment and Cleanup:

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for Safe Handling:

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for Safe Storage, Including any Incompatibilities:

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters:

Exposure Limits This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate Engineering Controls:

Engineering controls None under normal use conditions.

Individual Protection Measures, Such as Personal Protective Equipment:

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection No special protective equipment required.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties:

Physical State: Solid
Appearance: No information available

Color:	white
Odor:	No information available
Odor Threshold:	No information available

Property	Values	Remarks: • Method
pH:	6 (5%)	No information available
Melting Point/Freezing Point:	95 degrees Celsius @ 1013 hPa	No information available
Boiling Point/Range:	No information available	No information available
Flash Point:	No information available	No information available
Evaporation Rate:	No information available	No information available
Flammability (solid, gas):	Non-Flammable	No information available
Flammability Limits in Air:		No information available
Upper Flammability Limit:	No information available	
Lower Flammability Limit:	No information available	
Vapor Pressure:	No information available	No information available
Vapor Density:	No information available	No information available
Relative density	No information available	No information available
Water Solubility:	Soluble in water	No information available
Solubility in other Solvents:	No information available	No information available
Partition Coefficient:	No information available	No information available
Autoignition Temperature:	No information available	No information available
Decomposition Temperature:	No information available	No information available
Kinematic Viscosity:	No information available	No information available
Dynamic Viscosity:	No information available	No information available
Explosive properties	No information available.	
Oxidizing properties	No information available.	

Other Information:

Softening Point:	No information available
Molecular Weight:	No information available
VOC Content (%):	No information available
Density:	No information available
Bulk Density:	1.46 g/cm3

10. STABILITY AND REACTIVITY

Reactivity: Reducing agent.

Chemical Stability: Stable under normal conditions.

Possibility of Hazardous Reactions: Reducing agent.

Hazardous Decomposition Products: Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Conditions to Avoid: excessive heat.

Incompatible Materials: Reducing agent.

Hazardous Decomposition Products: None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on the Likely Routes of Exposure (inhalation, ingestion, skin and eye contact):

Product Information

Inhalation Specific test data for the substance or mixture is not available.

Eye contact Specific test data for the substance or mixture is not available.

Skin contact Specific test data for the substance or mixture is not available.

Ingestion Specific test data for the substance or mixture is not available.

Information on Toxicological Effects:

Symptoms No information available.

Numerical Measures of Toxicity

Acute Toxicity

Unknown acute toxicity No information available

LD50/oral: No information available
LD50/dermal: No information available
LC50/inhalation: No information available

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Magnesium nitrate hexahydrate; Mg(NO3)2+6H2O - 13446-18-9	= 5440 mg/kg (Rat)	Ne	Ne

Delayed and Immediate Effects as well as Chronic Effects from Short and Long-Term Exposure:

Skin corrosion/irritation No information available.

Serious eye damage/eye irritation No information available.

Respiratory or skin sensitization No information available.

Germ cell mutagenicity No information available.

Carcinogenicity No information available.

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity The environmental impact of this product has not been fully investigated.

Persistence and Degradability: No information available.

Bioaccumulation: No information available.

Mobility Soluble in water.

Mobility: No information available.

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods:

Waste from residues/unused products	Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.

14. TRANSPORT INFORMATION

DOT: Not regulated

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

Ozone-depleting substances (ODS)	Not applied
Persistent Organic Pollutants	Not applied
The Rotterdam Convention	Not applied

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA:	**Health hazards** 0	**Flammability** 0	**Instability** 0	**Physical and chemical properties** -
HMIS Health Rating:	**Health hazards** 0	**Flammability** 0	**Physical hazards** 0	**Personal protection** X

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)	Ceiling	Maximum limit value
*	Skin designation				

Revision Date 13-Feb-2018

Revision Note: *** Indicates changes since the last revision. This version replaces all previous versions.

Disclaimer

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

BB/MA 2025 MR 03
RS 1050 L2 158

Great Value TM MC

White Vinegar

Vinaigre blanc

5% Acetic Acid by Volume
5 % acide acétique par volume

VALUE SIZE
FORMAT ÉCONOMIQUE

SUGGESTED SERVING
PRÉSENTATION SUGGÉRÉE

INGREDIENTS: WHITE VINEGAR.
MAY CONTAIN: WHEAT.

INGRÉDIENTS : VINAIGRE BLANC.
PEUT CONTENIR : BLÉ.

כשר COR 158

MADE IN • FABRIQUÉ AU CANADA
FROM DOMESTIC AND IMPORTED INGREDIENTS
À PARTIR D'INGRÉDIENTS CANADIENS ET IMPORTÉS

PREPARED FOR / PRÉPARÉ POUR : Wal-Mart Canada Corp.
1940 Argentia Rd, Mississauga, Ontario L5N 1P9 ©2018

4 L

MADE IN CANADA FROM DOMESTIC AND IMPORTED INGREDIENTS.
FABRIQUÉ AU CANADA À PARTIR D'INGRÉDIENTS CANADIENS ET IMPORTÉS.

76067 6 81131 70

Farmers Edge Laboratories
1357 Dugald Road
Winnipeg, Manitoba Canada
R2J 0H3
Phone: 1 204 233 4099

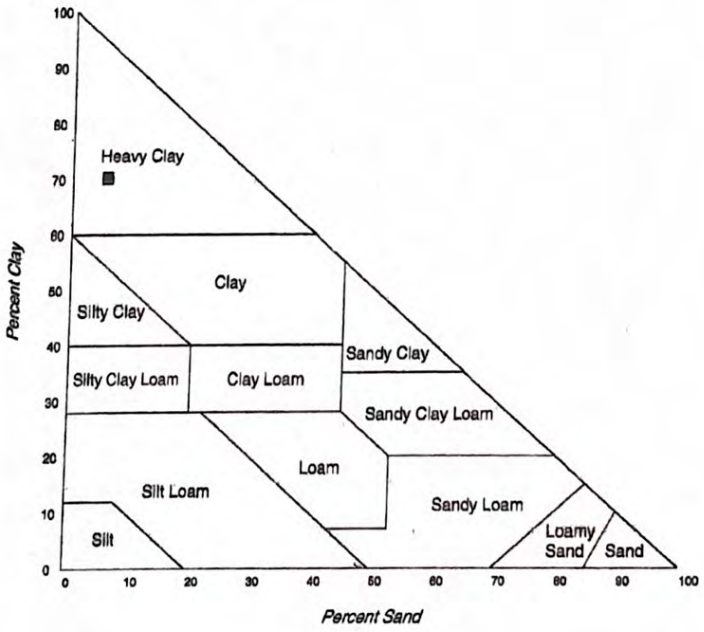
Soil Particle Size Report

Client: Cash Account - East
Address: Box 36, Group 8
Hadashville, MB R0E 0X0
Attn: Chris Panych

Client: Polar Enterprises
Sample ID: Oakwood Wood rd + 207
Sample Date: Apr 23, 2020

Lab Lot ID: 200423_007
Lab Sample ID: 200423_007-01
Matrix: Env Soil
Date Received: Apr 23, 2020
Date Reported: Apr 28, 2020

Parameter	Result	Units
% Gravel (>4.5mm)	0	%
% Sand (4.5mm - 0.075mm)	5.8	%
% Silt (0.075mm - 0.005mm)	23.8	%
% Clay (<0.005mm)	70.4	%
Texture	Heavy Clay	



Dmitri Ermak BSc.
Lab Manager

Analysis performed by and particle size classes determined according to test method ASTM D 422 - 63.
Texture class and triangle plot determined by using clay fractions and combined sand and gravel fractions.

Annex 4: Stormwater Management Plan by Sision Blackburn Consulting inc.

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

SBC
SISON BLACKBURN CONSULTING INC.

May 29, 2020 Project No: 19139-00

Manitoba Sustainable Development
Drainage and Water Control Licensing
Box 8, 200 Saulteaux Crescent
Winnipeg, MB R3J 3W3

Attn: Wendy Lewick:

RE: PEAT PROCESSING PLANT SITE – RM of Springfield
STORM WATER MANAGEMENT PLAN DESIGN BRIEF

Sison Blackburn Consulting Inc. (SBC) has been retained by Berger Peat Moss Ltd. to develop a site grading plan and drainage management system for their proposed Peat Processing Plant Site located in the Rural Municipality of Springfield, MB.

This 67.1 ha site is located within the northwest quadrant of Section 23, Township 11, Range 4E, and is bounded by Oakwood Road 64N to the north, Lorne Hill Road 22E to the west and existing farmland to the south and to the east.

This design brief has been prepared by SBC to outline how the storm water management plan for the overall site works and to outline how it will satisfy the drainage policies of Manitoba Sustainable Development (MSD) in order for Berger to obtain their license under the Manitoba Environment Act. Attached for your reference is a copy of our latest Overall Grading Plan for the site.

STORM WATER RUNOFF & ANALYSIS

For calculating runoff rates of site developments, the typical approach is to use the Rational Method, given by:

$$Q = 0.00278CiA$$

where 'Q' is the peak discharge in cubic metres per second, 'A' is the drainage area in hectares, 'C' is a weighted runoff coefficient characteristic of the ground surface, and 'i' is the average rainfall intensity in millimetres per hour, determined using appropriate return period design storms and based on a time of concentration 't'.

The RM of Springfield has developed their own design rainfall parameters and utilize runoff coefficients that are higher than typical values. In order to satisfy both MSD and the RM's requirements, the pre and post-development conditions were analyzed using both the RM of Springfield and the typical runoff coefficient values. The more stringent of the two results were selected to govern for the storm water management for this site.

Table 1.0 below outlines the RM of Springfield and the typical runoff coefficient values used.

Table 1.0 – Runoff Coefficient Values

	RM of Springfield Values	Typical Values
Grass/Agricultural Land	0.20	0.10
Gravel	0.85	0.50
Pavement	0.95	0.90
Roof	0.90	0.90

EXISTING (PRE-DEVELOPMENT) DRAINAGE

The existing site has some existing buildings and gravel pads near its northeast corner but the majority of the site consists of existing farmland. The site primarily surface drains into existing field swales and discharges into the existing Lorne Hill Road 22E ditch and into the existing neighbouring property to the south.

Table 2.0 below outlines the existing runoff calculations for the overall site, using the Rational Method.

Table 2.0 – Existing (Pre-Development) Runoff Calculations

Total Area 'A'	67.1 ha
- Grass	64.41 ha
- Gravel	1.95 ha
- Pavement	0.00 ha
- Roof	0.71 ha
Weighted Runoff 'C'	
- Using RM 'C' Values	0.23
- Using Typical 'C' Values	0.12
Time of Concentration 't'	45 min*
Intensity 'i' (5-year)	47.5 mm/hr
Peak Discharge Q (5-year)	
- Using RM 'C' Values	2.01 cms
- Using Typical 'C' Values	1.06 cms

** Based on rounded average of Kirpich and Bransby Williams Time of Concentration Equation values using estimated maximum flow length and surface slope.*

Topographic survey taken by SBC indicates that approximately 75% of the overall existing site generally surface drains towards the west, eventually reaching the existing Lorne Hill Road 22E ditch, while the remaining 25% generally surface drains south to the existing farmland located south of site. A negligible amount of runoff surface drains to the existing Oakwood Road 64N ditch north of site since the existing top of ditch acts as drainage split with runoff generally being directed southwest, away from the ditch.

POST-DEVELOPMENT DRAINAGE

The proposed site will consist of a new peat processing plant building and network of gravel roadways and storage areas draining through ditches and swales. All existing buildings and gravel pads located on site will be remaining as well. Berger plans to construct the new storage areas in stages over the next 5 years however the development of the entire site is being considered for analysis.

Table 3.0 below outlines the post-development runoff calculations for the overall site using, the Rational Method.

Table 3.0 – Post-Development Runoff Calculations (without Flow Restriction)

Area 'A'	67.1 ha
- Grass	37.02 ha
- Gravel	28.81 ha
- Pavement	0.00 ha
- Roof	1.25 ha
Weighted Runoff 'C'	
- Using RM 'C' Values	0.49
- Using Typical 'C' Values	0.29
Time of Concentration 't'	45 min*
Intensity 'i' (5-year)	47.5 mm/hr
Peak Discharge Q (5-year)	
- Using RM 'C' Values	4.36 cms
- Using Typical 'C' Values	2.54 cms
Intensity 'i' (25-year)	69.1 mm/hr
Peak Discharge Q (25-year)	
- Using RM 'C' Values	6.34 cms
- Using Typical 'C' Values	3.69 cms

** Based on rounded average of Kirpich and Bransby Williams Time of Concentration Equation values using estimated maximum flow length and surface slope.*

General drainage for the overall site will follow a similar pattern to the pre-developed site except that any runoff that was previously directed to the existing farmland south of site will be intercepted by drainage swales located within property and directed toward the existing Lorne Hill Road 22E ditch. The post-development time of concentration was estimated to remain the same as the pre-development value due to the similar maximum flow length, surface slope and surface type within the drainage channels.

STORM WATER MANAGEMENT PLAN

As part of the RM's design criteria for proposed site drainage, post-development runoff leaving the site is to be equal to or less than the existing pre-development rates. For this site, runoff from the catchments discharging into the internal ditches and swales will be restricted by the placement of control culverts at their downstream ends near the west property line prior to leaving site and entering the existing Lorne Hill Road 22E ditch. There will also be a small portion of unrestricted runoff from the perimeter swale located along the south property line that will be discharging directly into the existing Lorne Hill Road 22E ditch.

For calculating the restricted runoff rate through control culverts, the typical approach is to use Manning's Equation, given by:

$$Q = VA = (1/n)AR^{2/3}\sqrt{S}$$

where 'Q' is the peak discharge in cubic metres per second, 'V' is the velocity in metres per second, 'A' is the flow area in square metres, 'n' is Manning's Roughness Coefficient, 'R' is the hydraulic radius in metres, and 'S' is the hydraulic grade line slope in metres per metre.

Table 4.0 below outlines the restricted and unrestricted post-development flows by catchment for the overall site, using Manning's Equation and the Rational Method, respectively.

Table 4.0 – Post-Development Runoff Calculations by Catchment (with Flow Restriction)

	Northwest Control Culvert	Southwest Control Culvert	South Perimeter Swale	Total Overall Site
Area 'A'	21.7 ha	36.4 ha	8.9 ha	67.1 ha
Pre-Dev. Runoff (5-Year)				
- Using RM 'C' Values	0.66 cms	1.11 cms	0.24 cms	2.01 cms
- Using Typical 'C' Values	0.35 cms	0.59 cms	0.12 cms	1.06 cms
Post-Dev. Runoff (25-year)				
- Using RM 'C' Values	0.33 cms (restricted)	0.53 cms (restricted)	0.34 cms (unrestricted)	1.20 cms
- Using Typical 'C' Values	0.33 cms (restricted)	0.53 cms (restricted)	0.17 cms (unrestricted)	1.03 cms
Storage Required				
- Using RM 'C' Values	4255 cu. m	7140 cu. m	395 cu. m	11655 cu. m
- Using Typical 'C' Values	2610 cu. m	4380 cu. m	200 cu. m	7090 cu. m
Storage Available	4480 cu. m	8780 cu. m	-	13260 cu. m

As shown in Table 4.0, the pre-development (allowable) runoff rate using the RM 'C' values is much higher than when using typical 'C' values. In order to satisfy both MSD and the RM's drainage requirements, the control culverts have been sized to restrict the post-development runoff rate to the lower of the two allowable rates.

The placement of control culverts at the downstream ends of the ditches near the west property limit restrict the overall post-development runoff for these areas to 0.86 cms, which is 0.08 cms below the pre-development rate of 0.94 cms. The post-development runoff for the unrestricted catchment area will remain the same as pre-development due to no significant development within these areas. The restricted area accounts for approximately 85% of the total site area and the unrestricted area accounts for the remaining 15%. The combined overall post-development discharge for the entire site is 1.03 cms, which is 0.03 cms below the overall pre-development rate of 1.06 cms.

For the purpose of containing flows in excess of the pre-development condition, MSDs design criteria also require that internal storage is provided for storm water retention. As shown in Table 4.0, the required storage volume using the RM 'C' values is significantly greater than when using typical 'C' values. In order to satisfy both MSD and the RM's drainage requirements, the site's internal storage has been designed to accommodate the greater of the two required storage volumes.

For this site, 13260 cubic metres of storage will be available throughout the system of ditches and swales located within the catchment areas draining to the control culverts, exceeding the required storage volume of 11655 cubic metres for the entire site.

Berger plans to install sedimentation ponds at the downstream ends of the two controlled catchment areas and they will be handling the design of these ponds internally. Any increase in storage capacity provided by the sedimentation ponds was not taken into account for the site's storm water management plan and would be in addition to the values shown in Table 4.0. Berger will also be providing the RM with a letter absolving the RM of all responsibilities associated with the operation and maintenance of the private internal land drainage system.

SUMMARY

The storm water management plan for this site development has been designed to meet the hydraulic design requirements set forth by Manitoba Sustainable Development. Post-development runoff will be limited to the 5-year pre-development rate through control culverts and storage for up to a 25-year rainfall event will be provided in the internal ditches.

We trust that the information outlined in this design brief is satisfactory to complete Berger Peat Moss Ltd.'s application for license under the Manitoba Environment Act for this proposed site development.

Yours Truly,

Sison Blackburn Consulting Inc.

Prepared by:

Justin Taplin, P.Eng.
Project Engineer

Annex 5: Emergency Response Plan at Hadashville Plant

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

BERGER PEAT MOSS LTD.

Emergency Response Plan

Hadashville Plant, Manitoba
March 2020

CONTENTS

Berger Peat Moss is committed to operating at the highest standards to protect the health and safety of our workers the public and the environment.

Therefore, as part of an emergency program the employees of Berger Peat Moss will develop and maintain an emergency plan in compliance with applicable laws and industry standards to ensure a timely and appropriate response to emergencies and spills.

Daryl Mueller
Maintenance / Quality Supervisor

March 2020

Responsibilities

All employees: production, loading, supervisors, and maintenance

Fire Procedure

- **Assess the severity of the situation**
    - Determine if the situation presents an immediate risk to your well-being. Evacuate the area if in danger
- **Contain Fire**
    - Press Operator helps Team Leader locate fire, then calls the Fire Department and advises the garage employees. Then the Press Operator returns to help the Team Leader
    - Yard Lift Operator brings the water tank (with a forklift) to an area close to the fire as directed by the Team Leader, then moves all motorized vehicles away from the area
    - Plant Team Leader prepares the hoses in the plant
    - Loader Operator starts electrical pump in pump house, runs hoses from pump house to the plant, then returns to the pump house to start the tractor for the PTO pump as back-up. Turns the water on as directed by employees at the plant
    - Regroup all personnel to make sure everyone is present
- **Manage call out**
    - Plant Team Leader is responsible to call the Fire Department at 911. If they do not have personnel to send, call Natural Resources at 1 (800) 782-0076
    - Call the Hadashville Plant Supervisor and inform him of the situation
- **Notes**

- IN CASE OF FIRE, SPARKS OR COALS, THE TEAM LEADER AND PLANT SUPERVISOR MUST MAKE SURE THAT THERE IS A 48 HOUR FIRE WATCH FOLLOWING THE INCIDENT.

RULES TO FOLLOW IN THE EVENT OF FIRE.

WHEN THERE ARE COALS ONLY:

- Stop the machinery where the fire is located
- Pinpoint the location of all coals
- Soak all coals with a wet rag and place in a container or barrel of water
- IMPORTANT: DO NOT SPRAY WITH WATER IF THERE ARE NO FLAMES, it will spread the coals
- Install all water hoses and start water pump by the plant
- Verify conveyors and reserves are free of coals
- Empty reserves and conveyors from where coals appear up to the end of the line
- Make sure coals are extinguished
- Make certain that there is a 48-hour fire watch following the incident
- Determine the problem on the equipment (if that was the cause) and immediately do repairs

WHEN FLAMES ARE PRESENT:

- Call the Fire Department
- Shut off all electrical current where the fire is
- EX: if fire is in the plant, shut off all electrical current in the plant
- Prepare water hoses and start water pump
- Spray the flames
- Take away any equipment that is near the plant
- Regroup all personnel to make sure everyone is present

WHEN THERE IS FIRE ON THE PEAT PAD:

- Spread the peat from the mound where the fire is
- Stir and turn over the peat
- Spray the surface of the peat
- Cover the flame with peat using the loader

TEAM LEADER'S RESPONSIBILITY:

- Install water hoses and start water pumps
- Make sure that all coals have been extinguished. If there are flames, turn off all electrical current and call Fire Department
- Move any equipment away from the fire area
- Regroup all employees. Make sure the fire is under control
- Make sure there is a 48-hour fire watch following the incident

INTERAL PRIMARY EMERGENCY CONTACTS
FOR HADASHVILLE PLANT SITE
DIAL 9 TO CALL OUT FROM A BERGER PHONE

POSITION	NAMES	NUMBERS	C.P.R. CERTIFIED
Director of Operations, Hadashville	Denis Lebel	Mobile: (418) 867-9119 Office: (418) 862-4462 ext 1241 Fax: (418) 867-3929	**No**
Administration/HR	Ginette Saindon	Mobile: (204) 346-3285 Office: (204) 426-2342 ext 6900 Fax: (204) 426-2343	**No**
Hadashville Plant Supervisor	Neil Kuharski	Mobile: (204) 371-8320 Office: (204) 426-2342 ext 6903 Fax: (204) 426-2343	**Yes**
Maintenance / Quality Supervisor	Daryl Mueller	Mobile: (204) 541-0086 Office: (204) 426-2342 ext 6902 Fax: (204) 426-2343	**Yes**
Field Foreman	Trent Russell	Mobile: (204) 870-2085	**Yes**

Berger Peat Moss Ltd.
Hadashville Plant Physical Address
43037, Provincial Road 503,
Hadashville, MB
R0E 0X0

INTERAL SECONDARY EMERGENCY CONTACTS FOR HADASHVILLE PLANT SITE

DIAL 9 TO CALL OUT FROM A BERGER PHONE

POSITION	NAMES	NUMBERS	C.P.R. CERTIFIED
Director of Operations, Hadashville	Denis Lebel	Mobile: (418) 867-9119 Office: (418) 862-4462 ext 1241 Fax: (418) 867-3929	**No**
Administration/HR	Ginette Saindon	Mobile: (204) 346-3285 Office: (204) 426-2342 ext 6900 Fax: (204) 426-2343	**No**
Hadashville Plant Supervisor	Neil Kuharski	Mobile: (204) 371-8320 Office: (204) 426-2342 ext 6903 Fax: (204) 426-2343	**Yes**
Maintenance / Quality Supervisor	Daryl Mueller	Mobile: (204) 541-0086 Office: (204) 426-2342 ext 6902 Fax: (204) 426-2343	**Yes**
Field Foreman	Trent Russell	Mobile (204) 870-2085 Office: (204) 426-2342 ext 6906 Fax: (204) 426-2343	**Yes**
Hadashville Plant Team Leader	Jason Nash	Mobile: (204) 918-9553	**Yes**
Plant Mobile Mechanic	Eugene Nault	Home: (204) 422-8589 Mobile: (204) 326-7020	**Yes**

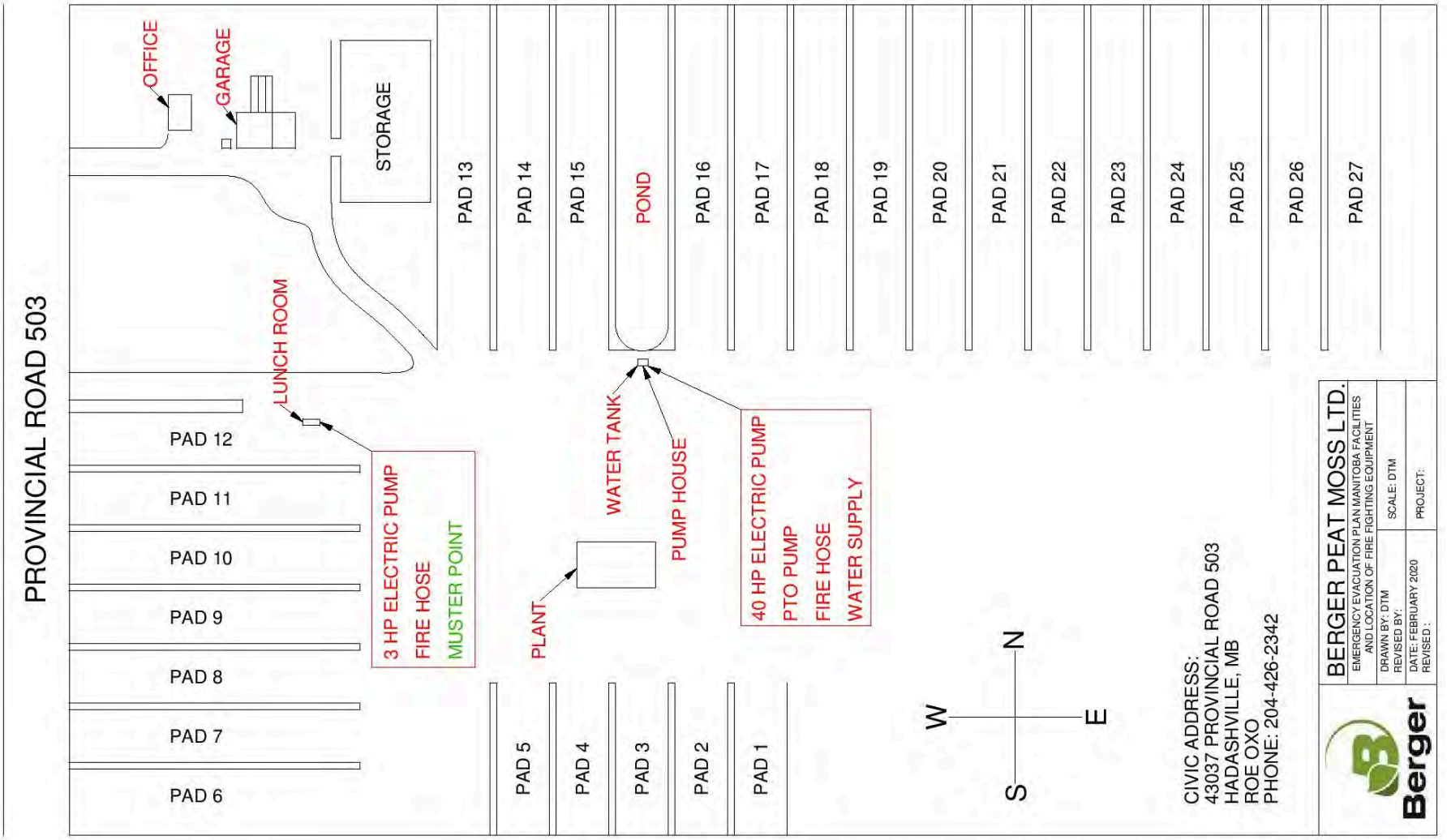
Berger Peat Moss Ltd.
Hadashville Plant Physical Address
43037, Provincial Road 503,
Hadashville, MB
R0E 0X0

EXTERNAL EMERGENCY CONTACTS
FOR HADASHVILLE PLANT SITE
DIAL 9 TO CALL OUT FROM A BERGER PHONE
FOR 911 JUST DIAL 9 – 1 – 1

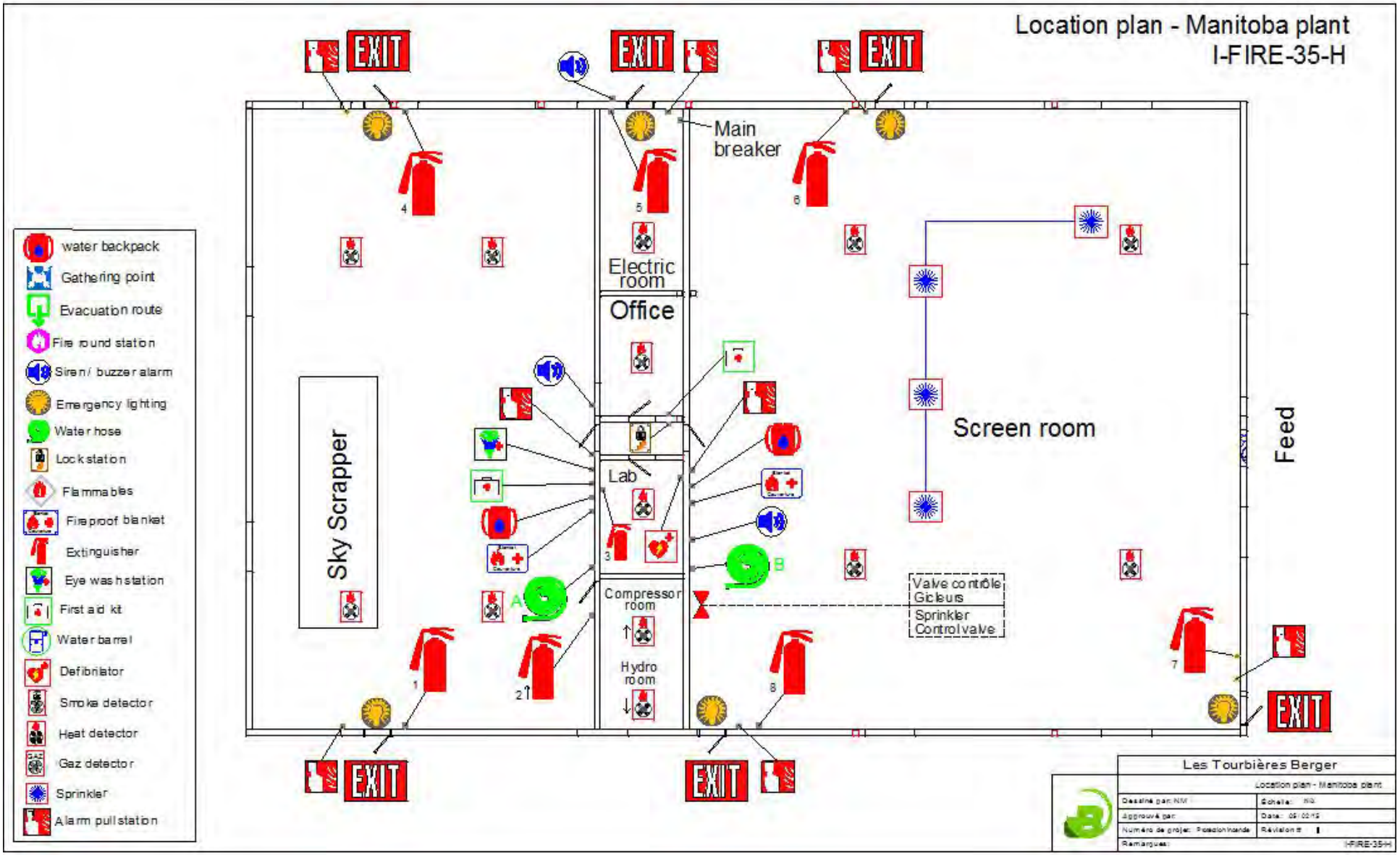
NAMES	NUMBERS
Ambulance	911
Police	911 1 (204) 376-5215
Fire Department	911
Poison Control	911
Natural Resources	1 (800) 782-0076
Dangerous Goods Emergency Centre	1 (613) 992-4624
Canadian Customs	1 (800) 461-9999
American Customs	1 (800) 232-5328
Border Patrol	1 (800) 502-9060 1 (204) 373 2474

Berger Peat Moss Ltd.
Hadashville Plant Physical Address
43037, Provincial Road 503,
Hadashville, MB
R0E 0X0

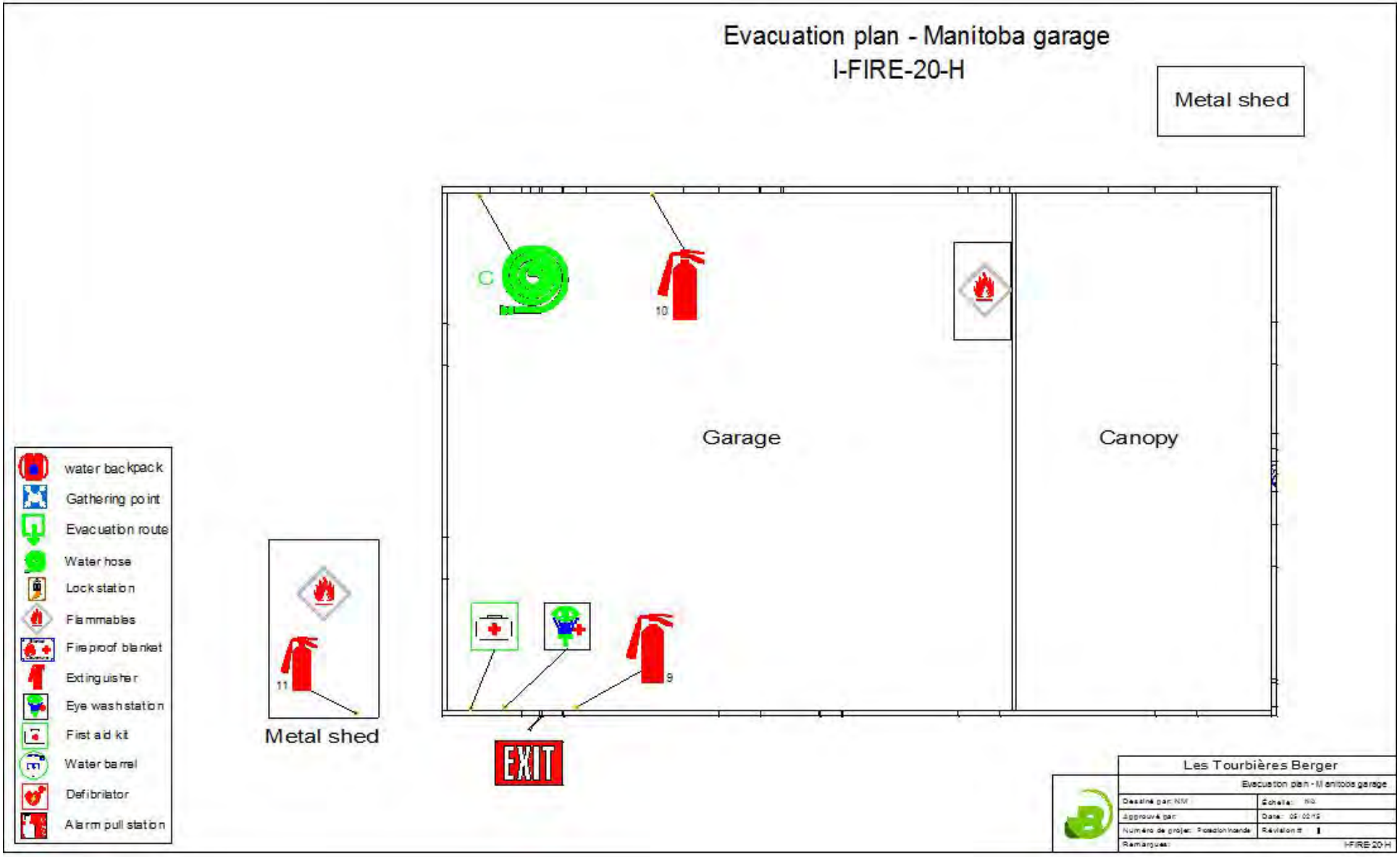
Hadashville Yard Site Map



Hadashville Plant Map



Hadashville Office & Garage Map



Annex 6: Phase 1 Environmental Assessment by HLC Consulting Ltd

121, RR 1, Saint-Modeste (Québec) GOL 3W0 TEL. : 418 862-4462 FAX : 418 867-3929
ressource@berger.ca | **www.berger.ca**

22054 Oakwood Road 64N
Oakbank, Manitoba

Phase I Environmental
Site Assessment Report

October 1, 2019

Provided To:

Les Tourbières Berger Ltée
121 1er Rang
Saint-Modeste, QC G0L 3W0

Prepared By:

HLC Consulting Ltd.
Unit 5 - 55 Henlow Bay
Winnipeg, MB R3Y 1G4
Project #: 20190446

HLC CONSULTING LTD.

EXECUTIVE SUMMARY

HLC Consulting Ltd. (HLC) was retained on September 10, 2019 by Les Tourbieres Berger Ltée (hereafter referred to as Client), to perform a Phase I Environmental Site Assessment (ESA) of the property located at 22054 Oakwood Road 64N in Oakbank, Manitoba (hereafter referred to as Site).

The Site consists of approximately 160 acres of land, zoned as Agricultural General, set in a rural area. The Site is developed with five buildings; one house, one arena, one barn, one stable, and one hay storage barn. The remainder of the Site is complete with mostly gravel surfaces between the buildings, two ponds, fenced areas, manure piles, and soft landscaping (grass, shrubs, trees) across the property.

HLC was advised by the Client that the purpose of the Phase I ESA was to assess potential environmental issues for due diligence purposes.

The primary objective of the Phase I ESA was to document site conditions at the time of the site inspection, conducted on September 16, 2019, and based on available sources of information and observations of surface conditions during the inspection; to identify former and current operations or practices of past and current occupants that may present potential environmental concerns. The Phase I ESA focused on identifying potential environmental concerns relating to hazardous materials (asbestos, mould, lead, etc.), and to soil and groundwater contamination events that may have occurred on-site and adjacent to the Site.

Based on the assessment undertaken, the following observation on the subject property could indicate potential subsurface impacts at the Site and is therefore, an area of environmental concern:

- Stressed vegetation (dead grasses) was observed under an aboveground storage tank (AST), lacking secondary confinement, located east of the house; the area is approximately 3 m^2

Based on the findings noted above, HLC recommends completing a Phase II ESA at the Site.

TABLE OF CONTENTS

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1.0 INTRODUCTION

1.1 Project Background

HLC Consulting Ltd. (HLC) was retained on September 10, 2019 by Les Tourbieres Berger Ltée (hereafter referred to as Client), to perform a Phase I Environmental Site Assessment (ESA) of the property located at 22054 Oakwood Road 64N in Oakbank, Manitoba (hereafter referred to as Site).

The Site consists of approximately 160 acres of land, zoned as Agricultural General, set in a rural area. The Site is developed with five buildings; one house, one arena, one barn, one stable, and one hay storage barn. The remainder of the Site is complete with mostly gravel surfaces between the buildings, two ponds, fenced areas, manure piles, and soft landscaping (grass, shrubs, trees) across the property.

HLC was advised by the Client that the purpose of the Phase I ESA was to assess potential environmental issues for due diligence purposes.

1.2 Objectives

The primary objective of the Phase I ESA was to document site conditions at the time of the site inspection, conducted on September 16, 2019, and based on available sources of information and observations of surface conditions during the inspection; to identify former and current operations or practices of past and current occupants that may present potential environmental concerns. The Phase I ESA focused on identifying potential environmental concerns relating to hazardous materials (asbestos, mould, lead, etc.), and to soil and groundwater contamination events that may have occurred on-site and adjacent to the Site.

1.3 Methodology

The Phase I ESA was completed in accordance with the Canadian Standard Association (CSA) document entitled "*Phase I Environmental Site Assessment, CSA Standard Z768-01*" dated 2001 and reaffirmed in 2016. The scope of the Phase I ESA was limited to site observations consisting of a visual inspection performed during the site inspection and did not include sampling or testing, a process consistent with industry standard. The scope also included a review of available documented information sources.

During the site inspection, HLC was accompanied by Todd Jowett, Maintenance at Les Tourbieres Berger Ltée (hereafter referred to as Site Representative).

2.0 SITE DESCRIPTION

2.1 Site Location and Setting

The Site is located at 22054 Oakwood Road 64N, southeast of the intersection between Oakwood Road 64N and Lorne Hill Road 22E, in Oakbank, Manitoba (Appendix I). The Site consists of an approximately 160 acre lot zoned as Agricultural General. The Site is developed with five buildings; one house, one arena, one barn, one stable, and one hay storage barn. The remainder of the Site is complete with mostly gravel surfaces between the buildings, two ponds, fenced areas, manure piles, and soft landscaping (grass, shrubs, trees) across the property. All five buildings are clustered in the northeast quarter of the property. The remaining three quarters of the property appear to be used as agricultural land.

The Site Representative advised HLC that all of the buildings were constructed approximately 15 years ago, in 2004. The house was undergoing renovations at the time of the site visit; the house appears to consist of one bedroom, one bathroom, a kitchen, and living area, with access to an attached 3-door garage space. The house consisted of a main floor, with an additional attic space above that could be used as a storage space. The approximate footprint area of the house/garage is 240 m^2. The arena consisted of one ground floor level and included a large horse arena, a commercial kitchen space, a second residential style kitchen, washrooms, and office space. The approximate footprint area of the arena is 3,750 m^2. The barn appeared to have been mainly cleared out since the Equine Park ceased operation, and

2.1 Site Location and Setting (continued)

consisted of mainly empty space, the Site Representative advised the space was previously used to house horses. The approximate footprint area of the barn is 2,175 m^2. The stable consisted of washrooms, an office space, a horse washing station, approximately 20 stables, and a manure collection area. The approximate footprint area of the stable is 925 m^2. The hay storage barn was utilized to store hay for the horses, the barn only has side walls on the north and west sides of the building, the south side is held up by wooden poles, and the east side is open. The approximate footprint area of the hay storage barn is 350 m^2.

Two outdoor ground air conditioning units and one thru-window air conditioning unit are utilized for cooling in the arena; a makeup air heater and supplementary electric heaters are used for heating. No heating or cooling equipment was observed in the house at the time of the site visit as it is undergoing renovations; the building is suspected to have previously utilized electric heating. One electric heater was observed in the stable washrooms; no other heating or cooling equipment was observed. No heating or cooling equipment was observed in either the barn or the hay storage barn. No emergency generators were reported or observed during the site visit.

2.2 Topographic, Geologic and Hydrogeological Setting

The Site is generally flat and at grade with adjacent properties and roadways. Based on an available topographic map and the observed site topography, regional surface drainage (anticipated shallow groundwater flow direction) appears to be to the west towards the Red River, located approximately 8.7 km northwest of the Site. It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground utility corridors and is not necessarily a reflection of regional or local groundwater flow or a replica of the Site or area topography. The nearest open water body is the Red River Floodway, located approximately 1.7 km west of the Site.

The surfaces of the Site consist primarily of agricultural land, a sand based outdoor horse arena, grassed areas, trees, and gravel areas around the five buildings. Additionally, there are two ponds on-site.

Based on an available surficial geology map, the native surficial soils of the Site consist of Osborne soils. Soils of the Osborne association are poorly drained Rego Humic Gleysol soils developed on moderately to strongly calcareous, deep uniform, clayey, lacustrine deposits. A site specific determination would be required in order to obtain detailed soil profile and permeability information.

The Site occurs over an area with underlying geologic deposits of the Red River Formation; dolomitic limestone and dolomite of the Paleozoic period. The Red River Formation is a stratigraphical unit of Upper Ordovician age in the Western Canadian Sedimentary Basin. The thickness of the Red River Formation varies from 45 to 150 m below ground surface.

2.3 Site Operations

Prior to the Client's purchase of the property, the Site had been operating as an Equine Park. The Site is undergoing a transitional stage and will be developed into a Peat Processing Plant. The existing buildings are anticipated to be renovated into storage and office spaces for the processing plant and an approximately 250 x 150 foot building will be constructed on-site and function as the Peat Processing Plant.

3.0 HISTORICAL RECORDS REVIEW

3.1 Site Interviews and Records

The Site Representative advised HLC of the following with respect to the historical occupancy and operations at the Site:

- The Equine Park, and associated buildings, were constructed in approximately 2004
- The Site Buildings will be undergoing renovations to suit the Client's development plans
- The Site was used as agricultural land prior to the development of the Equine Park
- No dry-cleaning services have historically taken place at the Site
- No retail fuel outlet (RFO) has operated at the Site

3.2 Aerial Photographs

Copies of aerial photographs dated 1937, 1950, 1965, 1972, 1983 and 1993 were reviewed by HLC at Manitoba Sustainable Development's (MSD's) Air Photo Library. In addition, HLC reviewed Google Earth™ Satellite Imagery dated 2004 and 2017. A summary of information with respect to the Site and surrounding area is provided in the following table:

Aerial Photograph Details

Period/Date	Land Use
1937	SITE: Agricultural land, with water channels along the southern half of the site. NORTH: Agricultural land, and what appears to be one single-family residential dwelling. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land, some trees are observed along Oakwood Road. WEST: Agricultural land, and what appears to be one single-family residential dwelling.
1950	SITE: Agricultural land, no water channels appear on-site. NORTH: Agricultural land, and what appears to be one single-family residential dwelling. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land, some trees are observed along Oakwood Road. WEST: Agricultural land, and what appears to be one single-family residential dwelling.
1965	SITE: Agricultural land. NORTH: Agricultural land, and what appears to be one single-family residential dwelling. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land, no trees are observed on-site. WEST: Agricultural land, and what appears to be one single-family residential dwelling.
1972	SITE: Agricultural land. NORTH: Agricultural land, the single-family residential dwelling is no longer on-site. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land. WEST: Agricultural land, and what appears to be one single-family residential dwelling.
1983	SITE: Agricultural land, a small water channel runs through the southwest corner of the Site. NORTH: Agricultural land. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land. WEST: Agricultural land, and what appears to be two single-family residential dwellings.
1993	SITE: Agricultural land, a small water channel runs through the southwest corner of the Site.

3.2 Aerial Photographs (continued)

Period/Date	Land Use
	NORTH: Agricultural land. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land. WEST: Agricultural land, and what appears to be five single-family residential dwellings.
2004	SITE: The Equine Park appears on-site, a small water channel runs through the southwest corner of the Site. NORTH: Agricultural land. SOUTH: Agricultural land, water channels and some trees are observed. EAST: Agricultural land. WEST: Agricultural land, and what appears to be five single-family residential dwellings.
2017	SITE: The Equine Park is on Site, a small water channel runs through the southwest corner of the Site. NORTH: Agricultural land. SOUTH: Agricultural land, water channels and some trees are observed, what appears to be one single-family residential building appears. EAST: Agricultural land. WEST: Agricultural land, and what appears to be five single-family residential dwellings.

3.3 Fire Insurance Plans

A review of Fire Insurance Plans (FIPs) for the Site and surrounding area was attempted by HLC at the Archives of Manitoba. However, no FIPs for the Site or surrounding area were available for review.

3.4 City Directories

City Directories for the Site and surrounding area were not readily available or reviewable.

3.5 Previous Reports

3.5.1 Environmental Reports

No previous environmental reports (i.e. Phase I ESAs, geological or geotechnical reports) were provided to HLC for review, and according to the Client, none are available.

3.5.2 Other Reports

HLC contacted Opta Information Intelligence (Opta) to review Fire Insurance Plans (FIPs) related to the Site and surrounding area, as well as Property Underwriters' Reports (PURs), Property Underwriters' Plans (PUPs) and Construction, Occupancy, Protection, Exposure (COPE) reports for the Site. The response received from Opta on September 17, 2019 (Appendix II) indicated that no records exist for the Site.

No other reports were identified or made available by the Client during the Phase I ESA.

3.6 Historical Summary

Based on the results of the historical review, nothing was identified that is likely to result in potential subsurface impacts at the Site.

4.0 REGULATORY INFORMATION AND CORRESPONDENCE

4.1 Site Regulatory Information

HLC requested copies of permits, approvals and registrations from the Client, and was advised that there was no regulatory information with respect to the Site.

4.2 Provincial Government

An inquiry request was made with MSD with respect to any orders, violations or spills. At the time of writing this report, a written response had not been received from MSD. A review of a formal response from MSD will be completed by HLC. If the response provides any information that represents a potential issue of environmental concern, a copy of the response will be forwarded to the Client under separate cover. Our conclusions and recommendations may be amended based on this information. A copy of the request has been appended (Appendix III).

HLC completed a 250 m search radius for properties listed on MSD's Contaminated/Impacted Sites All Sites List updated June 5, 2019. Neither the Site nor any notable adjacent properties upgradient from the Site were identified on this list.

HLC completed a 250 m search radius for properties listed on the MSD Hazardous Waste Generation Registrations database updated July 2019. Neither the Site nor any notable adjacent properties upgradient from the Site were identified in the registration database.

4.3 Local and Municipal Government

The RM of Springfield maintains records regarding sewer-use infractions and other information related to sewer use. Given that the present activities at the Site as identified in this Phase I ESA are not expected to result in sewer discharges outside those permitted by the RM of Springfield's bylaws, HLC did not contact the RM of Springfield as part of this Phase I ESA.

In addition, HLC reviewed the location of the RM of Springfield's landfills and transfers stations. Landfill materials have the potential to produce methane gas during the decomposition of organic matter, which can subsequently migrate into buildings through pathways in building foundations. However, no landfills, dump sites or transfer stations were observed within 200 m of the Site. As such, it is HLC's opinion that former and present landfills and dump sites are not likely to give rise to potential impacts in connection with the Site.

4.4 EcoLog ERIS

HLC submitted a request to EcoLog Environmental Risk Information Services Ltd. (ERIS) for a review of the following databases that pertain to the Site and surrounding properties located within a 250 m radius of the Site:

- *"Water Well Inventory"* dated 1880 to May 2015

A copy of the EcoLog ERIS report has been appended in Appendix IV. HLC notes that one mappable record was identified for the Site and adjacent properties within a 250 m radius.

A summary of information obtained with respect to the Site is provided in the following table:

4.4 EcoLog ERIS (continued)

Detail Summary

Site Name:	L H Craig
Databases:	Water Well Inventory
Address:	MB
Distance:	2.5 m; Corrected: 0 m (on-site)
Direction:	Southeast; Corrected: N/A
Elevation:	+1.0 m; Corrected: 0 m
Comments:	Well PID: 23497 Water Use: Domestic Well Use: Production Date Completed: December 18, 1974 Location: 23-11-4E Driller: Aquarius Well Drilling HLC noted one well was located on-site, ERIS plots the above well in the centre of the four quarter sections. HLC reviewed the MB SD Drill Database and did not find a listing specific to the northwest 1/4 section, therefore will assume that the above information corresponds to the well observed on-site.

4.5 Regulatory Information Summary

Based on the regulatory information reviewed, nothing was observed that is likely to result in potential subsurface impacts at the Site.

5.0 SITE INSPECTION

5.1 Hazardous Materials and Wastes

MSD generally defines hazardous waste, with certain exceptions, as "waste dangerous goods" from the use of familiar products that households and businesses use every day. Hazardous waste can include paint thinners, waste paint, oil, oil filters, batteries, and cleaning chemicals. If the product has a dangerous goods safety label on its packaging, the waste product is more than likely a hazardous waste.

Chemicals stored on the Site consisted of routine cleaning supplies and typical building and equipment maintenance supplies. Chemicals observed on-site were stored within manufacturer-supplied containers.

A summary of information with respect to the hazardous materials and wastes is provided in the following table:

Hazardous Materials and Waste Details

Material	Quantity	Use	Comments
Oil	1 x 4 litre jug	Likely to replace vehicle oil	The jug was observed on a shelf along the east wall of the garage attached to the house.
Zep Cleaner	1 x 5 gallon pail	Cleaning	The pail was observed on the floor along the east wall of the garage attached to the house.
Paint	~16 x 1 gallon can	Paint	All paint cans were observed on a shelf along the east wall of the garage attached to the house.
Paint	~2 x 5 gallon pail	Paint	Pails were observed on the floor along the east wall of the garage attached to the house.
Paint	~5 x 5 gallon pail	Paint	Pails were observed in the southwest corner of the manure room in the stables.
Hydraulic Fluid	~3 x 5 gallon pail	For use in equiment	Pails were observed in the mechanical room in the stables.
Compressed gas cyclinder	1 x ~40 pound tank	Unknown	Tank was observed in the attic of the house, the Site Representative advised that the tank will be removed from Site.

5.1 Hazardous Materials and Wastes (continued)

Material	Quantity	Use	Comments
Compressed gas cylinder	1 x ~21.4 litre tank	Unknown	Tank was observed sitting outside the southeast corner of the house, the Site Representative advised that the tank will be removed from Site.
Steel drum	1 x ~10 gallon drum	Unknown	Drum was observed sitting outside the southeast corner of the house, the Site Representative advised that the drum will be removed from Site.

5.2 Aboveground Storage Tanks (ASTs)

Evidence of two (2) aboveground storage tanks (ASTs) was observed on the Site during the site reconnaissance. Details of the ASTs are provided below.

ASTs Details

Content	Age	Construction	Approx. Volume	Location	Use
Diesel	~2004	Steel	300 gallons	Located to the east of the house. No secondary containment noted. The Site Representative advised that the tank will be removed from the property.	To fuel yard maintenance equipment.
Propane	~2004	Steel	3,785 litres	Located on the northeast side of the arena.	Used to fire the makeup air heater and commercial kitchen equipment.

5.3 Underground Storage Tanks (USTs)

No evidence of underground storage tanks (USTs) was observed on-site (i.e. fill/vent pipes), and none were reported by the Client. No evidence of former USTs was observed by HLC at the time of the site visit.

5.4 Water and Wastewater

The water supply source is from a groundwater well located west of the stable building. Groundwater is used as a source of potable water. Water is primarily used for domestic-related activities. No wells, other than the domestic groundwater well observed, were observed or reported on-site.

Multiple water features were observed on-site as follows:

- Pond A: located centrally on the north side of the site, the approximate area of the pond is 1,875 m^2
- Pond B: located centrally on the east side of the site, the approximate area of the pond is 160 m^2
- A ditch was observed along the west side of the outdoor horse arena, that continued directly west from the northwest corner of the arena, running through two culverts under the gravel Site entrance, and appears to drain into Pond A
- A ditch was observed to the north of Pond B and appears to drain water into the pond, away from the Site Buildings

Effluents (i.e. system process water and discharges to sewers or other disposal systems) were limited to domestic sewage, which were directed to either one of three septic tanks located on-site, effluents then flow to one of two septic

5.4 Water and Wastewater (continued)

fields located on-site. D&S Industrial provides removal services for the remaining solids as required. The Site Representative advised that removal services last occurred approximately 2 years ago.

The septic tanks are located on the Site as follows:

- Septic Tank #1: Services the house and is located on the north side of the building.
- Septic Tank #2: Services the stables and is located on the east side of the building.
- Septic Tank #3: Services the arena and is located on the north side of the building.

The septic fields are located on the Site as follows:

- Septic Field #1: Services the house and stables and is located to the east of the house.
- Septic Field #2: Services the arena and is located to the east of the driveway entrance from Oakwood Road.

The Site Representative advised that effluents from the manure room and barn are pumped out to the same area as the manure piles on-site; the manure piles are located approximately 50 m south of the barn.

No grease traps or oil/water separators were observed and none were reported by the Site Representative.

5.5 Non-Hazardous Waste

Domestic non-hazardous wastes and recyclables are deposited in metal bins; one bin is located between the barn and the stable and one is located to the north side of the stable. The waste is removed off-site by GFL Environmental Inc. (GFL), an external waste hauler. What appears to be a burn pit was observed on-site and located to the east side of the house. The Site Representative advised that this pit will be removed during the on-site renovation process.

5.6 Air Emissions

Washroom and kitchen vents are exhausted through the sides of the applicable Buildings. No process vents were observed. Odours typical to that of an Equine Park were present throughout the arena, stable and barn. The Site Representative reported that no permits/approvals for the Site, as related to air emissions or discharges are available.

5.7 Staining and Stressed Vegetation

Stained Soil/Stressed Vegetation was observed on the Site during the site reconnaissance as follows:

- Stressed vegetation (dead grasses) was observed under an AST located east of the house; the area is approximately 3 m^2. The Site Representative advised this is likely caused by weed whacking that is done in this area and reported no spills have occurred in the area.
- The following stressed vegetation was observed in areas that used to contain horses and was likely stressed due to compaction and/or grazing; vegetation appears to be growing back in these areas:
    - One area was observed south of the stable; the area is approximately 360 m^2.
    - One area was observed east of the stable; the area is approximately 525 m^2.
    - One area was observed southeast of the stable; the area is approximately 590 m^2.
    - One area was observed north east of the stable; the area is approximately 315 m^2.
    - One area was observed in what used to be an outdoor horse arena; the area is approximately 2,000 m^2.

5.8 Polychlorinated Biphenyls (PCBs)

The use of polychlorinated biphenyls (PCBs) as dielectric fluids in electrical equipment such as transformers, fluorescent lamp ballasts and capacitors was common up to about 1980. Other uses included heat transfer fluid, hydraulic, fluid, dye carriers in carbonless copy paper, plasticizers in paints, adhesives, and caulking compounds. In Canada, PCBs were prohibited from being used in products, equipment, machinery, electrical transformers and capacitors that were manufactured or imported in the country after July 1980.

5.8 Polychlorinated Biphenyls (PCBs) (continued)

Where possible, labelling or other forms of identification on electrical and other equipment are compared to summary documents prepared by Manitoba Hydro. Manitoba Hydro may therefore be contacted to determine the PCB content of electrical transformers based on their serial numbers.

Given the year of construction of the Buildings, it is unlikely that dielectric fluid in fluorescent light ballasts contains PCBs.

5.9 Asbestos-Containing Materials (ACMs)

Asbestos-containing materials (ACMs) are commonly found in building construction materials in buildings constructed in the mid-1980s. In Manitoba, ACM is defined as being either non-friable (i.e. containing 1.0% of greater of asbestos fibres) or friable (i.e. containing 0.1% or greater asbestos fibres. Friable asbestos, which is a material that can be crumbled, powdered or pulverized by hand pressure, was widely used in sprayed fireproofing until 1973, and in decorative or finished plasters, and thermal systems insulation until the early 1980s. Non-friable asbestos, which is a material that cannot be crumbled, powdered or pulverized by hand pressure, was widely used in building construction including in vinyl floor tiles, sheeting flooring, ceiling tiles, cement boards, gaskets, and several other products until the mid-1980s.

Given the year of construction of the Buildings, it is unlikely that the Buildings contains ACMs.

5.10 Lead-Containing Paints (LCPs)

Lead was extensively used for pigmentation, sealing, and as a drying agent in oil-based paints up until the early 1950s. Exterior paints can typically contain up to 60% lead by weight. A decrease in content of lead used in paints began in 1960s. Although paints containing lead were banned from use on both exterior and interior surfaces of buildings, furniture or household products in the 1970s, various commercial paints are still known to contain lead.

Given the year of construction of the Buildings, it is unlikely that the Buildings contains LCPs.

5.11 Ozone-Depleting Substances (ODS)

Ozone-depleting substances (ODS), such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, may be used as refrigerants, propellants and in the manufacture of items such as packaging, insulation, solvents and halon-based fire extinguishing agents.

Sources of ODS are likely limited to refrigerators and air conditioning units. R-22 or R-12 refrigerant may be present within these units, which is noted within the phase-out schedules for elimination in both Provincial and Federal regulations.

5.12 Radon

Radon is a radioactive gas that is formed by naturally occurring radioactive breakdown of uranium in soil, rock and water. Radon escapes from the ground and is mixed with outdoor air forming concentrations that are too low to be of concern. If radon enters a building, its concentration can accumulate to higher levels. Based on information presented by the Canadian Centre for Occupational Health and Safety, the area in which the Site is located (i.e. Manitoba) is known to have elevated radon levels. Health Canada has developed guidelines for acceptable levels or radon in buildings; however, there are currently no regulations governing acceptable levels of radon within buildings, and no requirements for testing or mitigation if levels are measured to exceed the current Health Canada guideline.

The Site Representative was unaware of any radon survey performed within the Buildings. Testing for radon in the Buildings was beyond the scope of this Phase I ESA.

5.13 Mercury

Mercury has historically been used in the construction of thermostats, switches and lamps. Mercury was also commonly added to paint coatings as a fungal retardant but is not normally tested as the proper handling and disposal of lead-containing paints would typically minimize any safety or disposal issues related to mercury.

No potential sources of mercury were observed during the site inspection.

5.14 Mould

The presence of mould or other microbiological contamination in buildings has become a concern to building tenants and owners due to potential health effects on occupants and users. Provincial labour departments have recently issued guidelines on enforced regulations to protect the health of construction workers who are exposed to mould in the course of building renovation. The presence of water leaks or high humidity can cause the growth or amplification of mould within indoor building environments.

Suspected visible mould growth on building materials is identified by visual growth or evidence of water intrusion and/or damage. It is important to note that mould growth may occur within enclosed spaces and may not be evident from a walkthrough building assessment, as was performed as part of this Phase I ESA. No visible mould growth or water damaged building materials were observed at the time of the assessment.

5.15 Summary of Site Inspection

Based on the results of the site inspection, the following issues have been identified as an area of potential environmental concern:

- Stressed vegetation (dead grasses) was observed under an AST, lacking secondary containment, located east of the house; the area is approximately 3 m^2.

6.0 ACTIVITIES ON ADJACENT PROPERTIES

Currently, the Site is located in a rural area that is predominantly occupied by agricultural and residential land uses. Based on the information gathered during the site inspection, nothing was observed on adjacent properties that is likely to result in potential subsurface impacts at the Site.

A description of the adjacent properties is summarized in the following table:

Adjacent Property Details

Direction From Site	Occupant	Use	Comments
North	Oakwood Road 64N, followed by agricultural land.	Agricultural	Adjacent property is transgradient from Site with respect to the inferred groundwater flow direction. No visible emissions or hazardous materials storage were noted during the site visit.
South	Agricultural land.	Agricultural	Adjacent property is transgradient from Site with respect to the inferred groundwater flow direction. No visible emissions or hazardous materials storage were noted during the site visit.
East	Agricultural land.	Agricultural	Adjacent property is upgradient from Site with respect to the inferred groundwater flow direction. No visible emissions or hazardous materials storage were noted during the site visit.

6.0 ACTIVITIES ON ADJACENT PROPERTIES (continued)

Direction From Site	Occupant	Use	Comments
West	Lorne Hill Road 22E, followed by single-family residential dwellings and agricultural land.	Mixed Use	Adjacent property is downgradient from Site with respect to the inferred groundwater flow direction. No visible emissions or hazardous materials storage were noted during the site visit.

7.0 CONCLUSION AND RECOMMENDATIONS

Based on the assessment undertaken, the following observation on the subject property could indicate potential subsurface impacts at the Site and is therefore, an area of environmental concern:

- Stressed vegetation (dead grasses) was observed under an AST, lacking secondary confinement, located east of the house; the area is approximately 3 m^2.

Based on the findings noted above, HLC recommends completing a Phase II ESA at the Site.

8.0 LIMITATIONS

This report was prepared for the exclusive use of the Client and was performed in order to identify potential issues of environmental concern associated with the Site located at 22054 Oakwood Road 64N in Oakbank, Manitoba, at the time of the site inspection. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. HLC disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed.

This Phase I ESA was completed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site. If additional parties require reliance on this report, written authorization from HLC will be required. Such reliance will only be provided by HLC following written authorization from the Client.

The report is based on data and information collected during the Phase I ESA and is based solely upon analysis of available documents, records and drawings, personal interviews, and on the conditions of the Site observed at the time of the site inspection. In evaluating the Site, HLC has relied in good faith on information provided by other individuals noted in this report. HLC has assumed that the information provided is factual and accurate. In addition, the findings in this report are based, to a large degree, upon information provided by the current owner/occupant. HLC accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts or persons interviewed or contacted, or contained in reports that were reviewed.

HLC will not be responsible for any consequential or indirect damages. HLC will only be held liable to damages resulting from negligence of HLC. HLC will not be liable for any losses or damage if the Client has failed, following the date upon which the claim is discovered within the meaning of the *Manitoba Limitation of Actions Act RSM 1987*, to commerce legal proceedings against HLC to recover such losses or damage.

The scope of work for this Phase I ESA did not include an intrusive investigation for designated substances (i.e. asbestos, mould, lead, etc.) and, therefore, these materials may be present in concealed areas. No soil, water, liquid, gas or other chemical sampling and analytical testing, other than that described herein at or in the vicinity of the Site was performed as part of this Phase I ESA.

HLC makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation. These interpretations may change over time with appropriate legal counsel.

9.0 CLOSURE

The conclusions and recommendations represent the best judgement of the assessor based on the site conditions observed on September 16, 2019 and current environmental standards.

We trust that the information presented in this report meets your current requirements. Please do not hesitate to contact the undersigned if you have any questions or concerns.

Regards,

HLC Consulting Ltd.

Author

Reegan Lawrence, B.Env.Sc.
Environmental Technologist

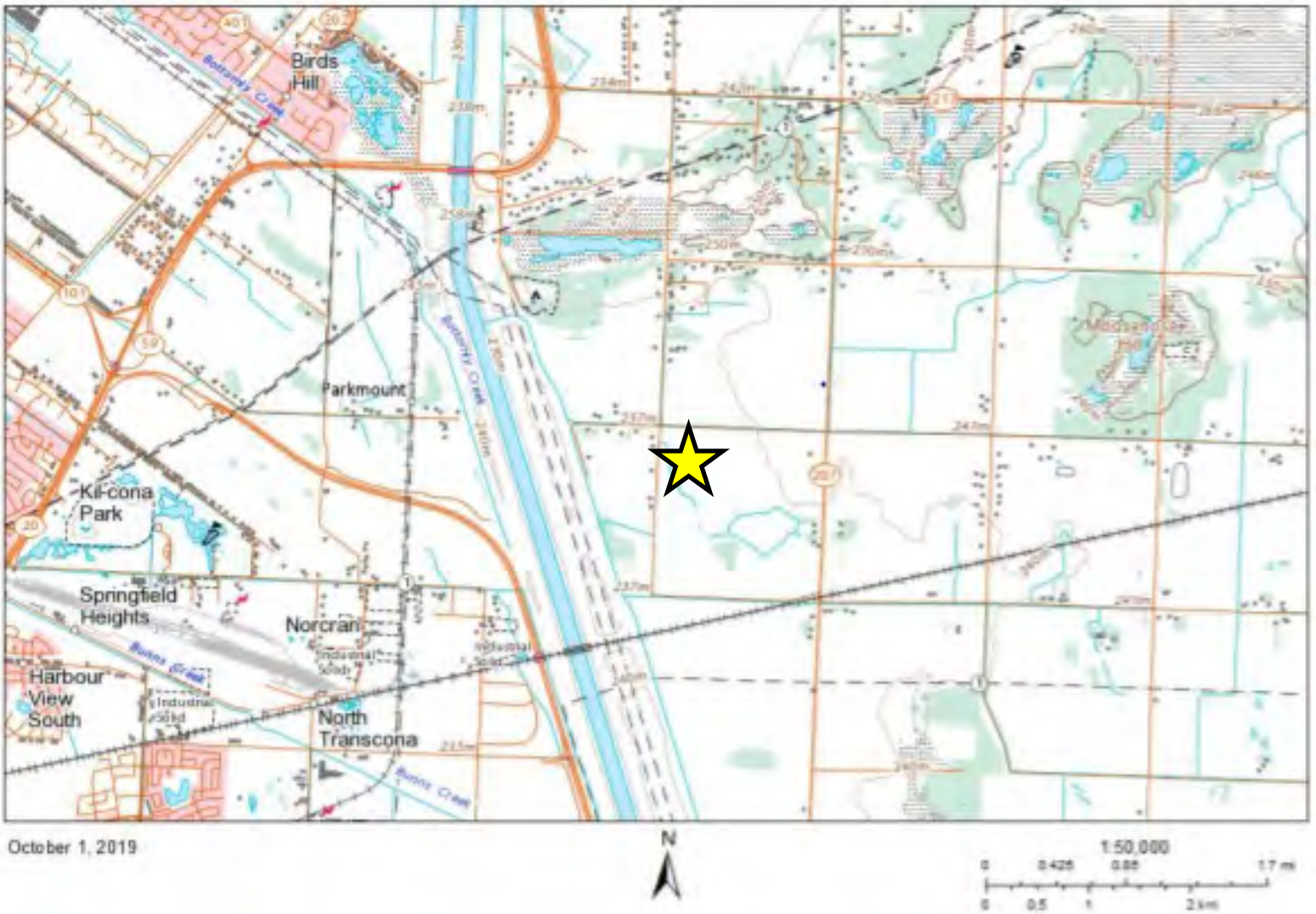
Reviewer

Carolyn Baldwin, B.Env.Sc., EP
Environmental Services Manager

Appendix I:

Site Figures

FIGURE 1: Site Location



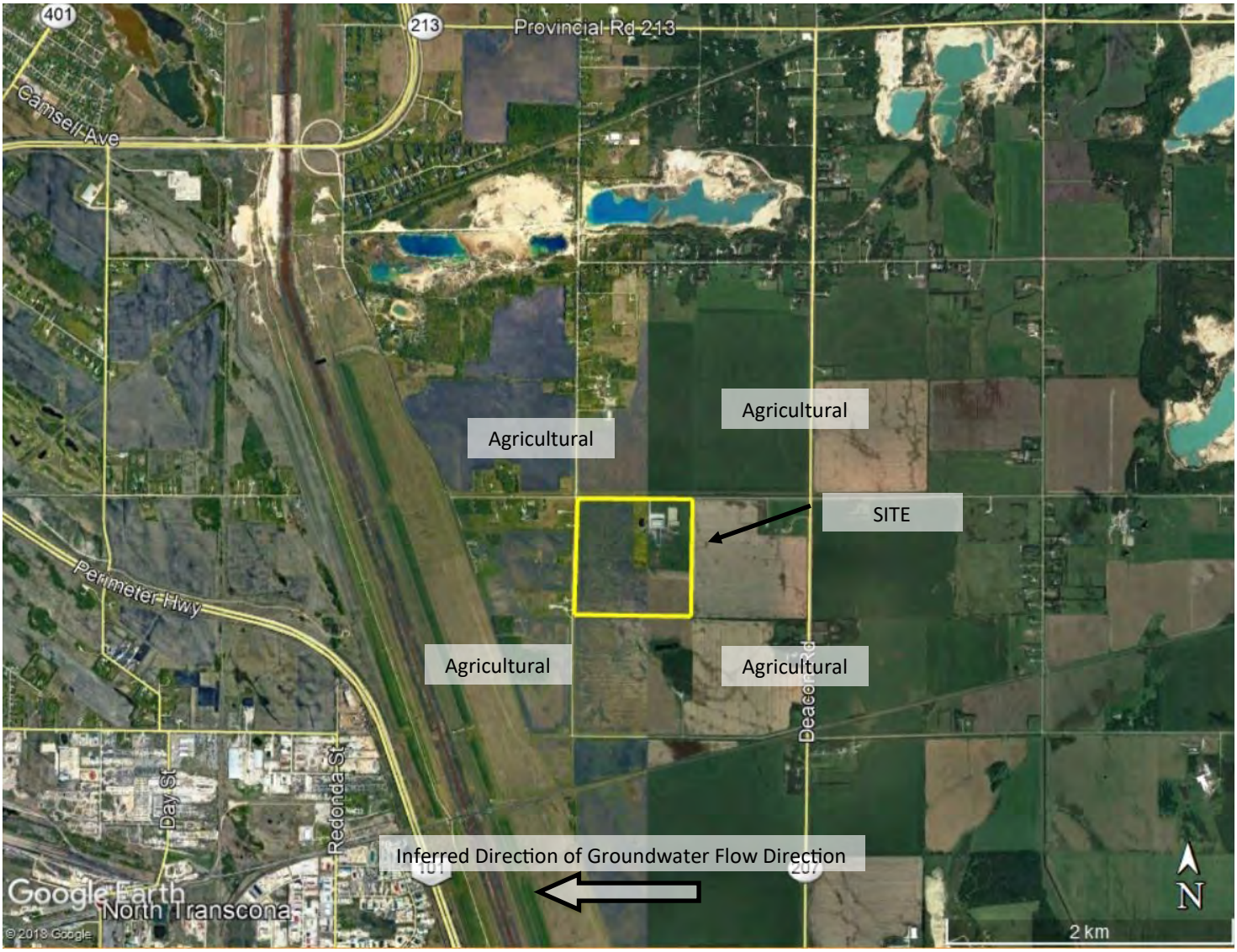
PROJECT NAME:	Phase I Environmental Site Assessment
CLIENT NAME:	Les Tourbières Berger Ltée
SITE LOCATION:	22054 Oakwood Rd 64N, Oakbank, Manitoba
PROJECT NO.:	20190446
DATE:	October 2019

HLC CONSULTING LTD.

Reference:

Natural Resources Canada. The Atlas of Canada—Toporama.

FIGURE 2: Site and Surrounding Land Use Plan



PROJECT NAME:	Phase I Environmental Site Assessment
CLIENT NAME:	Les Tourbières Berger Ltée
SITE LOCATION:	22054 Oakwood Rd 64N, Oakbank, Manitoba
PROJECT NO.:	20190446
DATE:	October 2019

HLC CONSULTING LTD.

Reference:

Google. Google Earth Imagery.

Appendix II:

Opta Response

opta
INFORMATION INTELLIGENCE

enviroscan

An SCM Company

175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 905-882-6300
W: www.optaintel.ca

Report Completed By:

Swati

Site Address:

22054 Oakwood Road 64NOakbank Mb Canada

Project No:

20190911100

Opta Order ID:

65713

Requested by:

Eleanor Goolab
ERIS

Date Completed:

9/17/2019 1:32:50 PM

Project Name: 22054 Oakwood Road 64N

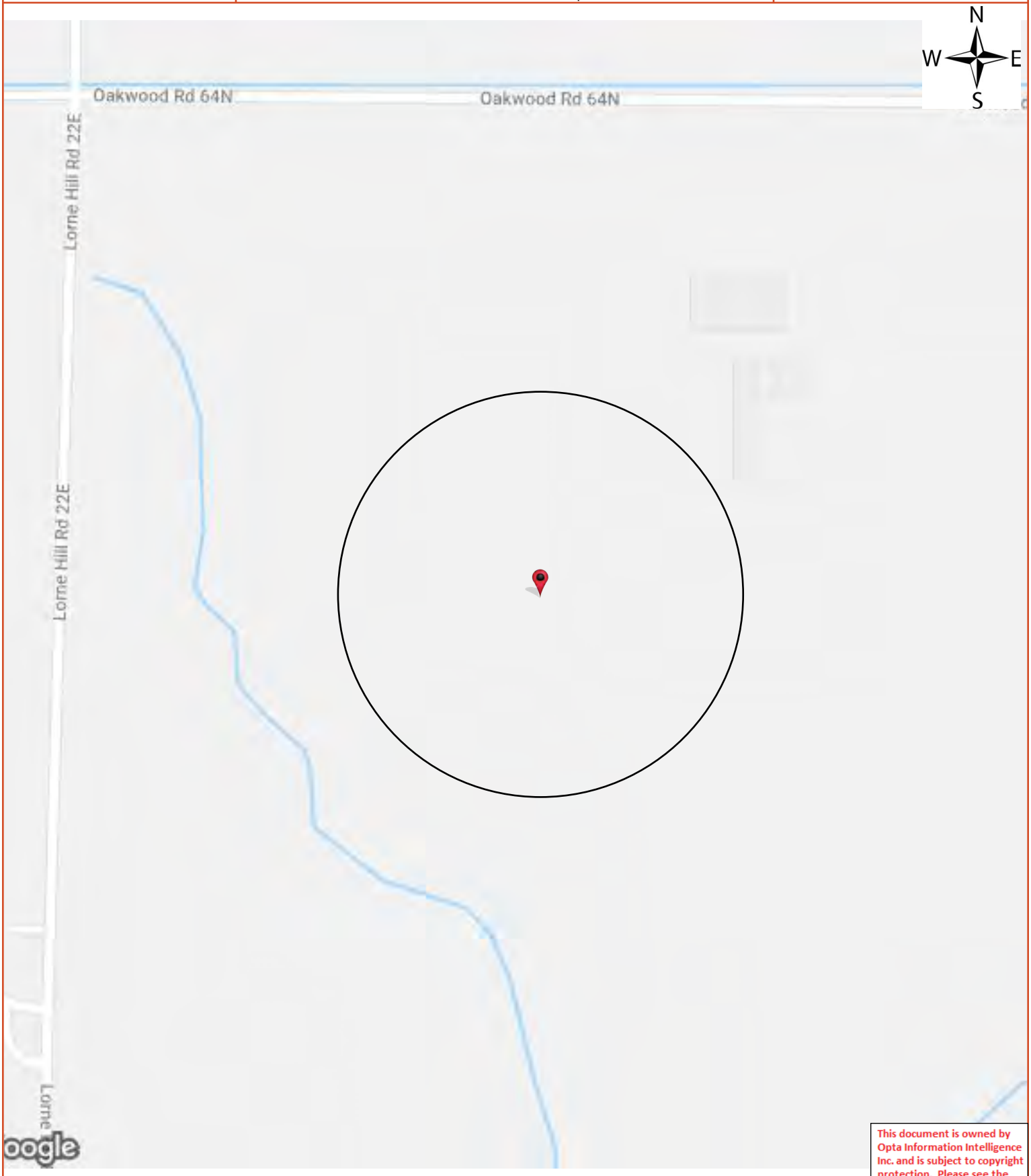
Project #: 20190911100
P.O. #: 20190446

ENVIROSCAN Report

Search Area: 22054 Oakwood Road 64NOakbank Mb Canada

Requested by:
Eleanor Goolab
Date Completed: 09/17/2019 13:32:50

enviroscan
OPTA INFORMATION INTELLIGENCE



Opta Historical Environmental Services Enviroscan™ Terms and Conditions

Report

The documents (hereinafter referred to as the "Documents") to be released as part of the report (hereinafter referred to as the "Report") to be delivered to the purchaser as set out above are documents in Opta's records relating to the described property (hereinafter referred to as the "Property"). Opta makes no representations or warranties respecting the Documents whatsoever, including, without limitation, with respect to the completeness, accuracy or usefulness of the Documents, and does not represent or warrant that these are the only plans and reports prepared in association with the Property or in Opta's possession at the time of Report delivery to the purchaser. The Documents are current as of the date(s) indicated on them. Interpretation of the Documents, if any, is by inference based upon the information which is apparent and obvious on the face of the Documents only. Opta does not represent, warrant or guarantee that interpretations other than those referred to do not exist from other sources. The Report will be prepared for use by the purchaser of the services as shown above hereof only.

Disclaimer

Opta disclaims responsibility for any losses or damages of any kind whatsoever, whether consequential or other, however caused, incurred or suffered, arising directly or indirectly as a result of the services (which services include, but are not limited to, the preparation of the Report provided hereunder), including but not limited to, any losses or damages arising directly or indirectly from any breach of contract, fundamental or otherwise, from reliance on Opta Reports or from any tortious acts or omissions of Opta's agents, employees or representatives.

Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

Project Name: 22054 Oakwood Road 64N

Project #: 20190911100
P.O. #: 20190446

ENVIROSCAN Report

No Records Found

Requested by:
Eleanor Goolab
Date Completed: 09/17/2019 13:32:50

OPTA INFORMATION INTELLIGENCE

No Records Found

N
W E
S

Appendix III:

Correspondence with Manitoba Sustainable Development

Manitoba

FILE SEARCH REQUEST FORM

NOTE: Please **COMPLETE** the questions below so that Manitoba Sustainable Development can effectively respond to your request for information as to outstanding Licenses, Orders or Violations, etc. against the indicated property. **A cheque or money order, in the amount of $94.50 ($90.00 + $4.50 G.S.T.) made payable to the Minister of Finance, must accompany this request.**

We will endeavor to respond to your request within 30 calendar days of receipt. Please direct all inquiries and return the completed form, along with your payment, to:

Environmental File Searches
Department of Sustainable Development
Box 10, 27 2nd Avenue SW
Dauphin, MB R7N 3E5

Email: EnvFS@gov.mb.ca

GST Registration #R107863847

Telephone: 204-622-2030
Fax: 204-638-8626

*Please note this application form, along with online payment will soon be available

1. Applicant:

Name: Reegan Lawrence

Company Name: HLC Consulting Ltd.

Address: 5 – 55 Henlow Bay

Winnipeg, Manitoba R3Y 1G4

Telephone: 204-479-8140 Fax: _____

E-mail: rlawrence@hlcconsultingltd.ca

2. If you are representing someone else respecting this request, please provide the following information:
(***not the property being searched)

Business/Individual Name: Les Tourbières Berger Ltée.

Legal Name (if different from above):

Address: 121 1er Rang

Saint-Modeste, QC G0L 3W0

Telephone:

Fax:

(a) BUSINESS NAME OF PRESENT OR PREVIOUS TENANT who is/was actually on the subject property (not numbered company name) MUST BE INCLUDED:
(If this is a shopping centre/strip mall please provide complete list of tenants)

Pineridge Equine Park

3. (a) Legal description of property involved:
NW-23-11-4-E1

(b) **STREET ADDRESS (INCLUDING CITY/TOWN, RURAL MUNICIPALITY) OF PROPERTY INVOLVED MUST BE INCLUDED:**
(Please provide a diagram if civic/numerical address is not available)

22054 Oakwood Rd 64N, Oakbank, Manitoba (see attached photo)

4. What information is being requested? - please be as specific as possible.

Environmental orders and spills, spills on adjacent properties, discharge orders, USTs, removal orders, fill material used, landfill on and adjacent to property.

If known, and if applicable, please indicate what legislation the information being requested pertains to:

The Environment Act	**X**	The Contaminated Sites Remediation Act	**X**
The Dangerous Goods Handling and Transportation Act	**X**	**Livestock Manure and Mortalities Management Regulation** ***** we only provide information on the above for Rural properties***	☐

5. For what purpose is the information required (i.e. sale of business/property, financing arrangements, etc.)?

Due Diligence

6. Type/description of business/operation presently being carried out on subject property (if not currently in operation, and if known, please identify past business/operation carried out on subject property):

Presently ¾ cropped agricultural land, and ¼ Pineridge Equine Park (currently not operational).

7. Description of intended use of subject property:

Future development of a peat manufacturing plant.

September 11, 2019 — Request Date

Signature of Requestor

****** PLEASE NOTE THAT INCOMPLETE FORMS WILL CAUSE A DELAY IN THIS SEARCH BEING PROCESSED. PLEASE BE SURE TO INCLUDE ALL AVAILABLE** DETAILS.

Appendix IV:

EcoLog ERIS Report

ENVIRONMENTAL RISK INFORMATION SERVICES

DATABASE REPORT

Project Property:	*22054 Oakwood Road 64N* *22054 Oakwood Road 64N* *Oakbank MB R0E 1J0*
Project No:	*20190446*
Report Type:	*Quote - Custom-Build Your Own Report*
Order No:	*20190911100*
Requested by:	*HLC Consulting Ltd.*
Date Completed:	*September 16, 2019*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:	*22054 Oakwood Road 64N* *22054 Oakwood Road 64N Oakbank MB R0E 1J0*
Project No:	*20190446*

Order Information:

Order No:	*20190911100*
Date Requested:	*September 11, 2019*
Requested by:	*HLC Consulting Ltd.*
Report Type:	*Quote - Custom-Build Your Own Report*

Historical/Products:

Insurance Products	*Fire Insurance Maps/Inspection Reports/Site Plans*

Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
CA	Certificates of Approval	Y	0	0	0
CDRY	Dry Cleaning Facilities	Y	0	0	0
CHEM	Chemical Register	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
CONV	Enforcement Actions	Y	0	0	0
CS	Contaminated/Impacted Sites	Y	0	0	0
DRL	Drill Holes	Y	0	0	0
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	0	0	0
EIIS	Environmental Issues Inventory System	Y	0	0	0
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FST	Fuel Storage Tanks	Y	0	0	0
FUEL	Bulk Fuel Distributors	Y	0	0	0
GEN	Waste Generators Summary	Y	0	0	0
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
MAST	Manure Storage Facilities	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
MOGW	Manitoba Oil and Gas Wells	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0
OGWW	Oil and Gas Wells	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCB	Inventory of PCB Storage Sites	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PITS	Manitoba Pits and Quarries	Y	0	0	0

Database	Name	Searched	Project Property	Boundary to 0.25km	Total
PUBLIC REGISTRY	***Sustainable Development Public Registry***	*Y*	*0*	*0*	*0*
REC	***Waste Receivers Summary***	*Y*	*0*	*0*	*0*
RST	***Retail Fuel Storage Tanks***	*Y*	*0*	*0*	*0*
SCT	***Scott's Manufacturing Directory***	*Y*	*0*	*0*	*0*
SPL	***Manitoba Spills***	*Y*	*0*	*0*	*0*
TCFT	***Transport Canada Fuel Storage Tanks***	*Y*	*0*	*0*	*0*
WDS	***Waste Disposal Site Inventory***	*Y*	*0*	*0*	*0*
WWIS	***Water Well Inventory***	*Y*	*0*	*1*	*1*
	Total:		*0*	*1*	*1*

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev diff (m)	Page Number

No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

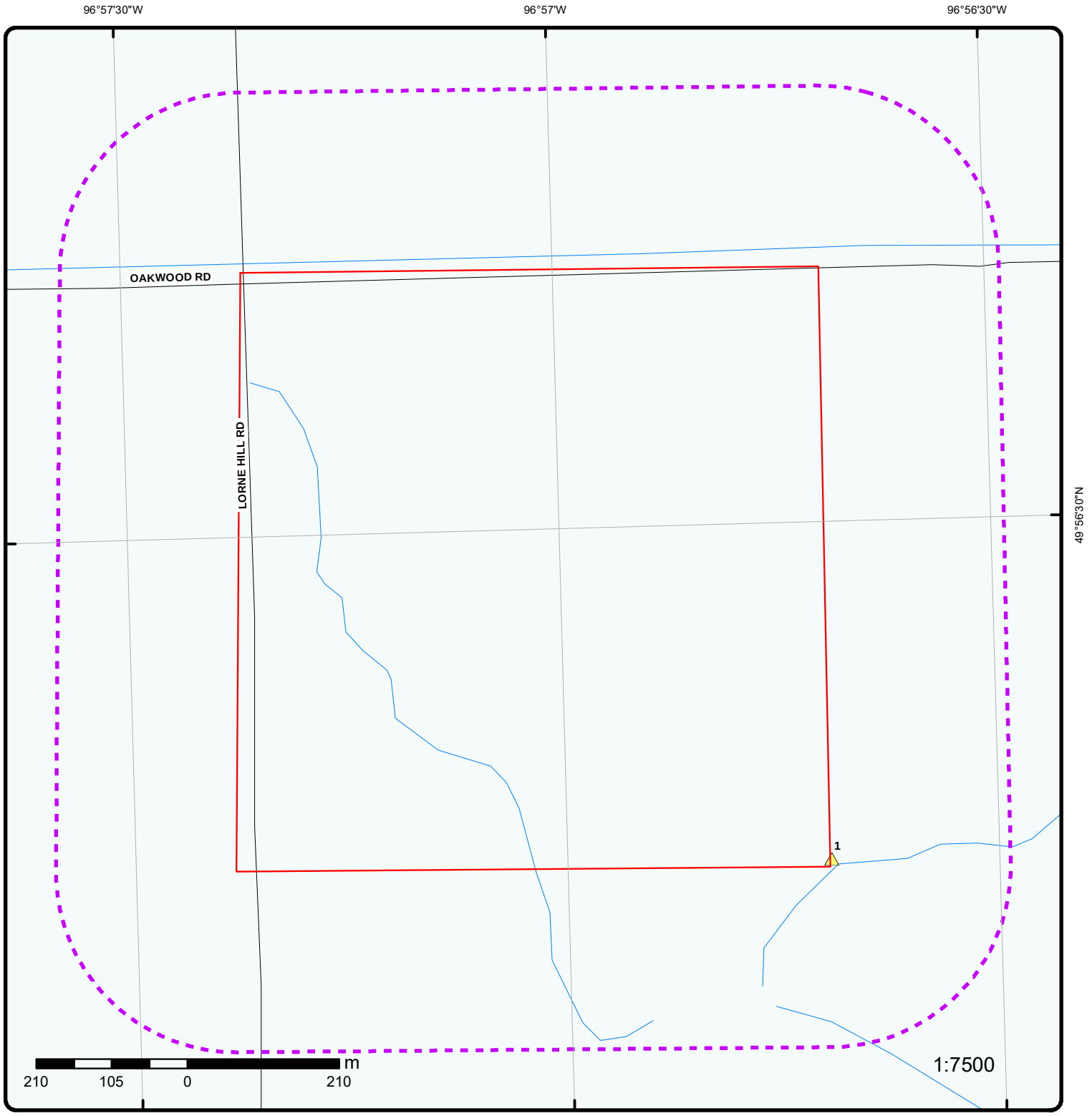
Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number
1	WWIS	L H CRAIG	MB **Well PID:** 23497	SE/2.5	1.00	12

Executive Summary: Summary By Data Source

WWIS - Water Well Inventory

A search of the WWIS database, dated 1880-May 2015 has found that there are 1 WWIS site(s) within approximately 0.25 kilometers of the project property.

Site	Address	Distance (m)	Map Key
L H CRAIG	MB ***Well PID:*** 23497	2.5	1



Map : 0.25 Kilometer Radius

Order No: 20190911100

Address: 22054 Oakwood Road 64N, Oakbank, MB, R0E 1J0

ERIS
ENVIRONMENTAL RISK INFORMATION SERVICES

- Expressway
- Principal Highway
- Secondary Highway
- Major Road
- Local road
- Trail
- Proposed Road
- Ferry Route/Ice Road
- Industrial and Resource - Regions
- Main Line
- Sidetrack
- Transit Line
- Abandoned Line
- National Park
- Provincial or Territorial Park
- Other Park
- Golf Course or Driving Range
- Park or Sports Field
- Other Recreation Area

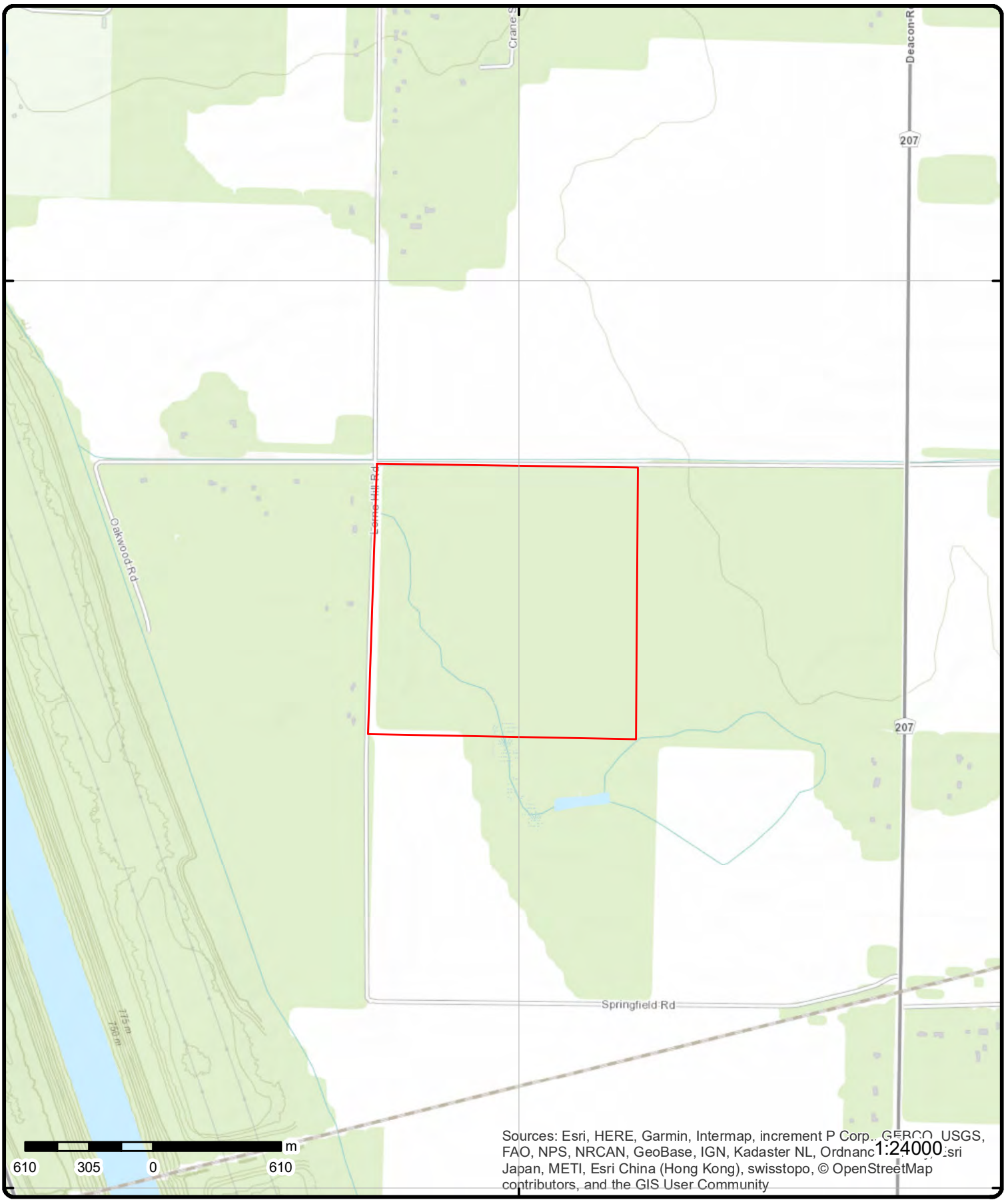
Source: © 2015 DMTI Spatial Inc.

Aerial (2016)

Order No: 20190911100

Address: 22054 Oakwood Road 64N, Oakbank, MB, R0E 1J0

Source: ESRI World Imagery



Topographic Map

Address: 22054 Oakwood Road 64N, Oakbank, MB, R0E 1J0

Source: ESRI World Topographic Map

Order No: 20190911100

ERIS ENVIRONMENTAL RISK INFORMATION SERVICES

Detail Report

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB
1	1 of 1	SE/2.5	236.4 / 1.00	L H CRAIG MB	WWIS

Well PID:	23497	**Well Name:**	
Water Use:	Domestic	**Driller:**	AQUARIUS WELL DRILLING
Well Use:	PRODUCTION	**Owner:**	
Date Completed:	1974 Dec 18	**Utm X:**	647463.603
Location:	23-11-4E	**Utm Y:**	5533701.86
Remarks:			

Unplottable Summary

Total: 0 Unplottable sites

DB	Company Name/Site Name	Address	City	Postal

Unplottable Report

No unplottable records were found that may be relevant for the search criteria.

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Jul 31, 2019

Certificates of Approval: Provincial CA

This database contains approvals issued since July 1988 within the following categories: Approvals for Air or Effluent and Orders, Permits and/or Regulated Sites designations for Air, Effluent, Refuse or Storage. The information available within this database pertains to client information, general location, class type, operation type, license # and the issue date of the CA. Please note that no specific site address information is available.

Government Publication Date: 1988-Jun 2013*

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2017

Chemical Register: Private CHEM

The Manitoba Industry, Trade and Tourism department maintains a chemical register of all known 'active' manufacturers of chemicals, fertilizers and pesticides within the province. Inactive chemical manufacturers are not required to remain in the database. Information available within this register pertains to company name, location and the 'product line'. Information from a private source regarding the locations of chemical manufacturers and distributors is also included in this database.

Government Publication Date: 1999-Jul 31, 2019

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 - Mar 2019

Enforcement Actions: Provincial CONV

This database summarizes enforcement activities (Convictions, Warnings, Director's Order's, EO Order's, MOH Order's, Offence Notice's, and Permit Suspensions) where companies/individual have been found guilty of environmental offenses under Manitoba's Environmental Protection Legislation. Please note that enforcement actions resulting from activities regulated under the Livestock Manure & Mortalities Mgmt Regulation MR 42/98 are also included.

Government Publication Date: Apr 1994-Jul 2019

Contaminated/Impacted Sites: Provincial CS

List of sites registered under the Contaminated/Impacted Sites Program, made available by Manitoba Sustainable Development, Environmental Programs and Strategies branch. Includes sites that are on the Designated Impacted and Designated Contaminated Sites lists, as well as sites where impacts do not pose a concern, remediation has been completed, or further action is necessary.

Government Publication Date: Up to May 2019

Drill Holes: Provincial DRL

The "Open File Drill Holes" database contains information on more than 10,000 drill holes in the province of Manitoba. The database provides information in regard to drill hole location (place, latitude and longitude), depth and overburden of hole, exploration company and assessment report year.

Government Publication Date: Oct 31, 2018

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Jul 31, 2019

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government.

Government Publication Date: Jun 2000-May 2019

Fuel Storage Tanks: Provincial FST

The Petroleum Storage Tank database, which is maintained by Manitoba's Petroleum Storage Program, contains information in regard to company name, location, status, outlet type (retail, used oil, bulk/used'), number of tanks, tank capacity and tank status. This database will not be updated as this information is no longer collected in this format. For current information regarding bulk fuel distributors, please see the FUEL database.

Government Publication Date: 1905-Feb 2003*

Bulk Fuel Distributors: Provincial FUEL

The Manitoba Petroleum Storage Program maintains an inventory of Bulk Fuel Distributors. This inventory contains valid operating permit numbers within the Province of Manitoba. Fields such as name, location, expiry date, type of facility and permit Number are included.

Government Publication Date: 2006-May 2019

Waste Generators Summary: Provincial GEN

Within Manitoba, a waste generator is defined as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled or stored at the site. This database contains the licensing/registration number (MB1 #), company name and address of registered generators. At present, access to the type of hazardous waste generated and the form of treatment used in the handling of the waste is only available by directly calling Manitoba's Hazardous Waste Program.

Government Publication Date: 1998 - Mar 2019

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2017

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Manure Storage Facilities: Provincial MAST

Under the Livestock Manure and Mortalities Management Regulation (MR 42/98), permits are issued for the construction, modification or expansion of manure storage facilities. Once issued, the Environmental Livestock Program is responsible for the enforcement of regulations on the management of manure and mortalities. Please note that the MAST database only provides information on permit number, operation name, RM and permit issue date. All other information must be obtained from MB Conservation.

Government Publication Date: Jul 1994-May 2019

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Provincial MNR

For over 25 years, Manitoba has been compiling Mineral Inventory Cards on mineral deposits in the province. This database was obtained from Manitoba Industry, Trade and Mines, and contains information on over 650 mineral occurrences in the province. Data is provided on the Mineral Inventory File No., Mineral Deposit Name, Product, Associated Minerals or Products of Value, NTS area, Name of Property Owner or Operator and Address, location, and geographical coordinates.

Government Publication Date: 1961-Mar 2019

Manitoba Oil and Gas Wells: Provincial MOGW

The Manitoba Oil and Gas Wells database was collected through the assistance of The Land Systems Company. Information is provided regarding license number and location for over 4,800 wells. Please note that this database will not be updated, information on wells drilled after May 2002 can be found in the Oil and Gas Wells (OGW) database under the `Private Source Database' section.

Government Publication Date: 1951-May 2002*

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Apr 2018

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Dec 31, 2018

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWW

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-May 31, 2019

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Inventory of PCB Storage Sites: Provincial PCB

Manitoba's Hazardous Waste Program maintains a listing of all "active" PCB storage facilities. Inactive PCB storage equipment and/or disposal sites are not required to remain as part of the PCB inventory database for the province. Please note that some of the sites have no wastes in storage at present, but are retained should they be required for future acceptance of PCB equipment as it comes out of service. The records within this database only provide information on facility name and location. Information pertaining to the inventory of stored wastes and waste quantities at a designated site is only available by directly contacting the Hazardous Waste Program. Please note that this database will not be updated, information after 1999 can be found in the National PCB Inventory (NPCB) database.

Government Publication Date: 1998-1999*

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Manitoba Pits and Quarries: Provincial PITS

The Manitoba Pits and Quarries database is comprised of 3 different types of permits. 1.Quarry Lease and Exploration Permits, which have a ten year term with exclusive rights for crown minerals. Quarry Exploration permits have a three year term with exclusive rights. 2. Private Pits and Quarry Permits require annual registration of private aggregate operations in the province and 3. Casual Permits which are for annual permits of Crown materials.

Government Publication Date: 1994-Apr 2018

Sustainable Development Public Registry: Provincial PUBLIC REGISTRY

The public registry system contains information on projects that are undergoing environmental assessment under The Environmental Act and projects applying for a license under The Dangerous Goods Handling and Transportation Act. This listing is made available by Manitoba Sustainable Development.

Government Publication Date: Jun 30, 2019

Waste Receivers Summary: Provincial REC

Disposal of regulated waste is maintained through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. A waste receiving location is any site or facility to which waste is transferred through a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by company name and address.

Government Publication Date: 1998-Jul 2017

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Jul 31, 2019

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Manitoba Spills: Provincial SPL

The Manitoba Conservation Environmental Management System (EMS) records spills from across the province. Information from this database includes incident type, substance type, reason, location of spill, contaminate info and responsible party.

Government Publication Date: Apr 2009-Mar 2019

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970-Aug 2018

Waste Disposal Site Inventory: Provincial WDS

Manitoba Conservation retains a separate inventory of all known active and inactive regulated waste disposal grounds and waste transfer facilities for each of the five regions in the province. Registered companies may hold a permit or certificate for release of the following waste types: Effluent, Refuse, Air and Special Waste Storage.

Government Publication Date: 1998*

Water Well Inventory: Provincial WWIS

The GW Drill database compiled by the Manitoba Water Stewardship Division and Groundwater Management Program provides information on water wells across the province. The GW Drill database is a compilation of records from various sources and is intended to provide water well, stratigraphic, and hydrogeologic background information. The compilation is extensive but is not a comprehensive or complete inventory of wells in the province. For many records, location has been provided in DLS (Dominion Land Survey) format and locations may be accurate to the section or quarter section only. Any analysis or interpretation of records or the absence thereof must take into consideration that the GW Drill database is not comprehensive and should not be used as an inventory.

Government Publication Date: 1880-May 2015

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

Appendix V:

Site Photographs

View of Site entry.

View from northeast corner of Site.

View of property from the southwest corner.

View of property from the northwest corner.

View of the south exterior of the house.

View of AST on the east side of the house. Note the stressed vegetation under the tank (1/2).

View of AST on the east side of the house. Note the stressed vegetation under the tank (/2).

View of the arena building.

View of propane AST located on the northern side of the arena.

View inside arena.

View of east/north sides of the stables.

View of septic tank on east side of the stables.

View of well located on-site near the northeast corner of the stables.

View inside stables.

View of west exterior of barn.

View inside north half of barn.

View inside south half of barn.

View of manure piles, located south of the barn.

View of hay storage barn.

Pond A.

Pond B.

View of drainage ditch leading to pond B.

Appendix VI:

Personnel Resumes

HLC CONSULTING LTD.

Reegan Lawrence, B.Env.Sc.

Environmental Technologist

Reegan Lawrence is an Environmental Technologist at HLC Consulting Ltd. Reegan graduated from the University of Manitoba in 2017 with an honours degree in Environmental Science focusing on Sustainable Development and minoring in Economics. She has experience conducting waste audits, compliancy inspections, and in data management and report writing. Reegan has completed work across Manitoba, Saskatchewan, and Alberta and takes pride in providing an excellent customer service experience.

Compliance Inspections

(2019) Correctional Service Canada (CSC)*
Conducted compliancy inspections across CSC sites in Manitoba, Alberta, and Saskatchewan, with respect to the Federal Halocarbon Regulations and the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

Waste Audits

*(2018) Canadian Beverage Container Recycling Association (CBCRA)**
Completed audits of waste and recycling material to determine recycling recovery rates in areas across Manitoba. Assumed responsibilities in waste and recycling material sorting, and associated logistics.

Data Management

*(2017) Green Manitoba**
Generated and information management system to collect an analyze data on the waste and recycling sector in Manitoba. Contributed to the development of Green Manitoba's Waste Reduction and Recycling Support Program database.

Education

Bachelor of Environmental Science (Honours), University of Manitoba, 2017

* Denotes work was completed at a different firm

HLC CONSULTING LTD.

Carolyn Baldwin, B.Env.Sc., EP

Environmental Services Manager

Carolyn Baldwin is the Environmental Services Manager at HLC Consulting Ltd. Carolyn is a certified Environmental Professional (EP). She has over 5 years of consulting experience that includes phase I, phase II, and phase III environmental assessments, ground and surface water monitoring, environmental construction site monitoring, landfill monitoring, designated substances surveys, hazardous materials assessments, and electromagnetic surveys. She has completed work in Manitoba, Saskatchewan and Alberta.

Environmental Site Assessment Project Experience

(2014, 2013) *Manitoba Infrastructure and Transportation (MIT)**

- Multiple Phase I ESAs were required on residential properties in the East St. Paul area to support construction of a high profile interchange construction project.
- Phase II ESA completed on a former gas and service station in the Headingley area to support planning and construction of a future roadway project.
- Phase I ESAs and Electromagnetic surveys completed on 13 maintenance and storage yards located throughout Manitoba. Results were used by the province to aid in environmental liability accounting.

*(2014, 2013) Regional Municipality of Wood Buffalo**

Multiple Phase I and II ESAs were required on municipal properties utilized for the storage of excess snow from removal operations, road maintenance vehicles and road salt. Results were used by the municipality to aid in environmental liability accounting.

*(2014) Anthem Riverfront Holdings Ltd.**

Phase II ESA completed on a downtown Calgary surface parking lot intended for future high-rise development.

*(2014) Allard Developments**

Phase I ESA completed on a downtown Edmonton commercial property.

*(2014) Rohit Land Development**

Phase I ESA completed on a newly renovated apartment block and parking garage in Winnipeg.

*(2014) Timbercreek Asset Management**

Phase I ESA completed on a multi-stage residential development in Drayton Valley, Alberta.

* Denotes work was completed at a different firm

*(2014, 2013) CEDA International**
Multiple Phase I ESAs completed on industrial properties located development in Saskatchewan and Alberta.

*(2014) Qualico**
Multiple Phase I ESAs completed within the Qualico residential developments of Tamarack and Cy Becker in Edmonton, Alberta.

Environmental Site Monitoring

*(2014) CEDA International**
Groundwater monitoring campaign on an industrial property in Edmonton. Monitoring report and record of site condition provided in order for the Client to meet the requirements of their approval under the *Environmental Protection and Enhancement Act*.

(2014, 2013) *Manitoba Infrastructure and Transportation (MIT)**
Environmental site inspections were provided during the construction and post-construction phases of the CentrePort Canada Way expressway project.

Hazardous Materials Assessment

Asbestos Buildings Survey and Asbestos Management Plan – (2015) *St. Charles Catholic School**
Completion of an asbestos survey and asbestos management plan for a school/childcare facility located in Winnipeg.

Designated Substances and Asbestos Survey – (2013) *CEDA International**
Examination of an industrial shop and suite of offices in Edmonton to identify designated substances and sample materials suspected to contain asbestos.

Education

Bachelor of Environmental Science (Major), University of Manitoba, 2012

Associations

Environmental Professional (EP) with the Canadian Environmental Certification Approvals Board

* Denotes work was completed at a different firm