PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING, IGNACE AREA

WP01 Commissioning Report – Site Infrastructure Setup for IG_BH03

APM-REP-01332-0261 **February 2020**

Golder Associates Ltd.

nwmo
NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Nuclear Waste Management Organization
22 St. Clair Avenue East, 4th Floor
Toronto, Ontario
M4T 2S3
Canada

Tel: 416-934-9814
Web: www.nwmo.ca

REPORT

PHASE 2 INITIAL BOREHOLE DRILLING AND TESTING, IGNACE AREA

WP01 Commissioning Report - Site Infrastructure Setup for IG_BH03

Submitted to:

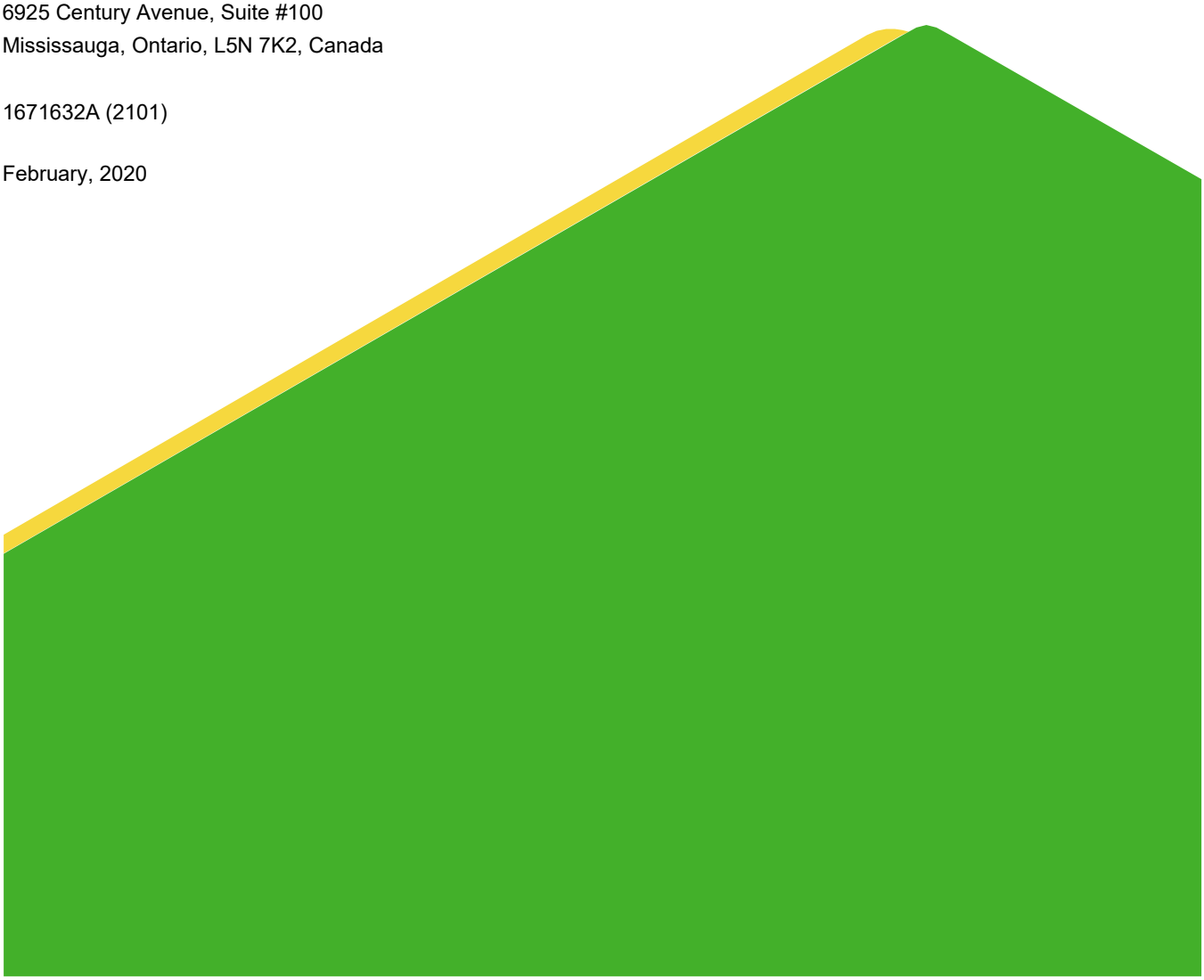
Nuclear Waste Management Organization
6th Floor 22 St. Clair Avenue East
Toronto, Ontario M4T 2S3

Submitted by:

Golder Associates Ltd.
6925 Century Avenue, Suite #100
Mississauga, Ontario, L5N 7K2, Canada

1671632A (2101)

February, 2020



Distribution List

eCopy - NWMO

eCopy - Golder Associates Ltd.

WP01B COMMISSIONING REPORT
SITE INFRASTRUCTURE SETUP FOR IG_BH03

CLIENT INFORMATION

Project Name: Phase 2 Initial Borehole Drilling and Testing, Ignace Area

Project Number: 1671632A

Client PO Number: 2000141

Document Name: 1671632A (2101) IG_BH03_WP1_Site_Com_Rpt_25Feb2020_R3a

Client: Nuclear Waste Management Organization (NWMO)
22 St. Clair Avenue East, Sixth Floor
Toronto, Ontario
M4T 2S3

Client Contact:	Geoff Crann	Maria Sánchez-Rico Castejón
Email:	gcrann@nwmo.ca	msanchez@nwmo.ca

Issue/Revision Index

Issue Code	Revision					Revision Details
	No.	By	Rev'd.	App.	Date	
RR	0	AK	GWS	-	Sept. 12, 2019	Draft for review and comment
RR	1	AK	GWS	-	Dec. 6, 2019	Revised draft
RR	2	AK	GWS	-	Feb. 12, 2020	Revised final draft for acceptance
RI	3	AK	GWS	JLC	Feb. 25, 2020	Final draft released for information

Issue Codes: RR = Released for Review and Comments, RI = Released for Information

SIGNATURES

Prepared by: _____

Adrian Kowalchuk, B.Sc., P.Geo.
WP01B Work Package Lead

Reviewed by: _____

George Schneider, M.Sc., P.Geo.
Project Director - Principal

Approved by: _____

Joe Carvalho, Ph.D., P.Eng.
Technical Manager – Principal

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The Initial Borehole Drilling and Testing project in the Wabigoon and Ignace Area, Ontario is part of Phase 2 Geoscientific Preliminary Field Investigations of the NWMO's Adaptive Phased Management (APM) Site Selection Phase. This project involves the drilling and testing of the first of three deep boreholes within the northern portion of the Revell batholith.

Work Package WP01 addresses site establishment and site infrastructure activities for the drilling and testing of boreholes IG_BH01, IG_BH02 and IG_BH03, and the construction of access roads to IG_BH02 and IG_BH03 in the Wabigoon and Ignace area (Figure 1). The area is located a direct distance of approximately 21 km southeast of the Wabigoon Lake Ojibway Nation and a direct distance of 43 km northwest of the Town of Ignace. Access to the area is via Highway 17 and primary logging roads, as shown on Figure 1.

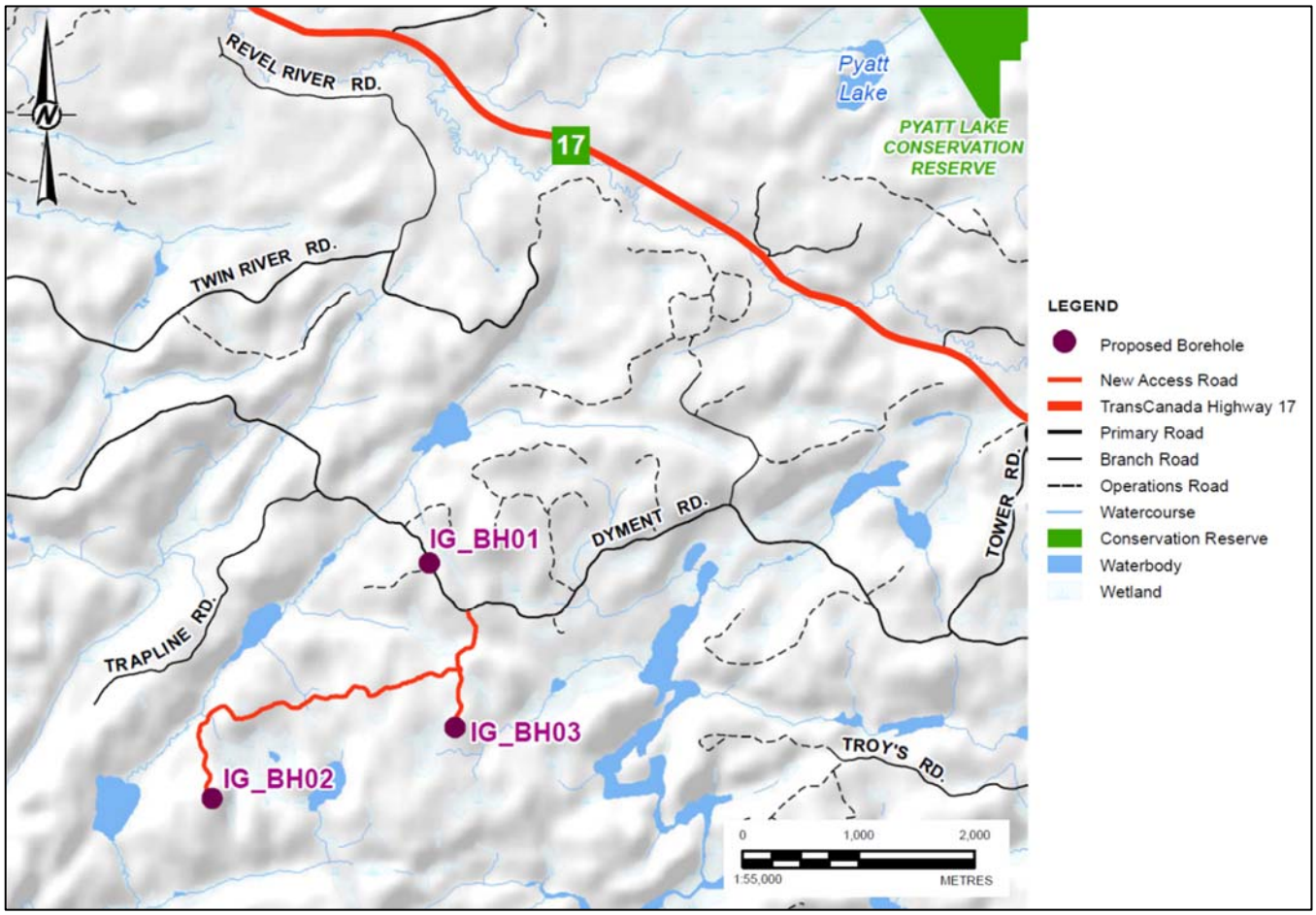


Figure 1: The Wabigoon / Ignace area – access roads and drill sites for IG_BH01, IG_BH02 and IG_BH03.

The work includes construction of access roads and drill sites, and on each of the drill sites, construction of the drill pad, site grading, drill fluid containment system(s), field offices (e.g. core logging, office), power, utilities and perimeter fencing. The work is being carried out in the following general sequence:

- Construction of the drill site and establishment of site infrastructure at IG_BH01 (completed);
- The drilling and testing of IG_BH01 (completed);

- Construction of the access roads to IG_BH03 and IG_BH02 including improvements to Dyment Rd. (completed);
- Construction of the drill sites at IG_BH03 and IG_BH02 (completed);
- The establishment of site infrastructure at IG_BH03 (completed);
- The drilling and testing IG_BH03 (completed);
- The establishment of site infrastructure at IG_BH02 (completed);
- The drilling and testing IG_BH02 (completed).

This report describes the road construction for and site commissioning of the IG_BH03 drill site, which took place from May to July 2019. The access road and drill site construction were carried out by Ricci Trucking under contract to Golder (Construction Division) with Golder assuming the role of "Constructor". The setup of site facilities at IG_BH03 was carried out by Taranis Contracting Group Ltd. (Taranis), and the setup of the drill was carried out by Rodren Drilling Ltd. (Rodren), both under contract to Golder.

2.0 IG_BH03 ROAD CONSTRUCTION

2.1 General Description of Activities

A 1.15 km access road to IG_BH03 was built to branch off from Dyment Road towards the south. The access road has been constructed to generally meet the geometric specifications for a Class III all season, low traffic access road, with minor variations (Table 1), and in accordance with MNRF Environmental Guidelines for Access Roads and Water Crossings (MNRF, 1990). The access road construction also meets the requirements of the permission application to the MNRF for IG_BH02 and IG_BH03 dated October 13, 2017, and requirements of DFO as described in their email dated July 18, 2018. One turnout area is located along the access road and is approximately 20 x 30 m in size.

Table 1: Geometric Specification for the Construction of the Access Road to IG_BH03

Road Use / Standard	Specification
Maximum Width of Right of Way	30 m
Maximum Width of Disturbed Area	10 m (may require increased width in some areas)
Maximum Roadway Width (ditch to ditch)	9 m
Maximum Roadway Width (shoulder to shoulder)	8 m
Width of Graveled Surface	6 m
Minimum Gravel Depth	10 cm
Maximum Degree of Curvature	10 degrees
Minimum Horizontal Sight Distance	100 m
Ditch Slope	Stable banks

Road Use / Standard	Specification
Minimum Vertical Sight Distance	100 m
Maximum Gradient (sustained)	8 degrees
Maximum Gradient (short)	9 degrees
Slopes of Repose	Stable
Major Fills (1 metre +)	-
Maximum Haul Speed	35 km/hr

Temporary facilities were set up along Dyment Road during the access road construction and included:

- A 40' furnished office trailer (Construction Office) for duration of the work, and a potable water supply.
- A 15 KW generator for Construction Office installed by a licensed electrician under an ESA permit and inspection process and include secondary fuel spill containment beneath the generator.
- A portable washroom for workers.
- A 2 cubic yard animal (bear) resistant garbage bin located next to the Construction Office.

2.2 Clearing and Grubbing

The access road from Dyment Road to IG_BH03, and the IG_BH03 drill site was cleared and grubbed in accordance with the MNRF Environmental Guidelines for Access Roads and Water Crossings (MNRF 1990) and MNRF letter dated July 18, 2018. An additional 10 m buffer around the perimeter of the drill site was cleared around the drill sites for worker safety.

Approximately 41 linear metres of scaled conifer timber was used to construct the access road to IG_BH03. The 41 linear metres is equivalent to 14 m^3 of timber, as defined by the Ontario Ministry of Natural Resources Corduroy Reporting Sheet provided in Appendix A.

The amount of merchantable timber was measured by Mr. Rob Hoedl (Scaler License #4949) and was reported to the Ontario Ministry of Natural Resources and Forestry. Clearing and grubbing for IG_BH03 was performed in conjunction with clearing and grubbing of IG_BH02, and with the clearing and grubbing of the access roads to both sites. The total merchantable timber produced by all clearing and grubbing work totalled 987 cubic meters of jack pine and 1,052 cubic meters of spruce. Based on the 3,500 m^2 of cleared area at IG_BH03, it is assumed that 2.5% of the total merchantable timber derived from clearing and grubbing originated from the IG_BH03 site. This percentage of cleared merchantable wood equates to 25 m^3 of jack pine, and 26 m^3 of spruce. Based on the 16,920 m^2 of cleared area along the access road from Dyment Road to IG_BH03, it is assumed that 12% of all merchantable timber originated from the access road. This percentage equals 118 m^3 of jack pine, and 126 m^3 of spruce. The tally sheets for merchantable wood are provided in Appendix B. The completed application for Clearance of Forest Resources is provided in Appendix C.

2.3 Construction Methodology

Road construction was carried out in accordance with the approved WP1 – Site Infrastructure Plan and Access Road Construction Plan (Golder, 2018). Roadway grading and ditching was performed to meet the geometric specification noted above and carried out in accordance with the MNRF Environmental Guidelines for Access Roads and Water Crossings.

Upon completion of grading and ditching, a minimum 10 cm layer of coarse aggregate (pit run) was applied to the entire road surface and was track compacted. A total of 1,841 m^3 of pit run material was used for the construction of the access road and turnout for IG_BH03. Approximately 482 m^3 of the material was sourced from the Dyment Road Borrow Pit (MNRF Licence #917). The remaining 1,359 m^3 of material was sourced from the Butler Pit (MNRF Licence #668). A total of 6 culverts were installed along the access road from Dyment 5.5 km to IG_BH03 to assist with drainage.

An additional 760 m^3 of clear gravel was brought in from the Broda Quarry (MNRF Licence #6733). The clear gravel was used for improvements along Dyment Road from 0 to 5.5 km.

Construction quality confirmation checks were performed throughout the road construction process and compared the roadway construction to the work plan specifications. Access roads were visually inspected during rainfall events to ensure that they were self-draining and that installed culverts were allowing adequate flow. Road geometries were also measured during daily inspections by the site supervisor to ensure that the installed roadway met the specifications of a low-traffic access road (MNR, 1990).

3.0 BOREHOLE IG_BH03 SITE CONSTRUCTION

This section provides a summary of the borehole site construction, which followed the construction of the access road to IG_BH03.

3.1 Fencing

Following clearing and grubbing, and prior to grading, a snow fence and silt fence was erected around the perimeter of the drill site to help prevent site creep and mitigate the discharge of suspended sediments in the surface water runoff. The snow and silt fences surrounded the entire area except for the access road to the site.

3.2 Borehole Location

The initial collar location of IG_BH03 was planned to be at 556166.6 E, 5484571.8 N (UTM Zone 15), however, due to the presence of large boulders, uneven ground and poor drainage in that area, the collar location was shifted south to a more level area of the site. The revised collar location for IG_BH03 is approximately 556171.5 E, 5484534.7 N. A survey of the final IG_BH03 borehole collar position and elevation was completed in January 2020, but the final coordinates have not yet been received.

3.3 Construction Methodology (Site and Drill Pad)

Subgrade material for the drill sites and pad of IG_BH03 was obtained from two sources. Approximately 6,040 m^3 of subgrade material was sourced from the Butler Pit (MNRF Licence #668). An additional 2,140 m^3 of subgrade material was sourced from the Dyment Road Borrow Pit (MNRF Licence #917). The subgrade material was compacted by excavator tracks, and final compaction was performed at the site using a smooth drum roller (Appendix D, Photo 1).

The IG_BH03 drill site area is approximately 70 x 50 m in size, with the highest elevation generally in the center of the site, so that the grade naturally slopes towards the perimeter of the site. A swale around the entire perimeter of the site (except for the access road entry point) received drainage from the site and conveyed it to the southeast. Drainage in the north central portion of the site was assisted by a French drain (Appendix D, Photo 2). The French drain conveyed runoff northeastwards towards the outer drainage swale. Two rock truck loads of cobble from the Ricci Cat 9 pit on Fox Road, (MNRF License # 11759) were used for construction of the French drain.

The drill pad was initially planned to be located on the northern side of the drill site but was moved to the southern side of site to take advantage of more level and firm ground conditions. The drill pad area was covered with a 0.15 to 0.2 m lift of cobble to provide stability and drainage. Layers of geotextile and cobble were continued in 0.15 to 0.2 m lifts until the drill pad was raised to the desired final grade. Each lift was compacted by track machine followed by a smooth drum roller. Placement, grading and compaction of the final layer of granular material at surface to create the finished grade and surface. The drill pad is elevated 40 cm higher than the rest of the drill site, and measures approximately 15 x 15 m in size (Appendix D, Photo 3). The drill pad is sloped towards a 1 m deep sump in the center.

As-built details of IG_BH03 are shown in Appendix E – IG_BH03 Site Facilities As-Built Layout. The final survey details of IG_BH03 are provided in Appendix F – As-Built Survey Drawing.

Construction quality confirmation checks were performed throughout the drill pad construction process, and the work was compared to the specifications outlined in the project work plan. Prior to grubbing and grading, and throughout the construction process, the perimeter was visually inspected to ensure that the silt and snow fences were in place around the site and functioning as intended. During grubbing and grading, the graded areas of site were reviewed daily to ensure that deleterious materials were removed as deemed appropriate by the contractor and Golder supervisor.

During grading, the site was observed during and after heavy rainfall events, to assess whether the site was self-draining as intended, and to identify areas where drainage required improvements. At the completion of grading, the site was proof rolled using a smooth drum compactor, to identify whether any areas of the site were unable to support the installation of site structures.

3.4 Test Plan Deviations

Due to conditions encountered, the following deviations were made from the Test Plan.

- Due to the presence of an irregular bedrock surface, parts of the site did not meet the planned ground slope, and the site layout was adjusted to work around these obstacles, noting that there was sufficient space to readily accommodate all required facilities;
- As previously noted, the borehole location was moved to a more level part of the site that better facilitated the construction of the drill pad, while still allowing site infrastructure to be arranged around it in a function way;
- As previously noted, a French drain was constructed in the northern part of the site to improve drainage;
- To stabilize the drill pad and to assist with drainage, the base of the drill pad was lined with geotextile, and covered with a 0.15 to 0.2 m lift of cobbles. Layers of geotextile and cobble were continued in 0.15 to 0.2 m lifts until the drill pad was raised to the desired final grade. Each lift was compacted by track machine followed by a smooth drum roller; and

- The height of the drill pad above the surrounding grade was reduced in order to make it easier to move equipment on / off the drill pad, and the drill pad was sloped downwards towards the centre of the pad and a plastic linear was placed to contain water and convey it to a central sump area.

4.0 BOREHOLE IG_BH03 SITE INFRASTRUCTURE

This section provides a summary of site infrastructure set-up, which followed site and drill pad construction. The final as-built site layout for IG_BH03 is provided in Appendix E. Photographs of the IG_BH03 site taken during construction and commissioning are provided in Appendix D. The commissioning checklist for the IG_BH03 site is provided in Appendix G. Lastly, the as-built drawing for the IG_BH03 site and the access road is presented in Appendix F.

4.1 Security Fencing

Following drill site construction, steel security fencing was erected around the site perimeter, to prevent site creep, demark work areas on the site, and to keep wildlife from entering the work area. Approximately 180 linear metres of 2.5 m tall fencing was installed around the perimeter of the drill site. Two lockable gates were installed on the western side of the site, to allow worker access to the drill site from the parking lot. In addition to the perimeter fencing, approximately 40 linear metres of 1.8 m tall fencing was installed inside the site, to define a work zone around the drill rig. Workers inside this drilling work zone were required to wear additional personal protective equipment. Two gates were installed along the interior fence to allow workers access to the exclusion zone area (Appendix D, Photos 4 and 5).

Site safety signage was installed at the entrances to site, and at defined areas such as the muster station, no-smoking areas, and smoking areas. Photos of the safety signage mounted at the entry gates to site is provided in Appendix D, Photos 4 and 5.

4.2 Temporary Site Infrastructure

Office Trailers

Three mobile office trailers were set up and levelled on the north side of site and function as field offices for Golder, the NWMO, and Rodren. The offices are all heated and air conditioned, have electrical power, cellular communication, and internet service via the local cellular network (Appendix D, Photo 6).

Core Logging and Storage Seacans

Two 40’ long modified shipping containers (seacans) were placed at the southeast corner of site near the drill rig and function as mobile workstations for the WP03 workers (Core Logging Seacan) and for the WP02 workers (Core Storage Seacan). The shipping containers were insulated, and furnished with electrical power, heat, and air conditioning. Internet communication is provided to the seacans via direct CAT-6 lines from the site’s cellular internet system. Two custom built core photography systems were set up in the Core Logging Seacan and consist of aluminum frames with suspended cameras for taking core photos. Refrigeration for water samples and select drill core samples is provided by two refrigerators located in the Core Storage Seacan. The refrigeration system is used for temporary sample storage until the samples can be shipped off of site to the appropriate laboratories or archives. The Core Storage Seacan also includes a work area for performing on-site water chemistry on water source, drill water and groundwater samples.

Site Internet and Wi-Fi

Cellular signals from the local mobile network are amplified for all site workers through the use of a Uniden cellular signal booster. Internet service for the site is provided through the local cellular network with a Bell Canada ZTE MF288 Turbo Hub. In the event of failure to the local cellular network, emergency satellite communications are available at the site through the use of a Garmin In-Reach SE which is located in the Golder office trailer.

Washrooms

The site washroom system consists of three separate buildings. The freshwater supply is located in a 2.5 x 6 m seacan which was been insulated and supplied with electrical power. A 6,000 L cistern and water pressure tank are located within the seacan, and the pressurized water leaves the freshwater supply building and flows into the washroom building (washcart). The cistern is equipped with a low-water alarm, to alert site occupants if a freshwater delivery needs to be arranged.

The washcart set up at site is divided into men's and women's sections with separate entrances. The women's section contains two washroom stalls and sinks, and the men's section contains six washroom stalls, urinals, six sinks. The washcart is fully climate controlled.

Wastewater from the washcart flows into the exterior 6,000 L septic tank located directly west of the washcart, which is equipped with a high-water alarm to alert site occupants when the tank is approaching its capacity.

4.3 Power Supply and Distribution

Power Generation

A portable CAT XQ100 diesel-electric generator was set up on the east side of site, and used to power the site office trailers, core logging and core storage seacans, freshwater supply system, washcart, and the core extrusion seacan. The location of the generator was chosen to minimize the length of electrical distribution cables, to protect the generator from vehicular traffic, and to allow for access by truck in the event that the generator required repairs or replacement.

The generator was designed to provide 90 kW of primary power and meets the calculated power requirements of the site. The calculated power draw of the site included provisions for additional power requirements by unforeseen equipment which could have been added to the drilling or logging process. To capture any spills or leakage from the generator, it was placed inside secondary containment with a spill containment capacity of 5,350 L. The secondary containment was sized so that the entire generator could fit within the walls of the containment, and therefore the secondary containment capacity exceeds the 660 L capacity of fluids stored by the generator.

A 4,500 L double-walled fuel storage tank was located adjacent to the generator, so that refueling of the generator could be performed directly from the fuel storage tank. The fuel tank was also placed inside secondary containment with an overflow storage capacity of 5,350 L, which exceeds the capacity of fluids within the tank. The tank was placed on concrete pads to provide a stable foundation beneath the tank. Fibre matting was placed beneath the concrete pads to prevent punctures to the containment from the concrete pads. The fuel tank was surrounded by four concrete bollards to protect it from vehicular traffic and heavy machinery. Photographs of the generator and fuel storage tank are available in Appendix D, Photo 7).

Power Distribution

Set up of the electrical distribution system from the generator to the site facilities was performed by Prezio Electric and was supervised by Master electrician Jeff Bouchey. The power distribution system was inspected on July 17, 2019 by Don Kuzemchuk of the Electrical Safety Authority. Power was distributed to the site facilities via double jacketed electrical cables. The majority of the power lines are mounted to the perimeter fencing. In areas where the electrical lines pass through a trafficable area, the electrical lines are buried underground inside an ABS conduit. An inspection outcome summary report from the Electrical Safety Authority is provided in Appendix H.

Lighting

Four 8-kW diesel powered light towers are installed at the site to provide lighting during the 24-hour drilling and testing operations. The light towers were placed at the approximate four corners of the site to allow for even distribution of light. The light tower placement also considered: ground stability, level of activity in the area, and the ability for accessing the light towers by truck for refueling or repairs. The light towers were all placed within secondary spill containment prior to use. The secondary containments were sized so that the entire light tower footprint would be within containment, and therefore, the capacity of the containments (2,800 L) exceeds the volume of fuel and oil within the light towers (133 L). The typical installation can be viewed in Appendix D, Photo 8).

Ground Fault Protection

Ground fault circuit interrupters (GFCI) are installed at all locations where work was to occur outside or near water. Locations where GFCIs are in use include water pumps in the Baker tanks, water pumps in the settlement tanks, general power supply inside the core extraction shack, electrical outlets near sinks inside the washcart, and inside washcart water supply shack. GFCI adapters are available at the site for use by workers if they identify the need for GFCI at a non-equipped outlet.

Power Generation at the Rig

An auxiliary Kubota GL 7000 diesel generator was utilized by Rodren Drilling to supply any additional power requirements that they might need. The generator was equipped with GFCI outlets, and power is distributed through temporary electrical extension cords that are set up as required. The generator was housed within a containment structure and placed next to Rodren's 1,500 L fuel storage tank for ease of refueling. The 1,500 L "fuel cube" is double-walled fuel storage tank with a built-in spill containment system. Rodren's auxiliary generator and fuel storage tank are shown in Appendix D, Photo 9.

4.4 Drill Rig

Prior to arrival of the drill rig on site, the drill pad was set up with a secondary containment system to capture any drill fluid spills that could potentially occur in the drill rig or drill fluid circulation system. The system was designed with a central sump and the drill pad was graded to slope into the central sump (Appendix D, Photo 10). All drill fluid spills that occur on the drill pad are collected in the central sump and then pumped into a wastewater storage tank, as required. The secondary containment system provides approximately 230 m^2 of lateral coverage, and was built to underlie the drill rig, settlement tanks / centrifuge, core extraction shack, wastewater tank, and fluorescein tank. The secondary containment system is primarily for collecting spills of drill fluid or fluorescein traced water and is not intended to collect spills of hazardous materials such as oils or fuels. Hazardous materials are placed within their own secondary containment, in an effort to keep spills of hazardous materials outside of

the main secondary containment system beneath the drill area. Rig matting was placed over top of the central sump system, to provide a level and solid foundation for the drill rig infrastructure (Appendix D, Photo 11)

The drill rig is set up with a steel drill water return sump which captures drill fluid as it exits the borehole during drilling. The drill fluid is pumped from the primary containment sump into the settlement tanks / centrifuge where drill cuttings are removed from the drill water. Once the cuttings are removed from the drill water, the water is recycled back into the borehole.

Drill cuttings were initially removed from the drill water through the use of three-stage gravity settlement tanks. The gravitational settlement was enhanced by the use of Magnasol AN1, and AMC Flock Blocks, both of which are anionic flocculants which slowly dissolve into the settlement water to assist in settlement. The gravitational settlement tanks were used from the start of drilling until August 17, 2019, at which point the settlement tanks were replaced with a diesel-powered centrifuge to simplify the drill water circulation system and to allow for easier disposal of the drill cuttings. Once the drill water passes through centrifuge, it is reused as drill fluid down-hole. The removed drill cuttings are shovelled into waste storage containers for disposal off site. The settlement tank building is pictured in Appendix D, Photo 12, and the centrifuge is pictured in Photo 13.

The drill rig was a rotary EF-75 manufactured by Discovery Drill Manufacturer (DDM) LTD in 2011. For this borehole, the drill was oriented at an azimuth of 180 degrees and a dip of 70 degrees from horizontal. The rig was oriented by aligning it with surveyor stakes set in the ground by Rugged Geomatics, and the dip direction was checked with the use of a digital level.

The core extraction shack was set up directly east of the drill rig, so that core barrels could be directly carried into the extraction shack with minimal handling. The core extraction shack was built by Rodren and features a hydraulic piston for extracting the core from the core barrels. Once the core is extracted from the drill rods, it slides out of the core extraction shack on a metal rail, where it can be picked up and carried directly into the Core Logging Seacan. The orientations of the core extraction and core logging shacks were set up to minimize manual handling of the drill core. Images of the drill rig and core extraction shack are visible in Appendix D, Photo 14).

The drill laydown area is fenced off from the rest of site and is used as storage for the drilling operations. Items stored inside the drill laydown area include drill rods and tooling, fuel storage, an auxiliary diesel generator, core box storage, and a defined area for lubricants and oils used for drill rig maintenance.

Drill water is supplied by two 28,350 litre Baker tanks located on the east side of the site (Appendix D, Photo 15). The primary Baker tank receives source water from the Township of Ignace, and stores the untraced water so that it can be isotopically and chemically characterized prior to being dyed with a fluorescein tracer. Following isotopic and chemical testing, the water was transferred to the second Baker tank, where it was dyed with 100 ppb (ug/L) of fluorescein prior to use in the drilling process.

4.5 Health and Safety Equipment

Health and safety equipment set up at site includes proactive equipment such as signage posted in areas including the entrance to site which identifies restricted areas, the site muster point, non-smoking areas, and PPE requirements. Personal protective equipment such as hard hats, hearing and eye protection, gloves, and high visibility clothing is available within the Golder site office for workers and visitors to use if they have not arrived with the required equipment.

Emergency response equipment is also provided around site, and includes eye wash stations in the core extrusion seacan, core storage seacan, and all site offices. First aid kits have been placed in each of the site offices, the core extrusion, core storage and core logging seacans. Fire extinguishers are located at the fuel storage tank, washrooms, smoking area, auxiliary generator and fuel tank, core push, core logging and core storage seacans, site offices, and proximal to light towers and other fuel burning equipment. Eye wash stations, first aid kits, and fire extinguishers are all inspected as part of monthly site inspections.

4.6 Waste and Chemical Storage

Solid Waste

Solid waste is managed using one garbage bin and one recycling bin were placed near the front entrance to the drill site, for ease of access by the garbage and recycling truck. The bins are both located inside the 2.5 m perimeter fencing and have lids which can be made animal proof if required. The garbage and recycling bins were sourced by B&M Deliveries out of Dryden, Ontario, and waste material is transported by B&M Deliveries to the Town of Dryden Landfill Site, located southwest of Dryden, Ontario.

Spill Response

Universal spill kits (200 L) were set up at site in areas where hazardous materials are stored and handled. The spill kits are outfitted with personal protective equipment, a variety of sorbent materials, as well as orange disposal bags and a waterproof 200 L storage drum. A total of five spill kits were placed around the site for ease of use near the following places: beside the drill rig fuel supply, beside the site fuel supply, next to the site generator, and in two locations on the west side of site, next to light towers. A barrel of sawdust was also placed by the washcart wastewater storage tank, to manage potential spills in that location.

There have been minor hydrocarbon spills at the site during site setup, which have been documented in daily field reports and cleaned up immediately. All stained soil/fill materials were hand excavated, and the material placed into a 200 L steel drum on site for short term storage. Consistent with the spill response plan, a composite soil/fill sample will be collected for laboratory analysis. Upon receipt of the laboratory analysis, Golder will arrange for appropriate disposal of the material in accordance with all Regulations.

Hazardous Chemical Storage

Hazardous chemicals are primarily stored in two locations. All products associated with the operation of the drill rig are stored in secondary containment on the south side of the drill rig. All products associated with water testing are stored in the Core Storage Seacan. Minor consumer quantities of cleaning supplies etc. are also located the site offices and washrooms. Copies of all Safety Data Sheets (SDS) for hazardous materials were kept on site in the Golder office trailer and/or the Core Storage Seacan.

5.0 SUMMARY

This report summarizes the improvements to Dyment Road, clearing and construction of the access road from Dyment 5.5 km to drill site IG_BH03, and the construction of the drill pad, site grading, drill fluid containment system, field offices, power, utilities and perimeter fencing at IG_BH03. The site setup for IG_BH03 was completed on July 20, 2019 (Appendix G – IG_BH03 Drill Site Commissioning Checklist). Drilling and testing at IG_BH03 commenced on July 9, 2019. The commissioned drill site is shown in Appendix D, Photo 16. The site will be demobilized following the completion of drilling and testing at IG_BH03.

6.0 REFERENCES

Golder, 2018. WP1 – Site Infrastructure Plan and Access Road Construction Plan – Ignace Boreholes IG_BH01, IG_BH02 and IG_BH03 – Golder Associates, July 2018.

MNR, 1990. Ministry of Natural Resources - Environmental Guidelines for Access Roads and Water Crossings, 1990.

NWMO, 2017a. Ministry of Natural Resources and Forestry - Ignace Borehole Drilling Project Submission - NWMO – May 25, 2017.

NWMO, 2017b. Ministry of Natural Resources and Forestry - Ignace Borehole Drilling Project Submission - NWMO – October 13, 2017.

APPENDIX A

Ontario Ministry of Natural Resources - Corduroy Reporting Sheet

Ministry of Natural Resources

Operations Branch

Wood Measurement Section
435 James Street South
Suite 221B
Thunder Bay ON
P7E 6S8
Tel: 807-475-1681
Fax: 807-475-1582

Ministère des richesses naturelles

Direction des opérations

Section de mesurage de bois
435 S. rue James
bureau 221B
Thunder Bay ON
P7E 6S8
Tél: 807-475-1681
Téléc. : 807-475-1582

Corduroy Reporting Sheet

1 kilometre of road corduroy = 344.000m^3

Company Name: _____Ricci's Trucking_____

Licence Number: _____NWMO Road and Bore hole pad Construction – km 5.5 dyment rd.

Approval Number: _____

Corduroy ID Number _____

Location of Corduroy (road name, block number, etc):

_Access rd from main rd – km 5.5 dyment to junction – west at junction to end of new road construction_____

Ground identifiers (GPS way points, stakes, etc):

none – can provide utm if required_____

Length of Corduroy (km or 100m, indicate which used): ____166 linear meters = 57.1 m3_____

Method used to measure length: _____GPS_____

Date installed: ____Various – January, May – July 2019_____

Date measured: __July 17, 2019_____

Species (Example Ce 60% Po 40%): _____100% Conifer – 50 / 5- sb / Pj_____

Company Contact: _____Caley Bachynski 807-938-7590_____

Tally Distribution: MNR, District Office,
MNR, Wood Measurement Section, Thunder Bay

caleyricci@bellnet.ca

From: Caley <caleyricci@bellnet.ca>
Sent: July 17, 2019 11:01 AM
To: Caley Bachynski
Subject: Linear meters. Corduroy. Bh03 a d 02 access

Linear meters. Corduroy. Bh03 a d 02 access
18
26
31
14
6
8
6
57

166.

Factor = 0.344

= 57.10 m3
USED

Sent from my iPhone

APPENDIX B

Ontario Ministry of Natural Resources – Stacked Wood Tally Sheet

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 (3+)	Net m^3
1	20.90	2.63	.60	148.41	99.033
2	16.70	1.85	.14	83.42	55.795
3	9.90	2.00	.10	53.46	35.751
4	2.00	.40		2.16	1.447
5	6.80	1.60		29.376	19.682
6	3.50	.90		8.51	5.698
7	2.40	.90		5.83	3.907
8	5.70	.70		10.77	7.218
9	4.20	.80		9.07	6.078

= 234.609 m^3

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	10	10	0001	4949	03	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rod Hoell	Jack Pine

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush.

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 (St)	Net m^3		
1	20:60	2:40	:	133:49	89:437	:	:
2	17:00	3:05	:	139:99	93:797	:	:
3	9:00	1:94	:	47:14	31585	:	:
4	4:30	1:00	:	11:61	7:79	:	:
5	1:50	:50	:	2:03	1:358	:	:
6	2:20	:80	:	4:75	3:184	:	:
7	3:20	:70	:	6:05	4:052	:	:
8	5:00	:70	:	9:45	6:331	:	:
9	6:00	:80	:	12:96	8:683	= :	239:206

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	10	10	0002	4949	18	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rob Hoult	spruce

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 (Jf)	Net m^3		
1	1.20	.80		2.59	1.737		
2	4.40	.70		8.32	5.572		
3	6.00	1.30		21.06	14.110		
4	7.00	1.20	.08	22.68	15.142		
5	2.70	.90		6.56	4.396		
6	3.50	1.20		11.34	7.598		
7	6.20	1.70		28.46	19.067		
8	4.30	1.30		15.09	10.112		
9	5.40	1.90	.12	27.70	18.480	=	96.214 m^3

Approval Number: 2.19361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	1.0	1.0	0003	49.49	03	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19.	Rob Hoult	JACK Pine

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 (Std)	Net m^3		
1	4:00	1:40	:	15:12	10:130	:	:
2	5:30	1:50	:	21:47	14:382	:	:
3	7:70	1:30	:	27:03	18:108	:	:
4	6:70	1:10	:	19:90	13:332	:	:
5	7:00	1:40	:	26:46	17:728	:	:
6	9:40	1:80	:	45:68	30:608	:	:
7	7:60	1:90	:	38:99	26:122	:	:
8	8:80	1:80	:	42:77	28:655	:	:
9	6:90	1:40	:	26:08	17:475	= :	176:540 m^3

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	10	1.0	0004	4949	18	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rob Hall	Spruce

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 (est)	Net m^3		
1	7:60	1:30		26:68	17:873		
2	6:10	1:70		28:00	18:759		
3	5:00	1:40		18:90	12:663		
4	5:70	1:40		21:55	14:436		
5	4:60	1:10		13:66	9:154		
6	11:30	1:80		54:92	36:795		
7	9:00	1:40		34:02	22:793		
8	5:00	:60		8:10	5:427		
9	5:00	1:80		24:30	16:281		

= 154.181 m^3

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	10	10	0005	4949	18	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rod Hood	Spruce

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush.

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 / st	net m^3		
1	4:10	1:20		13:28	8900		
2	5:40	:80		11:66	7:815		
3	7:20	1:60	:12	31:10	20:759		
4	4:30	1:10		12:77	8:557		
5	1:30	:70		2:46	1:646		
6	2:50	:80		5:40	3:618		
7	3:20	:70		6:05	4:052		
8	4:00	:70		7:56	5:065		
9	7:80	1:70	:15	35:80	23:887		

= 84.299 m^3

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
130 1	10	10	00016	4949	03	2.70	2	9

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O		~~Jun 9/19~~	Jun 9/19	Rod Hood	Jack pine

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush.

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 ST		net m^3		
1	5:70	1:30		20:01		13:405		
2	5:50	1:30		19:30		12:934		
3	5:50	1:00		14:85		9:950		
4	12:30	3:10		102:95		68:977		
5	11:10	2:40		71:93		48:192		
6	23:10	3:10		235:20		157:582		
7	7:80	2:40		50:54		33:864		
8								
9						344:904		

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1304	10	10	0007	9999	18	2.70	2	7

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rod Hoult	Spruce

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush.

Ministry of Natural Resources
Ontario

Stacked Wood Tally Sheet

Send Original to Regional Office

Stack No.	Metres (in 2cm classes) Length	Height	Deductions	Contents in 100ths of m^3 (stacked) based on volume for 2.54m wood — Minor species and code: Gross m^3 st		net m^3 solid	
1	22.40	3.40	.52	205.63		137.425	
2	5.70	1.50		23.08		15.467	
3	9.40	2.30	.22	58.37		38.963	
4							
5						191.855	
6							
7							
8							
9							

Approval Number: 219361
OR
District Cutting Lic.:

Destination	Unit of Measure	Period	Sheet No.	Scaler No.	Major Species	Bolt Length in metres	Scale Type	Total Stacks
1301	10	10	0008	4949	03	2.70	2	3

Unit of Measure: 10-Rough, 20-Peeled, 61-Fuelwood
Scale Type: 1 - Ministry, 2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	Major Species
N.W.M.O			Jan 9/19	Rob Hoell	Jack Pine

2371 (87/4)

See Procedure TS.3.4.7 for proper completion of this form.

Scaled in bush

total 9' for Ignace

= ~~1282.602 m^3 solid~~
1521.808 m^3 solid

Ontario

Send original to Regional Office

Cubed Wood Tally Sheet

Culls by Species

Species & Code: JACK Pine (03)

Length ▶ 5.1 m

Dia.	Calculations
6	
8	
10	2 X .04 = .08
12	12 X .058 = .696
14	171 X .079 = 13.509
16	414
18	
20	
22	329 X .[illegible] = 63.322
24	180 X .231 = 41.580
26	75 X .271 = 20.325
28	54 X .314 = 16.956
30	9 X .360 = 3.24
32	5 X .410 = 2.05
34	1 X .462 = .463
36	1 X .519 = .519
38	1 X .578 = .578
40–54	
56	412 X .103 = 42.436
58	612 X .130 = 79.560
60	590 X .160 = 94.40
62–90	

Pj total = 380.218 m³

Scaled in bush

Total: 2454

Approval Number	Destination	Unit of Measure		Period	Sheet No.	Scaler No.	Sample Factor	Scale Type	Sheet Total
219361	21114	30	30-Fixed Length 31-Tree Length 40-Tol. Hwd. 41-Grade 1 42-Grade 2 63-Fuelwood	10	0001	4949	01	2	12454

OR District Cutting Lic.

1 - Ministry
2 - Domestic

Licensee	Mill	Township or Base Map No.	Date	Scaler	% Scale	Skidway No.
N.W.M.O			Jan 9/19	Rob Hood	100	01

2354 (87/4)

See Procedure TS.3.4.8 for proper completion of this form.

Ontario

Cubed Wood Tally Sheet

Send original to Regional Office

Culls by Species | Species & Code | Length ▶ | Dia. | ◀ Length | Species & Code | Culls by Species

Spruce (018)

5.1m

Dia.				
6				
8				
10				
12	1			
14	5	X .058 =	0.174	
16	45	X .079 =	3.555	
18	126	X .103 =	12.978	
20	160	X .130 =	20.800	
22	223	X .160 =	35.68	
24	151	X .194 =	29.294	
26	89	X .23 =	20.559	
28	30	X .27 =	8.130	
30	13	X .314 =	4.082	
32	3	X .360 =	1.08	
34	2	X .410 =	.820	
36				
38				
40				
42				
44				
46				
48				
50				
52				
54				
56				
58				
60				
62				
64				
66				
68				
70				
72				
74				
76				
78				
80				
82				
84				
86				
88				
90				
Total	845			Total

Spruce total = 137.152 m³

Total 16' (5.1m) logs

= 517.370 m³

Scaled in bush.

Approval Number: 2193611 OR District Cutting Lic.:

Destination: 2114

Unit of Measure: 30 (30-Fixed Length, 31-Tree Length, 40-Tol. Hwd., 41-Grade 1, 42-Grade 2, 63-Fuelwood)

Period: 10

Sheet No.: 0002

Scaler No.: 4949

Sample Factor: 01

Scale Type: 2 (1 - Ministry, 2 - Domestic)

Sheet Total: 1845

Licensee	Mill	Township or Base Map No.	Date	Scaler	% Scale	Skidway No.
N.W.M.O			Jan 9/19	Rod Hood	100	01

2364 (87/4)

See Procedure TS.3.4.8 for proper completion of this form.

APPENDIX C

Ontario Ministry of Natural Resources – Previously Scaled Crown Timber

Ontario

Ministry of Natural Resources and Forestry

Clearance of Forest Resources
Previously Scaled Crown Timber

APPLICANT:

Name: (Print) Nuclear Waste Management Org

Address: _____

_____ Telephone: _____

CFSA AUTHORIZATION FOR TIMBER HARVESTED:

MNRF Administrative District: Dryden

Forest Management Unit: Wabigoon

Forest Resource Licence: A64925 Approval #: 219361

LAND DESCRIPTION FOR TIMBER RESERVED TO THE CROWN (Patent Land):
(Township, Concession, Lot #, Lot Description-(N½), Land Registry Parcel #)

_____

_____

_____

DESCRIPTION OF TIMBER:

Measuring Location (Harvest Site, Concentration Yard, Etc.)	Destination	Contract #	Species	Grade	Volume (m^3)
Harvest site 219361	Atikokan		PJ/Sb	na	600 m^3

DECLARATION:

I (Print Name) Rob Hoedl do solemnly declare that the Crown forest resources described herein and cut from the lands described above have been measured and reported to the Ministry of Natural Resources and Forestry for Crown charges.

Rob Hoedl
Signature of Applicant

2019/01/09
Date (yyyy/mm/dd)

Verified by: (Where forest resources are stick scaled, the scaler is to complete, as per below)

☒ Scaler Licence #: 4949

2019/01/09
Date (yyyy/mm/dd)

☐ MNRF

Verified by (Print): Rob Hoedl

☐ Licensee

☐ Other _____

Rob Hoedl
Signature

Ontario

Ministry of Natural Resources and Forestry

Clearance of Forest Resources
Previously Scaled Crown Timber

APPLICANT:

Name: (Print) Nuclear waste Managment organization.

Address: _____

_____ Telephone: _____

CFSA AUTHORIZATION FOR TIMBER HARVESTED:

MNRF Administrative District: Dryden.

Forest Management Unit: Wolfgon.

Forest Resource Licence: A64925 Approval #: 219361.

LAND DESCRIPTION FOR TIMBER RESERVED TO THE CROWN (Patent Land):
(Township, Concession, Lot #, Lot Description-{N½}, Land Registry Parcel #)

_____

_____

_____

DESCRIPTION OF TIMBER:

Measuring Location (Harvest Site, Concentration Yard, Etc.)	Destination	Contract #	Species	Grade	Volume (m^3)
Harvest site: 219361	Ignace		Pj/Sb.	n/a	3000 m^3

DECLARATION:

I (Print Name) Rob HOEDL do solemnly declare that the Crown forest resources described herein and cut from the lands described above have been measured and reported to the Ministry of Natural Resources and Forestry for Crown charges.

Rob Hoedl
Signature of Applicant

2019/01/09
Date (yyyy/mm/dd)

Verified by: (Where forest resources are stick scaled, the scaler is to complete, as per below)

☒ Scaler Licence #: 4949

2019/01/09
Date (yyyy/mm/dd)

☐ MNRF

Verified by (Print): Rob HOEDL

☐ Licensee

☐ Other _____

Rob Hoedl
Signature

APPENDIX D

IG_BH03 Site Setup Photos

Photo 1: Facing north from the west side of the drill site. A vibratory roller was used to pack the final layer of subgrade material.

Photo 2: Facing south from the northeast corner of the drill site. To assist in self-drainage at the north end of the site, a drainage swale was dug into the subgrade, and was backfilled with cobbles to allow easterly movement of rainwater off of site. Walking paths were created next to the anticipated office trailer locations to mitigate tripping hazards associated with walking on cobbles.

Photo 3: Facing west towards the elevated drill pad at IG_BH03. Perimeter silt and snow fencing can be observed to the left, and access road approach can be observed on the right side.

Photo 4: Facing east from the parking lot towards the site perimeter fencing of IG_BH03

Photo 5: Facing east from the parking lot towards the fencing around the drill laydown area of IG_BH03

Photo 6: Facing East from the parking lot on June 27, 2019. Visible from the left are the wash cart, three office trailers, generator and fuel storage tank (not yet in place), core storage seacan, core logging seacan, garbage and recycling bins.

Photo 7: Facing north towards the site generator and fuel storage tank. Concrete barriers were placed around the fuel storage tank to protect it from inadvertent contact by heavy equipment.

Photo 8: Facing north towards one of four 8-kilowatt light towers. Each light tower was placed in a secondary containment berm to capture any potential spills. The site cell phone signal booster is visible at the top of the light tower.

Photo 9: Facing east towards the drill pad. From the left are the drill water settlement tanks, auxiliary generator, fuel storage tank, drill rig, drill rod holders, and temporary skid steer.

Photo 10: Facing south towards the secondary containment liner and sump used to collect spilled drill water on the drill pad. The drill pad is graded towards the central sump.

Photo 11: Facing east towards the rig matting which was placed over top of the drill pad secondary containment liner

Photo 12: Facing south towards the fluorescein storage tanks on the left, and the drill water settlement tanks on the right.

Photo 13: Facing southeast towards the centrifuge which replaced the drill water settlement tanks. Drill cutting storage can be observed in containment berm on the left side of the photo.

Photo 14: Facing south towards the drill rig, and core extraction shack, sitting on the drill pad secondary containment and rig matting.

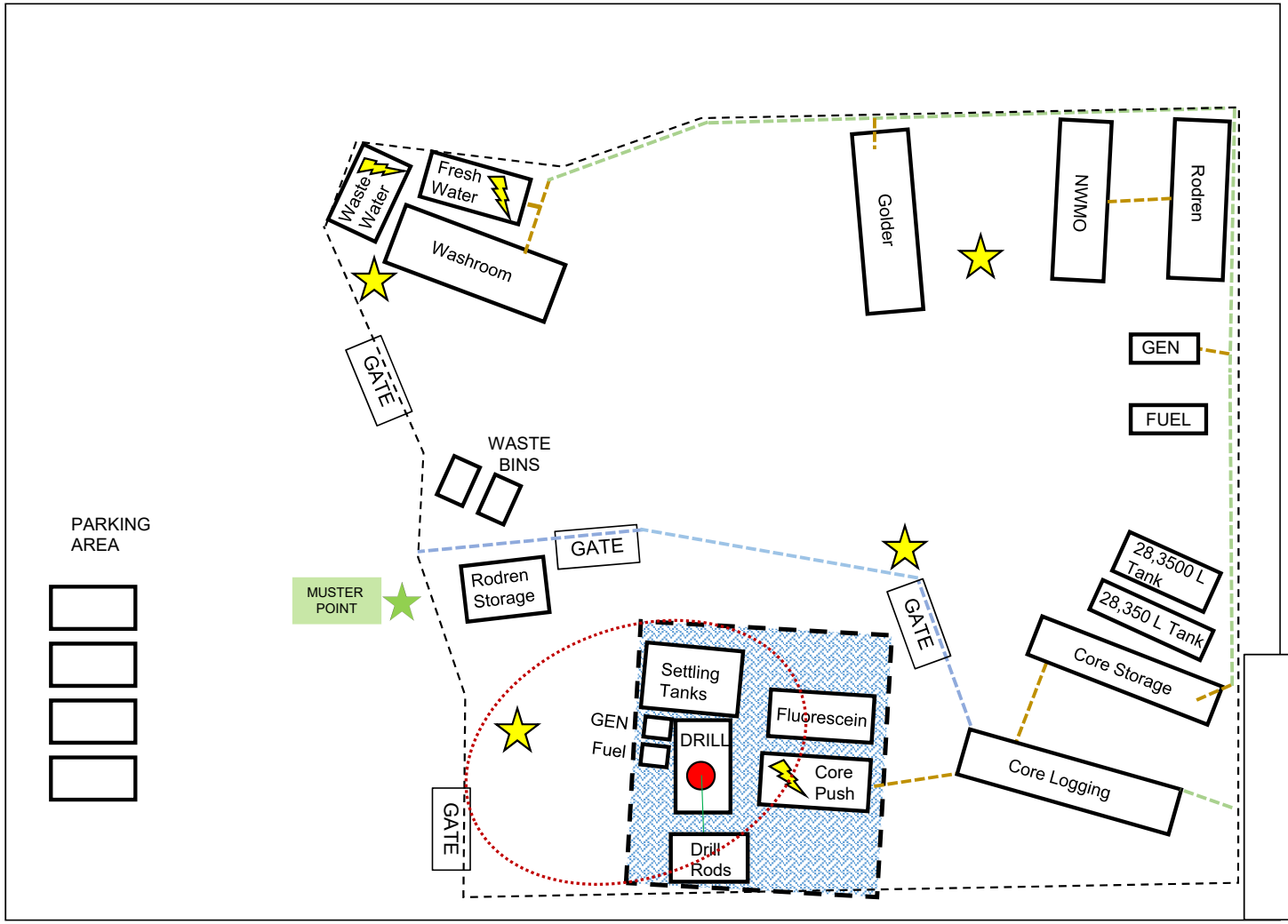
Photo 15: Facing south towards one of the two 28,350 L baker tanks located on the east side of site. The baker tanks are used to store source water supplied from the Township of Ignace.

Photo 16: Facing south towards the commissioned IG_BH03

APPENDIX E

IG_BH03 As-Built Site Facilities Layout

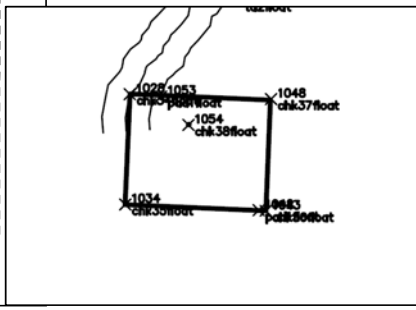
Appendix D - IG_BH03 As-Built Site Facilities Layout



LEGEND:

- LIGHT TOWER
- 8' FENCE (580 feet)
- 6' FENCE
- GFCI Protection Required
- Underground electrical lines from Generator
- Aboveground electrical lines from Generator
- Drill pad Containment
- > 83 Decibels

Key Plan:



1 CM = 10 Feet

APPENDIX F

As-Built Survey Drawings

AS-BUILT SKETCH OF
ROAD LAYOUT
TABOR LAKE AREA AND REVELL LAKE AREA
DISTRICT OF KENORA

ERIC RODY, OLS

FIELDWORK COMPLETED NOVEMBER 12TH, 2019.

SCALE 1 : 3000

60 30 0 60 120 180 METRES

METRIC: DISTANCES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

AREAS SHOWN ON THIS PLAN ARE IN HECTARES AND CAN BE CONVERTED TO ACRES BY MULTIPLYING BY 2.471.

BEARING NOTE

BEARINGS ARE UTM GRID, DERIVED FROM STATIC GPS OBSERVATIONS PROCESSED USING NATURAL RESOURCES CANADA PRECISE POINT POSITIONING ON MONUMENTS 100 AND 101 TO YIELD A GRID BEARING OF N 53°05'30" W, NAD 83 CSRS AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 15 (93° W LONGITUDE) (2010).

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC REFERRED TO THE CGVD28 DATUM DERIVED FROM GPS OBSERVATIONS COLLECTED AT POINT 100 AND POST PROCESSED UTILIZING THE PRECISE POINT POSITIONING (PPP) NRCAN SERVICE. ELEVATION OF POINT 100 IS 434.26m.

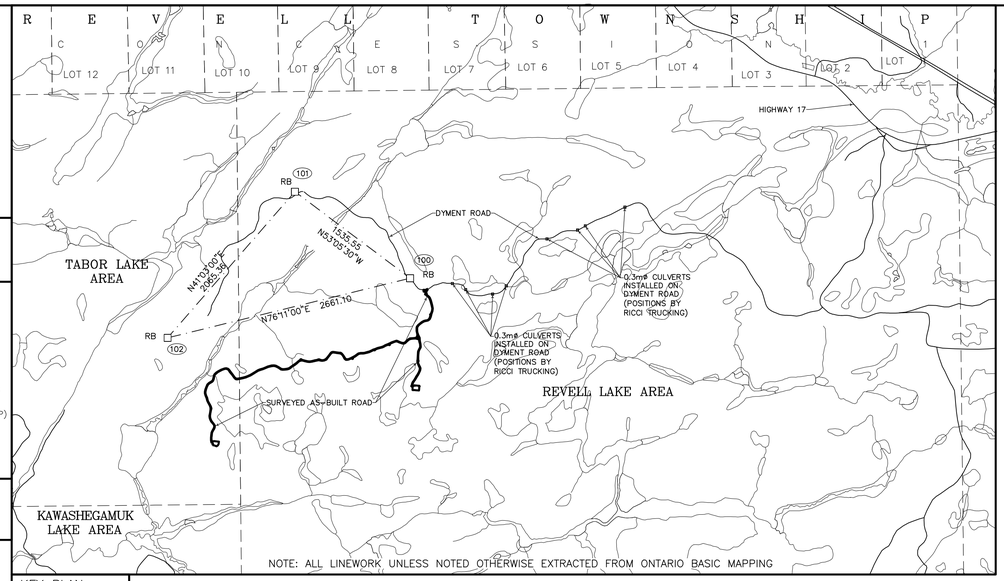
SCALE FACTOR NOTE

DISTANCES ARE GRID AND CAN BE CONVERTED TO GROUD BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 1.000424.

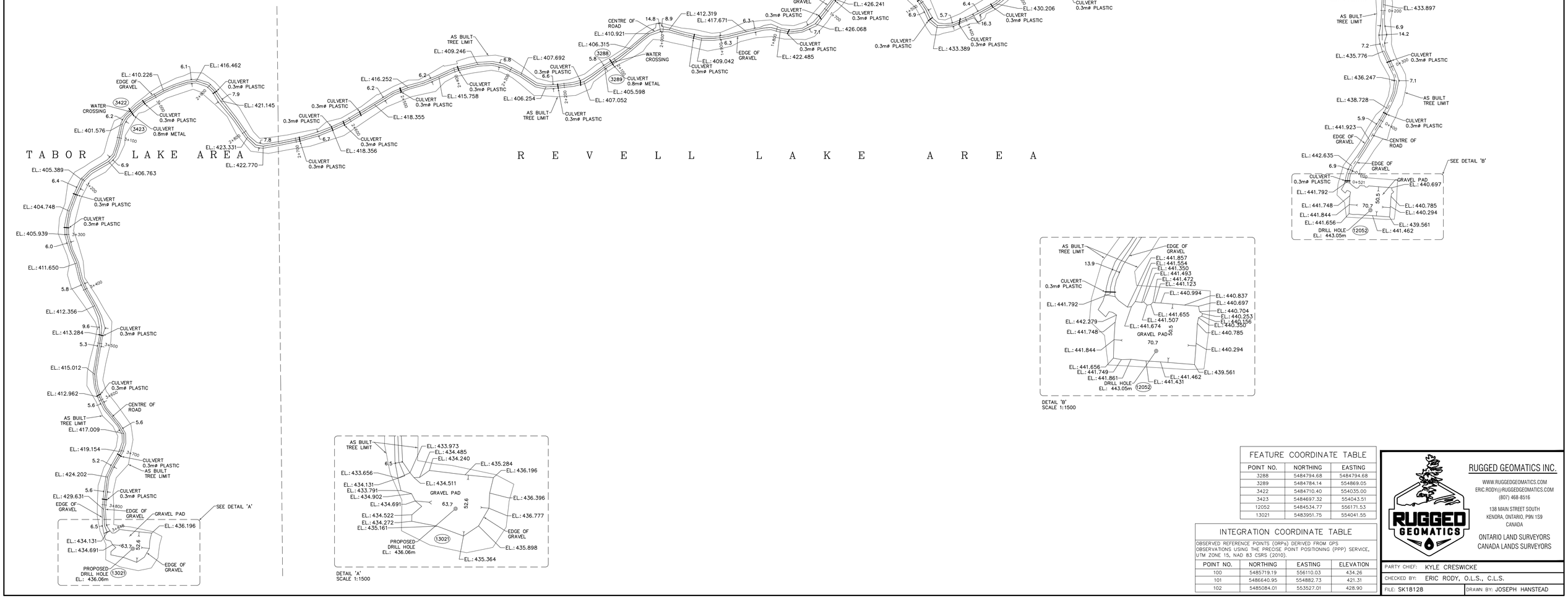
LEGEND

□ ------- DENOTES - SURVEY MONUMENT PLANTED

RB ------- DENOTES - ROCK BAR



KEY PLAN
SCALE 1 : 50,000



DETAIL 'A'
SCALE 1:1500

DETAIL 'B'
SCALE 1:1500

FEATURE COORDINATE TABLE

POINT NO.	NORTHING	EASTING
3288	5484794.68	5484794.68
3289	5484784.14	554869.05
3422	5484710.40	554035.00
3423	5484697.32	554043.51
12052	5484534.77	556171.53
13021	5483951.75	554041.55

INTEGRATION COORDINATE TABLE

OBSERVED REFERENCE POINTS (ORPs) DERIVED FROM GPS OBSERVATIONS USING THE PRECISE POINT POSITIONING (PPP) SERVICE, UTM ZONE 15, NAD 83 CSRS (2010).

POINT NO.	NORTHING	EASTING	ELEVATION
100	5485719.19	556110.03	434.26
101	5486640.95	554882.73	421.31
102	5485084.01	553527.01	428.90

RUGGED GEOMATICS INC.
WWW.RUGGEDGEOMATICS.COM
ERIC.RODY@RUGGEDGEOMATICS.COM
(807) 468-8516
138 MAIN STREET SOUTH
KENORA, ONTARIO. P9N 1S9
CANADA
ONTARIO LAND SURVEYORS
CANADA LANDS SURVEYORS

PARTY CHIEF: KYLE CRESWICKE

CHECKED BY: ERIC RODY, O.L.S., C.L.S.

FILE: SK18128 DRAWN BY: JOSEPH HANSTEAD

APPENDIX G

IG_BH03 – Drill Site Commissioning Checklist

IG_BH03 - Drill Site Commissioning Checklist

Item No.	Item	General Requirements	Date Commissioned	Checked by	Approved by	Comments
1.0	**SITE PREPARATION**					
1.1	Clearing and grubbing	Site adequately cleared and grubbed, surface material stockpiled adequately, site accessible from road	July 7, 2019	Adrian Kowalchuk	George Schneider	
1.2	Drill pad	Drill pad constructed in the correct location, of adequate size, adequately compacted, levelled	July 7, 2019	Adrian Kowalchuk	George Schneider	
1.3	General site levelling	Site generally levelled to allow placement of surface facilities and safe movement between facilities	July 7, 2019	Adrian Kowalchuk	George Schneider	
1.4	General Site Drainage	Site grading allows for adequate drainage without ponding	July 7, 2019	Adrian Kowalchuk	George Schneider	
2.0	**FENCING**					
2.1	Silt fencing	Silt fencing around site perimeter, properly installed and in good order	July 7, 2019	Adrian Kowalchuk	George Schneider	
2.2	Snow fencing	Snow fencing around site perimeter, properly installed and in good order	July 7, 2019	Adrian Kowalchuk	George Schneider	
2.3	Modulok security fencing	Security fencing around required areas, drill area separated, properly installed and in good order	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 - Additional fencing was added to the swales on the east and south sides of site to deter animals from entering the site beneath the fence.*
3.0	**OFFICE TRAILERS**					
3.1	Trailer 1 (Golder)	Trailer correctly positioned, blocked and levelled, stairs installed, furnishings supplied meet requirements, heated	July 7, 2019	Adrian Kowalchuk	George Schneider	
3.2	Trailer 2 (NWMO)	Trailer correctly positioned, blocked and levelled, stairs installed, furnishings supplied meet requirements, heated	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 - Air conditioning was repaired in the NWMO trailer.*
3.3	Trailer 3 (Rodren)	Trailer correctly positioned, blocked and levelled, stairs installed, furnishings supplied meet requirements, heated	July 7, 2019	Adrian Kowalchuk	George Schneider	
4.0	**CORE LOGGING AND STORAGE**					

Item No.	Item	General Requirements	Date Commissioned	Checked by	Approved by	Comments
4.1	Core Logging Seacan	Seacan correctly positioned, blocked and levelled, interior meets requirements, heated	July 7, 2019	Adrian Kowalchuk	George Schneider	
4.2	Core Logging Table	Core logging table meets design specifications, correctly installed	July 7, 2019	Adrian Kowalchuk	George Schneider	
4.3	Camera Racking	Camera tracking correctly installed, meet performance criteria	July 7, 2019	Adrian Kowalchuk	George Schneider	
4.4	Core Storage Seacan	Seacan correctly positioned, blocked and levelled, interior meets requirements, heated	July 7, 2019	Adrian Kowalchuk	George Schneider	
4.5	Commercial Refrigerator	Refrigerator installed correctly, operating correctly, provides adequate storage capacity	July 7, 2019	Adrian Kowalchuk	George Schneider	
5.0	**COMMUNICATIONS**					
5.1	Satellite phone	Phone is installed and functioning correctly	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Provisionally approved – an INREACH satellite communicator and GPS unit has been installed at the site and request for approval will be sent to the NWMO for a change to the emergency communication system.*
5.2	Cellular internet	Cellular Internet Wi-Fi network is installed and functioning correctly, reception is adequate in all required areas of the site	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 - Internet access is available in all site offices, the core logging seacan and the core storage seacan.*
6.0	**GENERATORS**					
6.1	Generator	Generator installed and functioning correctly, installation completed by an electrician, and certified by electrician to meet codes	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 – Power distribution has been installed at all locations across site and has been reviewed by an electrical inspector.*
6.2	Secondary containment	Secondary spill containment in place beneath fuel tank, correctly installed, of adequate capacity	July 7, 2019	Adrian Kowalchuk	George Schneider	
6.3	Power distribution	Power distribution panel installed and functioning correctly, installation completed by an electrician, and certified by electrician to meet codes	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 – Power distribution has been installed at all locations across site and has been reviewed by an electrical inspector.*
7.0	**LIGHT TOWERS**					

IG_BH03 - Drill Site Commissioning Checklist

Item No.	Item	General Requirements	Date Commissioned	Checked by	Approved by	Comments
7.1	Light Tower	All light towers installed and functioning correctly, installation completed by an electrician, and certified by electrician to meet codes	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 – All light towers have been placed in secondary containment and are operational*
7.2	Secondary containment	All secondary spill containment in place beneath fuel tank, correctly installed, of adequate capacity	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 – the generator, fuel tank, and four light towers have been placed in secondary containment and are operational*
8.0	**FUEL STORAGE**					
8.1	Fuel tank	Fuel tank correctly installed, blocked and levelled	July 7, 2019	Adrian Kowalchuk	George Schneider	
8.2	Secondary containment	Secondary spill containment in place beneath fuel tank, correctly installed, of adequate capacity	July 7, 2019	Adrian Kowalchuk	George Schneider	
8.3	Protective barricade	Tank is adequately protected from inadvertent collision with mobile equipment	July 7, 2019	Adrian Kowalchuk	George Schneider	
9.0	**SANITARY FACILITIES**					
9.1	Washroom	Washroom correctly positioned, blocked and levelled, stairs installed, toilets and sinks functioning correctly, heated	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 - Washrooms are working with no leaks observed.*
9.2	Water tank	Water tank building correctly positioned, blocked and levelled, correctly connected to the washroom building, heated	*July 7, 2019*	*Adrian Kowalchuk*	*George Schneider*	*Approved July 20 – Water tank is hooked up to the site electrical distribution system and is functioning correctly.*
9.3	Septic tank	Septic tank building correctly positioned, blocked and levelled, correctly connected to the washroom building, heated	July 7, 2019	Adrian Kowalchuk	George Schneider	
10.0	**GARBAGE BINS**					
10.1	Garbage Bin	Bin placed in suitable location, secure lid	July 7, 2019	Adrian Kowalchuk	George Schneider	
10.2	Recycling Bin	Bin placed in suitable location, secure lid	July 7, 2019	Adrian Kowalchuk	George Schneider	
11.0	**SPILL KITS**					
11.1	Drill fluid kit	Spill kit components present, size and type meets requirements	July 7, 2019	Adrian Kowalchuk	George Schneider	

IG_BH03 - Drill Site Commissioning Checklist

Item No.	Item	General Requirements	Date Commissioned	Checked by	Approved by	Comments
11.2	Fuel kit	Spill kit components present, size and type meets requirements	July 7, 2019	Adrian Kowalchuk	George Schneider	
11.3	General (chemical) kit	Spill kit components present, size and type meets requirements	July 7, 2019	Adrian Kowalchuk	George Schneider	

Completed by: Adrian Kowalchuk July 20, 2019

Date:

Verified by: George Schneider July 20, 2019

Date:

APPENDIX H

IG_BH03 – Electrical Safety Authority Inspection Letter

Electrical Safety Authority
www.esasafe.com

400 Sheldon Dr, Unit 1, Cambridge, ON , N1T 2H9
For inquiries:
TOLL FREE TEL: 1-877-372-7233 TOLL FREE FAX: 1-800-667-4278

Requested Inspection Outcome Summary Report

PREZIO'S ELECTRICAL LIMITED
G PREZIO ELECTRIC
890 ALLOY PL
THUNDER BAY ON P7B 6E6

PRINT DATE: January 23, 2020
CUSTOMER ID: 7975
FAX NUMBER: 807346-1224

Notification: 16361981

Status: Passed
Code: Final Requested

Site:

GOLDER ASSOCIATES
TARANIS CONTRACTING
GOLDER ASSOCIATES
KENORA UNORGANIZED ON

golder.com