PROPOSED CUMBERLAND QUARRY

Aggregate Resources Act Summary Statement Report

Project Location:
Part Lot 12,13, & 14, Concession 11
Township of Severn, County of Simcoe, ON

Prepared for:
Severn Aggregates Limited
151 Whitehall Drive
Markham, ON L3R 9T1

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

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1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by Severn Aggregates Ltd. to complete an Aggregate Resources Act Summary Statement to support an application for a Class A, Category 2 quarry (proposed Cumberland Quarry) which proposes to extract aggregate from below the established water table. The proposed Cumberland Quarry is located on Part Lots 12, 13, and 14, Concession 11, in the Township of Severn (formerly Township of Orillia), County of Simcoe (hereby referred to as "the Site"). **Figure 1** shows the Site location.

The landowner registered on title for the Site is 1662947 Ontario Inc. and is currently using the Site for agricultural and forestry practices. Progressive restoration of historical farming activities is ongoing in Lots 13 and 14. 1662947 Ontario Inc. has entered into an agreement with Severn Aggregate Ltd. to pursue a License for Class A, Category 2 – Quarry Below Water and intends on continuing with agricultural and forestry activities on-Site while the quarry is operating.

The purpose of this report is to present the Aggregate Resources Act (ARA) Site Plans and the results of the technical documents submitted in support of the application to show compliance with the Provincial Standards of Ontario for a Category 2 Class A Quarry Below Water, hereby referred to as the 'Standards'.

2.0 AGGREGATE RESOURCES ACT SITE PLANS

MTE prepared a set of ARA Site Plans in support of the application. As per Standard 1.0, two sets of the Site Plan will be provided along with the application package. These Site Plans provide details on the following:

- Existing Features (Sheet 1);
- Operational Plan (Sheet 2);
- Cross-Sections and Consultant Recommendations (Sheet 3);
- Operational Details (Sheet 4);
- Rehabilitation Plan (Sheet 5); and
- Stages of Operation (Sheets 6 through 8).

The proposed licensed area for the quarry is 138 ha with a proposed extraction area of 118.5 ha. The proposed annual tonnage limit is 500,000 tonnes per year, which will be comprised of aggregate removed from the Site. Recycled aggregate will be imported and exported from the Site from time to time as well.

Extraction of aggregate will be done in nine (9) phases comprising 14 operational stages. **Figure 2** shows the proposed phasing. Extraction will commence in the south part of the Site in Phase 1a and proceed northerly through subsequent phases. Phase 1a will be the designated area for processing, shipping and recycling of aggregate. The disturbed area in each phase will be minimized using progressive rehabilitation.

Successive areas will be 25 Ha on average and will include clearing, tree removal, stripping of soils, extraction of aggregate and areas undergoing rehabilitation. The maximum depth of extraction will follow the top of the Shadow Lake Formation ranging in elevation from 216 mAMSL to 217 mAMSL.

The final rehabilitated state includes an agricultural area in the north portion of the Site, and a mix of forest corridors, wetlands and open field meadows in the south portion. The rehabilitation plan has been designed to mimic existing conditions so that water flowing onto the Site in the northern portion continues to exit the Site in the south and southeast portions. The rehabilitation plan including the end use for the Site is discussed in more detail in **Section 7.0.**

3.0 PLANNING AND LANDUSE CONSIDERATIONS

Standard 2.1.1 requires that any planning and land use considerations be presented in the Summary Statement Report. Land uses surrounding the Site are shown in **Figure 3**.

The County and the Township recognize that this area contains aggregate potential and that this area is to be protected for future aggregate extraction. The Site is designated Greenland (GL) in the Township of Severn Official Plan (Schedule A South – Land Use) It also has an overlay designation of *bedrock aggregate resource* (Schedule C – Aggregate Resource Potential). The Site is designated as Greenland (GL) in the Simcoe County Official Plan (Schedule 5.1) but also identified as *high potential mineral aggregate resource* in Schedule 5.2.1. Since the Site is recognized in the Official Plan for both the County and the Township as a future aggregate resource, an Official Plan Amendment will not be required by the County or the Township.

Most of the Site is zoned Greenlands (GL) in the Township of Severn Zoning Bylaw No. 2010-65, with the exception of the southeast corner which is zoned Environmental Protection (EP) because of the presence of a Provincially Significant Wetland (PSW) known as the Grass Lake Wetland. The table below summaries the zoning designation for each lot on the Site as wells as their respective uses.

Location	Zone	Use
Lot 12 West Half of Concession 11 (southeast portion)	Environmental Protection	Wetland
Lot 12 West Half of Concession 11 (northwest and central portion)	Greenlands	Woodlands
Lot 13 West Half of Concession 11	Greenlands	Farming, Forestry
Lot 14 West Half of Concession 11	Greenlands	Farming, Forestry, Woodlands

In order to make the Site available for aggregate extraction as a licensed quarry, a Zoning By-law Amendment from the Township of Severn will be required. The Site is proposed to be Zoned Extractive Industrial (M3), which is consistent with neighbouring land uses.

There is a Class A quarry (Severn Pines Quarry) west of the Site, operated by Walker Aggregates Inc. and there is a Class A pit and quarry (Seyler Pit/Quarry) east of the Site currently owned by Dufferin (previously owned by Beamish/Royal). These existing licenses show that aggregate extraction is already an established use in the area.

3.1 Variations to the Operational Standards

Variations to the Operational Standards will be required on the site plan and have been identified on Table 4 of the Operation Plan (Sheet 2 of 8). The following provides justification for each variance of the Operational Standard.

Operational Standard 5.13 - Aggregate Stockpiles

Variance	Justification
Stockpiles of aggregate and/or topsoil and/or overburden will be located closer than 30 meters from the licensed boundary in the processing/shipping/recycling area.	Lands to the south and the west of the processing/shipping/recycling area (Phase 1a) are controlled by a neighbouring quarry operator and there are no sensitive receptors (i.e. residential land uses) nearby.

Operational Standard 5.1 - Fencing

Variance	Justification
The limit of extraction adjacent to the PSW in the south east corner of the Site will be delineated with marker posts and siltation controls.	The PSW is heavily wooded swamp lands which impedes access to the quarry. Construction of fencing would be considered a disturbance to the PSW.
The north and north east licensed boundaries will not be fenced but will be demarcated with marker posts.	The lands to the north are vacant swamp lands owned by the County of Simcoe, which impedes access to the quarry. The lands to the northeast are privately owned and heavily wooded, which impede access to the quarry with no sensitive receptors (i.e. residents) nearby.

Operational Standard 5.10 - Setbacks

Variance	Justification
The setback along the east Site boundary in Lot 13, adjacent to the existing Seyler Pit/Quarry (Beamish/Dufferin) will be reduced to 0 meters.	There will be a common boundary agreement between the two quarries, which will be filed with the MNRF.

The setback along the north boundary will be reduced to 0 meters.	In lieu of a 15m setback, a 90 m buffer is included to allow for the construction of a tree nursery and a habitat linkage connecting the north outlet to the new water channel.
The setback along the west Site boundary will be reduced to 0 meters.	Abuts an unopened road allowance patented to the Township of Severn, which is inaccessible due to extreme topography. A boundary agreement between the parties will be filed with the MNRF. As the resource is extracted in each stage along the westerly boundary of the proposed quarry, progressive rehabilitation will include backfilling to create 2:1 slopes down to the quarry floor.

Operational Standard 5.9 - Scrap

Variance	**Justification**
Scrap will be stored closer than 30 meters to the licensed boundary in the processing/shipping/recycling area.	Lands to the south and the west of the processing/shipping/recycling area (Phase 1a) are controlled by a neighbouring quarry operator and there are no sensitive receptors (i.e. residential land uses) nearby.

Operational Standard 5.11 - Excavation within Setbacks

Variance	**Justification**
Excavation in the 30 meter residential setback along the east boundary.	Excavation will be required to properly construct Settling Pond 2 so that its outlet is an elevation below 216masl.

Operational Standard 5.19 - Sloping Of Excavation Faces

Variance	**Justification**
Vertical faces will be included in the final rehabilitation of the west boundary in Phase 3B only (see detail B on Sheet 4 of the Site Plans).	In combination with sloping, a portion of the quarry face will remain vertical so that hibernacula can be included in the rehabilitation plan for the length of 300 m Phase 3B only.

4.0 AGRICULTURAL CLASSIFICATION OF THE PROPOSED SITE

As per Standard 2.1.2, the agricultural classification of the Site must be determined using the Canada Land Inventory classes. For the lands being returned to agriculture, the proposed rehabilitation techniques must be identified.

MTE understands that portions of the Site were used by homesteaders for agricultural purposes in the mid-1800s through until the first half of the 1900s. Until recently, agricultural uses were abandoned. However, the current land owner is restoring Lot 13 and Lot 14 to farmland so that it can be used while quarry activities occur in the southern portion of the Site.

The Site is not considered a prime agricultural area and does not contain prime agricultural land. The Site is mapped as Class 0, Class 4 and 6 agricultural lands with the majority of the Site designated as Class 6 (see **Figure 4**). As such, the Site does not consist of prime agricultural lands and is not within a prime agricultural area.

Despite a Class 6 designation, the northern half of the Site will be rehabilitated to an agricultural use, while the southern half of the Site will be rehabilitated to an ecological diverse terrain including forest blocks, open field meadows, swamps, and marshland. These uses will reinstate the variety of plant and wildlife habitat currently present. The layout will connect the forest to the east with forest pockets to the west, providing a wildlife corridor across the property. Aquatic habitat will be reinstated through the creation of a new drainage channel on the quarry floor.

5.0 QUALITY AND QUANTITY OF AGGREGATE ON-SITE

Standard 2.1.3 requires that the quality and quantity of aggregate on Site be described in the Summary Statement report. The presence of active quarries to the east (Seyler Pit/Quarry) and west (Severn Pines Quarry) of the Site indicates that there is a viable aggregate deposit on-Site of sufficient quality to meet market requirements. These quarries are extracting limestone and dolostone found in the Bobcaygeon and Gull River Formations which represents high quality aggregate that can be used for road and construction projects (**Figure 5**).

The quantity of aggregate was determined using geology information from boreholes drilled on Site. This information was used to determine the thickness of the reserve so that tonnage calculations could be done for the Site. The results of the tonnage calculation are shown in **Table 1** (attached). The Site contains almost 40 million tonnes of proven high quality aggregate. With an annual tonnage limit of 500,000 tonnes, this volume represents almost 80 years of aggregate reserve.

6.0 MAIN HAULAGE ROUTES

As per Standard 2.1.4 the main haulage routes and proposed truck traffic to and from the Site, and necessary entrance permits have been identified.

The market area for trucks leaving the proposed quarry will be primarily the northern GTA including:

- York Region; and
- Peel Region.

Some product will also be destined for locations in Simcoe County including:

- Orillia; and
- Barrie.

A smaller percentage may be shipped to locations in Muskoka including:

- Gravenhurst;
- Bracebridge; and
- Huntsville.

As per the Traffic Study, the proposed quarry will have access to Nichols Line, which is a designated major haul route. The proposed quarry will have one entrance and one exit onto Nichols Line, which provides direct access to Highway 11. To access the proposed quarry, Nichols Line will require an approval from the Township of Severn to reconstruct and extend it about 800 meters along the existing unopened road allowance.

Access to and from Highway 11 is restricted to the southbound lanes as there is no interchange at this location. For product being shipped south, loaded trucks will take Nichols Line to Highway 11 and then proceed south on Highway 11. Empty trucks returning northbound to the Site would exit Highway 11 as South Sparrow Lake Road, cross over the highway to access the southbound lanes and then proceed south to the Nichols Line exit. Trucks shipping product northward would take Highway 11 south to the New Brailey Line/ Bayou Road exit and then cross over the highway to access the northbound lanes. Southbound returning empty trucks would just exit at the Nichols Line.

The Traffic Study concluded that the additional traffic from the proposed quarry will have virtually no impact on the traffic conditions for Highway 11. The proposed hours for shipping are:

- 6:00 am to 6:00 pm, Monday to Friday.
- 6:00 am to 12:00 pm on Saturdays.
- After hours loading and shipping may occur at the request of the Province of Ontario.

7.0 PROGRESSIVE AND FINAL REHABILITATION

As per Standard 2.1.5, the proposed rehabilitation plan was designed with regard for adjacent land uses.

The ARA Site Plans show that the Site will be progressively rehabilitated as extraction occurs. The rehabilitation plan includes ecological enhancements with the goal of creating a natural heritage feature consisting of forest blocks, open field meadows, swamps, marshland, and aquatic habitat in the south portion of the Site. The north portion of the Site will be rehabilitated to an agricultural use.

The final landform will include stabilized slopes, revegetated surfaces, as well as shallow aquatic habitat. The rehabilitation plan for the Site includes revegetating the south portion of the Site with native grasses, replanting portions of the Site with native trees to create a forested corridor, and connecting the new drainage channel to the north inlet to allow for fish migration from the southeast portion of the Site to the north portion. In the south-central portion of the Site, an 8.0 ha wetland will be created having irregular, vegetated shorelines which will provide for a variety of habitats. The final landform will be self-sustaining and will be compatible with surrounding natural heritage features such as Grass Lake Wetland.

8.0 TECHNICAL REPORTS

As per Standard 2.2, technical reports were completed in support of the application to ensure that the proposed quarry is properly designed such that potential environmental impacts are avoided or mitigated. Two copies of each report are included in the application package. Each technical report has been prepared by a person with appropriate training and/or experience.

The technical documents submitted in support of the application include:

1. Level 1 and 2 Hydrogeological Investigation completed by MTE Consultants Inc.;
2. Level 1 and 2 Natural Environment Report completed by Niblett Environmental Associates Inc.;
3. Stage 1, 2 and 3 Archaeological Assessment completed by Kinickinick Heritage Consultants;
4. Noise Impact Analysis completed by Valcoustics Canada Ltd.;
5. Blast Impact Analysis completed by Explotech Engineering Ltd. and
6. Traffic Impact Review completed by Skelton Brumwell & Associates Inc.

The following sections provide a brief description of the purpose and results of each report and describe how they were used to create the final design for Cumberland Quarry Site Plans.

8.1 Hydrogeological Investigation

"Level 1 and 2 Hydrogeological Investigation" by MTE Consultants Inc., dated November 28, 2014.

As per Standard 2.2.1 and 2.2.2, this investigation was used to assess the final extraction elevation relative to the established groundwater table, and assess the potential impact to groundwater and surface water resources and their uses. Mitigation measures were recommended where required. The investigation identified and described any of the following features found within the study area as defined by the Hydrogeology Investigation:

- Water wells;
- Springs;
- Groundwater aquifers;
- Surface watercourses and bodies;
- Discharge to surface water; and
- Proposed water diversion, storage, and drainage facilities on Site.

Groundwater
To describe the geology and groundwater aquifers under the Site, the Hydrogeology Investigation included 29 groundwater monitoring wells installed in three bedrock formations including:

- Bobcaygeon Formation (limestone bedrock);
- Gull River Formation (limestone and dolostone bedrock); and
- Shadow Lake Formation (shale bedrock).

Groundwater monitoring using the 29 groundwater monitoring wells is on-going so that a robust database is created showing baseline groundwater fluctuations. Groundwater data has been collected since 2007.

Based on the Level 1 and 2 Hydrogeological Investigation, the established groundwater table within the shallow bedrock of the Gull River Formation varies from an elevation of 238.58 meters Above Mean Seal-Level (mAMSL) in the northwest corner of the Site to an elevation of 214.97 mAMSL in the southeast corner of the Site. As the quarry develops, the water table will be lowered to an elevation coincident with the quarry floor, 216 mASML on average. This drawdown will result in a Zone of Influence (ZOI) around the quarry.

The Level 1 and 2 Hydrogeological Investigation utilized Feeflow groundwater modelling software to predict the size of the ZOI during different phases of the proposed quarry. Feeflow is a computer modelling tool that uses mathematical equations to represent natural groundwater flow in the environment. Feeflow can predict changes to groundwater patterns caused by the development of a quarry.

The natural groundwater flow was replicated in the groundwater model by incorporating site-specific groundwater data collected in the field. Once the natural state was replicated, hypothetical scenarios were developed for the different phases of the quarry. The ZOI for each phase was assessed to understand potential impact on groundwater and surface water resources.

The numerical groundwater flow modelling predicted measureable (up to 1 m) drawdown up to 2,000 metres from the northwestern face and 800 m from the northeastern Site boundary. Based on the results of the groundwater modelling, mitigation measures were included on the Site plans to help protect existing private well users and natural features. Mitigation measures included:

- Limits on the size of the disturbed area (25 Ha, on average);
- Groundwater monitoring on-Site;
- Monitoring water levels in private wells through the Private Well Monitoring Program;
- Development of a Private Well Interference Complaint Procedure; and
- Inclusion of a 90 metre buffer at the north end of the Site.

To ensure groundwater quality is not affected by the proposed quarry, the Level 1 and 2 Hydrogeological Investigation recommended that a Spills Contingency Plan will be in place prior to Site preparation.

Surface Water

The Hydrogeological Investigation identified surface water features on and within 120 m of the Site. These surface water features included:

- A small portion of a Provincially Significant Wetland known as the Grass Lake Wetland, which crosses the southeast corner of the Site;
- Two unevaluated wetlands in the central and north portions of the Site; and
- Two intermittent watercourses that flow when there is sufficient precipitation and meltwater to sustain flow:
    - Watercourse 1 runs through the northern and central portions of the Site and it also receives and conveys water from the Severn Pines Quarry.
    - Watercourse 2 drains the southern portion of the Site.

Sixteen (16) surface water stations were established on the Site in 2014 to measure surface water flow and chemistry. Through this portion of the Hydrogeological Investigation, it was found that surface water mixes with groundwater at all discharge points, including Watercourse 1 and Watercourse 2.

On-Site surface water monitoring is ongoing. The results of the surface water monitoring program will be used to ensure surface water flow during extraction and post extraction to the Grass Lake Wetland continues in manner that mimics pre-quarry conditions.

Water Management

The Level 1 and 2 Hydrogeological Investigation recommended that water leaving the Site be managed using settling ponds. As such, two settling ponds are included on the Site Plans – one in Phase 1B and another in Phase 2. These ponds will be used to protect surrounding water resources and will require an Environmental Compliance Approval from the Ministry of the Environmental and Climate Change (MOECC). The final design and associated monitoring will be in accordance with these approvals, which will be obtained before extraction commences in Phase 1b for Settling Pond 1 and Phase 2 for Settling Pond 2.

A surface water monitoring program will be used to ensure surface water drainage to the Grass Lake Wetland continues during extraction. The results of this program will also be used to design a new drainage channel.

To ensure the Grass Lake Wetland is not impacted by silt during the development of the quarry, a sediment and erosion control plan will be designed and implemented prior to extraction.

A wash plant will be established in Phase 1A (the processing/shipping/recycling area). A PTTW from the MOECC will be required for utilizing ground and/or surface water for the wash plant.

8.2 Natural Environment Report

Natural Environment Level 1 & Level 2 Technical Report by Niblett Environmental Associates Inc., dated December, 2017.

As per Standard 2.2.3 and 2.2.4, the Level 1 Natural Environment Report was used to determine whether any of the following features exist on and within 120 metres of the Site:

- Significant wetlands;
- Significant portions of habitat for endangered or threatened species;
- Fish habitat;
- Significant woodlands;
- Significant valley lands;
- Significant wildlife habitat; and
- Significant areas of natural and scientific interest.

Where the Level 1 report identified any features on and within 120 metres of the Site, the subsequent Level 2 Natural Environment Report was used to assess the impact of the operation on the natural features and ecological functions, and recommend preventative, mitigation or remedial measures.

Grass Lake Wetland

A small portion of the Grass Lake Wetland crosses the southeast corner of the Site. A 30 m setback has been incorporated into the Site Plans, as well as recommendations for rehabilitation and monitoring, to ensure this feature remains outside the proposed extraction area. The Level 1 and 2 Natural Environment Report has assessed this portion of the Grass Lake Wetland and concluded that the quarry will have no negative impacts on the wetland provided the recommended mitigation measures are implemented (i.e. a 30 m setback).

Habitat for Species at Risk

The Site provides suitable habitat for some Species at Risk. Habitat for Species at Risk is also found on adjacent lands (i.e. the Grass Lake Wetland and the swamp to the north identified as the "Beaver Pond" in the Level 1 and 2 Natural Environment Report). The Level 1 and 2 Natural Environment Report assessed the habitat for each of these species and concluded that the quarry will not have a long term impact on the identified Species at Risk and other natural features identified, provided the compensation measures, mitigation measures and recommendations are followed. To protect any Species at Risk identified on the Site, a Species at Risk Plan will be developed and submitted in support of an application for an Overall Benefit Permit from the Ministry of Natural Resources and Forestry (MNRF) prior to extraction commencing.

Rare Vegetation Species

Four (4) Category 2 (retainable) Butternut trees were found on the Site. An additional nine (9) trees were found within 120 m of the Site. Prior to extraction occurring where the Butternut trees are found, a Notice of Butternut Impact Form under the Endangered Species Act will be submitted to the MNRF to permit the replacement/compensation of these trees.

There are also eight (8) regionally rare vegetation species found on-Site. A professional biologist will develop a Vegetation Salvage Plan to transplant and relocated any rare vegetation species. The Vegetation Salvage Plan will require approval from the MNRF prior to extraction proceeding.

Significant Wildlife Habitat

There are small unevaluated wetlands on the Site and surrounding the Site. Grass Lake Wetland crosses the southeast corner of the Site and there is a swamp wetland north of the Site referred to as the "Beaver Pond" in the Level 1 and 2 Natural Environment Report. Significant wildlife habitat exists on-Site, in the Grass Lake Wetland, and in the Beaver Pond. The presence of significant wildlife habitat is primarily a result of the large continuous forest and wetland areas in this part of the Township where few roads are present.

The Site will be appropriately designed, buffered and/or separated from sensitive land uses to minimize impacts. For example, the Grass Lake Wetland will be protected using a 30 m setback and the wetland to the north will be protected using a 90 m buffer.

In order to develop a quarry on-Site, significant wildlife habitat will be removed and then re-established. The Level 1 and 2 Natural Environment Report demonstrates that there will be no negative impact to natural features or their ecological function due to mitigation measures included in the Operational Plan and the commitment to progressively rehabilitate.

The Operational Plan for the Site includes nine (9) phases comprised of 14 operational stages which will include progressive rehabilitation and limiting the disturbed area in each phase to approximately 25 ha on average. The progressive rehabilitation plan will limit the amount of mature forest cut at any one time and includes replanting forests, wetland creation, and creating open field meadows. This diversity of habitats will re-establish significant wildlife habitat on-Site. Other notable mitigation measures include clearing vegetation outside the peak breeding bird season (April 15th - August 15th).

Fish and Fish Habitat

Two (2) surface water courses (identified as Watercourse 1 and Watercourse 2 in the Level 1 and 2 Hydrogeological Report) drain across the Site into the Grass Lake Wetland. Fish and fish habitat exists in both water courses. The rehabilitation plan includes the creation of a new drainage channel with the same ecological and fish habitat functions as Watercourse 1. Enhanced functions will be included in the design, such as the creation of a habitat linkage that will connect the new drainage channel to the north inlet, overwintering habitat, enhanced cover and in-stream habitat structure complexity. Before making the switch from Watercourse 1 to the new drainage channel, a Fish Salvage Plan will be submitted in support of an application for a Fish Collection Permit from the MNRF. The final design for the new drainage channel will be provided to MNRF before extraction commences in Phase 2.

Detailed monitoring

A monitoring program will be used to mitigate potential impacts due to the development of a quarry on-Site. The monitoring program will be developed by a professional biologist and include the collection of information on Species at Risk and regionally rare plants prior to extraction in each phase. Monitoring will also include Species at Risk training to quarry staff and details on signage to be posted at suitable locations to identify Species at Risk habitat.

8.3 Archaeological/Heritage Assessment Report

Stage 1, 2 and 3 Archaeological Assessments by Kinickinick Heritage Consultants, dated May 2008.

As per Standard 2.2.5, 2.2.6, and 2.2.7, the Stage 1, 2 and 3 Archaeological Assessments were used to determine if any known or potential significant archaeological resources were on-Site. In Stage 2, the Site is surveyed by a licensed archaeologist if Stage 1 identifies heritage resources or the potential for heritage resources. In Stages 3 and 4, a detailed investigation by a licensed archaeologist is completed using a combination of test pits, plowing fields and survey, as well as mitigation through excavation, documentation or avoidance. The Stage 3 Archaeological Assessment found that Stage 4 review was not applicable for this Site.
The Stage 3 Archaeological Assessment report was submitted to Ministry of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. On January 14, 2014 a letter was issued by the Ministry of Tourism, Culture and Sport indicating that the ministry is satisfied with the fieldwork and reporting for the archaeological assessment completed and that the report was entered into the Ontario Public Register of Archaeological Reports.

8.4 Noise Assessment

Noise Impact Analysis by Valcoustics Canada Ltd., dated September 14, 2017

Standard 2.2.8 requires a noise assessment report be completed if extraction and/or processing facilities will be within 500 meters of a noise receptor (i.e. a residence). The closest residence to the Site is located at 2670 South Sparrow Lake Road, a distance of 178 m from the Site (**Figure 6**). As such, a Noise Impact Analysis was completed to identify receptors, determine the expected sound exposure levels during the operation of the quarry at these receptors; and provide mitigation measures so that noise guidelines from the Ministry of the Environment and Climate Change (MOECC) can be satisfactorily met.

This noise impact analysis only evaluates the potential noise impacts from the steady noise sources operating on-Site and does not evaluate the noise and vibration from blasting. Blasting has been addressed using a Blast Impact Analysis (see **Section 8.5**). The noise impact analysis considered noise from:

- Front End loaders;
- Rock drills;
- Excavators;
- Dedicator Haul Trucks;
- A permanent processing plant; and
- Shipping Trucks

The Noise Impact Analysis presented the results of sound exposure at five residential receptors located 178 m (R1), 600 m (R2), 800 m (R3), 1.3 km (R4) and 7.80 m (R5)

away for the Site. To assess the noise impact at the receptors, a 3-D acoustical model of the proposed quarry operations was developed using MOECC accepted software known as CadnaA Version 4.6 environmental noise modelling software.

The results of the modelling found that some of the sound exposures required mitigation to meet the MOECC noise guideline limits. The following mitigation measures have been incorporated into the design for the quarry:

- Noise attenuation barriers;
- Sound emission measurements of equipment used on-Site;
- Placement of stockpiles around the location of the processing plant;
- Work timing restrictions; and
- Off-site noise audit measurements.

The Noise Impact Analysis found that sound exposure will be in compliance with noise limits set by the MOECC provided these mitigation measures are implemented.

8.5 Blast Impact Analysis

Blast Impact Analysis by Explotech, dated November 1, 2017

Standard 2.2.9 requires a blast design report be completed if a sensitive receptor is within 500 meters of the limit(s) of extraction. The resident at 2670 South Sparrow Lake Road (R1) is located a distance of 178 m from the Site. A blast impact analysis was completed to identify blast receptors nearest the Site, determine the vibration and sound exposure levels during a blast at these receptors; and provide mitigation measures so that the MOECC's guidelines for noise and vibration can be met. The report also done ensures no possibility of damage to any buildings, structures or residences surrounding the Site as a result of the proposed blasting.

The Blast Impact Analysis calculated vibration and overpressure exposure related to blasts on the Site at the five residential receptors (R1-R5) and the TransCanada Pipeline, which is located 320 m from the southeast corner of the Site. The analysis also considered revisions that may be required to the blast design if blasts occurred during active spawning season of fish.

The results of the calculation were compared to the MOECC's guidelines for blasting in quarries, which are among the most stringent in North America. The limits specified by the Department of Fisheries and Oceans were also used when considering blasts during the active spawning season of fish. The most common and accepted formulas were used to predict vibration and overpressure levels. The results of the calculations found that vibration and overpressure were well below the MOECC's limits at all receptors.

To ensure that blasting operations in all phases of the proposed quarry will be carried out in a safe and productive manner and there is no possibility of damage to any

buildings or residences surrounding the Site, the following recommendations were made:

- Completion of an attenuation study during the first 12 months of operation to obtain data to confirm the results of the blast impact analysis and develop future blasts;
- Monitoring for vibration and overpressure as the residential closest receptor;
- Monitoring vibration at the water's edge adjacent to the spawning bed during blasts that occur during the active spawning season;
- Monitoring for vibration at the closest portion of the TransCanada pipeline if vibration levels exceed 2/3 of the applicable limit;
- Design blasts so that the direction of flyrock is away from structures as much as possible; and
- Maintain detailed blast records in accordance with MOECC's Standards.

In addition to these recommendations, notes were added to the Site Plans to comply with the following Standards for Category 2 Licenses:

- Standard 3.10 - The licensee will monitor all blasts for ground vibrations and blast overpressure and will operate to ensure compliance with current provincial guidelines.
- Standard 3.11 - Blasting will not occur on a holiday or between the hours of 6 p.m. on any day and 8 a.m. on the following day.
- Standard 3.12 - All blast monitoring reports must be retained by the licensee and made available upon request by the Ministry of Natural Resources for audit purposes.

The Blast Impact Analysis report concluded that the Operational Plan for the proposed quarry can be carried out safely and within the MOECC's guidelines.

8.6 Traffic Study

Traffic Impact Review by Skelton Brumwell & Associates Inc. dated February 2015.

Standard 2.1.4 requires that the main haulage routes and proposed truck traffic to and from the Site be provided in the Summary Statement report. A traffic study was completed to assess the impact of Site generated traffic on historical traffic volumes on local roads and highways.

The traffic study considered the impact of the proposed quarry on Nichols Line and Highway 11 using data obtained from the Ministry of Transportation.

The Traffic Study reported that Nichols Line is designated as a major haul route, which was approved by the Township of Severn in 2008. As part of the approval, improvements were made to the road to accommodate heavy truck traffic from the Severn Pines Quarry and MAQ Aggregates quarry (on Brennan Line). The Traffic

report states that it will be structurally adequate to carry the additional traffic from the Cumberland Quarry.

There are only five (5) residences on Nichols Line and the majority of annual traffic will be generated by the Severn Pines and MAQ quarries. At the maximum tonnage for the proposed quarry, the Site could generate up to 183 trips per day from May to November. The Traffic Report estimated that this volume could result in an average hourly volume of up to 15 trips per hour (8 in / 8 out).

To access the propose quarry, Nichols Line will be extended about 800 meters northward along the existing unopened road allowance. The total distance from the quarry entrance to Highway 11 is approximately 3.1 km.

The Traffic Study concluded that the additional traffic from the proposed quarry will have virtually no impact on the traffic conditions for Highway 11.

9.0 SUMMARY

The Site contains a viable aggregate deposit that is designated as a future resource in the Official Plan for the County of Simcoe. This resource can be extracted without impacting groundwater or surface water resources and their uses.

Significant habitats identified on-Site will be reestablished with a natural heritage feature through progressive rehabilitation.

There are no prime agricultural resources or incompatible land uses that would preclude extraction on the Site.

Noise levels will be maintained within acceptable levels utilizing noise barriers (as required).

Blasting will be carried out safely and within the MOECC's guidelines for vibration and overpressure.

Nichols Line is an existing designated haul route and the additional truck traffic from the Site will have virtually no impact on the existing/future traffic conditions for Highway 11.

The final rehabilitated landform will include an enhanced natural heritage feature that is compatible with surrounding land uses.

Should you have any questions or concerns, please do not hesitate to contact us.

Respectfully submitted,

MTE CONSULTANTS INC.

Jay Flanagan, B.E.S.
Manager, Aggregate Resources

JBF:scp

10.0 REFERENCES

Corporation of the Township of Severn. Official Plan. Adopted by Council on July 7, 2005 by By-Law 2005-90. Approved by the County of Simcoe on April 25, 2006. Approved by the Ontario Municipal Board on June 11, 2010. Official Consolidation September 2010.

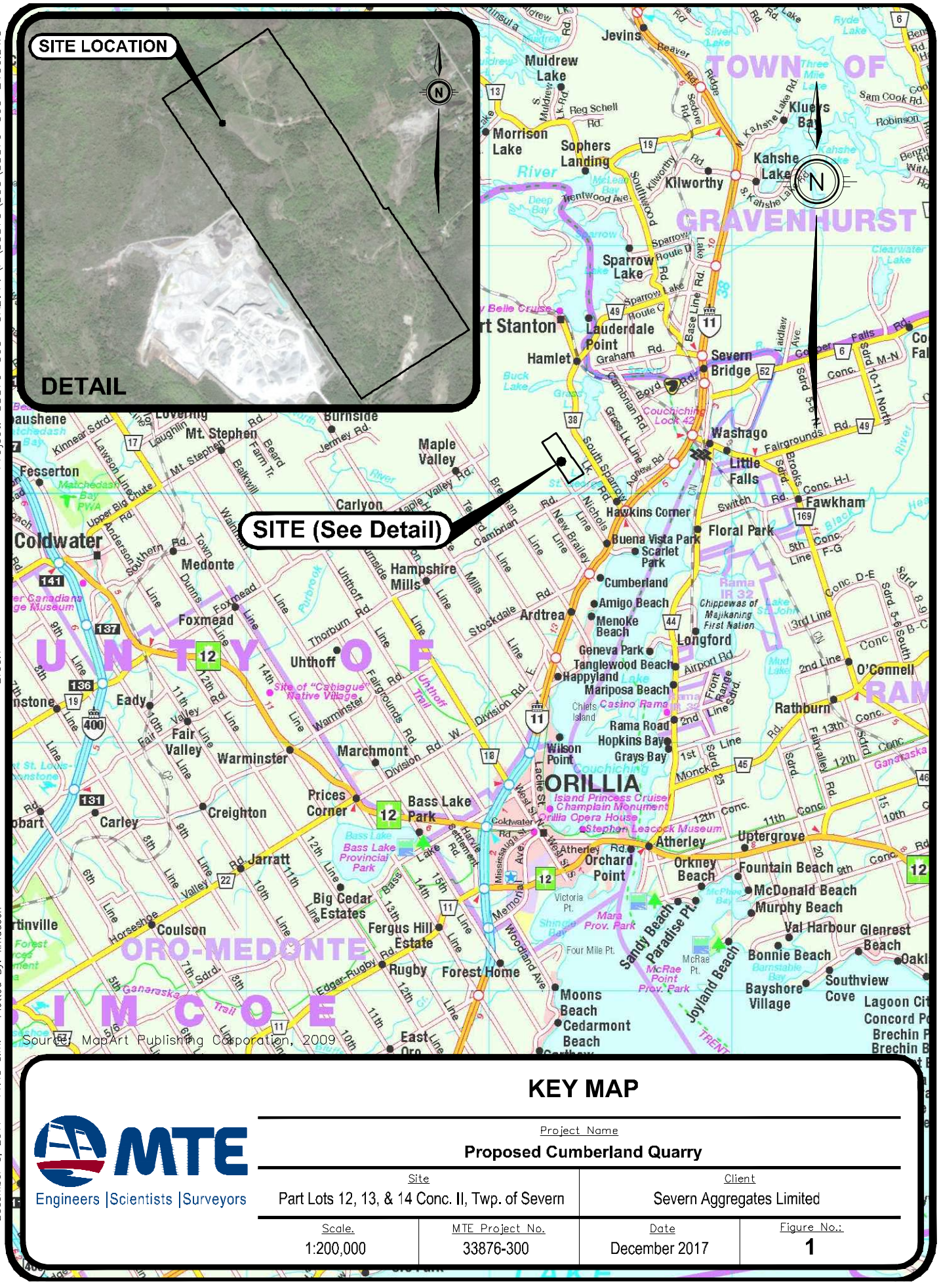
County of Simcoe. Official Plan. Adopted November 25, 2008. Proposed Modifications January 22, 2013. Approved as of December 29, 2016 by the Ontario Municipal Board File No. PL091167.

Ontario Soil Survey, 1967. Lake Simcoe, Ontario, Canada Land Inventory, Soil Capability for Agriculture. Map 31D, scale 1250,000.

Rowell, D.J. 2013. Aggregate Resources Inventory of the County of Simcoe, Southern Ontario; Ontario Geological Survey, Aggregate Resources Inventory Paper 188, 94p.

Corporation of the Township of Severn. Comprehensive Zoning By-Law no. 2010-65. August 5, 2010. Prepared by Planscape 104 Kimberly Ave. Bracebridge, ON. Updated to include all amendments to the By-Law passed by Council and/or the Ontario Municipal Board from August 5, 2010 to April 5, 2012.

FIGURES



KEY MAP

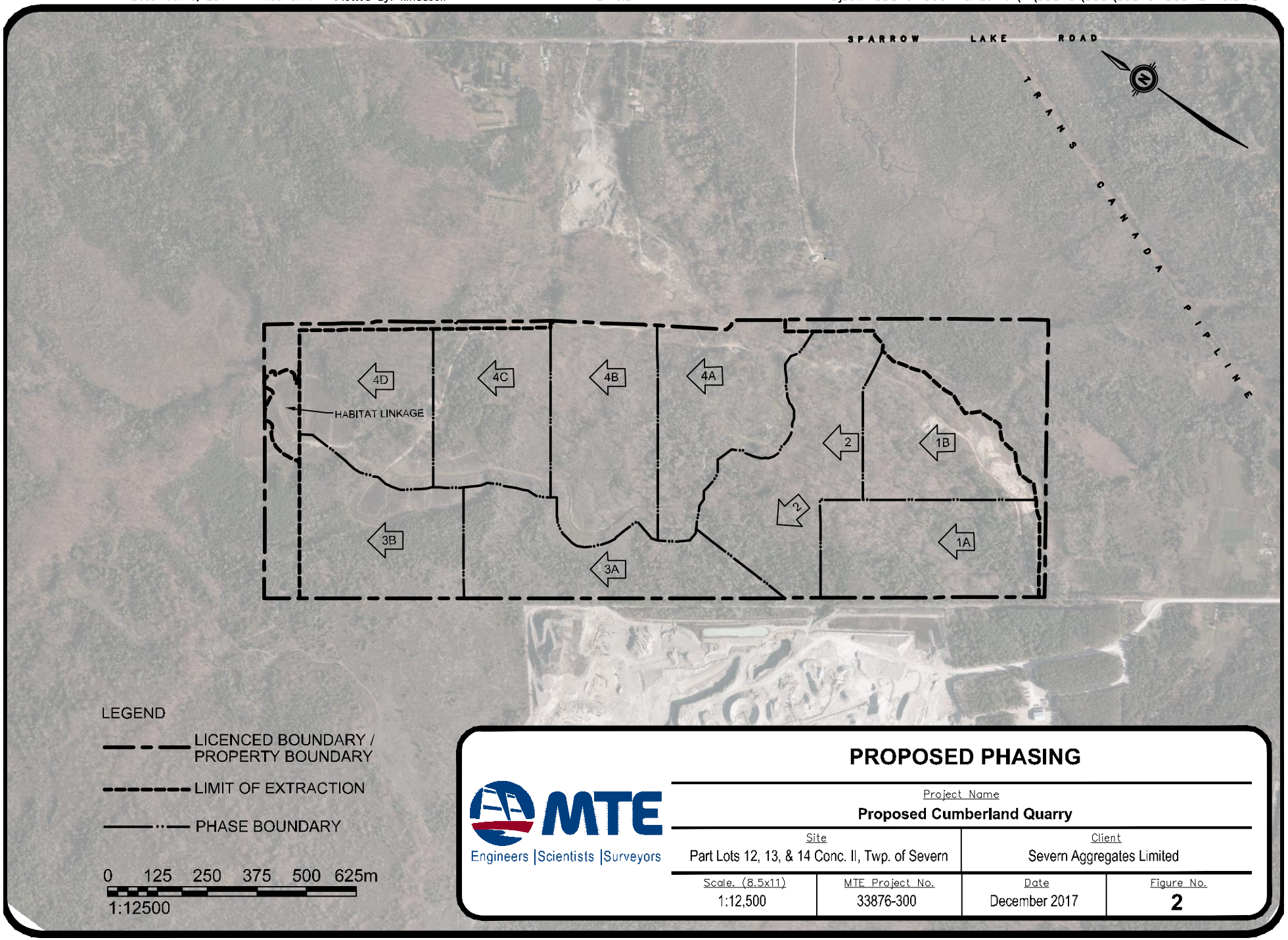
MTE
Engineers | Scientists | Surveyors

Project Name
Proposed Cumberland Quarry

Site	Client
Part Lots 12, 13, & 14 Conc. II, Twp. of Severn	Severn Aggregates Limited

Scale.	MTE Project No.	Date	Figure No.:
1:200,000	33876-300	December 2017	1

December 6, 2017 — 11:45 a.m. — Plotted By: kmadsen
Project: 33876-300 CAD: P:\33876\300\33876-300-EV90.DWG
EV90.1

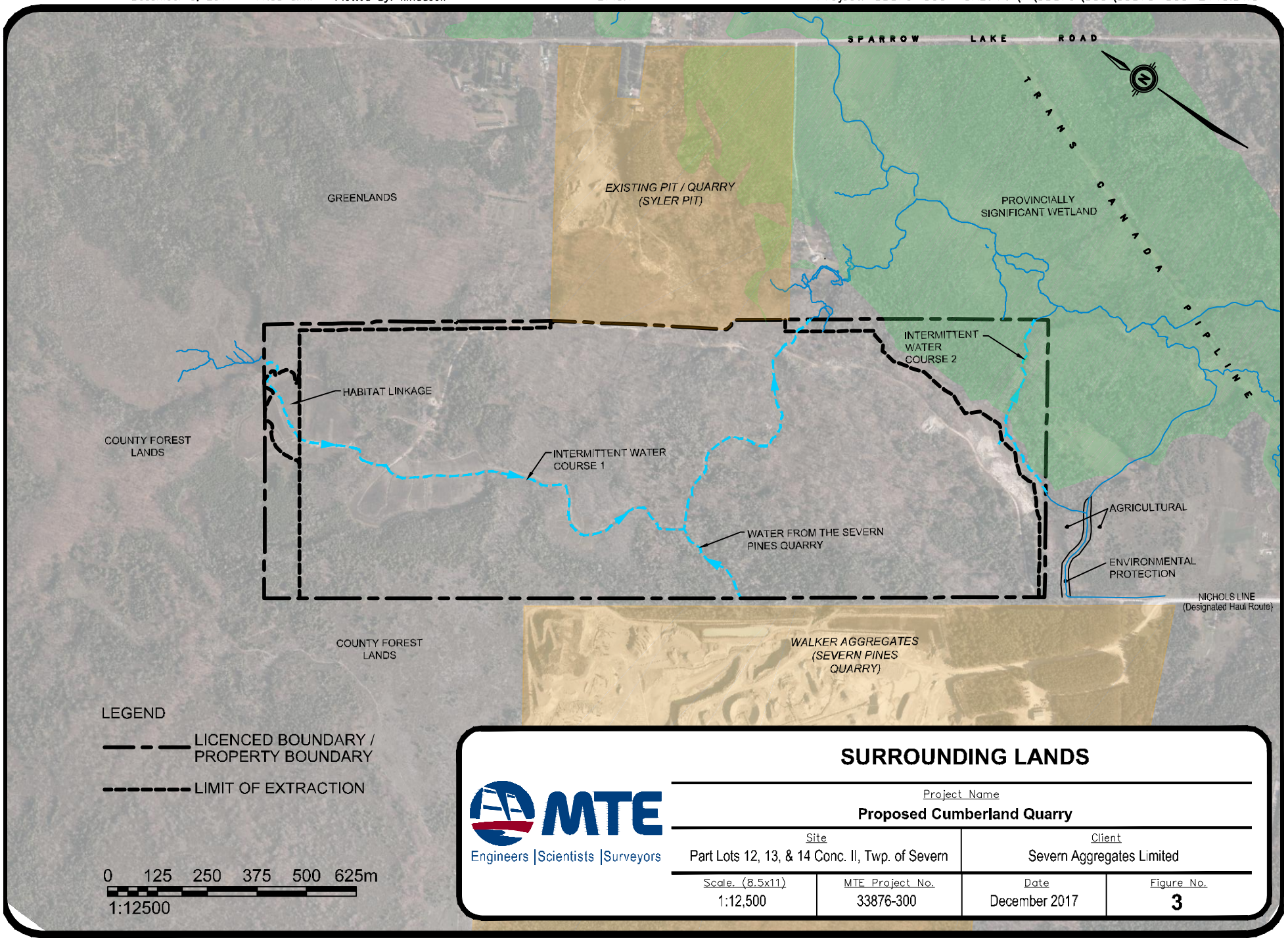


PROPOSED PHASING

MTE Engineers | Scientists | Surveyors

Project Name	
Proposed Cumberland Quarry	
Site: Part Lots 12, 13, & 14 Conc. II, Twp. of Severn	Client: Severn Aggregates Limited

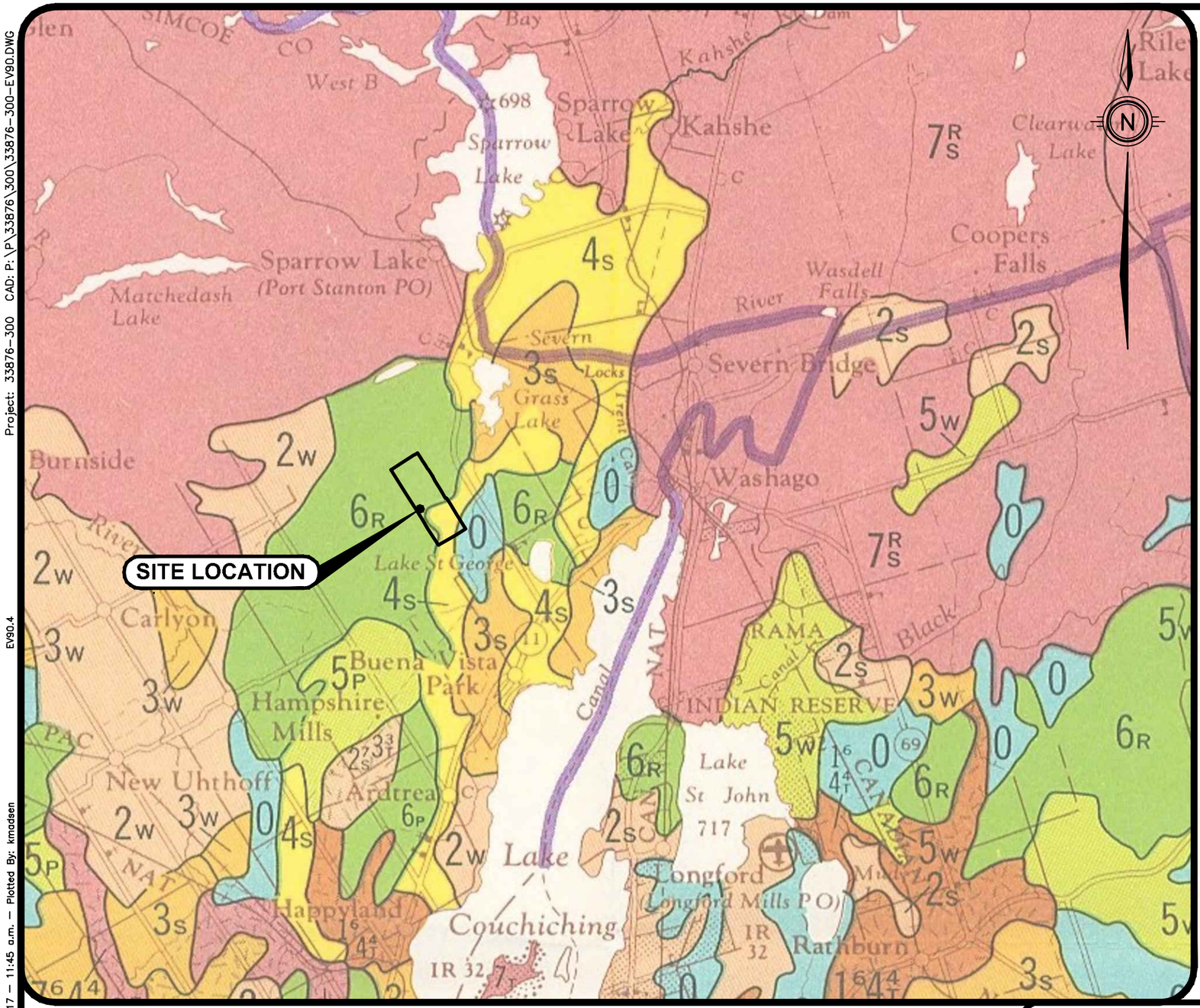
Scale. (8.5x11)	MTE Project No.	Date	Figure No.
1:12,500	33876-300	December 2017	2



MTE Engineers | Scientists | Surveyors

SURROUNDING LANDS

Project Name			
Proposed Cumberland Quarry			
Site: Part Lots 12, 13, & 14 Conc. II, Twp. of Severn		Client: Severn Aggregates Limited	
Scale. (8.5x11): 1:12,500	MTE Project No.: 33876-300	Date: December 2017	Figure No.: 3



Reference: Ontario Soil Survey, 1967. Lake Simcoe, Ontario, Canada Land Inventory, Soil Capability for Agriculture. Map 31D, scale 1250,000.

DESCRIPTIVE LEGEND

In this classification the mineral soils are grouped into seven classes on the basis of soil survey information. Soils in classes 1, 2, 3 and 4 are considered capable of sustained use for cultivated field crops, those in classes 5 and 6 only for perennial forage crops and those in class 7 for neither.

Some of the important factors on which the classification is based are:

- The soils will be well managed and cropped, under a largely mechanized system.
- land requiring improvements, including clearing, that can be made economically by the farmer himself, is classed according to its limitations or hazards in use after the improvements have been made. land requiring improvements beyond the means of the farmer himself is classed according to its present condition.
- The following are not considered: distances to market, kind of roads, location, size of farms, type of ownership, cultural patterns, skill or resources of individual operators, and hazard of crop damage by storms.

The classification does not include capability of soils for trees, tree fruits, small fruits, ornamental plants, recreation, or wildlife.

The classes are based on intensity, rather than kind, of their limitations for agriculture. Each class includes many kinds of soil, and many of the soils in any class require unlike management and treatment.

CLASS 1 SOILS IN THIS CLASS HAVE NO SIGNIFICANT LIMITATIONS IN USE FOR CROPS.

The soils are deep, are well to imperfectly drained, hold moisture well, and in the virgin state were well supplied with plant nutrients. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for a wide range of field crops.

CLASS 2 SOILS IN THIS CLASS HAVE MODERATE LIMITATIONS THAT RESTRICT THE RANGE OF CROPS OR REQUIRE MODERATE CONSERVATION PRACTICES.

The soils are deep and hold moisture well. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a fairly wide range of crops.

CLASS 3 SOILS IN THIS CLASS HAVE MODERATELY SEVERE LIMITATIONS THAT RESTRICT THE RANGE OF CROPS OR REQUIRE SPECIAL CONSERVATION PRACTICES.

The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management they are fair to moderately high in productivity for a fair range of crops.

CLASS 4 SOILS IN THIS CLASS HAVE SEVERE LIMITATIONS THAT RESTRICT THE RANGE OF CROPS OR REQUIRE SPECIAL CONSERVATION PRACTICES, OR BOTH.

The limitations seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.

CLASS 5 SOILS IN THIS CLASS HAVE VERY SEVERE LIMITATIONS THAT RESTRICT THEIR CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS, AND IMPROVEMENT PRACTICES ARE FEASIBLE.

The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants, and may be improved by use of farm machinery. The improvement practices may include clearing of bush, cultivation, seeding, fertilizing, or water control.

CLASS 6 SOILS IN THIS CLASS ARE CAPABLE ONLY OF PRODUCING PERENNIAL FORAGE CROPS, AND IMPROVEMENT PRACTICES ARE NOT FEASIBLE.

The soils provide some sustained grazing for farm animals, but the limitations are so severe that improvement by use of farm machinery is impractical. The terrain may be unsuitable for use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.

CLASS 7 SOILS IN THIS CLASS HAVE NO CAPABILITY FOR ARABLE CULTURE OR PERMANENT PASTURE.

This class also includes rockland, other non-soil areas, and bodies of water too small to show on the maps.

0 ORGANIC SOILS (Not placed in capability classes).

SUBCLASSES

Excepting Class 1, the classes are divided into subclasses on the basis of one or more of nine kinds of limitation. The subclasses are as follows:

*SUBCLASS C: adverse climate — The main limitation is low temperature or low or poor distribution of rainfall during the cropping season, or a combination of these.

SUBCLASS E: erosion damage — Past damage from erosion limits agricultural use of the land.

SUBCLASS I: inundation — Flooding by streams or lakes limits agricultural use.

SUBCLASS P: stoniness — Stones interfere with tillage, planting, and harvesting.

SUBCLASS R: shallowness to solid bedrock — Solid bedrock is less than three feet from the surface.

SUBCLASS S: adverse soil characteristics — Adverse characteristics include one or more of the following: undesirable structure, low permeability, a restricted rooting zone because of soil characteristics, low natural fertility, low moisture-holding capacity, salinity.

SUBCLASS T: adverse topography — Either steepness or the pattern of slopes limits agricultural use.

SUBCLASS W: excess water — Excess water other than from flooding limits use for agriculture. The excess water may be due to poor drainage, a high water table, seepage or runoff from surrounding areas.

*SUBCLASS X: Soils having a moderate limitation caused by the cumulative effect of two or more adverse characteristics which singly are not serious enough to affect the class rating.

CONVENTIONS

Large arabic numerals denote capability classes.
Small arabic numerals placed after a class numeral give the approximate proportion of the class out of a total of 10. Letters placed after class numerals denote the subclasses, i.e. limitations.

*Denotes class or subclass not present on this map.

EXAMPLES

An area of Class 4 land with topography and stoniness limitations is shown thus: 4_{P}^{T}

An area of Class 2 with topographic limitation, and Class 4 with stoniness limitation, in the proportions of 7:3 is shown thus: $2_{P}^{7}\ 4_{P}^{3}$

N.B. The color used for a complex area is determined by the first digit of the symbol. Generally the dominant class appears first in a complex symbol. However, in complexes of two arable classes (1-4) and one non arable class (5-7), the arable classes are shown first if they total one half or more of the map unit.

This pattern is overprinted on the color in complex areas, except those having ratios of 8:2, 8:1:1 and 9:1.

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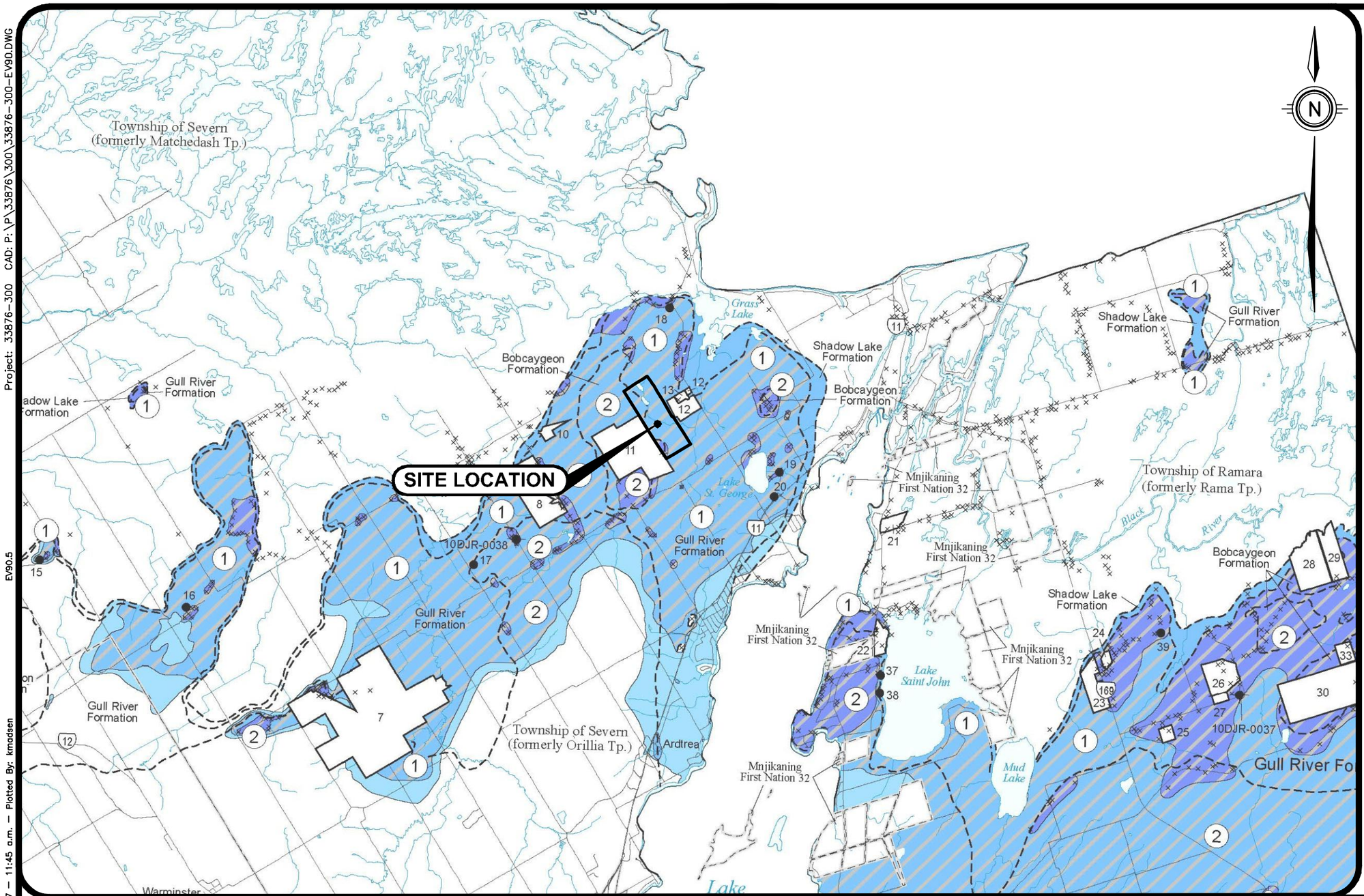
AGRICULTURAL CAPABILITY

Project Name
Proposed Cumberland Quarry

Site	Client
Part Lots 12, 13, & 14 Conc. II, Twp. of Severn	Severn Aggregates Limited

Scale (11x17)	MTE Project No.	Date	Figure No.
1:100,000	33876-300	December 2017	4

Project: 33876-300 CAD: P:\33876\300\33876-300-EV90.DWG EV90.5 December 6, 2017 — 11:45 a.m. — Plotted By: kmadsen



LEGEND – BEDROCK UNITS

PHANEROZOIC
- PALEOZOIC
  - SILURIAN
    - MIDDLE AND UPPER SILURIAN
      - **Amabel Formation:** Dolostone
      - **Clinton and Cataract Groups:** Sandstone, shale, limestone and dolostone
  - ORDOVICIAN
    - UPPER ORDOVICIAN
      - **Queenston Formation:** Red shale
      - **Georgian Bay Formation:** Shale and limestone
      - **Blue Mountain Formation:** Shale and minor limestone
      - **Lindsay Formation:** Limestone and shale
      - **Verulam Formation:** Limestone and shale
      - **Bobcaygeon Formation:** Limestone and minor shale
      - **Gull River Formation:** Limestone and dolostone
      - **Shadow Lake Formation:** Siltstone, conglomerate and shale

DRIFT THICKNESS

- Paleozoic bedrock outcrop (*see* Table 4); areas of exposed bedrock partially covered by a thin veneer of drift. Drift thickness is generally less than 1 m (3 feet).
- Paleozoic bedrock covered by drift (*see* Table 4); drift thickness is generally 1 to 8 m (3 to 25 feet). Bedrock outcrops may occur.
- Paleozoic bedrock covered by drift (*see* Table 4); drift thickness is generally 8 to 15 m (25 to 50 feet). Isolated bedrock outcrops may occur.
- Paleozoic bedrock covered by drift: drift thickness is generally greater than 15 m (50 feet) or areas underlain by Precambrian bedrock.

SYMBOLS

- Selected Bedrock Resource Area; deposit number (*see* Table 6)
- Licenced quarry boundary; property number (*see* Table 5)
- Unlicenced quarry (i.e., abandoned quarry or wayside quarry operating on demand under authority of a permit); property number (*see* Table 5).
- Borehole location; identification number (*see* Table 7)
- Sample site; identification number (*see* Table 9)
- Geological formation and/or member boundary
- Drift thickness contour
- Isolated bedrock outcrop
- Administrative boundary

Reference: Rowell, D.J. 2013. Aggregate Resources Inventory of the County of Simcoe, Southern Ontario; Ontario Geological Survey, Aggregate Resources Inventory Paper 188, 94p.

0 1000 2000 3000 4000 5000m
1:100000

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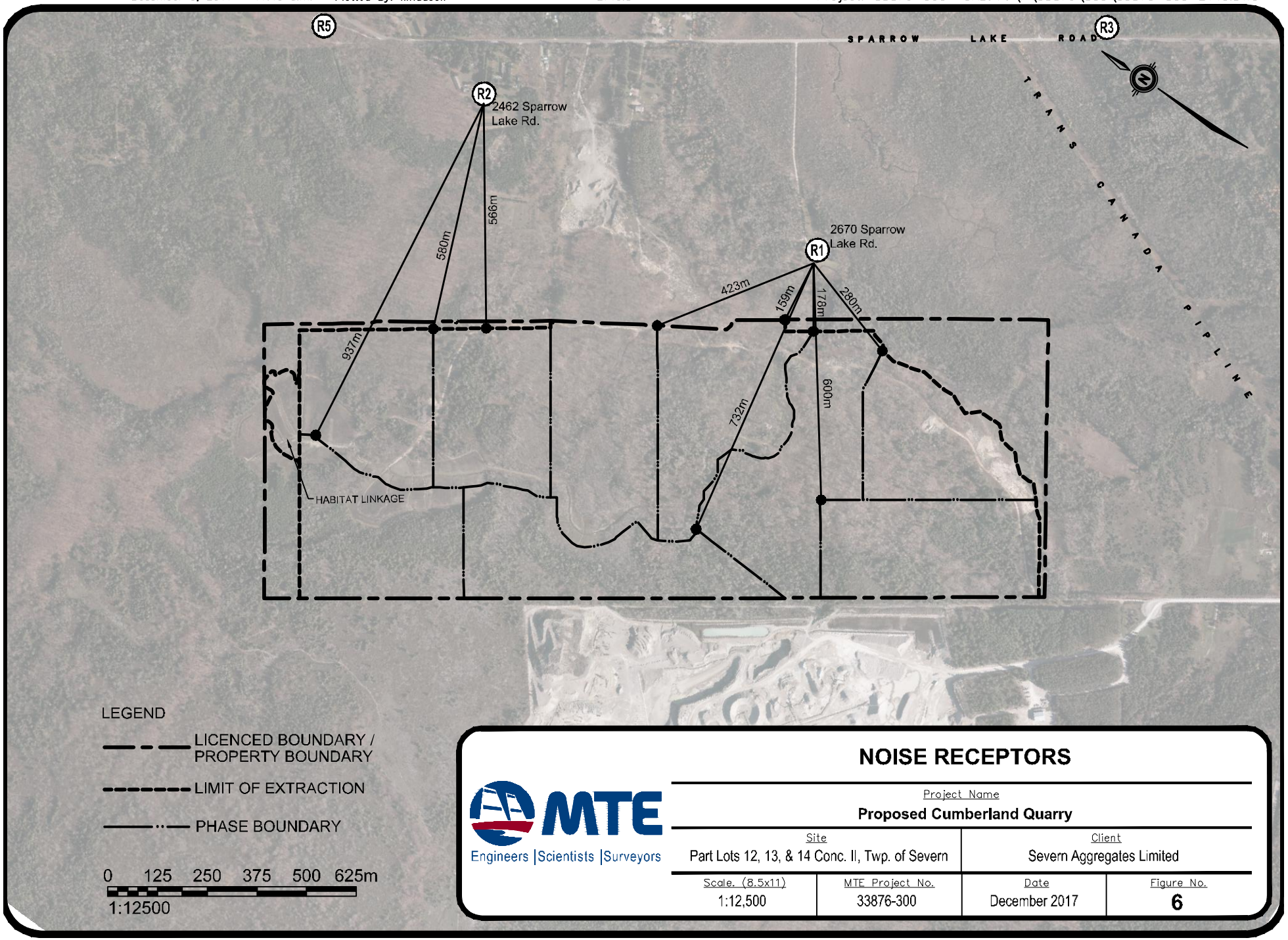
BEDROCK RESOURCES

Project Name			
Proposed Cumberland Quarry			
Site: Part Lots 12, 13, & 14 Conc. II, Twp. of Severn		Client: Severn Aggregates Limited	
Scale (11x17): 1:100,000	MTE Project No.: 33876-300	Date: December 2017	Figure No.: **5**



NOISE RECEPTORS

Engineers | Scientists | Surveyors

Project Name	
Proposed Cumberland Quarry	
Site: Part Lots 12, 13, & 14 Conc. II, Twp. of Severn	Client: Severn Aggregates Limited
Scale. (8.5x11): 1:12,500	MTE Project No.: 33876-300
Date: December 2017	Figure No.: 6

TABLES

Table 1: Tonnage Calculation by Stage

Stage	Area (m^2)	Avg Bedrock Thickness (m)	Volume (m^3)*	Tonnes
1	135,000	5.8	776,250	2,056,286
2	200,000	8.5	1,700,000	4,503,300
3	70,000	13.0	910,000	2,410,590
4	60,000	12.7	762,000	2,018,538
5	75,000	18.0	1,346,250	3,566,216
6	130,000	19.8	2,567,500	6,801,308
7	25,000	13.0	325,000	860,925
8	110,000	10.9	1,193,500	3,161,582
9	70,000	13.0	906,500	2,401,319
10	70,000	13.0	906,500	2,401,319
11	120,000	15.0	1,800,000	4,768,200
12	120,000	13.8	1,656,000	4,386,744
13	-	-	-	-
14	-	-	-	-
			Total	**39,336,326**

* Multiplied by a density factor of 2.649 tonnes per cubic meter for dolostone rock. This density factor is used by the Province in its Aggregate Resource Inventory reports.