2329059 Ontario Inc.

HYDROGEOLOGICAL ASSESSMENT – ROCKRIDGE QUARRY

Trent Lakes, Ontario

161-00461-00

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WSP

HYDROGEOLOGICAL ASSESSMENT – ROCKRIDGE QUARRY

TRENT LAKES, ONTARIO

2329059 Ontario Inc.

Project No.: 161-00461-00

Date: March 16, 2017

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March 16, 2017

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Subject: **Hydrogeological Assessment, Proposed Rockridge Quarry, Municipality of Trent Lakes (Harvey) Ontario**
Project No. 161-00461-00

Dear Sir,

WSP is pleased to submit this Hydrogeological Assessment Report as input to an aggregate license application for the proposed Rockridge Quarry, located northeast of Flynn's Turn, on Highway 507, north of the village of Buckhorn, Ontario.

The Aggregate Resources of Ontario Provincial Standards (Ministry of Natural Resources and Forestry, 1997) were considered in the development of the hydrogeological work program for this report. The Rockridge Quarry is proposed as a Category 4 – Class A Quarry situated above the groundwater table. As such, the objective of the current assessment is to establish the high groundwater table within the Site area, and demonstrate that quarry extraction activity will remain at least two (2) meters above that level for groundwater protection. It is also understood that this report will support the application to the Municipality for an Official Plan Amendment to operate a quarry at the Site.

WSP has previously conducted hydrogeological studies and hydrogeological compliance monitoring reports for several of the adjacent quarries and property developments in the Site area, including the Stonescape and Milkhouse Quarries located immediately adjacent to the site, and the Pluard Quarry to the west along Highway 36. Existing information from these historic reports and our experience with development of those properties has been considered in our analysis. We trust that you will find this report to be relatively straightforward, and that it addresses your current requirements. Should you have any questions, please contact us.

Yours truly,
WSP Canada Inc.

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EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by 2329059 Ontario to conduct a Hydrogeological Assessment in support of the development of a proposed limestone quarry on the property designated as Part of Lot 21, Concession 8, in the Geographic Township of Harvey, Municipality of Trent Lakes, County of Peterborough, Ontario (the "Site"). The Site is currently an undeveloped rural lot and comprises open and wooded areas, with localized ephemeral drainage and a steep easterly sloping ridge along the edge of the Mississauga River corridor. Two residential houses, a former administration building (Lovesick Lake Women's Association), and a Bell transmission tower are currently located on the Site. Adjacent development includes licensed industrial extractive sites (i.e. the Stonescape and Milkhouse Quarries), and a gasoline station and convenience store at Flynn's Turn opposite the Site.

The proposed Rockridge Quarry will facilitate the extraction and removal of both dimension stone and select construction aggregates. This Hydrogeological Assessment Report is intended to provide information to support an application under the Aggregate Resources Act (A.R.A.), for a Category 4 – Class A Quarry Above Water. In addition, this assessment supports associated applications to local Municipality (Trent Lakes), pursuant to the Planning Act.

The objective of our evaluations was to establish the high groundwater table within the Site area, and demonstrate that proposed quarry extraction activity will remain at least two (2) meters above that level for groundwater protection. In addition, this report discusses potential impacts on groundwater and surface water resources, and discusses monitoring, mitigation and adaptive management plans with respect to the groundwater conditions.

WSP has previously conducted hydrogeological studies and hydrogeological compliance monitoring reports for several of the adjacent quarries and property developments in the Site area, including the Stonescape and Milkhouse Quarries located adjacent to the Site. Existing information from these historic reports and our experience with development of those sites has been considered in our analysis.

Information contained within this Report has been utilized in the overall design of proposed Site operations and rehabilitation.

It is the general conclusion of this report that quarry operations may proceed within the Site, provided that:

1. Extraction remains a minimum of 2 metres above the groundwater table as established herein.

2. On-going monitoring of groundwater and surface water sources is conducted, to maintain compliance with existing Standards.

3. Monitoring results are interpreted by a Qualified Professional in order to facilitate proactive adaptive management to the observed Site conditions over time.

Recommendations and conclusions of this report have been incorporated on the A.R.A. Site Plan to be submitted as part of this application.

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1 INTRODUCTION

1.1 BACKGROUND

The proposed Rockridge Quarry (the “Site”) is located on the eastern side of County Road 507, northeast of Flynn’s Turn and approximately 6 km north-northwest of the community of Buckhorn (Figure 1). The Site is situated on part of Lot 21, Concession 8 in Geographic Township of Harvey, Municipality of Trent Lakes, in the County of Peterborough, Ontario.

The Site is largely undeveloped land, containing areas of open field, low-lying shrubs and woodland. Topography, from west to east, is mainly flat with the exception of a defined, stepped, limestone escarpment situated along the east (see Figure 2). The Site currently contains two existing single-family rental dwellings that are owned by the Applicant, a vacant commercial/administration building, and lands under lease to accommodate a Bell telecommunications tower. Surrounding land-uses include: rural residential to the west across County Road 507, vacant land to the north, a gasoline station and convenience store to the west, an existing quarry (Stonescape Quarry) abutting the Site to the south, and the Kawartha Highlands Provincial Park (and Mississauga River valley) to the east. Milkhouse Quarry is located southwest of the Site, on the opposite side of Highway 36.

The Quarry Applicant (2329059 Ontario Inc.) is seeking to licence lands containing high quality limestone and dolostone bedrock resources, comprising approximately 95.5 ha (236 acres). It is understood that the Applicant is proposing a Category 4, Class “A” Quarry Above Water, to be licenced under the Aggregate Resources Act. Approval is required to extract both dimension stone for general landscaping purposes, and processed select aggregates for construction use. Removal of dimension stone will be conducted by mechanical means, but may also employ occasional low-intensity blasting in order to loosen rock faces. The extraction of construction aggregates will require drilling, blasting, crushing and possibly washing of the crushed material to create various marketable commodities. All processes are subject to securing approvals and permits under Provincial regulations.

This Hydrogeological Assessment Report provides background information on the physical and hydrogeological setting of the Site, summarizes procedures and results of groundwater investigations, interprets the high groundwater table across the Site area as required in the Provincial Standards for design, discusses groundwater and surface water interaction and protection of existing resources in the Site area, and includes our recommendations for design and operation within acceptable limits of environmental impact.

It is understood that this report will be submitted as part of a comprehensive application package to review agencies, including: the Municipality of Trent Lakes, the County of Peterborough, and the Ministry of Natural Resources and Forestry (MNRF). The conclusions and recommendations derived from the assessment have been incorporated into the design of the proposed operational plan (i.e. Site Plan), included in the overall submission.

2 REGULATORY REQUIREMENTS

Under the Aggregate Resources Act and related Standards, it is necessary to establish the high groundwater table for a Category 4 quarry. A 2 m separation is required between the floor of the Category 4 quarry and the groundwater table. This separation is provided to buffer quarry extraction and processing activities from the groundwater table, and to avoid dewatering of groundwater resources in and beyond the quarry area. The groundwater table may be established based on hydrogeological investigations that consider existing and published groundwater information (including previous hydrogeological and monitoring reports), drilling and monitoring well investigations, site inspections and test pitting, etc. Sufficient investigations are required to facilitate a three-dimensional interpretation of the groundwater table (i.e. plan and profiles), and should also consider recharge of the groundwater in the context of the hydrologic system, interaction with surface water, and the potential long-term effects of quarry extraction on drainage and the groundwater table. Monitoring is generally recommended to confirm groundwater conditions and their responses to quarry activity. Also, monitoring results will facilitate adaptive management plans and systems that react to potentially changing or unexpected conditions as the quarry is developed.

Legislation and policies related to quarry development within the context of water resources are summarized in the following sections.

2.1 AGGREGATE RESOURCES ACT

In the Aggregate Resources of Ontario Provincial Standards (Ministry of Natural Resources and Forestry, 1997), Section 2.1 outlines the following requirements for the summary statement accompanying a Category 4 - Class “A” Quarry Above Water, among others:

> *“2.1.6 identify any existing surface water on and surrounding the site and proposed water diversion, storage and drainage facilities on the site and points of discharge to surface waters; and*
> *2.1.7 determine the elevation of the established groundwater table within the site for both the unconsolidated surficial materials (if present) and the bedrock strata, e.g. demonstrate that the final depth of extraction is at least two (2) metres above the highest of the on-site groundwater table levels.”*

Of note, a Hydrogeological Report is not specifically listed as a requirement of a Category 4 - Class “A” Quarry Above Water license application. However, in light of the requirements to establish the groundwater table for the design of general operations, and to prepare the Site Plan, a Level 1 Hydrogeological Study similar to requirements below water applications has been completed. The Aggregate Resources of Ontario Provincial Standards (MNRF, 1997) defines a Level 1 Hydrogeological Study as follows:

"Hydrogeological Level 1: Preliminary hydrogeological evaluation to determine the final extraction elevation relative to the established groundwater table(s) in both unconsolidated materials (if present) and consolidated bedrock strata, and the potential for adverse effects to groundwater and surface water resources and their uses (e.g. water wells, groundwater aquifers, surface watercourses and bodies, discharge areas, etc.)."

"The technical report must be prepared by a person with appropriate training and/or experience in hydrogeology to include the following items:

a) Water wells;

b) Springs;

c) Groundwater aquifers;

d) Surface watercourses and bodies;

e) Discharge to surface water;

f) Proposed water diversion, storage and drainage facilities on site;

g) Methodology;

h) Description of the physical setting including local geology, hydrogeology, and surface water systems;

i) Water budget;

j) Mitigation measures including trigger mechanisms;

k) Contingency plans;

l) Monitoring plan; and

m) Technical support data in the form of tables, graphs and figures, usually appended to the report."

Several but not all of the above items may apply to standards for Category 4 quarry applications.

2.2 OFFICIAL PLAN AND ZONING

The Rockridge Quarry Site is designated "Rural (RU)" (Official Plan of the Township of Galway, Cavendish and Harvey, dated April 2011), and is zoned "Rural (RU)" (Comprehensive Zoning By-law 2014-070, dated July 15, 2014).

Appropriate zoning must be in place in order to licence the Rockridge Quarry holdings under the Aggregate Resources Act. To acquire the applicable zoning (i.e. Industrial Extractive), the Applicant will submit applications to the Municipality for an Official Plan Amendment, and amendments to the Zoning By-Law.

The Official Plan includes policies for mineral aggregate extraction areas in Section 5.10. Among others, Policy 5.10.5 (Township Considerations and Information Requirements) requires the provision of:

"*A hydrogeological report to address the potential for adverse effects of the mineral aggregate operation on groundwater and surface water resources and their uses.*"

2.3 PROVINCIAL POLICY STATEMENT

The Provincial Policy Statement (PPS) is issued under Section 3 of the Planning Act, effective April 30, 2014. The 2014 PPS replaces the previous version, issued March 2005. Policies of the PPS pertaining to water resources, specifically Section 2.2, were incorporated into the scope of work outlined herein in Section 1.3. Section 2.2 of the PPS is outlined below.

"2.2 Water

2.2.1 Planning authorities shall protect, improve or restore the quality and quantity of water by:

a) using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;

b) minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;

c) identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;

d) maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;

e) implementing necessary restrictions on development and site alteration to:

1. *protect all municipal drinking water supplies and designated vulnerable areas; and*
2. *protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;*

f) planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;

g) ensuring consideration of environmental lake capacity, where applicable; and

h) ensuring storm water management practices minimize storm water volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.

2.2.2 Development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored. Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions."

3 OBJECTIVES AND METHODOLOGY

3.1 OBJECTIVES AND SCOPE

In the context of the above information and our understanding of the proposed extractive development plan, the principal objectives of this hydrogeological assessment were as follows.

- To provide a detailed understanding of the Site's physical setting, topography, geology, stratigraphy, and hydrogeology.
- To delineate viable quarry extraction depths to maintain above water table operations according to the application Standards.
- To introduce and discuss potential impacts of quarrying operations on groundwater and surface water resources in the Site area.
- To define a monitoring program, to monitor and assess impacts, if any, on groundwater and surface water resources in the Site area, as the quarry is developed.

Our Hydrogeological Work Plan involved background information review, data collection and analysis components, as well as report preparation including maps, sections and various illustrations.

3.2 METHODOLOGY

The hydrogeological assessment for the proposed Rockridge Quarry comprised several tasks, which are summarized as follows.

- Review of published mapping and data for the Site, including topographical, physiographical, geological and hydrogeological mapping from government sources, as well as select aerial photos.
- Review existing reports and studies for adjacent quarries and land development applications.
- Site reconnaissance inspections, to map and document existing surface features on the Site (including drainage features), and verify off-site land use and general conditions.
- Review of existing groundwater information, including water levels for on-site and off-site wells, and annual compliance monitoring reports for the adjacent Stonescape Quarry.
- Borehole investigations on the Site, including rock coring and installation of new groundwater monitoring wells.
- Measurements of groundwater levels in on-site monitoring wells and accessible off-site monitoring wells, and domestic wells near the Site.
- Elevation surveying to determine geodetic elevations.
- Analysis and report preparation including interpretations of the bedrock stratigraphic formations and the groundwater table within the bedrock, and preparation of summary plans and cross sections.

In addition, preliminary aggregate quality testing, limited to geological inspections of core samples, was authorized by the Applicant as part of the study. These results were used to comment on the quality and of the bedrock resource, with the intention to licence it as a viable commercial supply.

4 BACKGROUND SUMMARY

4.1 ADJACENT QUARRY INVESTIGATIONS

WSP, in its former entities (Site Investigation Services and Jagger Hims Limited) and under the direction of the author of this current report, previously prepared Hydrogeological Investigation reports for three nearby quarry developments. These reports include:

- *Hydrogeological Assessment of Pluard Quarry*, Part of East ½ Lot 22, Concession 2, Township of Galway-Cavendish and Harvey (Harvey Ward), County of Peterborough prepared by Site Investigation Services - Division of Jagger Hims Limited, in April 2004.
- *Hydrogeologic Investigation Report*, Proposed Quarry Operation (Proposed Stonescape I Quarry), Part of Lots 19 and 20, Concession 8, Township of Galway-Cavendish and Harvey (Harvey Ward), County of Peterborough, prepared by Site Investigation Services - Division of Jagger Hims Limited, in November 2004.
- *Stage II Hydrogeologic Investigation*, Proposed Stonescape Quarry II, Part of Lot 20, Concession 8, Township of Galway-Cavendish and Harvey (Harvey Ward), County of Peterborough, prepared by Jagger Hims Limited in March 2008.

Each of the above noted reports contributed to the eventual licencing of three associated quarries in relative proximity to the Site (Appendix C). This work has afforded WSP the opportunity to gain a comprehensive understanding of existing rock formations, and groundwater and surface water features in the vicinity of Flynn's Turn.

In addition, comprehensive groundwater and surface water monitoring has been has been conducted by WSP since the subsequent approval of each of the above-noted quarry sites. WSP continues to provide on-going monitoring services on an annual basis. WSP also provides monitoring services at the Stonescape Quarry, as part of an annual compliance monitoring for a Permit to Take Water (OWRA Section 34).

4.2 PUBLISHED INFORMATION

The following technical resources were reviewed to obtain geological and stratigraphical background information for the Site:

- Aggregate Resources Inventory Paper No. 132 for Harvey Township (Ontario Geological Survey 1995);
- Limestone Industries of Ontario – Volume III (Ministry of Natural Resources 1989);
- Tentative Correlation of the Lower Paleozoic (C.A. Rogers, in draft, 1989);
- Approved Site Plan for Stonescape 1 Quarry, A.R.A. licence #127479 (Appendix E);
- Approved Site Plan for Milkhouse Quarry, A.R.A. Licence #624849 (Appendix F).

These sources describe bedrock formations below the Site, and provide information on historic aggregate testing and general performance. Site plans for the adjacent quarries facilitate correlations of bedrock units and the groundwater flow system at the Site.

In addition, a draft copy of the 1:2000 scale Site Plan indicating existing features, topography and proposed extractive activities of the proposed quarry, as prepared by Harrington McAvan Limited Landscape Architects of Markham, was provided by the Applicant. WSP obtained a digital version of the Site Plan for review purposes (Appendix D).

4.3 HISTORIC GROUNDWATER MONITORING

Since licensing of the existing Stonescape Quarry adjacent to (south of) the Site in 2007, WSP (formerly Genivar) has been conducting on-going monitoring of eighteen (18) monitoring wells and selected domestic wells located in the immediate Site area. Existing domestic wells located on the Rockridge Site are included in these programs and results are documented in Appendix A. A monitoring well location map is included as Figure A-1 in Appendix A, and hydrographs are included as Figures A-2 and A-3. Historic monitoring data have been considered in the conceptualization of the groundwater flow system.

5 PHYSICAL SETTING

Based on the available background information, and WSP observations during reconnaissance visits, this section summarizes Site topography access, the physiographical and geological setting, and an overview of existing drainage features.

5.1 TOPOGRAPHY AND SITE ACCESS

Overall, the Site is located among a group of existing quarries in the area known as Flynn's Turn. The Site location is shown on Figure 1, and Appendix C includes a general area map of Site in relation to the nearby Stonescape and Milkhouse quarries.

Site conditions and rock formations within the Rockridge Quarry property closely resemble those found within the Stonescape site. WSP has used previous knowledge of both sites to assist in examining the current Rockridge application proposal.

The general topography in the Site area is shown on Figure 2. Across the western and central parts of the Site the ground is relatively flat, with surface elevations ranging from approximately 300 metres above sea level (mASL) to 305 mASL. The highest ground elevations on the Site generally occur within the central region. Bedrock is locally exposed across the Site, or has a thin cover of topsoil or drift that supports various grasses, immature shrubs and trees.

The eastern part of the Site contains a forested area (see Appendix B Photo 1), which has been partially logged. A relatively steep rock slope is present in this area, which descends from elevation 295 mASL at the top of the ridge, towards a number of wetland features that range from elevation 271 to 267 mASL, and finally to the Mississauga River east of the Site, which has a reported water elevation of approximately 254 mASL. The bedrock ridge and valley slope is stepped and the bedrock is exposed in several locations.

Access to the Site is currently available from Peterborough County Road 507, using a number of approved entrance locations associated with existing residential and former administrative buildings. A partially drivable access trail leads from the northern section of the Site, eastward to the rock ridge, and then proceeds down along the stepped slope to the valley area, and then beyond the property into dense bush. The trail is indicated on the Site Plan included in Appendix D.

5.2 PHYSIOGRAPHICAL AND GEOLOGICAL SETTING

The subject Site is located on the boundary of the Georgian Bay Fringe and Dummer Moraines Physiographic Regions (as defined by Chapman and Putnam 1984). These regions are physically characterized by shallow soil deposits and bare rock knobs and ridges (see Figures 3 and 4).

Bedrock lithologies within the Site area are indicated on the generalized geologic map of Harvey Township included as Figure 5. The Site is located in an outlier of Paleozoic rocks (limestone, dolostone and shale) surrounded by Precambrian metavolcanic rocks and banded gneisses. Deposits in the Site area include the Bobcaygeon Formation (lower member) and the underlying Gull River Formation. The Shadow Lake Formation, which includes sandstone and conglomerate deposits, underlies the Gull River Formation and rests unconformably on Precambrian basement rocks. Stratigraphic cross sections are discussed later in this report, in Section 7.

5.3 CLIMATE DATA

Data from the Trent University Climate Station was requested to assess general precipitation trends and related effects on groundwater levels at the Site. A summary of monitoring records from 2012 is provided in Table H-1 of Appendix H, and indicates total annual precipitation of 738 mm.

Climate normals for a 30 year period, including mean temperature and precipitation factors, are presented in Table H-2 of Appendix H. Based on a Thorthwaite water budget analysis using inferred heat indices and evapo-transpiration factors for the local area, the Rockridge Quarry has an estimated annual precipitation surplus of about 280 mm. Deficit conditions occur in the months of June, July and August. For the overall surplus condition, water from precipitation is expected to available for groundwater recharge. Above water quarries are intended to maintain this capability, and potential quarry impacts to the groundwater table are further discussed in Section 7.

5.4 ONSITE DRAINAGE FEATURES

Generally the Site is situated on the west side of the Mississauga River and its associated valley area. The river has a controlled water level at approximate elevation 254 mASL, and flows south into Buckhorn Lake, which is on the Trent-Severn Waterway system. Based on personnel communications with Trent-Severn Waterway staff, flow in Mississauga River north of Buckhorn Lake is in the order of 80,000 L/min. Trent-Severn Waterway tries to maintain a minimum 72,000 L/minute outflow through the upstream dam at Mississauga Lake.

The topography of the western, central and most of the eastern portion of the Rockridge Quarry holdings is relatively flat, with variations in elevation ranging from about 305 to 300 mASL. The eastern part of the Site contains more dramatic changes in elevation, due the presence of the defined escarpment noted previously (Appendix B, Photo 2). It is inferred that much of the surface water runoff from the Site eventually flows towards the Mississauga River Valley system, with the exception of localized drainage associated with low-lying areas to the south and north of the Site.

Within the central-westerly portion of the Site, a narrow ephemeral drainage course crosses the bedrock surface (see Appendix B, Photos 3, 4, 5, and 6). Seasonal runoff follows an unconfined channel through partially wooded areas southward. This drainage feature has been identified by Vegetation Mapping completed by the Applicant's consultant. Water also collects, temporarily, in an area where topsoil has presumably been removed during site grading operations for the existing Bell telecommunications tower on the Site. Topsoil berms partially confine surface water into a shallow pool in this area. Based on our field inspections, this water may totally evaporate during dry seasons. When water is present, it may overtop partially vegetated areas and flow along exposed bedrock in a southeasterly direction. Within the Site, this surface runoff often enters rock crevasses and fractures and presumably discharges down-gradient or recharges groundwater.

A second small ephemeral drainage course traverses the northwestern corner of the property, northwest of the existing residential structure. A shallow depression in an open field collects surface runoff from a relatively small and localized catchment area. Water is conducted by the topography off-site to the County Road 507 Right-of-Way, and either flows southwesterly in the roadside ditch or, in the case of higher seasonal volumes, passes through an 18-inch diameter culvert beneath the roadway into the northern ditch (Appendix B, Photos 7 and 8).

Small depressions within the woodland areas onsite are typical of many hardwood forests. These include areas between trees or groups of trees. These depressions are isolated and generally only contain water after snowmelt or from precipitation. As part of the proposed rehabilitation, undulations in final topography will be created and it is envisioned that similar isolated depressions will be created.

Patchy depressions and marshy areas are present in undeveloped lands north of the Site and appear to be associated with permanent marsh lands close to the east escarpment. Surface water may contribute to the observed higher or perched groundwater conditions in the northwesterly part of the Site, as further discussed in Section 7.

The above forms the main inventory of surface water features on the Site. Some seasonal and localized ponding of precipitation may temporarily occur in other low-lying depressions on the bedrock surface, but are not considered significant in this Application.

5.5 ADJACENT EXTRACTIVE ACTIVITY

The Stonescape Quarry abuts and is located south of the Site (see Appendix C). It is currently licenced under the Aggregate Resources Act as a Class A Category 4 – Above Water Quarry. Similar to the proposed Rockridge Quarry, the Stonescape operation is approved to extract both dimension stone and construction aggregates. It is currently operated by Stonescape Ontario Inc. (Owner) and CBM Aggregates (Tenant), and has been active since 2004.

The operations of Stonescape Ontario Inc. include the removal of dimension stone by largely mechanical means and manufacturing of various specialized landscape products. Construction aggregates are extracted by CBM Aggregates Inc., and include removal of limestone rock by drilling, blasting, crushing, screening and washing of various quantities and sizes of aggregate.

The Stonescape Quarry has a licensed area of 173.84 ha. The approved Site Plan indicates that the quarry is licensed for staged extraction above the water table, to a maximum base elevation of 270 mASL. The quarry sump, which is used to remove accumulated precipitation, is currently based at approximately 285 mASL. The bedrock units currently being extracted in the quarry are consistent with the subsurface profile encountered in the Stonescape drilling programs prior to licencing. Owing to similarities between the Stonescape and Rockridge quarry sites, similar above-groundwater extraction depths are anticipated.

To support the washing of construction aggregates, CBM (tenant) has acquired MOECC approvals for water taking and discharge under the Ontario Water Resources Act. CBM has a Permit to Take Water for water taking at a rate exceeding 50,000 L/day. Monitoring programs conducted under the permit conditions have not detected significant impacts on the groundwater table, and no measureable effects from the washing operations have been detected beyond the Stonescape property, to date.

The Milkhouse Quarry, located southwest of the Site, is licenced under the Aggregate Resources Act to Stonescape Ontario Inc. This site is approved for dimension stone quarrying, using limited blasting and largely mechanical operations. The Milkhouse Quarry comprises approximately 60.2 ha and is presently inactive. The current quarry approval restricts the average depth of extraction of dimension stone to approximately 7 m depth, which is designed to be a minimum of 2 m above the groundwater table.

6 DRILLING INVESTIGATIONS

To advance the understanding of the hydrogeological conditions at the Rockridge Quarry, in the context of the previous work and background information, two (2) new groundwater monitoring wells were installed at the Site in 2016. The wells were designated as RRMW-1 (Borehole No. BH15-1) and RRMW-2, and are located as shown on Figure 7.

RRMW-1 (BH15-1) was drilled and core sampled on February 27, 2016 using a track-mounted rig. Continuous coring techniques were used to extract NQ-size (48 mm diameter) core samples of the bedrock in 1.5 m long “runs”. The borehole was terminated at a depth of 28.7 metres below ground surface (mbgs), at approximate elevation 273.1 mASL. Rock quality and core recovery indices were recorded during drilling, and core runs were logged and photographed.

On completion of drilling, a monitoring well comprising a 39 mm diameter No. 10 slotted screen and riser pipe was installed at RRMW-1. The annulus between the well screen and the borehole was backfilled with clean sand to a depth of 6 m below the ground surface. Bentonite grout was subsequently added to provide an annular space seal to grade, and prevent the entry of surface water. The monitoring well was secured in a lockable protective casing. As such the installation meets O. Reg. 903 standards; the drilling contractor has prepared and submitted the well log/tag number to MOECC (see Appendix G).

Monitoring well RRMW-2 was drilled on October 24, 2016 by Burgess Well Drilling of Omemee, Ontario. This well was drilled to a depth of 27.4 mbgs (to elevation 271.1 mASL) using conventional air-rotary methods. The well was not core sampled, but a log was generated by the well driller recording various material properties, including: colour, lithology, fractures, water found depth, etc. The well was completed using a 159 mm diameter carbon steel well casing extending to a depth of 6 mbgs with the remaining depth comprising an uncased open hole in bedrock. The casing annulus was sealed with bentonite hole-plug. The driller submitted the well log to MOECC and the well was tagged as A175718 in the database system (see Appendix G)

7 HYDROGEOLOGY

This section describes geological profiles at the investigated monitoring well locations and presents the conceptual hydrogeological model (cross sections and interpreted flow system) of the Rockridge Quarry.

7.1 GEOLOGIC PROFILE AT RRMW-1

The borehole log for monitoring well RRMW-1 is included in Appendix G, and describes the following geologic intervals:

- Lower Bobcaygeon Formation: surface el. 301.8 mASL to el. 293.9 mASL
- Gull River Formation: el. 293.9 to 279.7 mASL
- Shadow Lake Formation: below el. 279.7 mASL

The Bobcaygeon Formation comprises massive to thinly bedded fine crystalline limestone with shale partings. Based on coring information, Rock Quality Designation (RQD) values in the Bobcaygeon unit ranged from approximately 60 to over 90 percent, indicating Fair to Excellent quality. Rock Quality Designation is defined as the sum of the rock core pieces longer than 10 cm expressed as a percentage of a given total length drilled, usually a core run. Core samples were noted as being medium hard, broken to blocky, and weathering appeared to be slight.

The Gull River formation comprises grey to greenish, lithographic texture (with “birds eye” and styolites) dolostone and dolomitic limestone. The rock is laminated to massive, broken to blocky, generally hard and relatively fresh. RQD was over 80 percent as indicated on the borehole log. Green marker horizons comprising relatively soft argillaceous material were documented as follows in the log: Upper Green Marker from 290.2 to 289.3 mASL; Lower Green Marker at approximate elevation 281 mASL.

It is noted that both the Bobcaygeon and Gull River Formation materials are used extensively in the Ontario aggregates industry to produce asphalt and concrete stone, granular base courses for roads and highways and construction aggregates. Localized zones within the Formations, such as softer shale and clay rich material, may have more limited use.

The Shadow Lake Formation comprises mainly weathered grey-green to reddish interbedded conglomerate, sandstone and shale material. It is documented in the literature that the Shadow Lake Formation has very limited value as an aggregate resource. However, the colour, texture and relative durability render the material as a source of decorative and landscaping stone, and it is locally extracted for these purposes (e.g. Stonescape Quarry).

Although not penetrated at RRMW-1, Precambrian metamorphic bedrock exists below the Shadow Lake Formation in the Site area. While this unit has been considered as a potential aggregate resource in Canadian Shield areas north of the Site, it is generally not pursued owing to the economic advantages of the overlying Paleozoic formations.

7.2 GEOLOGIC PROFILE AT RRMW-2

The rock at RRMW-2 was not core sampled, however, rock features, including colour, lithology, fractures, etc. were noted by the well driller. A copy of the well log (MOECC Tag No.: A195718) is included in Appendix G, and indicates the following profile:

- Grey Limestone: surface (298.0 mASL) to 278.2 mASL
- Red “granite” (presumed Shadow Lake Formation): 278.2 to 271.2 mASL
- Black granite (presumed Precambrian): 271.2 mASL to bottom of well (270.6 mASL)

Fractures were reported at the following approximate depths: 6 to 7.3 mbgs; 10.4 to 11 mbgs; and 13.4 mbgs.

7.3 INTERPRETED STRATIGRAPHY

Based on the drilling information, and background data from the adjacent sites and published reports, WSP has prepared three cross-sections indicating the subsurface stratigraphy at the Rockridge Quarry: these are designated as Sections A-A’, B-B’ and C-C’ in Figures 8 through 10 of this report.

The cross-sections show that the Site is underlain by Paleozoic limestone and dolomitic limestone of the Bobcaygeon and Gull River Formations to a depth of approximately 20 m below ground surface, underlain by Shadow Lake Formation (approximately 6 m thick), and subsequently Precambrian metamorphosed bedrock material. Unit depths and thickness are consistent with the findings at the Stonescape and Milkhouse Quarries, and with the expected bedrock lithologies discussed in published background sources.

7.4 INTERPRETED GROUNDWATER FLOW SYSTEM

Groundwater levels for monitoring wells and domestic wells on the Rockridge Quarry are summarized in Table A-1 of Appendix A. Groundwater information, including tabulated results and hydrographs for offsite compliance monitoring reports (Stonescape and Milkhouse Quarries), are provided in Appendix A.

Based on this information, WSP has interpreted the groundwater flow system at the Site, and including the surrounding areas, as shown on Figure 7. The highest or latest water levels taken in 2016 were used in the analysis. Groundwater levels are subject to slight changes with seasonal weather events, which may affect the interpretation slightly. Fluctuations are generally relative in the overall system except possibly where perched conditions exist. Adaptive management plans, as discussed later in this report, may be used to adjust operations to groundwater conditions and maintain compliance with the Aggregate Standards and A.R.A requirements for the proposed quarry.

In summary, the results indicate that there is a groundwater drainage divide on the Site, with a local high situated in the northwesterly area. Overall, groundwater flow is directed towards either Mississauga River along the east end of the Site, or toward a wetland approximately 700 m west of the site. Groundwater elevations (in 2016) ranged from 292.4 mASL in RR MW1 in the north part of the Site, to about 285 mASL in other areas. East of the eastern ridge area, the groundwater elevation drops rapidly as a reflection of the local topography and drainage conditions.

Groundwater investigations at monitoring well RR MW2 near the eastern ridge (see Figure 7) indicate a perched groundwater condition within the shallow fractured rock. After initial the drilling, water levels in this well slowly rose to approximately 286 mASL, over several weeks. WSP subsequently pumped out the well several times, and conducted down-hole photography to observe fractures and slow seepage from fractures below the well casing, at approximately 6 m to 8 m below ground surface. Fractured rock intervals were also observed at approximate depths of: 10.4 to 11 m, 19 m, 23 m and 27 m, with the rest of the rock column appearing relatively solid. Based on water recovery measurements taken on March 7, 2017, after the well was pumped down to elevation 271 mASL, the water inflow rate was less than 1 L/min. For perspective, this is considered to be a low flow condition that would not meet minimum yield requirements for a domestic well even with secondary storage.

Based on our investigations, RR MW2 is connected to shallow perched groundwater, possibly sustained by intermittent surface drainage and recharge associated with locally irregular surface topography. Modifications to water table contours were required in this area to interpret a flow system that is consistent with other groundwater observations on and beyond the Site, and in consideration of the local changes in gradient proximal to the adjacent ridge.

8 RECOMMENDATIONS

8.1 QUARRY FLOOR DESIGN

Similar to approvals obtained for the Stonescape Quarry, the proposed Rockridge Quarry application is for an above water operation, extracting both dimension stone and construction aggregate materials. Provincial Standards for a Category 4 Quarry require that the base of extraction be situated at least 2 m above the established high groundwater table as noted. This separation distance provides for protection of the bedrock aquifer and potential fluctuations in the local groundwater levels. In establishing the high groundwater table for the entire Site, it is important to consider possible seasonal fluctuations and, where necessary, account for local irregularities in water levels attributed to measurements within variable fractured rock (e.g. perched groundwater).

Water level monitoring shall be conducted during quarry development to verify that the proposed base level for the quarry is suitably conservative. Monitoring shall also assess potential effects on the groundwater system from off-site activities and development. Final extraction depths can be modified, if necessary, based on these monitoring results. An adaptive management plan is discussed in Section 8.3 below. If necessary, additional monitoring wells can be installed during quarry development to further assess groundwater response to extraction.

Based on the information in this report, it is recommended that the design level for the proposed quarry floor be situated at least 2 m above the latest groundwater contours as shown on Figure 7. In the steeper eastern slope area, where quarrying is limited to the mechanical excavation of landscaping stone, WSP expects it will be feasible to extract to a depth of approximately 15 m below the existing surface grades and still maintain the required water table separation from the quarry base.

The Site has varying amounts of overburden and exposed rock surfaces, and extraction activities are not expected to have adverse impacts on natural infiltration and groundwater recharge. This is supported by the absence of significant or measurable groundwater impacts related to the Stonescape operations, as documented in several years of available monitoring data. The existing water surplus condition for the Rockridge Site, as summarized in Section 5.3, is similar to the Stonescape site and recharge to the groundwater table should not be compromised by the proposed licensed activity. Since no unauthorized groundwater pumping is permitted, and groundwater flows in an easterly direction towards the Mississauga River and away from the existing limited adjacent development, significant interference with groundwater resources and domestic water uses in the Site area is not expected. Further, any drainage of minor perched lenses of groundwater in the shallow rock will not have an effect on private wells, which are established at considerable separation distances from these areas and much deeper in the Formation.

WSP does not expect adverse effects on existing surface water resources as a result of proposed quarry activities. The ephemeral drainage in the central-west part of the Site can be re-routed in the design to maintain seasonal flows towards the adjacent Stonescape Quarry, and eventually continuing to highway ditch areas and down-gradient surface watercourses. Since proposed extraction will initially occur in the southeastern part of the Rockridge Site, the ephemeral drainage area can be maintained in its current state for many years before grading modifications are required. It is noted that the Site and ephemeral drainage area are outside the jurisdiction of Provincial Conservation Authorities, Thus, re-routing of onsite surface drainage can be addressed directly on the Site Plan for MNRF approval.

Impacts on the Mississauga River, located well to the east of the Site, as a result of the proposed above water table operations are not anticipated. Relative to current conditions, groundwater recharge will probably remain constant or increase slightly within the proposed quarry area, because of possible surficial fracturing effects and grade modifications at the floor level. The estimated Site contribution to the base flow of the Mississauga River, as a result of infiltration, is less than 1 percent of the total 72,000 L/minute regulated minimum flow through the watercourse. Consequently, temperature and other potential effects on the River from proposed quarry operations are unlikely to be measurable.

8.2 GROUNDWATER MONITORING PROGRAM

Previous assessments for nearby quarries include requirements for monitoring. Currently WSP monitors a number of wells on adjacent properties and established quarries.

For the proposed Rockridge Quarry, WSP recommends a similar monitoring program be conducted, including the following tasks:

- Monitoring of water levels in all onsite and offsite monitoring wells and domestic wells, including wells at the Stonescape and Milkhouse Quarries, at a minimum frequency of four times per year (i.e. Quarterly).
- Complete a baseline door-to-door survey of adjacent domestic wells prior to the start of extraction to obtain information on well use and construction details (as noted earlier, information for most local wells is already known).
- Prepare and submit an annual monitoring report documenting and discussing all findings, including recommendations to adjust the monitoring program if required. The report shall be prepared, signed and sealed by a qualified Hydrogeologist and submitted to MNRF for review.

8.3 ADAPTIVE MANAGEMENT

To provide approval authorities with even greater confidence that proposed maximum extraction elevations remain at least 2 m from the groundwater table, it is recommended that an adaptive management approach be taken.

Based on the results of the groundwater monitoring program described, fluctuations in groundwater levels and the overall flow system should be assessed annually to determine if modifications to the quarry extraction design are warranted.

According to the Design Standards, WSP anticipates that groundwater levels in the eastern rock ridge will translate westerly, as surficial material is mechanically removed, and the slope topography is slowly altered. The effects on the overall groundwater flow system from this process are not expected to be large, as is the case at the Stonescape Quarry, and flow direction and gradients should be reasonably well maintained. If excessive drainage from the ridge rock formations is encountered, it should be reported to WSP immediately so we may suggest possible design modifications or additional monitoring well installations.

In addition, presently there are three (3) viable monitoring wells on the Rockridge Site (RRMW-1, RRMW-2 and RRDW1). At this time, and for the design and initial development of the quarry, these are sufficient. As extraction progresses within Phase 1, additional installations may be required in the southern part of the Site to obtain additional data for adaptive management as the quarry is developed further into Phase 2.

To implement the above components, the following site plan note is recommended:

- "Should the annual groundwater monitoring program, or Site conditions, reveal changes to surface or groundwater conditions which may warrant an adjustment in the depth of extractive operations, a qualified Hydrogeologist shall be retained to ascertain if design adjustments to the Site Plan are required in order to ensure a minimum 2 m separation from the groundwater table".

8.4 COMPLAINT MANAGEMENT PLAN

To provide a mechanism to address potential groundwater-related complaints, should any occur as quarry development proceeds, it is recommended that that a Complaint Management Plan be developed, and implemented, in the event of water shortages, or complaints, by adjacent landowners. Upon consultation with the Ministry of Environment and Climate Change (MOECC), the Plan should include the following components:

- Investigation of the complaint by a Qualified Hydrogeologist;
- If necessary, provision of temporary water supplies while the investigation is underway;
- If necessary, provision of remedies if complaints are validated by scientific evidence of a connection to quarry activity, with such remedies to include immediate suspension of impactful quarry activities linked to the problem and/or compensation for a replacement water supply of suitable performance.

8.5 SPILLS MANAGEMENT PLAN

To provide for overall effective management of extractive operations, it is recommended that the Operational Notes contained within the Site Plan include provision for a Spills Management Plan at the quarry, to provide direction to protect the Site and groundwater table from hazardous or designated substances.

As no chemical or fuel storage is planned at the Site, possible hazards will be limited to minor fuel and oil leaks and spills from trucks and/or hydraulic equipment.

The following operational note is recommended to be placed on the quarry Site Plan:

- "Prior to extractive operations, the licensee shall provide to the Ministry of Natural Resources and Forestry a completed Spills Management Plan. The plan shall include, as a minimum, a spills response plan, and a provision to immediately report any spill to the MOECC Spills Action Center".

9 CONCLUSION

WSP has completed a Hydrogeological Investigation of a proposed Category 4 Quarry on Part of Lots 19 and 20, Concession 8, Township of Galway-Cavendish and Harvey (Harvey Ward), County of Peterborough, Ontario. Details and interpretations were prepared based on information from published data and historic reports on adjacent quarry operations, and on additional drilling and groundwater monitoring data obtained in 2016.

The following are conclusions of this Report.

- Since the proposed quarry will be an above water table operation, with a minimum separation of 2 m between the base of the quarry and the established high groundwater table, measurable impacts on existing groundwater resources in the Site area are considered unlikely.

- Surface water resources in the Site area include two ephemeral drainage ditches, located at the northwest corner of the Site and traversing through the central-western part of the property. The northwest drainage ditch will be unaffected by the proposed operation, as it has been included within the setback area, and will not be disturbed by quarry activities. The central-western ditch is proposed to be relocated to the west, and then conducted south to its present outlet area at the southern section of the property. This planned re-routing of the ephemeral drainage course will maintain current runoff levels to road ditch areas and the down-gradient holdings.

- Seasonal groundwater fluctuations at the Site are expected to be consistent with historic trends (Appendix A) and generally within a 1 m or 2 m range. The Applicant will commit to a groundwater monitoring program to confirm these trends at the Site and, if necessary, adapt the quarry floor design to the observed conditions. If necessary, additional monitoring wells can be installed to assess the effects of quarry development, as staged extraction occurs.

The following recommendations are provided, based on the findings of this Report.

- Based on requirements for a Category 4 Quarry, the design base grade for the proposed quarry should be set at least 2 m above groundwater contours shown on Figure 7.

- It is recommended that the water monitoring program discussed in Section 8.2 be implemented. Monitoring results shall be used to modify the quarry floor to elevation, if necessary, to maintain the 2 m required separation from the highest groundwater table.

- It is recommended that the various recommendations outlined in sections pertaining to Adaptive Management, Complaint Management Plan and the Spills Management Plan be incorporated into Operational Notes of the Site Plan.

10 CLOSURE

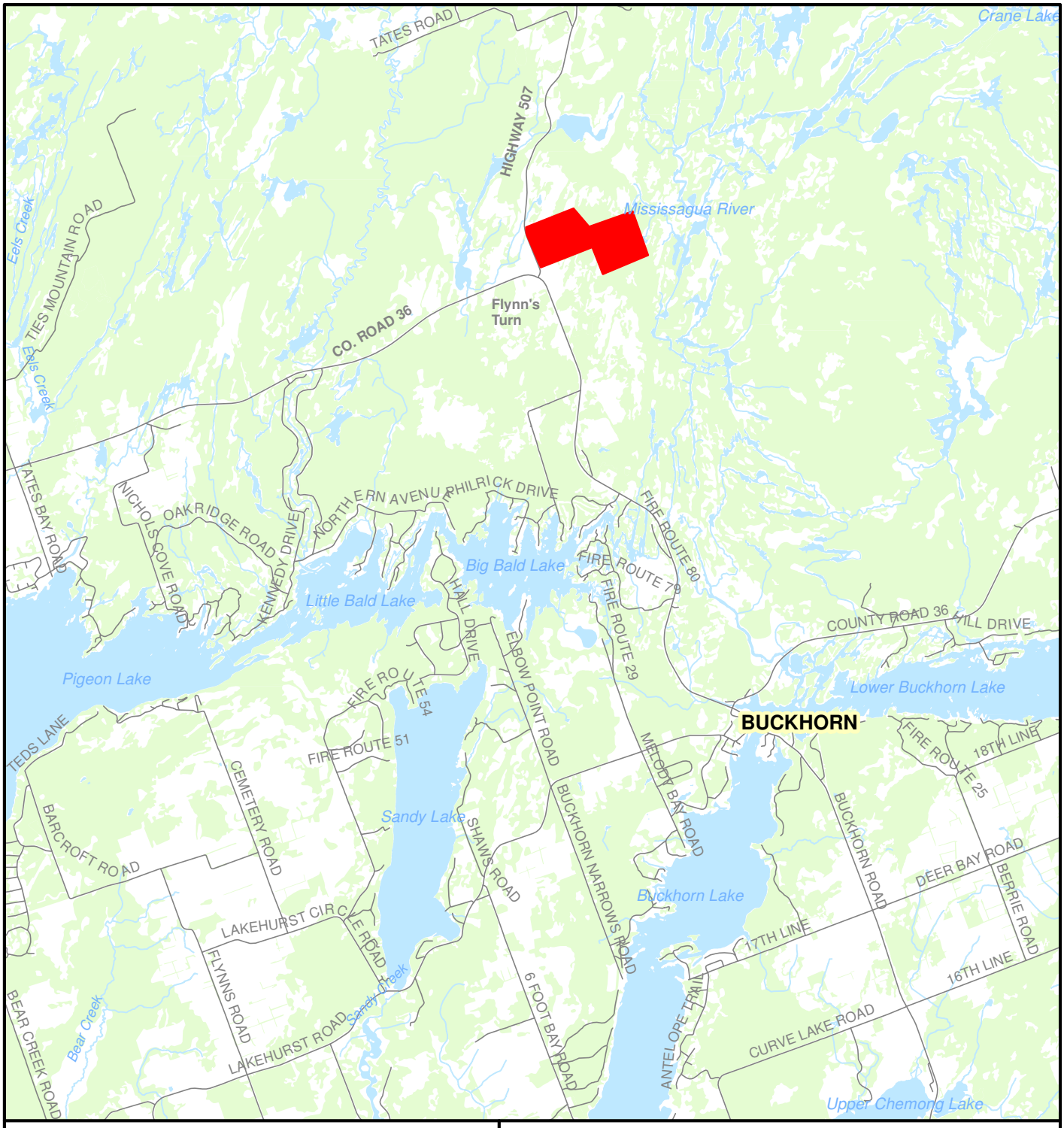
We trust this report meets the requirements of 2329059 Ontario Inc. Should you have any questions please do not hesitate in contacting the undersigned

Prepared by:
WSP Canada Inc.

Bernie Fuhrmann
Project Lead

J. Stephen Ash, P. Eng., P.Geo.
Director – Environment

FIGURES



LEGEND

APPROXIMATE SITE LOCATION

N
W E
S

800 400 0 800 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.

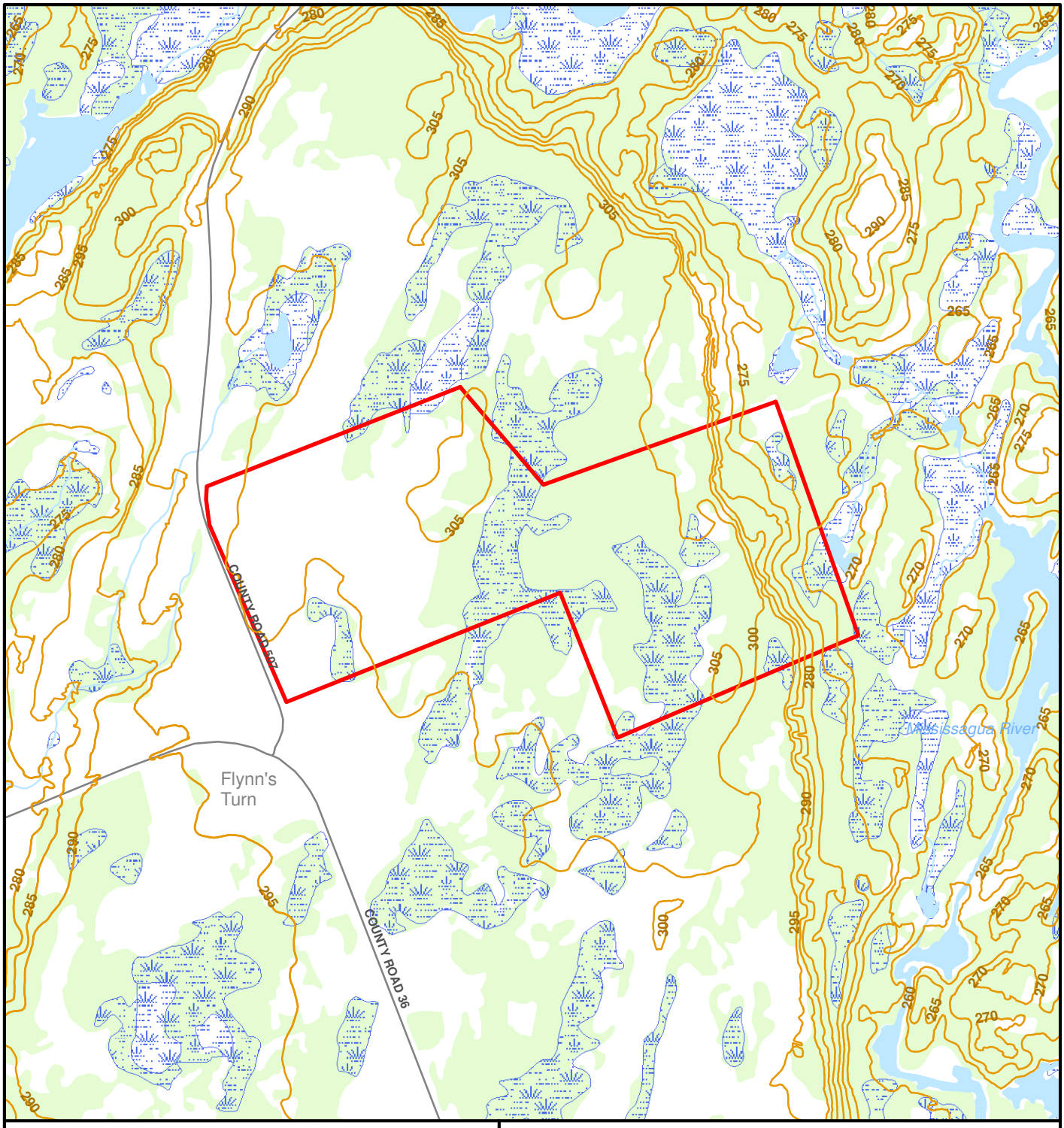
SITE LOCATION MAP

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRUARY 2017	SCALE: 1:80000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F1

WSP

FIGURE 1



LEGEND

- APPROXIMATE SITE LOCATION
- WETLANDS
- WATERBODIES
- WATERCOURSE
- TOPOGRAPHIC CONTOURS (mASL) (5 m INTERVAL)

N
W E
S

150 75 0 150 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.

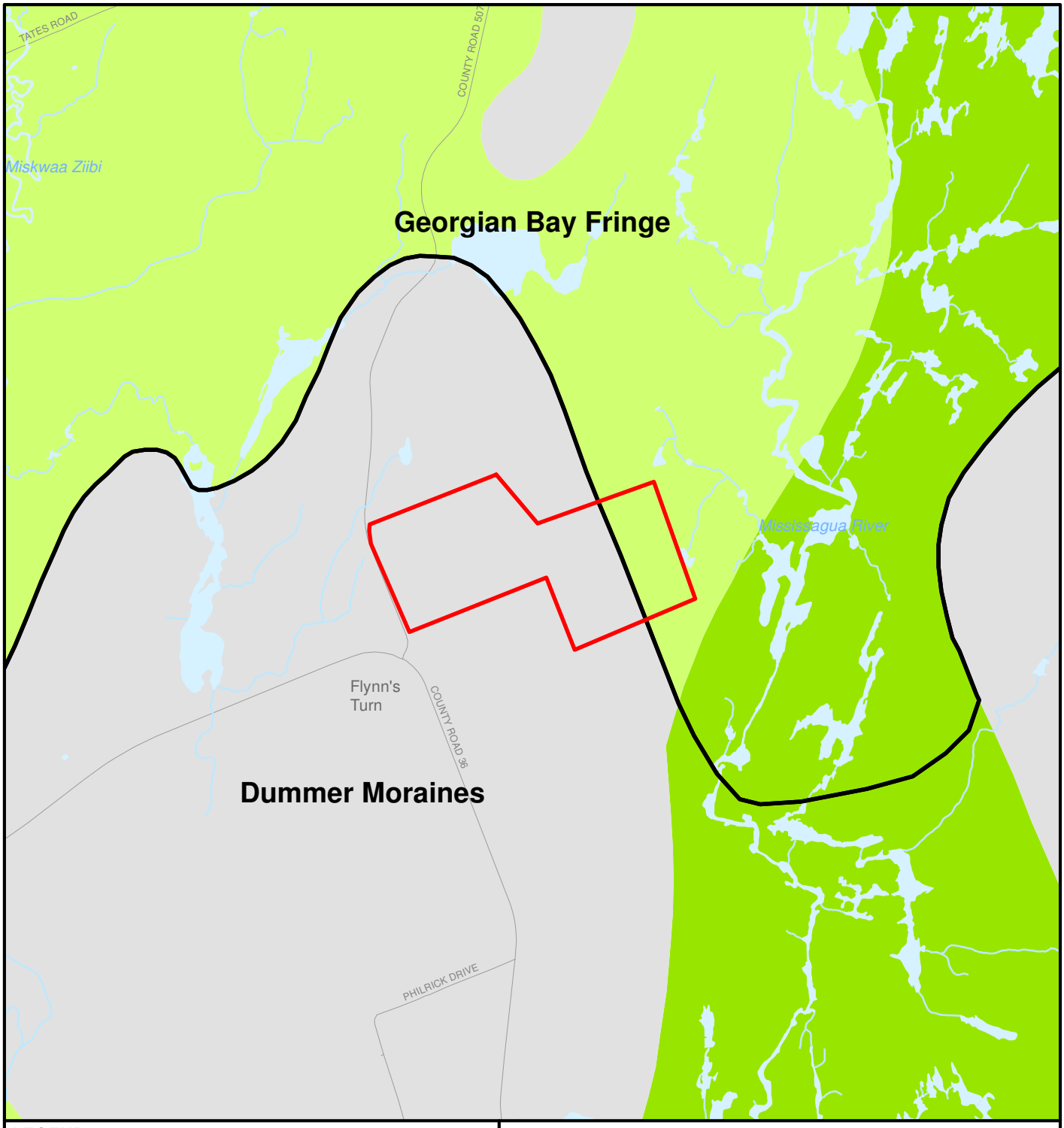
GENERAL TOPOGRAPHY

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRUARY 2017	SCALE: 1:15000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F2

WSP

FIGURE
2



LEGEND

- APPROXIMATE SITE LOCATION
- BARE ROCK RIDGES AND SHALLOW TILL
- SHALLOW TILL AND ROCK RIDGES
- LIMESTONE PLAINS
- PHYSIOGRAPHIC REGION BOUNDARY

N
W E
S

300 150 0 300 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

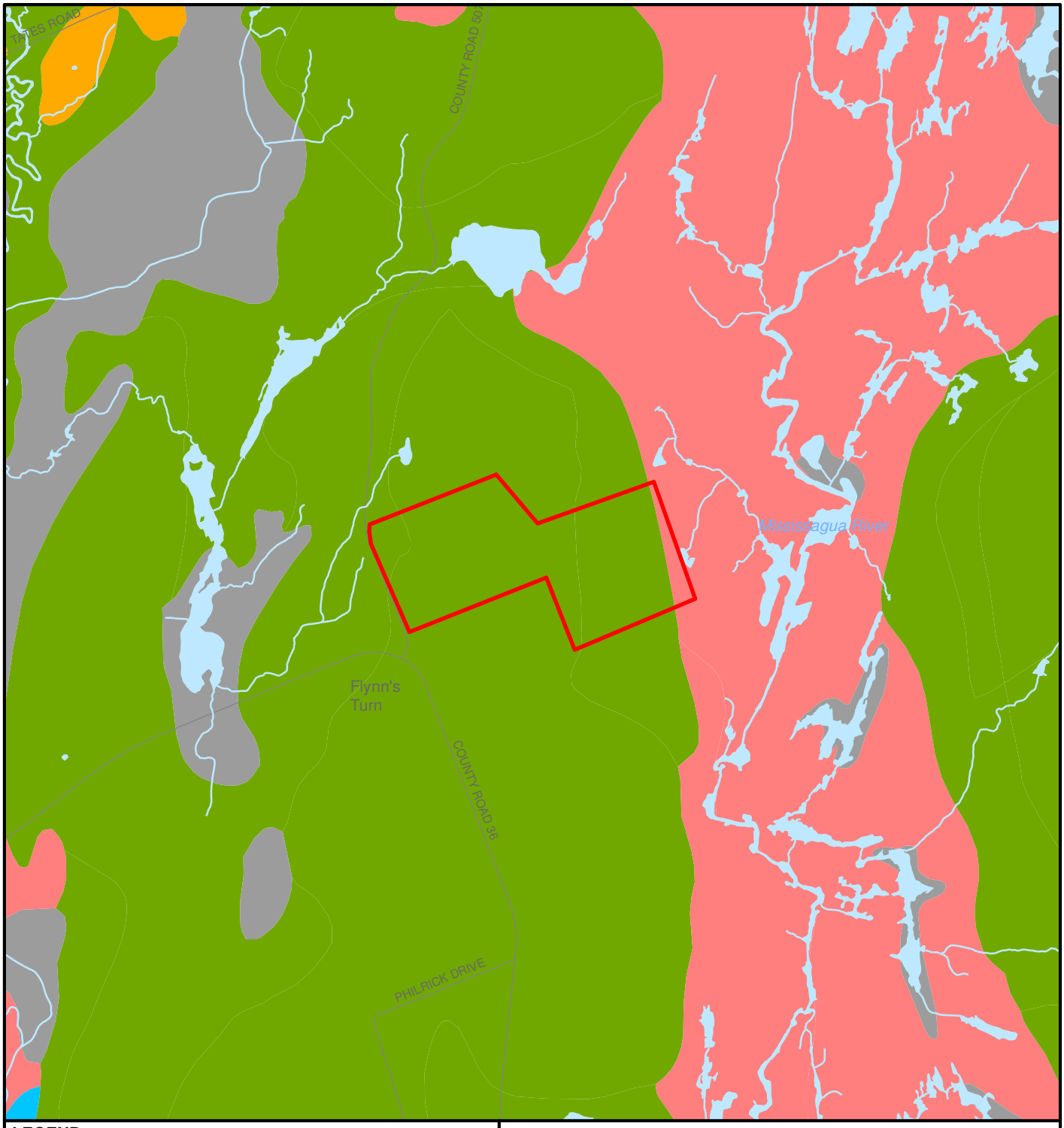
PHYSIOGRAPHY

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRUARY 2017	SCALE: 1:30000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F3

WSP

FIGURE 3



LEGEND

- APPROXIMATE SITE LOCATION
- WATERCOURSE
- WATERBODIES
- PRECAMBRIAN BEDROCK
- DIAMICTON - SILT TO SANDY SILT
- GRAVEL
- ORGANIC DEPOSITS
- SILT

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Surficial Geology of Southern Ontario, MRD 128-REV, Ontario Geological Survey, Ministry of Northern Development and Mines.

N
W E
S

300 150 0 300 Metres

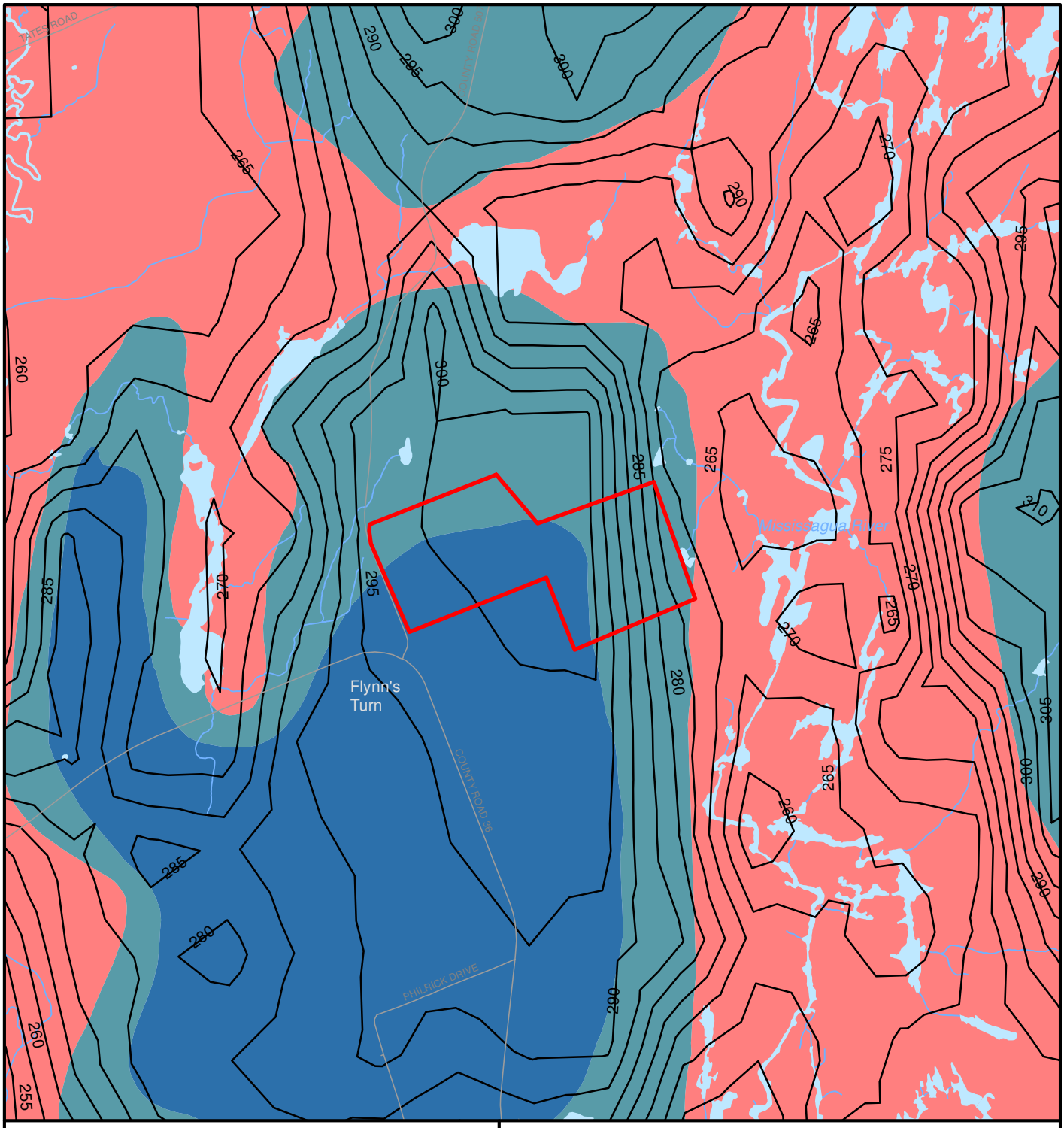
SURFICIAL GEOLOGY

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRUARY 2017	SCALE: 1:30000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F4

WSP

FIGURE 4



LEGEND

- APPROXIMATE SITE LOCATION
- BOBCAYGEON FORMATION
- GULL RIVER FORMATION
- PRECAMBRIAN BEDROCK
- BEDROCK ELEVATION (mASL) (5m INTERVAL)
- WATERBODIES
- WATERCOURSE

N
W E
S

300 150 0 300 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Bedrock Topography and Overburden Thickness Mapping, Southern Ontario, MRD 207, Ministry of Northern Development and Mines.
Paleozoic Geology of Southern Ontario, MRD 219, Ministry of Northern Development and Mines.

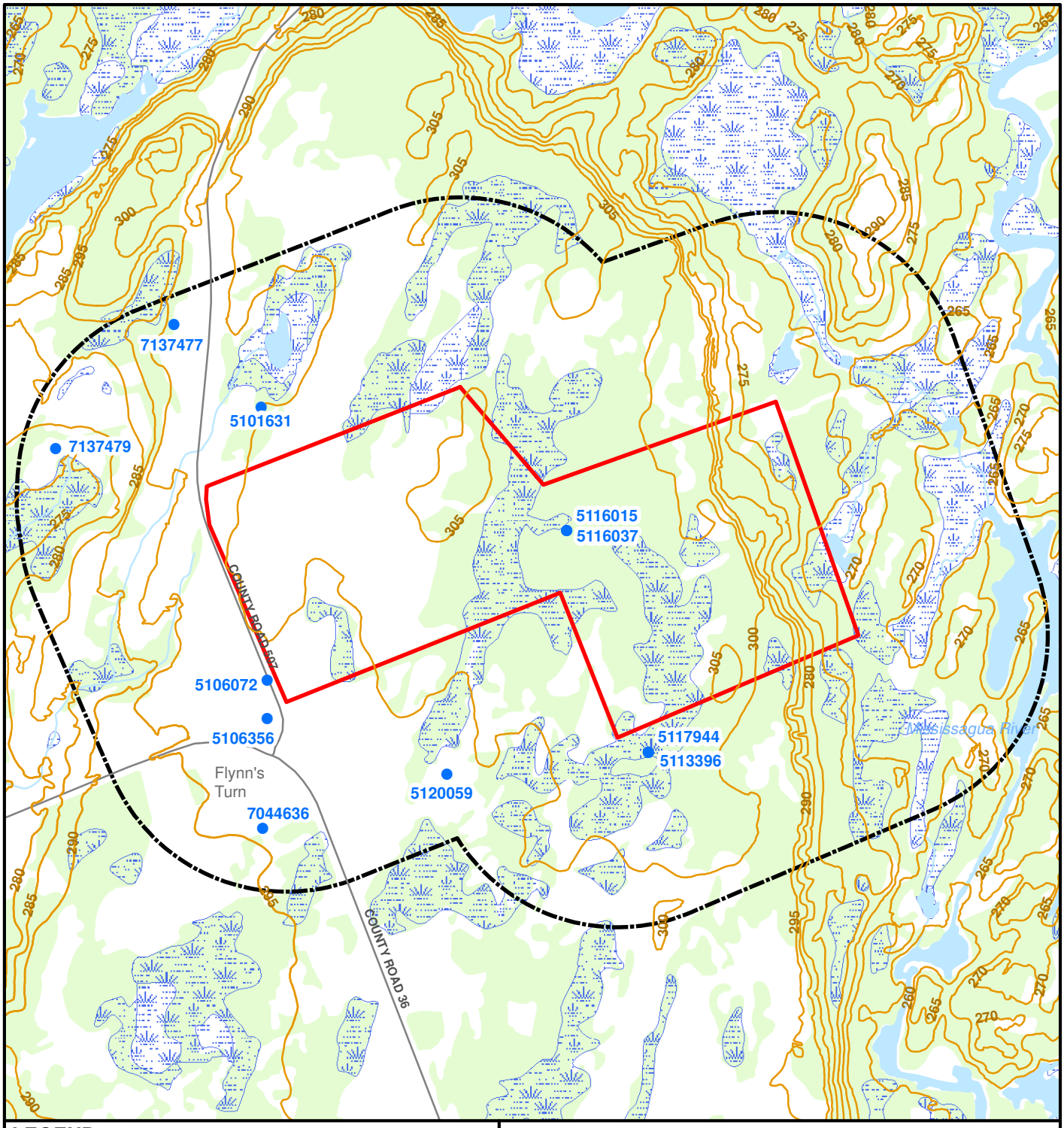
BEDROCK TOPOGRAPHY AND GEOLOGY

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRURY 2017	SCALE: 1:30000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F5

WSP

FIGURE 5



LEGEND

- APPROXIMATE SITE LOCATION
- 500 m SITE RADIUS
- WETLANDS
- WATERBODIES
- WATERCOURSE
- TOPOGRAPHIC CONTOURS (mASL) (5 m INTERVAL)
- MOECC WATER WELL LOCATION (BASED ON MOECC COORDINATES THAT MAY CONTAIN SIGNIFICANT ERRORS)

N
W E
S

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.

150 75 0 150 Metres

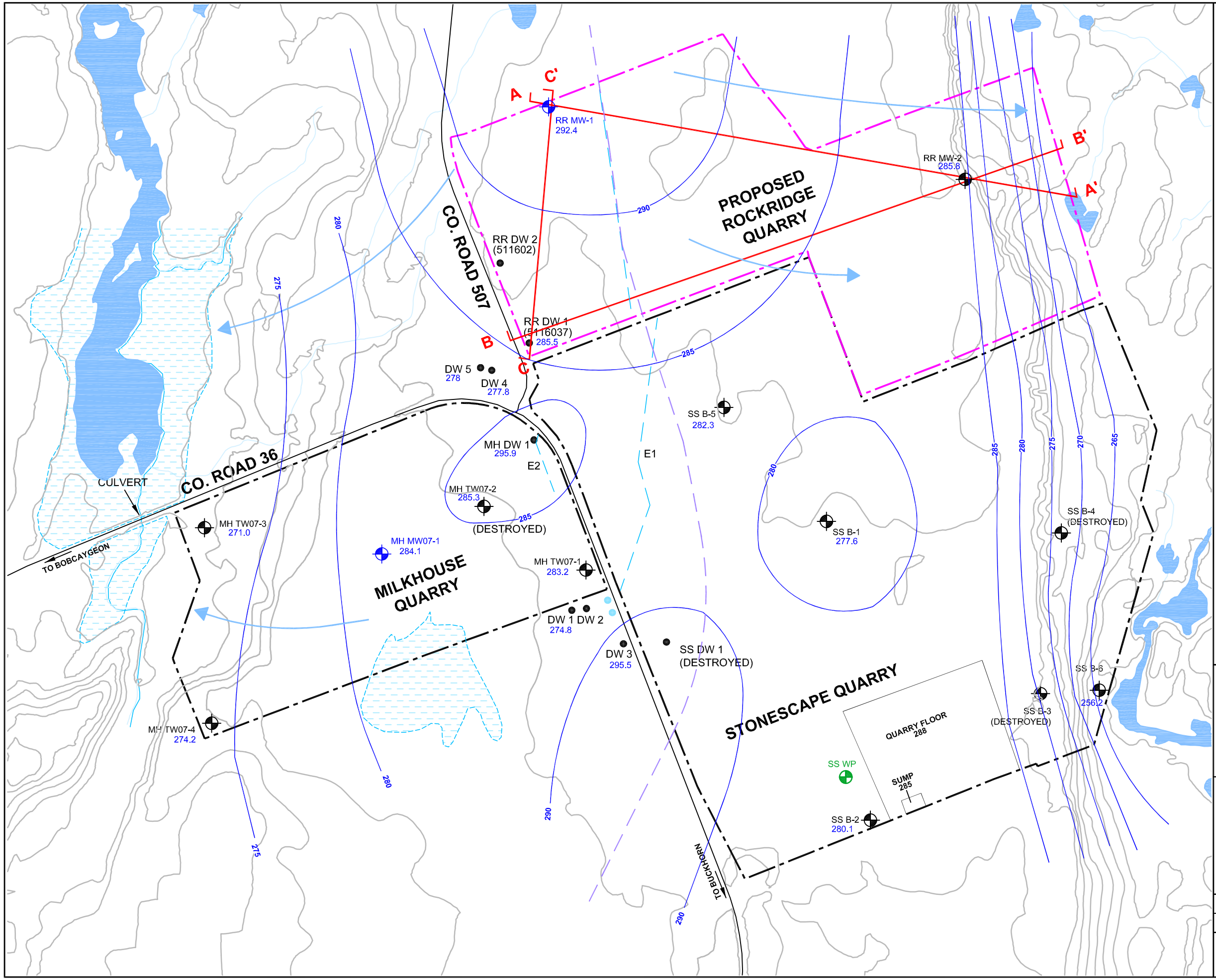
MOECC WATER WELL LOCATIONS (APPROXIMATE)

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: FEBRUARY 2017	SCALE: 1:15000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F6

WSP

FIGURE 6



LEGEND

- PROPOSED ROCKRIDGE QUARRY BOUNDARY
- EXISTING QUARRY BOUNDARIES
- DW1 — DOMESTIC WATER WELL LOCATION AND DESIGNATION
- B-1 — MONITORING WELL LOCATION AND DESIGNATION
- MW07-1 — CORED HOLE AND DESIGNATION
- WP — WASH POND STAFF GAUGE LOCATION
- UNEVALUATED WETLAND
- EPHEMERAL DRAINAGE
- PRIVATE POND
- A — A' — LINE OF CROSS SECTION
- 280.9 — WATER LEVEL (AS AT DECEMBER 2, 2016)
- 280 — INFERRED GROUNDWATER ELEVATION CONTOUR (mASL)
- INFERRED GROUNDWATER FLOW DIRECTION (BASED ON DECEMBER 2, 2016 MONITORING DATA)
- DRAINAGE DIVIDE

LOCATION ID

SS - STONESCAPE

MH - MILKHOUSE

RR - ROCKRIDGE

100 0 200 metres

MAP SOURCE:
OBM SHEET, 10 17 7050 49400, NAD 27, UTM, 1990.

BOREHOLE LOCATION PLAN AND INFERRED GROUNDWATER FLOW SYSTEM

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

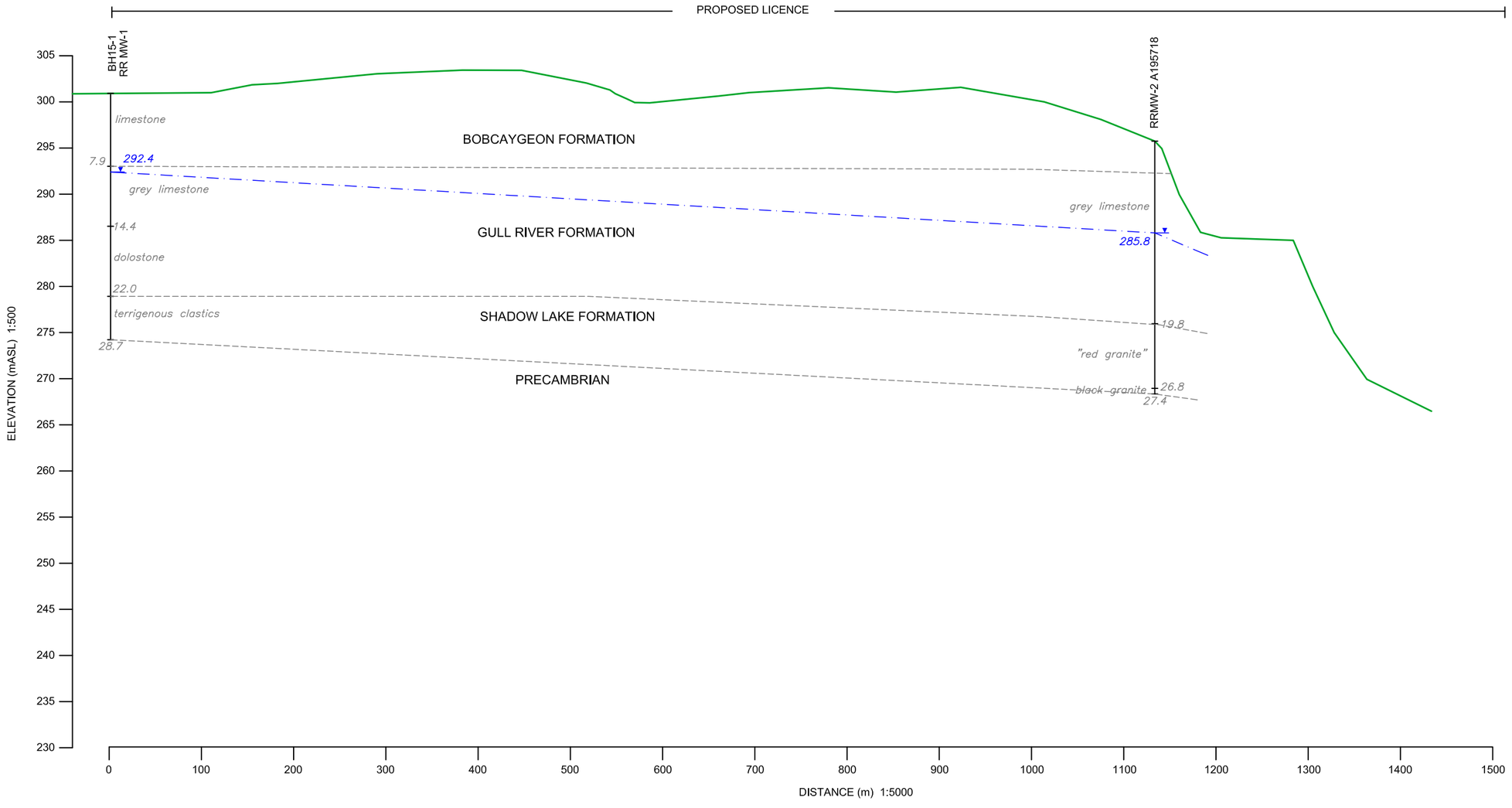
DATE: MARCH 2017	SCALE: 1:10000
PROJECT: 161-00461-00 100	FILE. NO.:161-00461-00 100 F7-GW

WSP

FIGURE 7

A North-West

A' South-East



LEGEND

BH15-1 — WELL DESIGNATION

GROUND SURFACE

STATIC WATER LEVEL (DECEMBER 2, 2016) IN mASL

CHANGE IN STRATIGRAPHY

26.8 — END OF BORING (mBGL)

NOTE:
THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE WATER WELL LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS. WELL DATA IS PROJECTED ONTO THE SECTION WHICH ALSO MAY CREATE SOME IRREGULARITIES IN CONTACT DEPTHS.

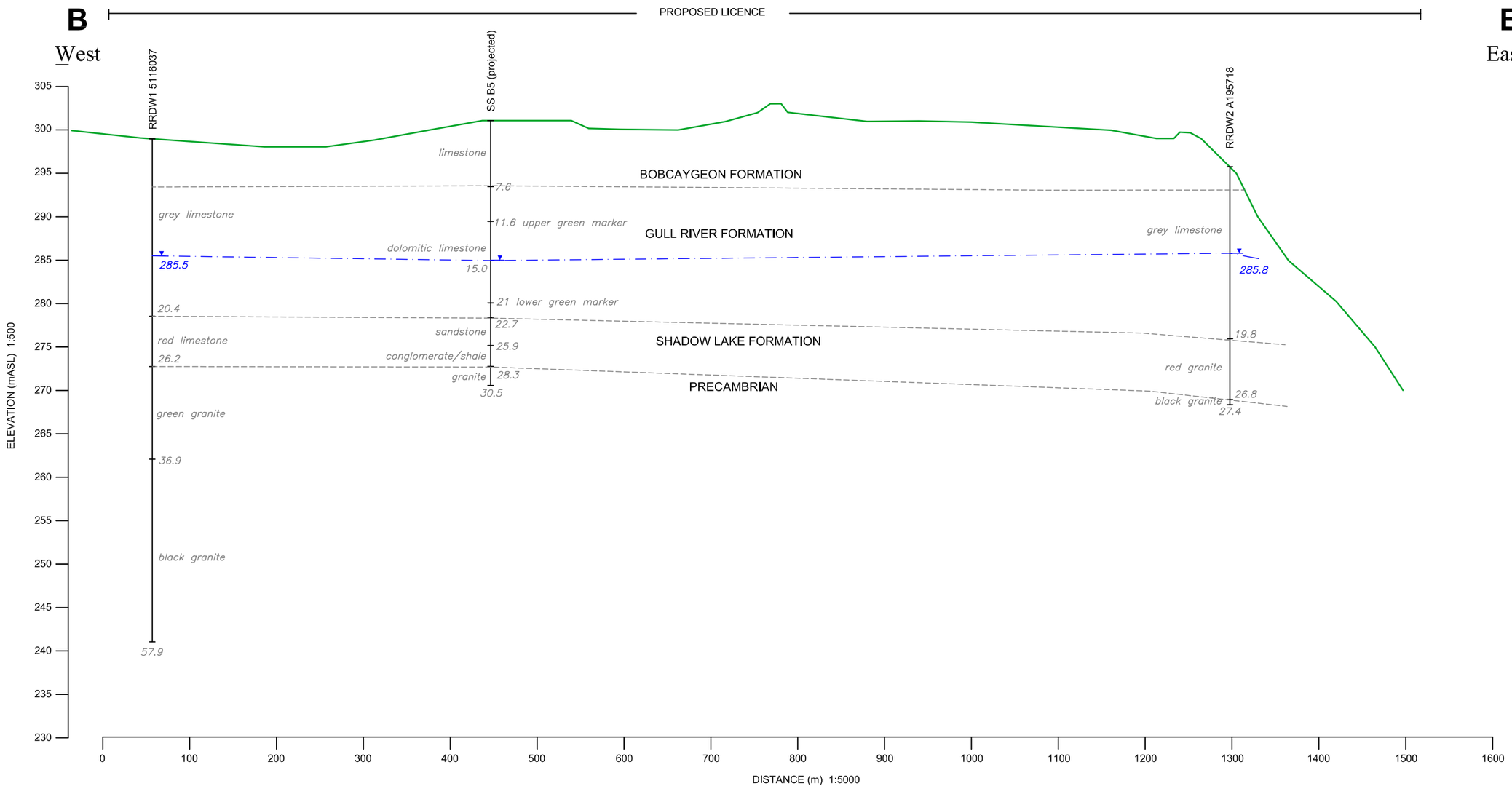
CROSS SECTION A-A'

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: MARCH 2017	SCALES: AS SHOWN
PROJECT: 161-00461-00 110	FILE NO.: 161-00461-00 110 F8 CR

WSP

FIGURE 8



LEGEND

6413379

WELL DESIGNATION

GROUND SURFACE

STATIC WATER LEVEL (DECEMBER 2, 2016) IN mASL

CHANGE IN STRATIGRAPHY

END OF BORING (mBGL)

26.8

NOTE:
THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE WATER WELL LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS. WELL DATA IS PROJECTED ONTO THE SECTION WHICH ALSO MAY CREATE SOME IRREGULARITIES IN CONTACT DEPTHS.

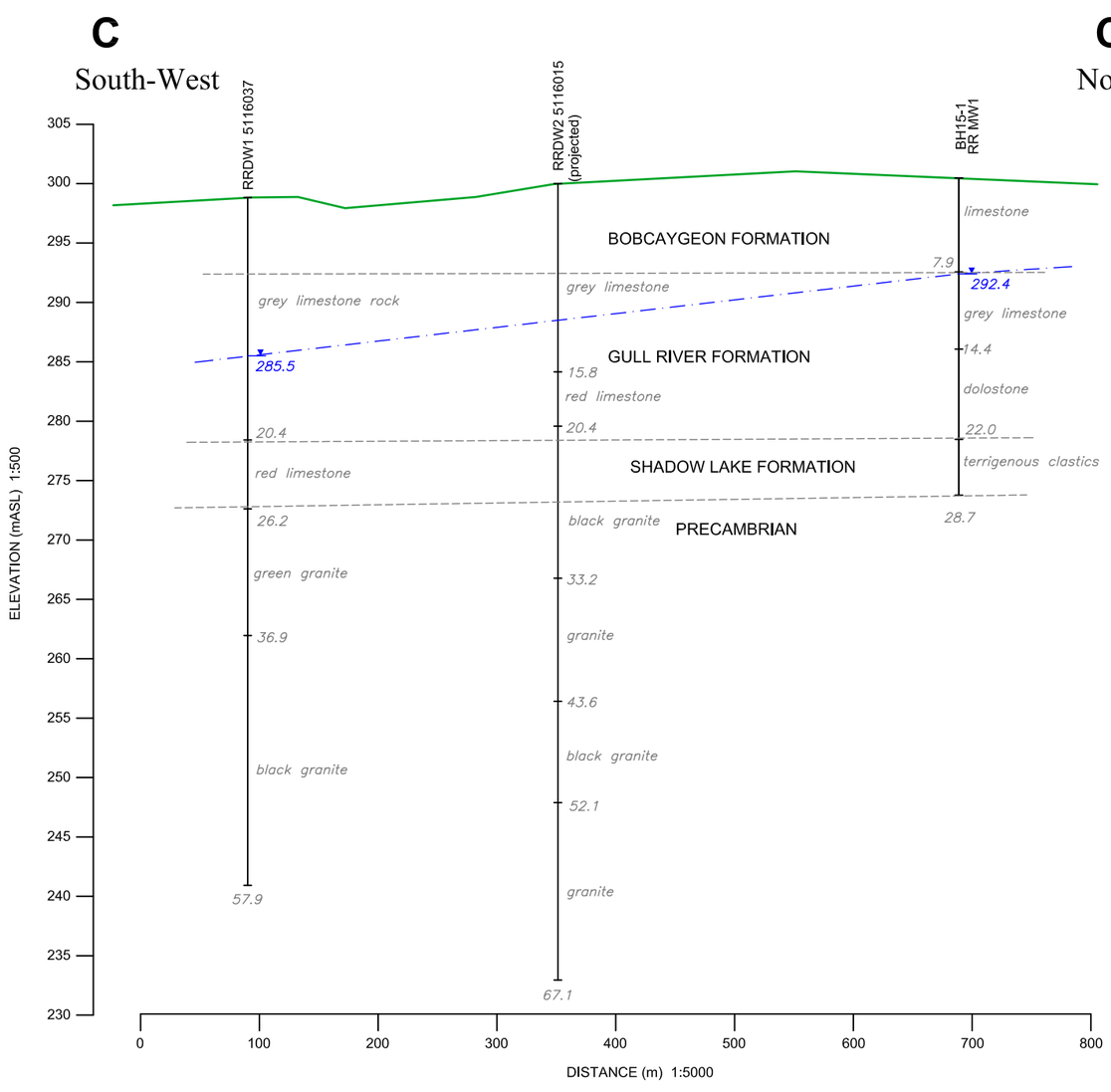
CROSS SECTION B-B'

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

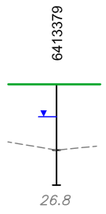
DATE: MARCH 2017	SCALES: AS SHOWN
PROJECT: 161-00461-00 110	FILE NO.: 161-00461-00 110 F9 CR

WSP

FIGURE 9



LEGEND



WELL DESIGNATION

GROUND SURFACE

STATIC WATER LEVEL (DECEMBER 2, 2016) IN mASL

CHANGE IN STRATIGRAPHY

END OF BORING (mBGL)

NOTE:
THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE WATER WELL LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS. WELL DATA IS PROJECTED ONTO THE SECTION WHICH ALSO MAY CREATE SOME IRREGULARITIES IN CONTACT DEPTHS.

CROSS SECTION C-C'

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: MARCH 2017	SCALES: AS SHOWN
PROJECT: 161-00461-00 110	FILE NO.: 161-00461-00 110 F10 CR

WSP

FIGURE 10

Appendix A

GROUNDWATER DATA

RR MW-1
RR MW-2
RR DW 2 (511602)
RR DW 1 (5116037)
ROCKRIDGE QUARRY
CO. ROAD 507
DW 5
DW 4
SS B-5
MH DW 1
E1
E2
CO. ROAD 36
CULVERT
MH TW07-2
(DESTROYED)
SS B-1
MH TW07-3
MH MW07-1
SS B-4
(DESTROYED)
TO BOBCAYGEON
MH TW07-1
MILKHOUSE QUARRY
DW 1 DW 2
DW 3
SS DW 1
(DESTROYED)
STONESCAPE QUARRY
SS B-3
MH TW07-4
SS B-3
(DESTROYED)
SS WP
SS B-2
TO BUCKHORN

LEGEND

- PROPOSED LICENSED BOUNDARY
- EXISTING QUARRY BOUNDARIES
- DW1 — DOMESTIC WATER WELL LOCATION AND DESIGNATION
- B-1 — MONITORING WELL LOCATION AND DESIGNATION
- MW07-1 — CORED HOLE AND DESIGNATION
- WP — WASH POND STAFF GAUGE LOCATION
- UNEVALUATED WETLAND
- EPHEMERAL DRAINAGE
- PRIVATE POND

LOCATION ID

SS - STONESCAPE

MH - MILKHOUSE

RR - ROCKRIDGE

N

100 0 200 metres

MAP SOURCE:
OBM SHEET, 10 17 7050 49400, NAD 27, UTM, 1990.

MONITORING WELL LOCATIONS

HYDROGEOLOGICAL ASSESSMENT
PROPOSED ROCKRIDGE QUARRY
Trent Lakes, Ontario
For 2329059 Ontario Inc.

DATE: MARCH 2017	SCALE: 1:10000
PROJECT: 161-00461-00 110	FILE. NO.:161-00461-00 110 FA-1

WSP

FIGURE A-1

TABLE 1: WATER LEVEL MONITORING SUMMARY
2016 MONITORING PROGRAM
Buckhorn Quarry
Our File: 111-53125-01 / 161-03753-00

Monitor Identification No.	Figure 1 Identification No.	Reference Elevation (masl)	Monitor Depth (mbgl)	Maximum Measured Water Level (mASL)
B1	B-1	297.7	28.60	280.9
B2	B-2	294.8	30.96	282.7
B3	B-3	278.0	15.50	275.0
B4	B-4	277.0	15.50	272.3
B5	B-5	298.0	30.50	284.3
B6	B-6	258.0	10.10	257.5
WP (Wash Pond)	WP	298.0		298.8
W-1	2	296.0	73.90	281.4
FW1 (Washroom)	10	299.0		291.1
FW2 (House)	11	299.0		280.2
LLNW	6	299.0		286.7
BW1	8	297.0		282.5
BW2	7	297.0		295.9
BW3	18	296.0		295.3
Miller	9	298.0		297.0
TW07-1	TW07-1	299.6	24.6	284.9
TW07-2	TW07-2	294.9	36.6	286.0
TW07-3	TW07-3	274.6	18.3	271.4
TW07-4	MW07-1	292.4	27.3	286.1
TW07-5	TW07-4	288.6	30.5	274.9
RRMW1		301.5		291.8
RRMW2		298.0		0.0

Notes:
1) Reference elevations inferred from topographic site plan (0.5 m contour interval).
2) D = Destroyed.
3) N/A = Not Available
4) mbgl = metres below ground level ; mASL = metres above seal level

FIGURE 2
Buckhorn Quarry
Hydrographs

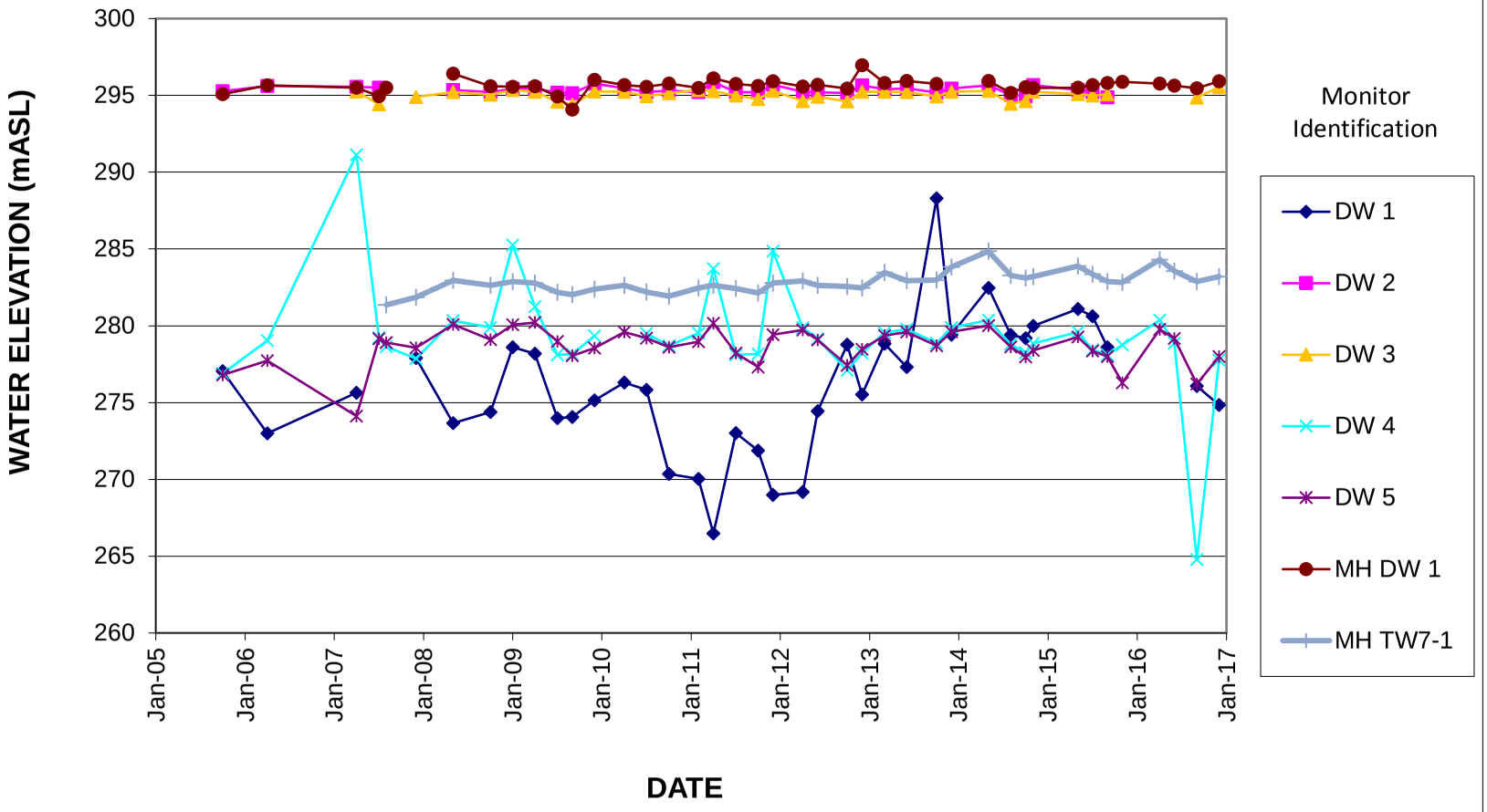


FIGURE 3
Buckhorn Quarry
Hydrographs

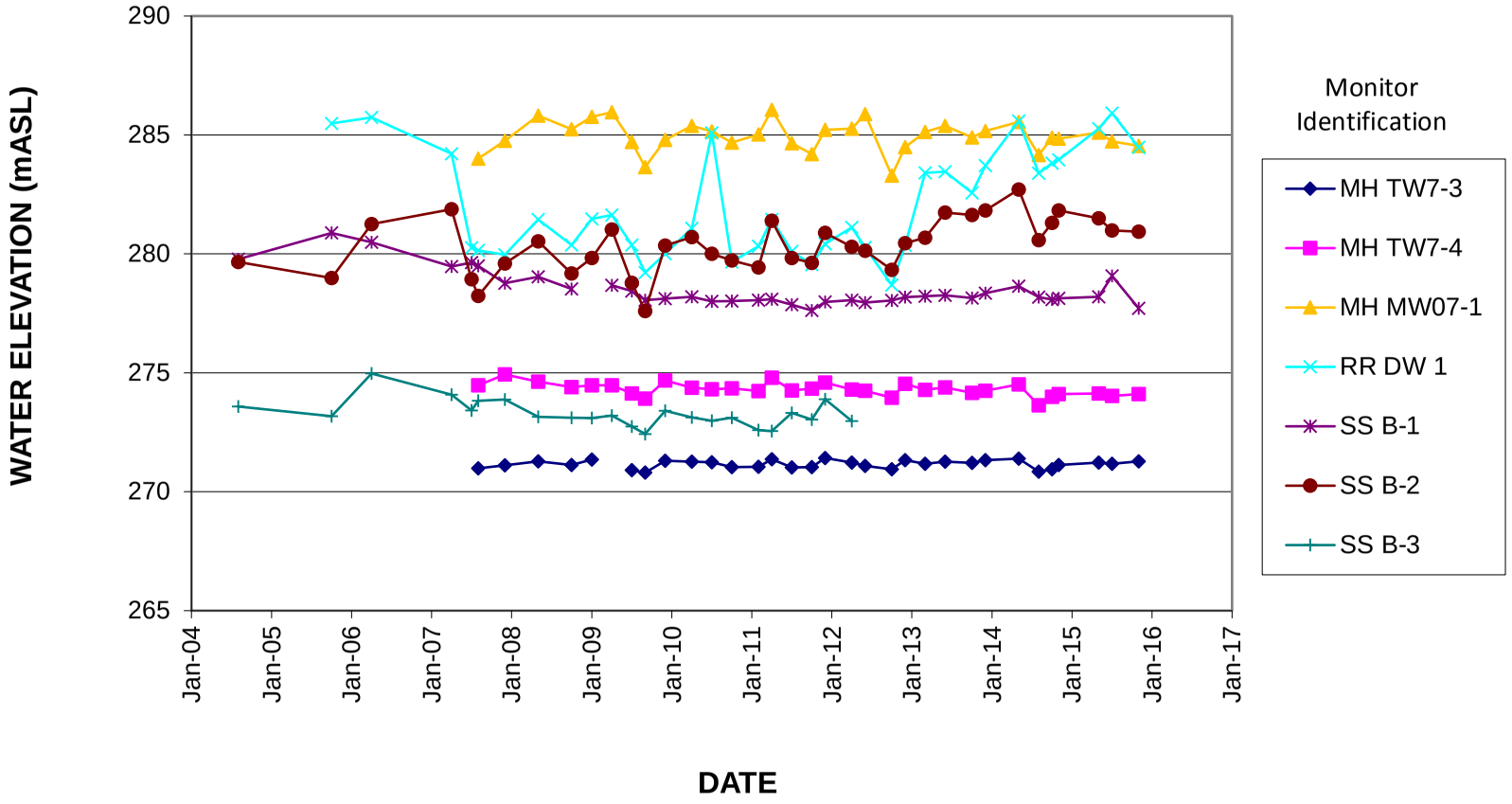
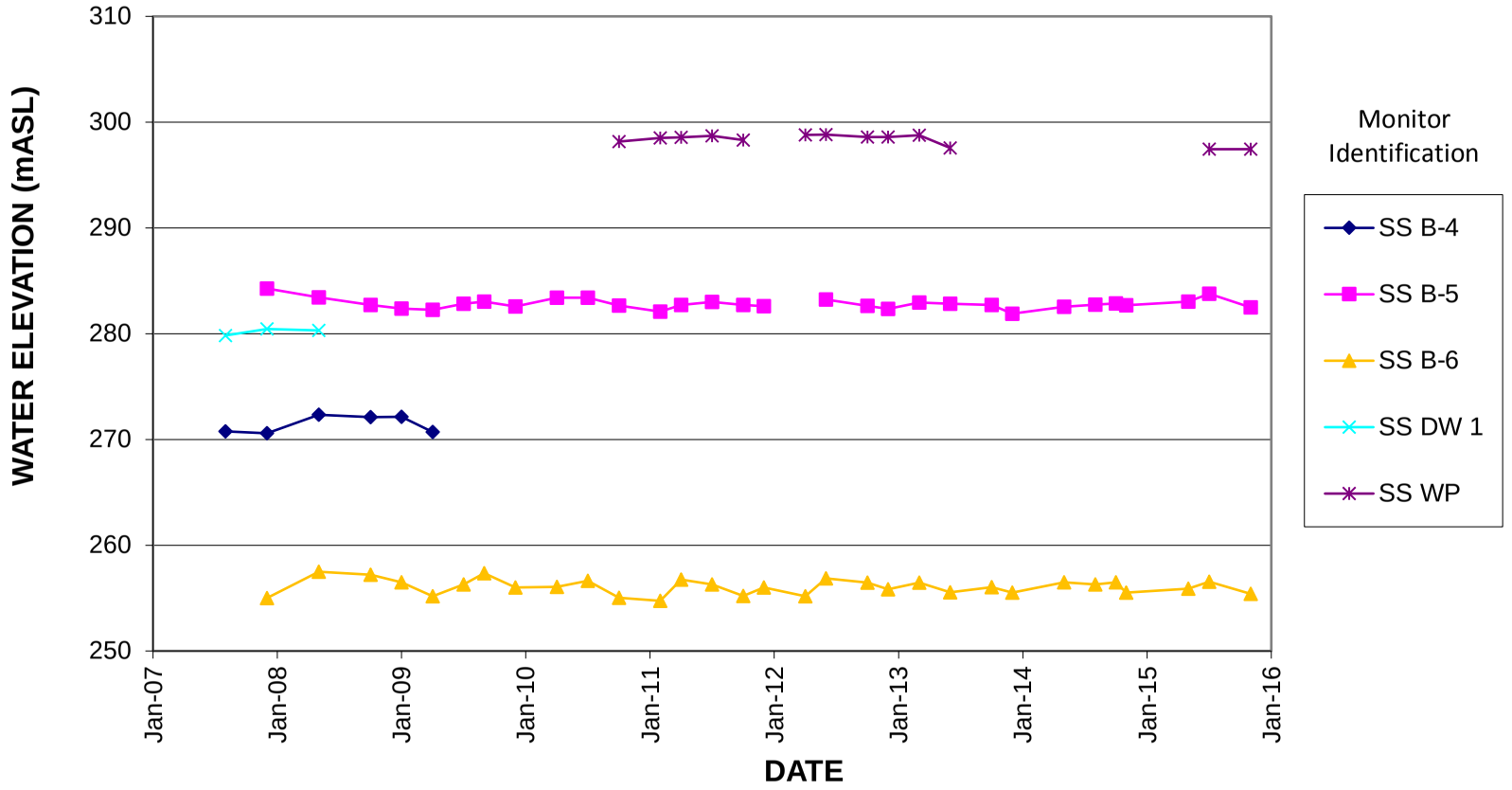


FIGURE 4
Buckhorn Quarry
Hydrographs



Appendix B

SITE AND CORE SAMPLE PHOTOGRAPHS

Photograph 1: Partial View of Eastern Escarpment

Photograph 2: General View of Forested Interior

Photograph 3:View of Spring 2016 Ephemeral Drainage at North-Central Part of Site

Photograph 4: View of Spring 2016 Ephemeral Drainage on South Side of Forest Access Road

Photograph 5:View of Part of Ephemeral Drainage Collection Area, Created by Past Grading of Overburden

Photograph 6: View of Ephemeral Drainage Flowing from Collection Area to the South Toward Proposed License Boundary

Photograph 7: View of Drainage Swale at Northeast Corner of Site

Photograph 8: View of Culvert Under County Road 507 from Drainage Swale

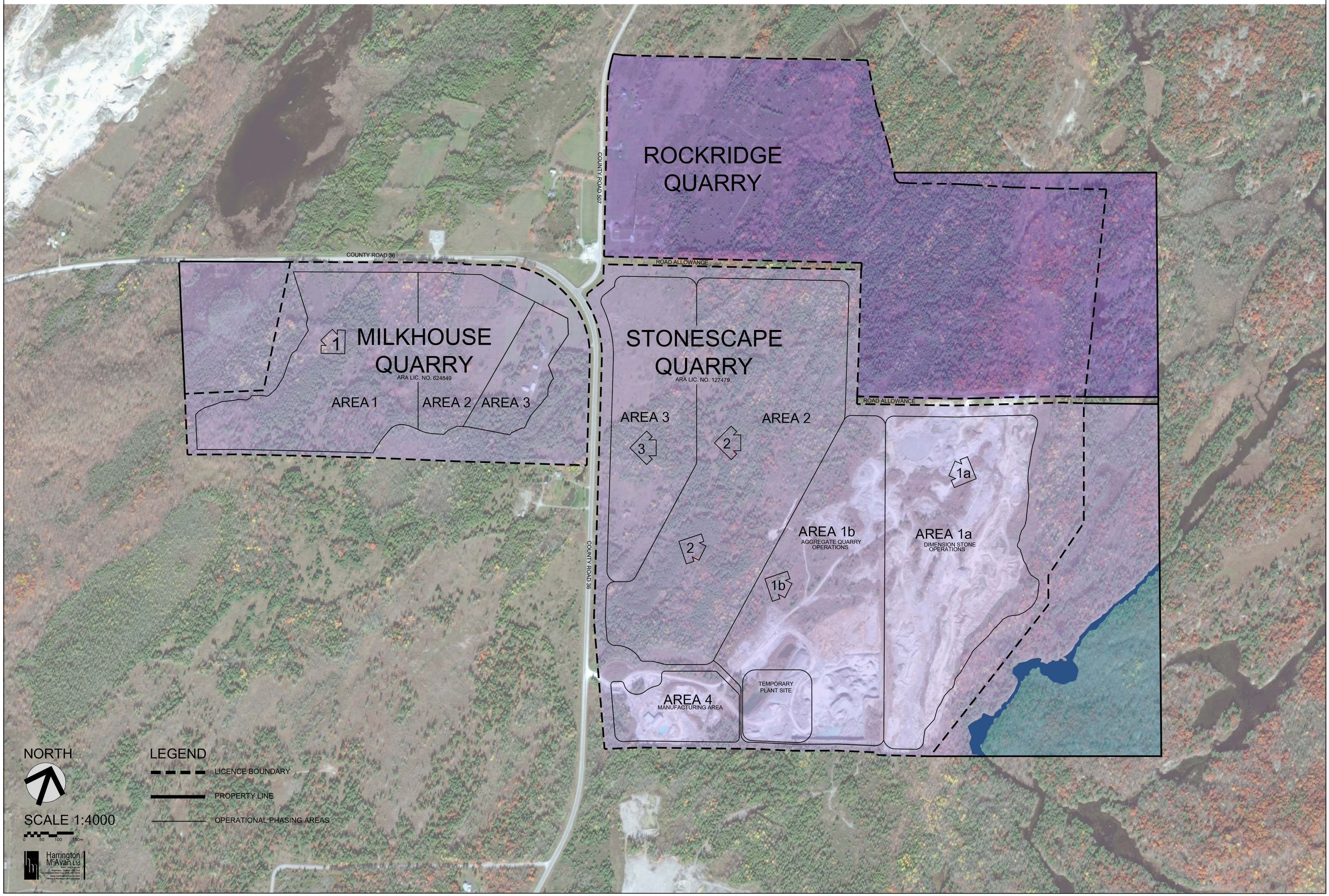
Photograph 9: Photo of Part of Cored Limestone Sampled from BH15-1 (RRMW#1)

Photograph 10: Photo of Part of Cored Limestone Sampled from BH15-1 (RRMW#1)

Appendix C

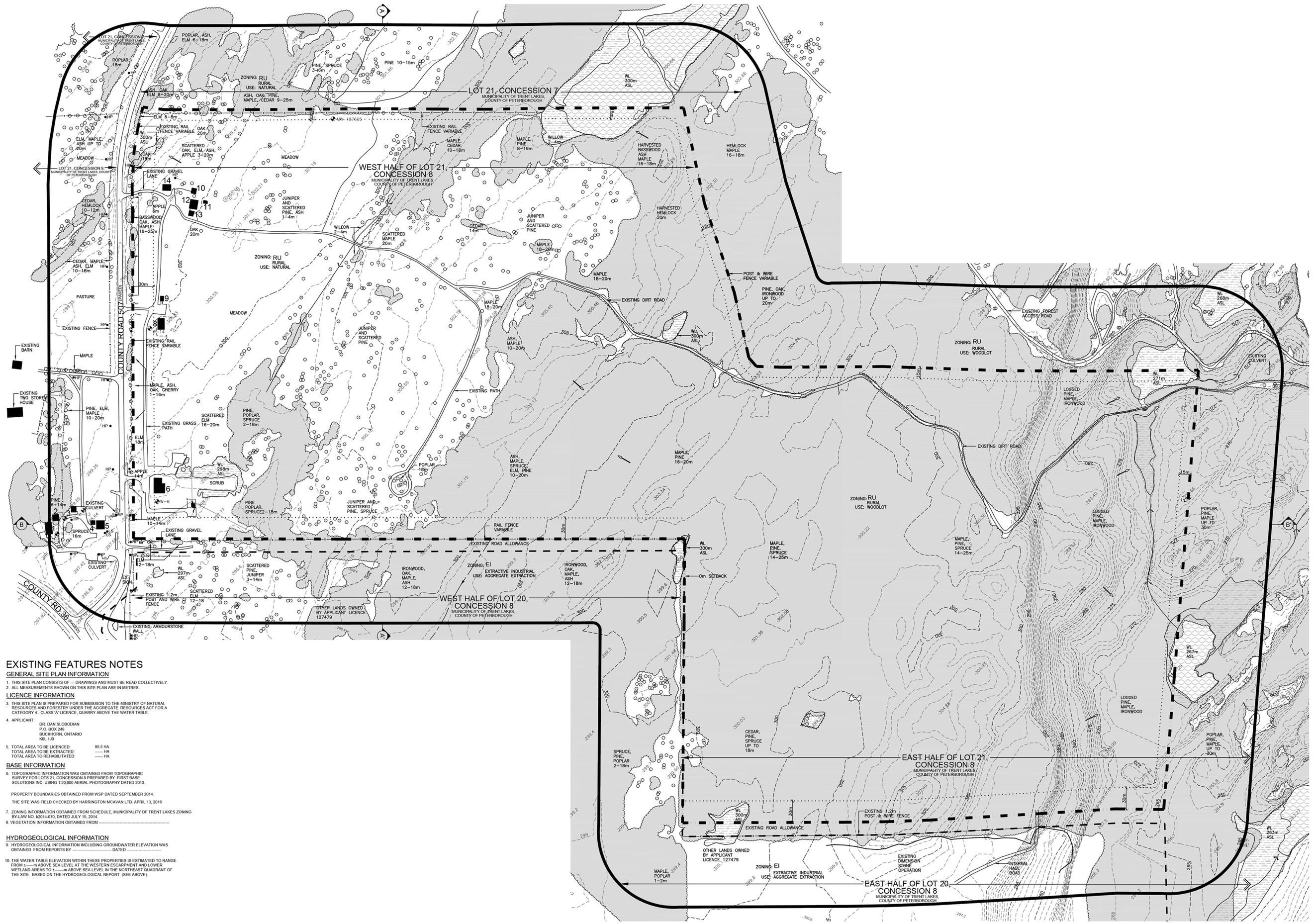
FLYNN'S TURN QUARRIES GROUP SKETCH

FLYNN'S CORNERS QUARRIES



Appendix D

ROCKRIDGE SITE PLAN (PROPOSED)



EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF ... DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES AND FORESTRY UNDER THE AGGREGATE RESOURCES ACT FOR A CATEGORY 4 - CLASS 'A' LICENCE, QUARRY ABOVE THE WATER TABLE.
4. APPLICANT:
   DR. DAN SLOBODIAN
   P.O. BOX 249
   BUCKHORN, ONTARIO
   K0L 1J0
5. TOTAL AREA TO BE LICENCED: 95.5 HA
   TOTAL AREA TO BE EXTRACTED: ..... HA
   TOTAL AREA TO REHABILITATED: ..... HA

BASE INFORMATION

6. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM TOPOGRAPHIC SURVEY FOR LOTS 21, CONCESSION 8 PREPARED BY FIRST BASE SOLUTIONS INC. USING 1:20,000 AERIAL PHOTOGRAPHY DATED 2013.

   PROPERTY BOUNDARIES OBTAINED FROM WSP DATED SEPTEMBER 2014.

   THE SITE WAS FIELD CHECKED BY HARRINGTON MCAVAN LTD. APRIL 13, 2016

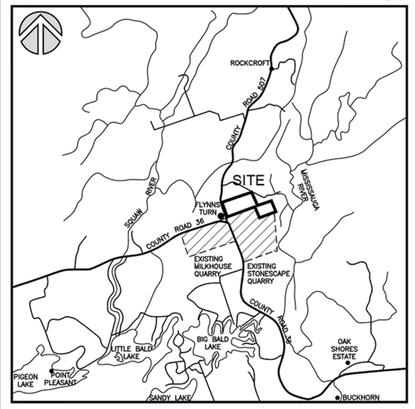
7. ZONING INFORMATION OBTAINED FROM SCHEDULE, MUNICIPALITY OF TRENT LAKES ZONING BY-LAW NO. b2014-070, DATED JULY 15, 2014.
8. VEGETATION INFORMATION OBTAINED FROM .....

HYDROGEOLOGICAL INFORMATION

9. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORTS BY ..... DATED .....
10. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO RANGE FROM +/-.....m ABOVE SEA LEVEL AT THE WESTERN ESCARPMENT AND LOWER WETLAND AREAS TO +/-.....m ABOVE SEA LEVEL IN THE NORTHEAST QUADRANT OF THE SITE. BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

KEY MAP

N.T.S.



LEGEND

- 120m INFORMATION BOUNDARY
- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF LICENCE 127479
- REGULATORY SETBACK LINE
- LOT/ CONCESSION LINE
- EXISTING FENCE
- EXISTING WATERCOURSE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- EXISTING QUARRY OPERATION
- 1 EXISTING BUILDING AND NUMBER
- HP EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- MW MONITORING WELL INSTALLED BY APPLICANT ON FEBRUARY 27, 2016
- W-1 EXISTING WELLS

BUILDING LIST

No.	
1.	HOUSE
2.	GARAGE
3.	GARAGE
4.	SHED
5.	STORE
6.	ADMINISTRATION BUILDING
7.	TOWER BUILDING
8.	HOUSE
9.	GARAGE
10.	SHED
11.	SHED
12.	STORAGE BUILDING
13.	GARAGE
14.	HOUSE

NO.	DATE	REVISIONS	OWNER	HM	MHR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MHR

Site Plan Amendments

Harrington McAvan Ltd
6882 14th Avenue
Markham, Ontario L6B 1A8
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com
Offices in Markham & Cambridge

Project Name

ROCKRIDGE QUARRY

LICENCE No._____

APPLICANT'S SIGNATURE_____

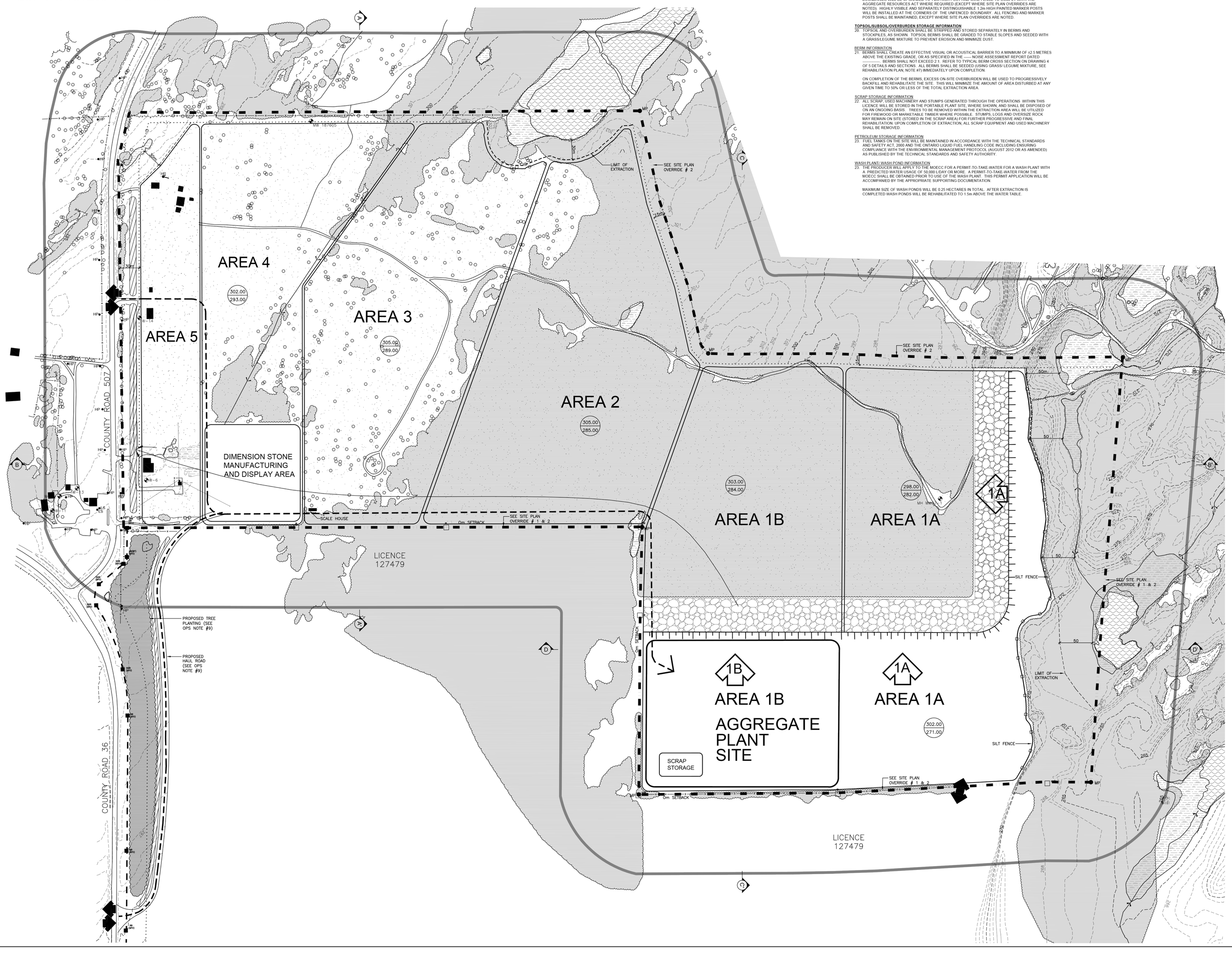
LOT 21, CONCESSION 8, (FORMERLY GALWAY-CAVENDISH & HARVEY TOWNSHIP) MUNICIPALITY OF TRENT LAKES, COUNTY OF PETERBOROUGH

Scale 1:2000 (0 10 50 80m)	**North**	**Stamp**
Drawing Status PRELIMINARY FOR DISCUSSION		
Drawn S.B.	**Checked** G.D.H./	**Issue Date**
Drawing Title EXISTING FEATURES PLAN		**Project Number** 16-01
		Drawing Number 1 OF

FILE NAME:16-01/COMP/160-1.DWG
PLOT DATE: APRIL 19, 2016

PHASE A

1. ESTABLISH MAIN COMMERCIAL ENTRANCE/EXIT TO COUNTY ROAD 35 AND SECONDARY ENTRANCE TO COUNTY ROAD 507 ACCORDING TO APPROPRIATE MUNICIPAL STANDARDS, ESTABLISH SCALES, SCALEHOUSE, AS SHOWN ON THE SITE PLAN AND HAUL ROAD INTO THE SITE.
2. PRIOR TO EXTRACTION COMMENCING IN AREA 1A AND 1B, CONSTRUCT OR UPGRADE THE FENCING ALONG THE WEST AND PART OF THE NORTH PERIMETER OF THE SITE TO THE STANDARDS OF THE ACT, AS REQUIRED.
3. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1A AND 1B AND CONSTRUCT WEST PERIMETER BERM AS SHOWN.
4. PRIOR TO DIMENSION STONE EXTRACTION BEGINNING IN AREA 1, INSTALL SILT FENCE AT DRIPLINE OF TREES ALONG EXISTING EAST BOUNDARY. SILT FENCE WILL BE INSTALLED PROGRESSIVELY AS STRIPPING MOVES IN A NORTHERLY DIRECTION. BEGIN DIMENSION STONE EXTRACTION IN AREA 1A AND 1B IN DIRECTION SHOWN. TRANSPORT WASTE ROCK TO PROCESSING PLANT FOR PROCESSING.
5. BEGIN EXTRACTION IN AREA 1A AND 1B IN DIRECTION SHOWN USING A SINKING CUT TO ESTABLISH THE QUARRY FLOOR AND FACE, AND PROCESS THE ROCK IN ORDER TO PRODUCE A VARIETY OF MATERIALS TO MEET MARKET DEMANDS. PORTABLE PROCESSING PLANT AND STOCKPILING AREA WILL BE LOCATED IN AREA 1B.
6. CONTINUE EXTRACTION OF AREA 1A IN THE DIRECTIONS SHOWN AND PROCESS AND STOCKPILE MATERIALS ON THE QUARRY FLOOR.
7. AREAS 2, 3, 4, AND 5 REMAIN UNDISTURBED EXCEPT FOR THE MANUFACTURING AREA.



OPERATIONS NOTES CONTINUED

HYDROGEOLOGICAL INFORMATION

12. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY ---- DATED ---- 201-.
13. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE BETWEEN ±------ AND ±------m ABOVE SEA LEVEL (A.S.L.) BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).
14. SURFACE DRAINAGE ON THE QUARRY FLOOR WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO EXISTING WETLANDS.

NOISE MITIGATION INFORMATION

15. ACOUSTICAL INFORMATION WAS OBTAINED FROM NOISE REPORT BY ....., DATED ..... (REFER TO SHEET 4 FOR TECHNICAL RECOMMENDATIONS).
16. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 09:00-15:00 SATURDAYS
EXCAVATION AND PROCESSING:	07:00-19:00 WEEKDAYS; 09:00-15:00 SATURDAYS
SHIPPING TO MARKET:	NO RESTRICTIONS

EXTRACTION AND PROCESSING ACTIVITIES ON SITE ON SATURDAYS AND SUNDAYS SHALL BE LIMITED TO MAINTENANCE ONLY.

AIR QUALITY INFORMATION

17. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

18. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

19. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 5 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE FENCE TO COMPLY WITH THE AGGREGATE RESOURCES ACT WHERE REQUIRED (EXCEPT WHERE SITE PLAN OVERRIDES ARE NOTED). HIGHLY VISIBLE AND SEPARATELY DISTINGUISHABLE 1.2m HIGH PAINTED MARKER POSTS WILL BE INSTALLED AT THE CORNERS OF THE UNFENCED BOUNDARY. ALL FENCING AND MARKER POSTS SHALL BE MAINTAINED, EXCEPT WHERE SITE PLAN OVERRIDES ARE NOTED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

20. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS AND STOCKPILES, AS SHOWN. TOPSOIL BERMS SHALL BE GRADED TO STABLE SLOPES AND SEEDED WITH A GRASS/LEGUME MIXTURE TO PREVENT EROSION AND MINIMIZE DUST.

BERM INFORMATION

21. BERMS SHALL CREATE AN EFFECTIVE VISUAL OR ACOUSTICAL BARRIER TO A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE, OR AS SPECIFIED IN THE ------ NOISE ASSESSMENT REPORT DATED ---------- BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 4 OF 5 DETAILS AND SECTIONS. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION.

ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. THIS WILL MINIMIZE THE AMOUNT OF AREA DISTURBED AT ANY GIVEN TIME TO 50% OR LESS OF THE TOTAL EXTRACTION AREA.

SCRAP STORAGE INFORMATION

22. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE PORTABLE PLANT SITE, WHERE SHOWN, AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. TREES TO BE REMOVED WITHIN THE EXTRACTION AREA WILL BE UTILIZED FOR FIREWOOD OR MARKETABLE TIMBER WHERE POSSIBLE. STUMPS, LOGS AND OVERSIZE ROCK MAY REMAIN ON SITE (STORED IN THE SCRAP AREA) FOR FURTHER PROGRESSIVE AND FINAL REHABILITATION. UPON COMPLETION OF EXTRACTION, ALL SCRAP, EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

23. FUEL TANKS ON THE SITE WILL BE MAINTAINED IN ACCORDANCE WITH THE TECHNICAL STANDARDS AND SAFETY ACT, 2000 AND THE ONTARIO LIQUID FUEL HANDLING CODE INCLUDING ENSURING COMPLIANCE WITH THE ENVIRONMENTAL MANAGEMENT PROTOCOL (AUGUST 2012 OR AS AMENDED) AS PUBLISHED BY THE TECHNICAL STANDARDS AND SAFETY AUTHORITY.

WASH PLANT/ WASH POND INFORMATION

23. THE PRODUCER WILL APPLY TO THE MOECC FOR A PERMIT-TO-TAKE-WATER FOR A WASH PLANT WITH A PREDICTED WATER USAGE OF 50,000 L/DAY OR MORE. A PERMIT-TO-TAKE-WATER FROM THE MOECC SHALL BE OBTAINED PRIOR TO USE OF THE WASH PLANT. THIS PERMIT APPLICATION WILL BE ACCOMPANIED BY THE APPROPRIATE SUPPORTING DOCUMENTATION.

MAXIMUM SIZE OF WASH PONDS WILL BE 0.25 HECTARES IN TOTAL. AFTER EXTRACTION IS COMPLETED WASH PONDS WILL BE REHABILITATED TO 1.5m ABOVE THE WATER TABLE.

IMPORTATION OF TOPSOIL INFORMATION

25. IN ORDER TO MAXIMIZE RESOURCE RECOVERY, IMPORTATION OF CLEAN INERT FILL (EG. TOPSOIL AND/OR OVERBURDEN) MAY BE IMPORTED TO FACILITATE 3:1 SIDESLOPE REHABILITATION (ABOVE WATER TABLE SIDESLOPES). ONLY NATIVE ON SITE OVERBURDEN AND/OR OFF-SPEC MATERIALS WILL BE USED FOR BELOW WATER REHABILITATION. ONLY SUFFICIENT MATERIAL TO CREATE FINAL GRADES AS SHOWN MAY BE IMPORTED.

IMPORTED MATERIAL SHALL MEET THE MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE'S PARAMETERS UNDER TABLE "1" OF MOECC'S "SOIL, GROUND WATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT"

SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. QP WILL ALSO DESIGN FILL MONITORING PROGRAM (PER L3 NOTES). RANDOM SAMPLING OF ALL IMPORTED MATERIAL SHALL BE CONDUCTED AT THE REQUEST OF MNRF.

THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MOECC.

NATURAL ENVIRONMENT INFORMATION

26.

REFER TO DRAWING 4 OF 5 FOR TECHNICAL RECOMMENDATIONS

LEGEND

- 120m INFORMATION BOUNDARY
- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF EXISTING ADJACENT LICENCE
- REGULATORY SETBACK LINE
- LOT/CONCESSION LINE
- LIMIT OF EXTRACTION
- EXISTING FENCE
- EXISTING WATERCOURSE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- 285 EXISTING 5m CONTOUR LINE
- 284 EXISTING 1m CONTOUR LINE
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- PROPOSED BUFFER ZONE REFORESTATION
- UNDISTURBED AREA
- SILT FENCE
- EXISTING BUILDING
- HP EXISTING HYDRO POLE
- ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- R3 LOCATION OF NOISE RECEPTOR
- 296.00 / 290.00 EXISTING ELEVATION / PROPOSED ELEVATION
- MP PROPOSED MARKER POST

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT, NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE, DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRED APPROVAL FROM MNRF.

2. REFER TO DRAWING 1 OF 5, EXISTING FEATURES, FOR A DESCRIPTION OF EXISTING VEGETATION AND BUILDINGS WITHIN THE 120 METRE BOUNDARY AND ON SITE.
3. SITE PLAN OVERRIDES ARE LISTED IN THE SITE PLAN OVERRIDE TABLE SHOWN ON THIS PAGE.

RESOURCE INFORMATION

4. RESOURCE INFORMATION IS OBTAINED FROM ARIP MAPPING, GEOLOGICAL MAPPING, AND BOREHOLES DRILLED BY APPLICANT FEBRUARY 27, 2016.

EXTRACTION/PROCESSING/HAULING INFORMATION

5. TOTAL AREA TO BE EXTRACTED IS ±8.2 HECTARES.
6. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS 1,500,000 TONNES.
7. EXTRACTION OF THE BOBCAYGEON FORMATION WILL TAKE PLACE IN ONE ±5.5-7.0m BENCH. THE EXTRACTION OF THE UNDERLYING GULL RIVER FORMATION WILL TAKE PLACE IN TWO OR THREE BENCHES OF ±7.0 TO 10.0M (BENCHES MAY BE COMBINED BUT WILL NOT EXCEED 25M IN HEIGHT) TO A MAXIMUM DEPTH OF ±270.00 TO 293m A.S.L. (2M ABOVE THE WATER TABLE) AND WILL INCLUDE DRILLING AND BLASTING OF BEDROCK, LOADING WITH FRONT END LOADERS AND TRANSPORTING BY TRUCK OR CONVEYOR TO THE PLANT FOR FURTHER PROCESSING. REFER TO SECTIONS ON DRAWING 4 OF 5, FOR FURTHER DETAILS.

DUE TO THE QUALITY, JOINT THICKNESS, OR THE MARKET DEMANDS ON THE LIMESTONE PRODUCTS (I.E. DIMENSION STONE), EXTRACTION OPERATIONS MAY EXIST WITHIN MORE THAN ONE AREA. THE EXTRACTION PRIORITY WILL BE TO SEQUENTIALLY DEPLETE RESOURCES WITHIN EACH AREA BY EXTRACTING THE DIMENSION STONE WITH MECHANICAL EQUIPMENT, ASSISTED PERIODICALLY BY LOW LEVEL BLASTING METHODS.

PORTABLE PROCESSING EQUIPMENT FOR WASHING, SCREENING, AND CRUSHING FOR RECYCLING WILL BE USED ON SITE AND WILL BE LOCATED ON THE QUARRY FLOOR. OTHER EQUIPMENT TO BE USED IN THE OPERATION OF THE QUARRY MAY INCLUDE TRUCKS, LOADERS, EXCAVATORS, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT.

TEMPORARY STOCKPILES MAY BE LOCATED NEAR THE QUARRY FACE. PROCESSING EQUIPMENT, STACKERS AND PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED IN THE PLANT SITE AND/OR CLOSE TO QUARRY FACES.

MATERIAL FROM OTHER LICENCED PROPERTIES (EG. SAND) MAY BE IMPORTED INTO THE SITE FOR BLENDING AND CUSTOM PRODUCTS.

8. PROPOSED SCALE AND SCALE HOUSE WILL BE CONSTRUCTED IN AREA 3, GREATER THAN 30m FROM LICENCE BOUNDARY.
9. ACCESS TO PUBLIC ROADS
TWO ENTRANCES FOR AGGREGATE EXTRACTION ARE PROPOSED:

1) UTILIZING A SERVICE ROAD THROUGH QUARRY LICENCE No. 127479 AS PER AGREEMENT WITH ADJACENT LICENSEE. ACCESS SHALL BE VIA AN ENTRANCE OFF COUNTY ROAD 36 (SUBJECT TO SITE PLAN AMENDMENT APPROVAL FOR LICENCE No. 127479). TWO GATES WILL BE MAINTAINED: ONE AT COUNTY ROAD 36 ENTRANCE AND ONE INTERNAL GATE AT THE SCALE HOUSE TO FACILITATE PARKING IF NECESSARY AND REDUCE THE NEED TO PARK ON THE SHOULDER OF COUNTY ROAD 36.

2) A SECONDARY ENTRANCE OFF COUNTY ROAD 507 WILL BE USED IF THE COUNTY ROAD 36 ENTRANCE IS NO LONGER AVAILABLE. THIS ENTRANCE WILL BE USED FOR MAINTENANCE, DELIVERY, AND LOGGING ACCESS IN THE MEANTIME AND WILL BE MAINTAINED AND GATED.

10. THERE MAY BE RECYCLING OF MATERIAL (ASPHALT AND CONCRETE) ON THIS SITE. MATERIAL IMPORTED FOR RECYCLING WILL BE STORED IN SEGREGATED STOCKPILES WITHIN THE PLANT SITE AREA. RECYCLABLE ASPHALT MATERIALS WILL NOT BE STOCKPILED WITHIN 30m OF ANY WATER BODY OR MAN-MADE POND, OR 2m OF THE SURFACE OF THE ESTABLISHED WATER TABLE. ANY REBAR AND OTHER STRUCTURAL METAL MUST BE REMOVED FROM THE RECYCLED MATERIAL DURING PROCESSING AND PLACED IN A DESIGNATED SCRAP PILE ON SITE WHICH WILL BE REMOVED ON AN ON-GOING BASIS. REMOVAL OF RECYCLED AGGREGATE IS TO BE ONGOING. ONCE THE AGGREGATE ON SITE HAS BEEN DEPLETED THERE WILL BE NO FURTHER IMPORTATION OF RECYCLABLE MATERIALS PERMITTED. ONCE FINAL REHABILITATION HAS BEEN COMPLETED AND APPROVED IN ACCORDANCE WITH THE SITE PLAN, ALL RECYCLING OPERATIONS MUST CEASE.
11. EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.

SITE PLAN OVERRIDE (VARIANCE)

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE OF THE PROVINCIAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT

ITEM	SECTION
1. SETBACK ALONG SOUTH BOUNDARY IS REDUCED TO 0m AS PER AGREEMENT WITH ADJACENT LICENSEE. SETBACK ALONG EAST BOUNDARY IS REDUCED TO 0m. LICENSEE OWNS ADJACENT LAND.	5.10.1
2. FENCING OMITTED ALONG SOUTH BOUNDARY AS PER AGREEMENT WITH ADJACENT LICENSEE. ALONG NORTHEAST BOUNDARY FROM WETLAND TO NORTHEAST CORNER AND EAST BOUNDARY DUE TO TOPOGRAPHICAL CONDITIONS.	5.1

NO.	DATE	REVISIONS	OWNER	HM	MHR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MHR

Site Plan Amendments

Harrington McAvan Ltd
6882 14th Avenue
Markham, Ontario L6B 1A8
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com
Offices in Markham & Cambridge

Project Name

ROCKRIDGE QUARRY

LICENCE No._____

APPLICANT'S SIGNATURE_____

LOT 21, CONCESSION 8, (FORMERLY GALWAY-CAVENDISH & HARVEY TOWNSHIP) MUNICIPALITY OF TRENT LAKES, COUNTY OF PETERBOROUGH

Scale 1:2000 (0 10 50 80m)	**North**	**Stamp**
Drawing Status PRELIMINARY FOR DISCUSSION		
Drawn A.C./S.B.	**Checked** G.D.H./ M.H.	**Issue Date**
Drawing Title OPERATIONAL PLAN PHASE A		**Project Number** 16-01
		Drawing Number 2 OF 5

FILE NAME:16-01/COMP/16D1-2.DWG
PLOT DATE: SEPTEMBER 8, 2016

Appendix E

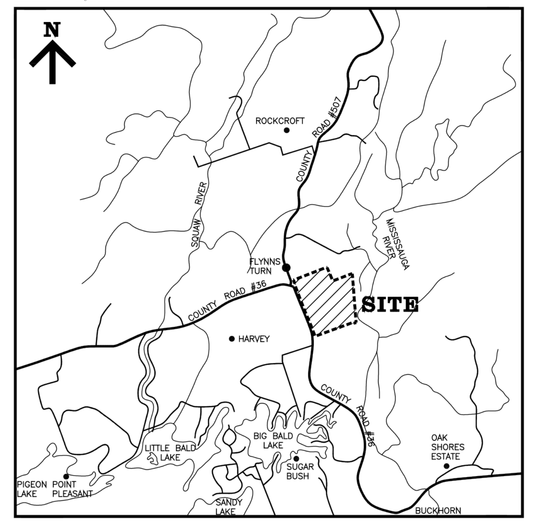
STONESCAPE SITE PLAN (APPROVED)

BUILDING LIST

No.	USE	SIZE
1.	HOUSE	
2.	HOUSE	
3.	SERVICE STATION	18mx12m
4.	OLD STONE FOUNDATION	3mx3m
5.	OLD STONE FOUNDATION	6mx6m
6.	WORKSHOP/GARAGE	4.5mx7.5m
7.	HOUSE	9mx6m
8.	BARN	7.5mx7.5m
9.	FARMHOUSE	12mx8.25m
10.	GARAGE	3.5mx6m
11.	NATIVE LEARNING CENTRE	3.5mx6m
12.	MANUFACTURING BUILDING	20mx37m 18.25mx24.5m EXTENSION
13.	SCALEHOUSE	7.5mx12.5m
14.	SALES OFFICE	7.5mx12.5m

KEY MAP

N.T.S.



LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF EXISTING LICENCED AREA
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- 1 EXISTING BUILDING AND BUILDING NUMBER
- DIRECTION OF SURFACE WATER DRAINAGE
- W-1 ON-SITE WELL
- W-1 OFF-SITE WELL
- B-1 (2002) BOREHOLE # AND LOCATION AND YEAR DRILLED
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- EXISTING FENCE
- PROPOSED PERIMETER FENCE
- WP WITNESS POST

NOTES

1. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES UNDER THE AGGREGATE RESOURCES ACT FOR A CATEGORY 4 – CLASS "A" LICENSE, QUARRY ABOVE WATER TABLE.
2. APPLICANT ADDRESS: DR. DAN SLOBODIAN
   P.O. BOX 249
   BUCKHORN, ONTARIO
   K0L 1J0
3. TOPOGRAPHIC INFORMATION WAS PREPARED BY J.B. FLEGUEL, PROJECT #1675A DATED JULY 2003. ALL ELEVATIONS ARE GEODETIC; PLANS WERE AUGMENTED USING 1:10,000 SCALE ONTARIO BASE MAPPING AND SITE PLANS FOR ADJACENT QUARRY TO THE SOUTH PREPARED BY SKELTON BRUMMELL AND ASSOCIATES LTD. (PROJECT NO. 97-1443) DATED JULY 2001.
   INFORMATION ON SITE AND WITHIN THE 120m INFORMATION BOUNDARY UPDATED BY WOELLMANN DEVELOPMENT SERVICES NOVEMBER 2003 ON BEHALF OF THE APPLICANT.
4. ZONING INFORMATION FOR SITE AND SURROUNDING LANDS OBTAINED FROM WOELLMANN DEVELOPMENT SERVICES.
5. PROPERTY BOUNDARIES OBTAINED FROM J.B. FLEGUEL, PROJECT #1675A DATED JULY 2003.
6. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM THE REPORT PREPARED BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD. DATED NOVEMBER 2004.
7. THE WATER TABLE ELEVATION WITHIN THE PROPERTY IS ESTIMATED TO RANGE FROM ±285m ABOVE SEA LEVEL IN THE WESTERN PART OF THE SITE TO ±255m ABOVE SEA LEVEL IN THE EASTERN PART OF THE SITE. (REFER TO HYDROGEOLOGICAL REPORT LISTED ABOVE).
8. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.
9. TOTAL AREA TO BE LICENSED: 173.64 Ha
   TOTAL AREA TO BE EXTRACTED: 151.12 Ha
   TOTAL AREA TO BE REHABILITATED: 151.12 Ha
10. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION OF THIS SITE.
11. BUILDINGS ON AND WITHIN 120m OF THE SITE ARE SHOWN.
12. VEGETATION INFORMATION OBTAINED FROM FIELD INSPECTION AND M.N.R. FOREST RESOURCE INVENTORY MAPPING.

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
6	JULY 2006	AS PER OMB DECISION			
5	MAR. 2005	AS PER MNR & PEER REVIEW COMMENT			
4	DEC 2004	AS PER MNR COMMENT			
3	NOV 2004	AS PER VARIOUS AGENCY COMMENTS			
2	MAR23 2004	AS PER MNR COMMENT			
1	FEB16 2004	AS PER MNR COMMENT			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
2	OCT20 2010	ADDED BUILDING EXTENSION			
1	OCT6 2008	REVISED TRUCK STAGING AREA, ADDED PROCESSING AREA, SHIFTED TEMP PLANT SITE AND SINKING CUT TO EAST, REMOVED SOUTHERN PORTION OF SILT FENCE FROM AREA 1a.			

Site Plan Amendments

Harrington and Hoyle Ltd.
LANDSCAPE ARCHITECTS
91 Anderson Avenue, Unit #2
Markham, Ontario. L6G 1A5
Telephone: (905) 294-8282
Fax: (905) 294-7623
Offices in Markham and Cambridge

Project Name

STONESCAPE QUARRY

PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY (FORMERLY HARVEY), COUNTY OF PETERBOROUGH

Scale	North	Stamp
1:2000 (0 10 50 80m)		ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS, HOWARD M. WOELLMANN, MEMBER

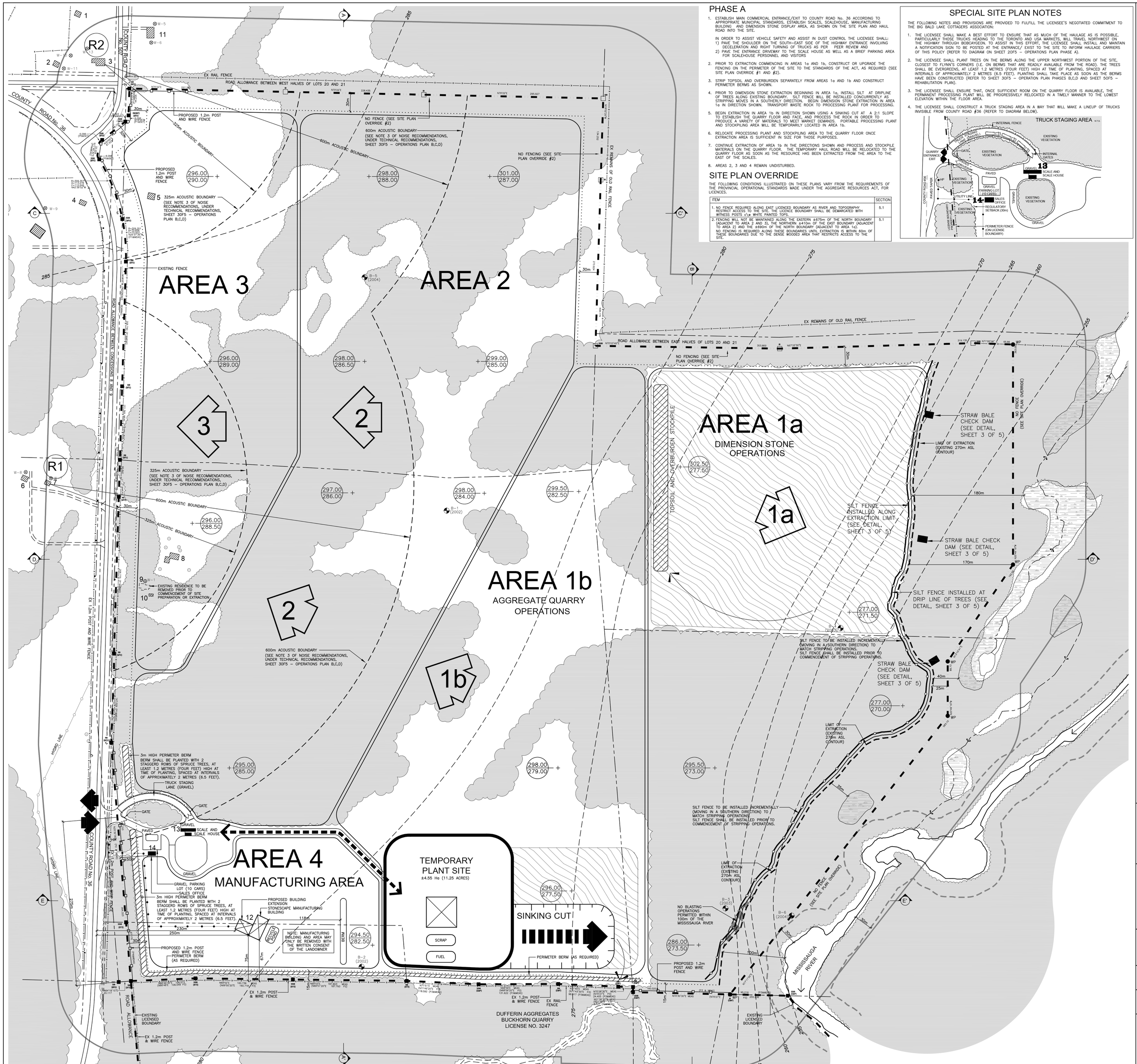
Drawing Status: **FINAL ISSUED FOR LICENCE**

Drawn	Checked	Issue Date	Project Number
RM	RM/BJ	JULY 2006	03-21

Drawing Title: **EXISTING FEATURES**

Drawing Number: **1 OF 5**

PLOT DATE: OCTOBER 20, 2010
FILE NAME: 0321-1.DWG



PHASE A

1. ESTABLISH MAIN COMMERCIAL ENTRANCE/EXIT TO COUNTY ROAD No. 36 ACCORDING TO APPROPRIATE MUNICIPAL STANDARDS. ESTABLISH SCALES, SCALEHOUSE, MANUFACTURING BUILDING AND DIMENSION STONE DISPLAY AREA, AS SHOWN ON THE SITE PLAN AND HAUL ROAD INTO THE SITE.

   IN ORDER TO ASSIST VEHICLE SAFETY AND ASSIST IN DUST CONTROL THE LICENSEE SHALL:
   1) PAVE THE SHOULDER ON THE SOUTH–EAST SIDE OF THE HIGHWAY ENTRANCE INVOLVING DECELERATION AND RIGHT TURNING OF TRUCKS AS PER PEER REVIEW AND
   2) PAVE THE ENTRANCE DRIVEWAY TO THE SCALE HOUSE AS WELL AS A BRIEF PARKING AREA FOR SCALEHOUSE PERSONNEL AND VISITORS

2. PRIOR TO EXTRACTION COMMENCING IN AREAS 1a AND 1b, CONSTRUCT OR UPGRADE THE FENCING ON THE PERIMETER OF THE SITE TO THE STANDARDS OF THE ACT, AS REQUIRED (SEE SITE PLAN OVERRIDE #1 AND #2).

3. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREAS 1a AND 1b AND CONSTRUCT PERIMETER BERMS AS SHOWN.

4. PRIOR TO DIMENSION STONE EXTRACTION BEGINNING IN AREA 1a, INSTALL SILT AT DRIPLINE OF TREES ALONG EXISTING BOUNDARY. SILT FENCE WILL BE INSTALLED CONCURRENTLY AS STRIPPING MOVES IN A SOUTHERLY DIRECTION. BEGIN DIMENSION STONE EXTRACTION IN AREA 1a IN DIRECTION SHOWN. TRANSPORT WASTE ROCK TO PROCESSING PLANT FOR PROCESSING.

5. BEGIN EXTRACTION IN AREA 1b IN DIRECTION SHOWN USING A SINKING CUT AT A 2:1 SLOPE TO ESTABLISH THE QUARRY FLOOR AND FACE, AND PROCESS THE ROCK IN ORDER TO PRODUCE A VARIETY OF MATERIALS TO MEET MARKET DEMANDS. PORTABLE PROCESSING PLANT AND STOCKPILING AREA WILL BE TEMPORARILY LOCATED IN AREA 1b.

6. RELOCATE PROCESSING PLANT AND STOCKPILING AREA TO THE QUARRY FLOOR ONCE EXTRACTION AREA IS SUFFICIENT IN SIZE FOR THOSE PURPOSES.

7. CONTINUE EXTRACTION OF AREA 1b IN THE DIRECTIONS SHOWN AND PROCESS AND STOCKPILE MATERIALS ON THE QUARRY FLOOR. THE TEMPORARY HAUL ROAD WILL BE RELOCATED TO THE QUARRY FLOOR AS SOON AS THE RESOURCE HAS BEEN EXTRACTED FROM THE AREA TO THE SOUTH OF THE SCALES.

8. AREAS 2, 3 AND 4 REMAIN UNDISTURBED.

SITE PLAN OVERRIDE

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE REQUIREMENTS OF THE PROVINCIAL OPERATIONAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT, FOR LICENCES.

ITEM	SECTION
1. NO FENCE REQUIRED ALONG EAST LICENCED BOUNDARY AS RIVER AND TOPOGRAPHY RESTRICT ACCESS TO THE SITE. THE LICENCE BOUNDARY SHALL BE DEMARCATED WITH WITNESS POSTS c\w WHITE PAINTED TOPS.	5.1
2. FENCING WILL NOT BE MAINTAINED ALONG THE EASTERN ±675m OF THE NORTH BOUNDARY (ADJACENT TO AREA 2 AND 3), THE NORTHERN ±410m OF THE EAST BOUNDARY (ADJACENT TO AREA 2) AND THE ±690m OF THE NORTH BOUNDARY (ADJACENT TO AREA 1a). NO FENCING IS REQUIRED ALONG THESE BOUNDARIES UNTIL EXTRACTION IS WITHIN 60m OF THESE BOUNDARIES DUE TO THE DENSE WOODED AREA THAT RESTRICTS ACCESS TO THE SITE.	5.1

SPECIAL SITE PLAN NOTES

THE FOLLOWING NOTES AND PROVISIONS ARE PROVIDED TO FULFILL THE LICENSEE'S NEGOTIATED COMMITMENT TO THE BIG BALD LAKE COTTAGERS ASSOCIATION:

1. THE LICENSEE SHALL MAKE A BEST EFFORT TO ENSURE THAT AS MUCH OF THE HAULAGE AS IS POSSIBLE, PARTICULARLY THOSE TRUCKS HEADING TO THE TORONTO AND USA MARKETS, WILL TRAVEL NORTHWEST ON THE HIGHWAY THROUGH BOBCAYGEON. TO ASSIST IN THIS EFFORT, THE LICENSEE SHALL INSTALL AND MAINTAIN A NOTIFICATION SIGN TO BE POSTED AT THE ENTRANCE/ EXIST TO THE SITE TO INFORM HAULAGE CARRIERS OF THIS POLICY (REFER TO DIAGRAM ON SHEET 2OF5 – OPERATIONS PLAN PHASE A).
2. THE LICENSEE SHALL PLANT TREES ON THE BERMS ALONG THE UPPER NORTHWEST PORTION OF THE SITE, CLOSEST TO FLYNN'S CORNERS (I.E. ON BERMS THAT ARE READILY AVAILABLE FROM THE ROAD). THE TREES SHALL BE EVERGREENS, AT LEAST 1.2 METRES (FOUR FEET) HIGH AT TIME OF PLANTING, SPACED AT INTERVALS OF APPROXIMATELY 2 METRES (6.5 FEET). PLANTING SHALL TAKE PLACE AS SOON AS THE BERMS HAVE BEEN CONSTRUCTED (REFER TO SHEET 3OF5 – OPERATION PLAN PHASES B,C,D AND SHEET 5OF5 – REHABILITATION PLAN).
3. THE LICENSEE SHALL ENSURE THAT, ONCE SUFFICIENT ROOM ON THE QUARRY FLOOR IS AVAILABLE, THE PERMANENT PROCESSING PLANT WILL BE PROGRESSIVELY RELOCATED IN A TIMELY MANNER TO THE LOWEST ELEVATION WITHIN THE FLOOR AREA.
4. THE LICENSEE SHALL CONSTRUCT A TRUCK STAGING AREA IN A WAY THAT WILL MAKE A LINEUP OF TRUCKS INVISIBLE FROM COUNTY ROAD #36 (REFER TO DIAGRAM BELOW).

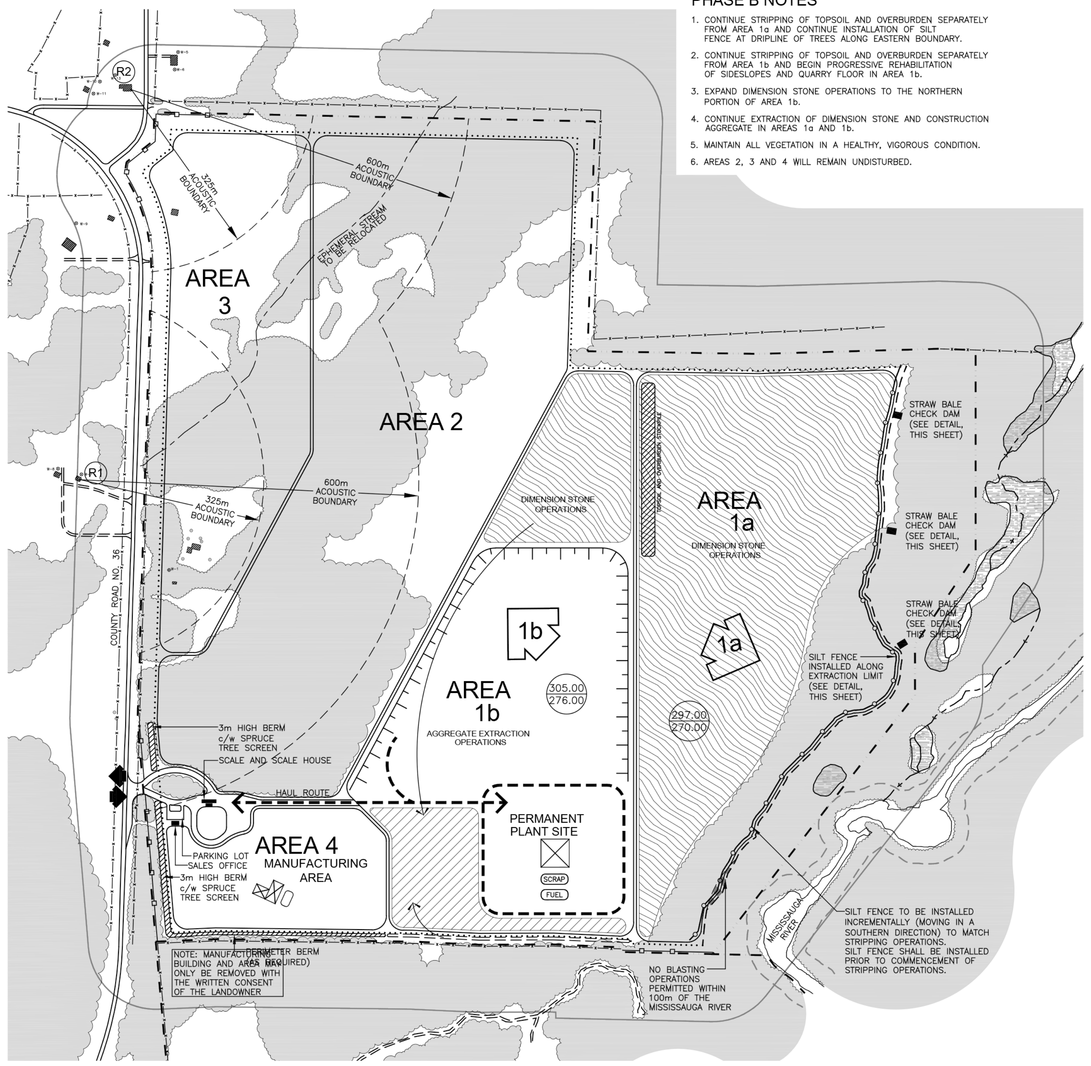
LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF EXISTING LICENCED AREA
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- 1 EXISTING BUILDING AND BUILDING NUMBER
- W-1 ON–SITE WELL
- W-1 OFF–SITE WELL
- B-1 (2002) BOREHOLE # AND LOCATION AND YEAR DRILLED
- WP WITNESS POST
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- EXISTING FENCE
- PROPOSED PERIMETER FENCE
- BERM
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- DIRECTION OF EXTRACTION
- EXTRACTION FACE
- DIRECTION OF TOPSOIL MOVEMENT
- PIT ENTRANCE / EXIT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- R3 LOCATION OF NOISE RECEPTOR
- 330 / 322 EXISTING ELEVATION / PROPOSED ELEVATION
- ACOUSTIC BOUNDARY
- 275 — — — 275 GROUND WATER CONTOUR (FROM HYDROGEOLOGICAL INVESTIGATION REPORT BY SITE INVESTIGATION SERVICES –FIGURE 6– NOVEMBER 2004)

NOTES

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. NOTWITHSTANDING THE EXTRACTION AND REHABILITATION PHASING DESCRIBED AND SHOWN ON THESE PAGES, DEMAND FOR CERTAIN PRODUCTS, BLENDING OF MATERIALS, SITE HYDROLOGY AND HYDROGEOLOGY MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING, AND WHEN REHABILITATION OF PART OF AN AREA IS POSSIBLE FROM AN OPERATIONAL PERSPECTIVE, IT SHALL BE CARRIED OUT. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM M.N.R.
2. TOPOGRAPHIC INFORMATION WAS PREPARED BY J.B. FLEGUEL, PROJECT #1675A DATED JULY 2003. ALL ELEVATIONS ARE GEODETIC. PLANS WERE AUGMENTED USING 1:10,000 SCALE ONTARIO BASE MAPPING AND SITE PLANS FOR ADJACENT QUARRY TO THE SOUTH PREPARED BY SKELTON BRUMWELL AND ASSOCIATES LTD. (PROJECT NO. 97–1443) DATED JULY 2001.
   INFORMATION ON SITE AND WITHIN THE 120m INFORMATION BOUNDARY UPDATED BY WOELLMANN DEVELOPMENT SERVICES NOVEMBER 2003 ON BEHALF OF THE APPLICANT.
3. PROPERTY BOUNDARIES OBTAINED FROM J.B. FLEGEUL, PROJECT #1675A DATED JULY 2003.
4. REFER TO DRAWING 1 OF 5, EXISTING FEATURES, FOR A DESCRIPTION OF EXISTING VEGETATION AND BUILDINGS WITHIN THE 120m BOUNDARY AND ON SITE.
5. RESOURCE INFORMATION IS OBTAINED FROM BORE HOLES DRILLED IN MAY 2002 (B–1, B–2), SEPTEMBER 2003 (B–3, B–4) AND SEPTEMBER 2004 (B–5, B–6) FOR THE HYDROGEOLOGICAL ASSESSMENT.
6. SITE PLAN OVERRIDES ARE LISTED IN THE SITE PLAN OVERRIDE TABLE SHOWN ON PAGE 2 OF 5.
7. BOUNDARIES OF THE LICENSED AREA THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 5, EXISTING FEATURES. PRIOR TO STRIPPING, FENCING AND GATES (AS SHOWN) ON THE LICENSED BOUNDARIES WILL BE ERECTED OR UPGRADED TO COMPLY WITH THE ACT (I.E. 1.2m HIGH FARM FENCE) (REFER TO PHASING NOTES ON SHEET 2 & 3 OF 5 FOR SPECIFIC BOUNDARIES). FENCES WILL BE MAINTAINED FOR THE DURATION OF THE QUARRY.
8. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS OR STOCKPILES. BERMS AND STOCKPILES OF TOPSOIL SHALL BE GRADED TO STABLE SLOPES AND SEEDED WITH A GRASS AND LEGUME MIXTURE TO PREVENT EROSION AND MINIMIZE DUST. STOCKPILES SHALL BE AT LEAST 30m FROM LICENCE BOUNDARY OR 90m FROM LAND ZONED FOR RESIDENTIAL OR IN RESIDENTIAL USE WHEN THE LICENCE WAS ISSUED.
9. BERMS SHALL CREATE AN EFFEC

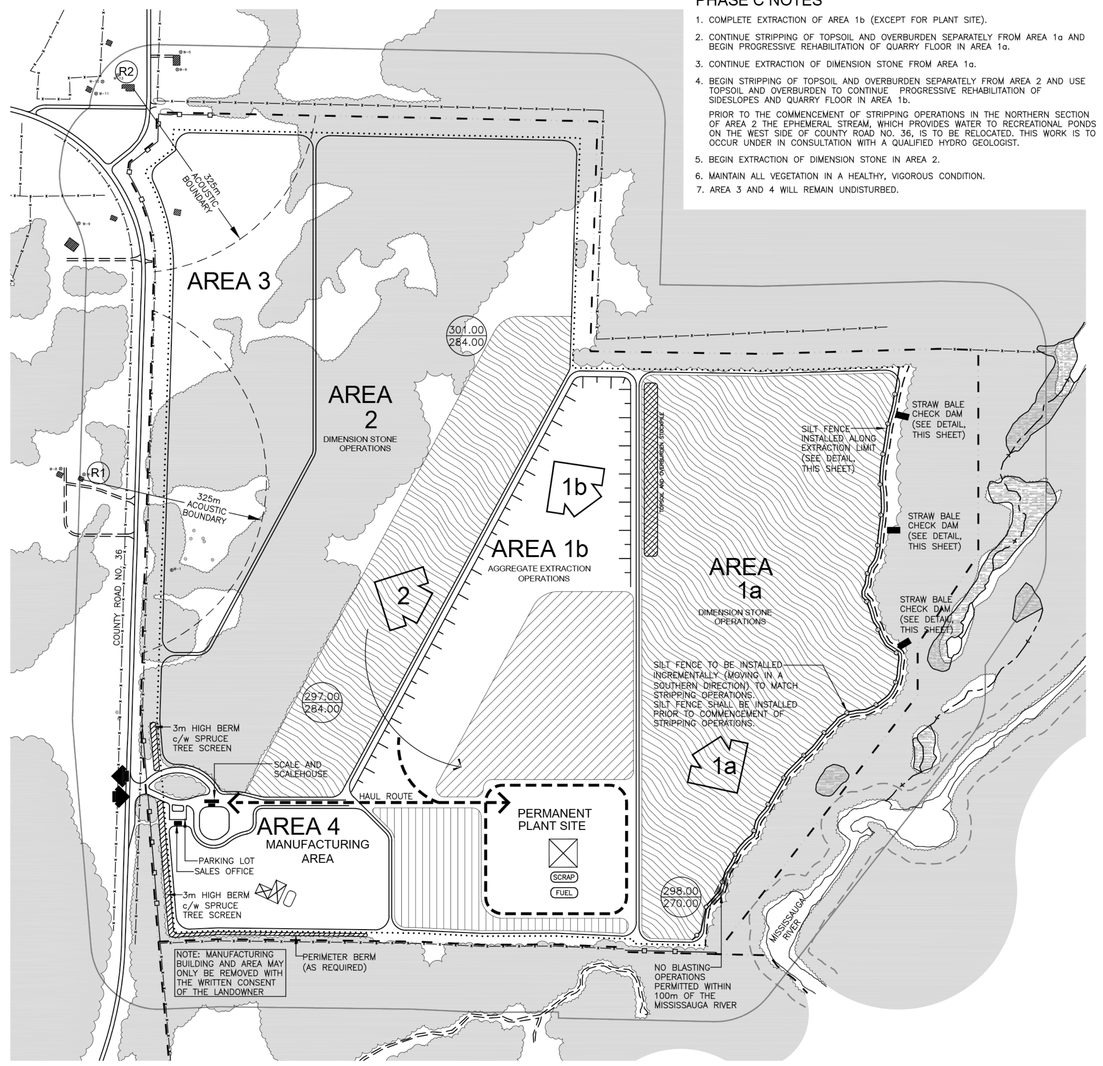
PHASE B



PHASE B NOTES

1. CONTINUE STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1a AND CONTINUE INSTALLATION OF SILT FENCE AT DRIPLINE OF TREES ALONG EASTERN BOUNDARY.
2. CONTINUE STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1b AND BEGIN PROGRESSIVE REHABILITATION OF SIDESLOPES AND QUARRY FLOOR IN AREA 1b.
3. EXPAND DIMENSION STONE OPERATIONS TO THE NORTHERN PORTION OF AREA 1b.
4. CONTINUE EXTRACTION OF DIMENSION STONE AND CONSTRUCTION AGGREGATE IN AREAS 1a AND 1b.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.
6. AREAS 2, 3 AND 4 WILL REMAIN UNDISTURBED.

PHASE C

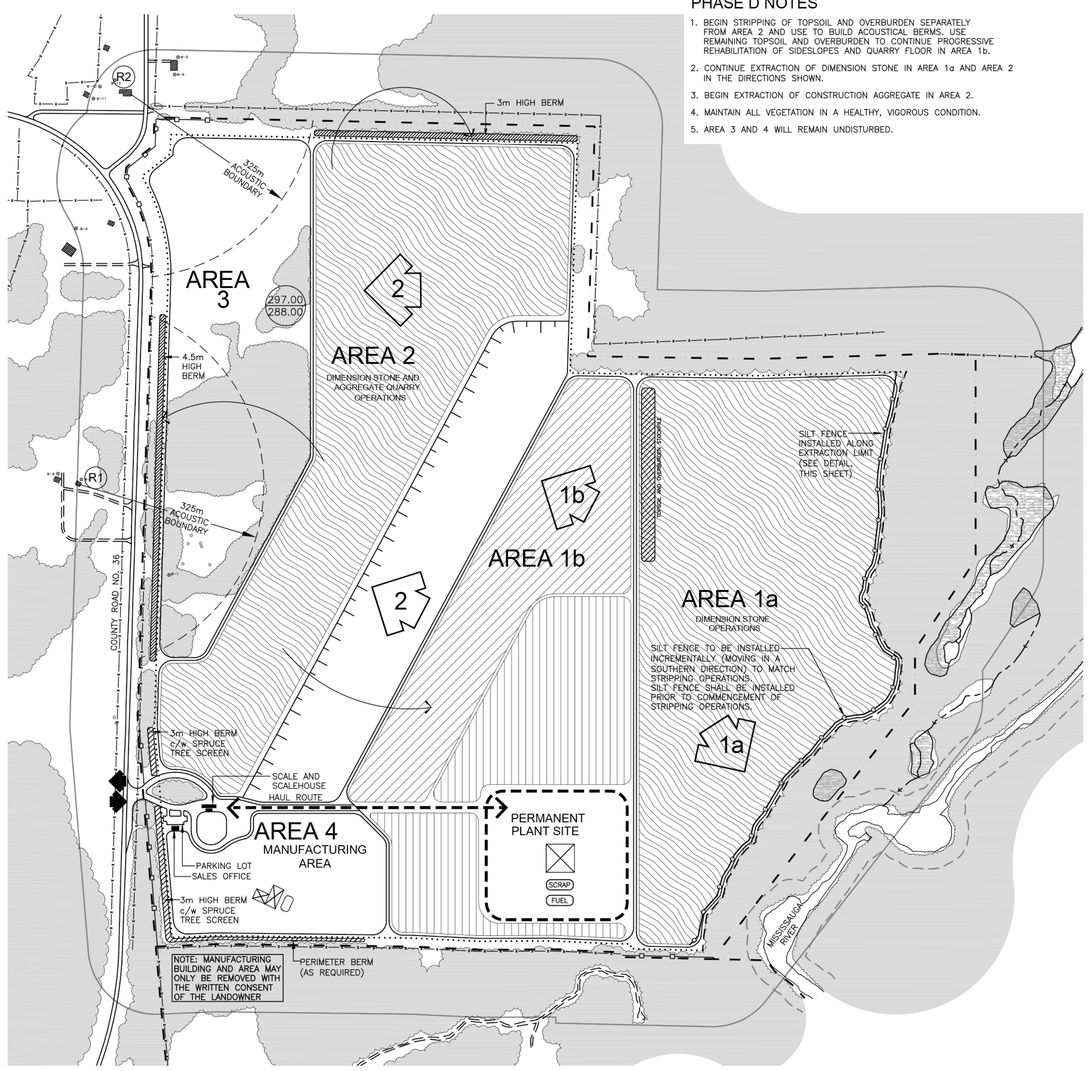


PHASE C NOTES

1. COMPLETE EXTRACTION OF AREA 1b (EXCEPT FOR PLANT SITE).
2. CONTINUE STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1a AND BEGIN PROGRESSIVE REHABILITATION OF QUARRY FLOOR IN AREA 1a.
3. CONTINUE EXTRACTION OF DIMENSION STONE FROM AREA 1a.
4. BEGIN STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE TOPSOIL AND OVERBURDEN TO CONTINUE PROGRESSIVE REHABILITATION OF SIDESLOPES AND QUARRY FLOOR IN AREA 1b.

   PRIOR TO THE COMMENCEMENT OF STRIPPING OPERATIONS IN THE NORTHERN SECTION OF AREA 2 THE EPHEMERAL STREAM, WHICH PROVIDES WATER TO RECREATIONAL PONDS ON THE WEST SIDE OF COUNTY ROAD NO. 36, IS TO BE RELOCATED. THIS WORK IS TO OCCUR UNDER IN CONSULTATION WITH A QUALIFIED HYDRO GEOLOGIST.
5. BEGIN EXTRACTION OF DIMENSION STONE IN AREA 2.
6. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.
7. AREA 3 AND 4 WILL REMAIN UNDISTURBED.

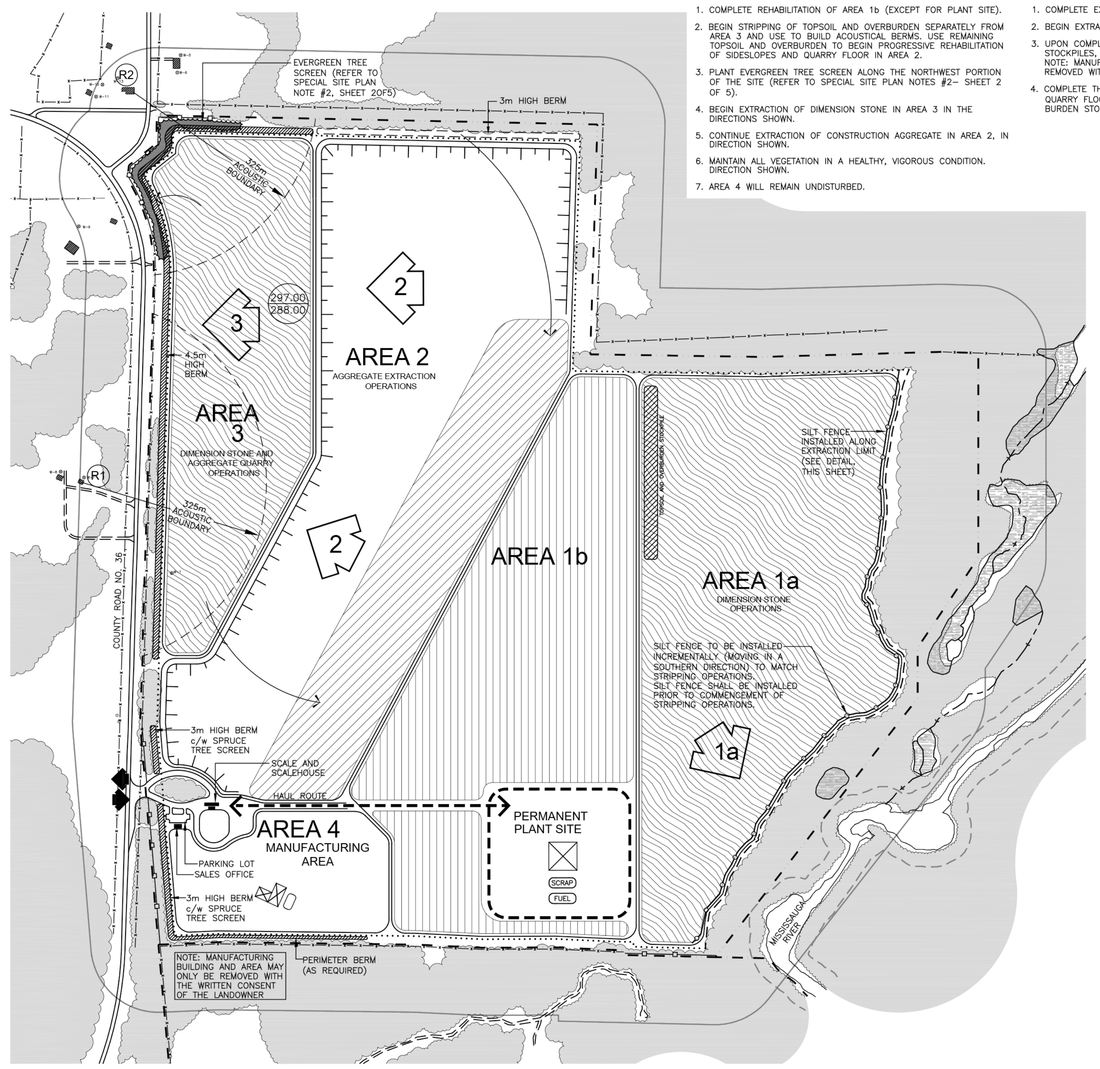
PHASE D



PHASE D NOTES

1. BEGIN STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE TO BUILD ACOUSTICAL BERMS. USE REMAINING TOPSOIL AND OVERBURDEN TO CONTINUE PROGRESSIVE REHABILITATION OF SIDESLOPES AND QUARRY FLOOR IN AREA 1b.
2. CONTINUE EXTRACTION OF DIMENSION STONE IN AREA 1a AND AREA 2 IN THE DIRECTIONS SHOWN.
3. BEGIN EXTRACTION OF CONSTRUCTION AGGREGATE IN AREA 2.
4. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.
5. AREA 3 AND 4 WILL REMAIN UNDISTURBED.

PHASE E



PHASE E NOTES

1. COMPLETE REHABILITATION OF AREA 1b (EXCEPT FOR PLANT SITE).
2. BEGIN STRIPPING OF TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 3 AND USE TO BUILD ACOUSTICAL BERMS. USE REMAINING TOPSOIL AND OVERBURDEN TO BEGIN PROGRESSIVE REHABILITATION OF SIDESLOPES AND QUARRY FLOOR IN AREA 2.
3. PLANT EVERGREEN TREE SCREEN ALONG THE NORTHWEST PORTION OF THE SITE (REFER TO SPECIAL SITE PLAN NOTES #2– SHEET 2 OF 5).
4. BEGIN EXTRACTION OF DIMENSION STONE IN AREA 3 IN THE DIRECTIONS SHOWN.
5. CONTINUE EXTRACTION OF CONSTRUCTION AGGREGATE IN AREA 2, IN DIRECTION SHOWN.
6. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.
7. AREA 4 WILL REMAIN UNDISTURBED.

PHASE F NOTES (NOT SHOWN)

1. COMPLETE EXTRACTION OF DIMENSION STONE IN AREA 3.
2. BEGIN EXTRACTION OF CONSTRUCTION AGGREGATE IN AREA 3.
3. UPON COMPLETION OF EXTRACTION REMOVE ALL EQUIPMENT, STOCKPILES, SCRAP AND MACHINERY FROM SITE. NOTE: MANUFACTURING BUILDING AND AREA MAY ONLY BE REMOVED WITH THE WRITTEN CONSENT OF LAND OWNER.
4. COMPLETE THE REHABILITATION OF THE SIDESLOPES AND QUARRY FLOOR IN AREA 2 AND 3 USING TOPSOIL AND OVER BURDEN STORED IN ACOUSTICAL AND PERIMETER BERMS.

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF EXISTING LICENCED AREA
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING BUILDING
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- EXISTING FENCE
- PROPOSED PERIMETER FENCE
- BERM
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- AREA UNDER REHABILITATION
- COMPLETED REHABILITATION
- DIRECTION OF EXTRACTION
- EXTRACTION FACE
- DIRECTION OF TOPSOIL MOVEMENT
- PIT ENTRANCE / EXIT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- R3 — LOCATION OF NOISE RECEPTOR
- 330 / 322 — EXISTING ELEVATION / PROPOSED ELEVATION

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF MARCH 2005

HYDROGEOLOGY (SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD. DATED NOVEMBER 2004).

1. THE DESIGN GRADE FOR THE PROPOSED QUARRY SHALL BE SET AT LEAST 2.5m ABOVE THE GROUNDWATER LEVEL CONTOURS SHOWN ON REPORT FIGURE 6 (SHOWN ON OPERATIONS PLAN – PHASE A, SHEET 2OF5). AN EXTRACTION DEPTH OF 5m IS CURRENTLY RECOMMENDED FOR THE STEEP EASTERN SLOPE AREA TO REMOVE DIMENSION STONE. ALL PROPOSED EXCAVATION DEPTHS ARE TO BE REVIEWED AND ALTERED, IF NECESSARY, BASED ON FUTURE MONITORING RESULTS.
2. A MONITORING PROGRAM SHALL BE IMPLEMENTED TO ENSURE THAT LOCAL WELLS ARE NOT IMPACTED. IT IS RECOMMENDED THAT MONITORING INCLUDE BOTH WATER LEVELS AND CHEMISTRY. THE RECOMMENDED MONITORING PROGRAM IS SUMMARIZED AS FOLLOWS:

   RECOMMENDED MONITORING PROGRAM

   1. THE MONITORING PROGRAM SHOULD INCLUDE THE EXISTING WATER WELL (W–1) AND PIEZOMETERS (B–1, B–2, B–3, B–4, B–5 AND B–6) THAT ARE CURRENTLY ON THE SITE.
   2. THE PROGRAM SHOULD INVOLVE THE MEASUREMENT OF WATER LEVELS IN THE WELL AND PIEZOMETERS AT A FREQUENCY OF AT LEAST FOUR (4) TIMES PER YEAR. WITH MONITORING EVENTS TO BE CONDUCTED IN APRIL, JUNE, SEPTEMBER, AND DECEMBER. A MONITORING EVENT IS RECOMMENDED FOR APRIL 2005, TO VERIFY THE SPRING WATER TABLE AT THE SITE. THE FREQUENCY SHALL BE INCREASED IF AN IMPACT IN THE GROUNDWATER IS SUSPECTED.

      SURFACE WATERCOURSES, INCLUDING THE EPHEMERAL DRAINAGE DITCH AND THE TWO OFFSITE PONDS, SHALL BE INSPECTED DURING EACH MONITORING EVENT. THE INSPECTION SHALL INCLUDE AN ESTIMATE OF THE EPHEMERAL FLOW AT A CONVENIENT ONSITE LOCATION, AND MEASUREMENT OF THE POND WATER LEVELS RELATIVE TO A FIXED REFERENCE POINT. THE POND MONITORING SHALL BE SUBJECT TO OBTAINING ACCESS PERMISSION FROM THE LANDOWNER.
   3. PRIOR TO ANY EXTRACTION, IT IS RECOMMENDED THAT A BASELINE DOOR TO DOOR WELL SURVEY OF LOCAL WELLS BE CARRIED OUT TO PROTECT BOTH THE EXISTING WELL OWNERS AND THE AGGREGATE PRODUCTION COMPANY.

      THE BASELINE DOOR–TO–DOOR SURVEY SHALL INCLUDE THE OFFSITE WELLS INDICATED ON FIGURE 7 OF THE HYDROGEOLOGICAL INVESTIGATION REPORT, PLUS ANY ADDITIONAL WELLS SUBSEQUENTLY DISCOVERED WITHIN 500m OF THE SITE BOUNDARY. THE SURVEY SHALL INCLUDE AN INTERVIEW/QUESTIONNAIRE WITH THE WELL OWNERS TO ESTABLISH HISTORICAL WELL PERFORMANCE AND WATER QUALITY, MEASUREMENT OF WATER LEVELS IN ACCESSIBLE WELLS, AND SAMPLING FOR LABORATORY ANALYSIS OF SELECTED WATER QUALITY PARAMETERS.

      THE BASELINE WATER ANALYSES SHALL CONSIST OF A MINIMUM PHILLIPS ANALYTICAL SERVICES RCAP50 SUITE OR EQUAL, WHICH SHALL INCLUDE SEVERAL INORGANIC ANIONS, NITRATES, HARDNESS, PH AND TURBIDITY, PLUS BACTERIOLOGICAL PARAMETERS.
   4. THE RESULTS OF THE MONITORING PROGRAM SHALL BE DOCUMENTED IN A BRIEF WRITTEN REPORT PREPARED ON AN ANNUAL BASIS. THE REPORT SHOULD INCLUDE WATER LEVEL DATA, ATMOSPHERIC DATA, AN UPDATE OF THE PROGRESSION OF THE OPERATION, AND ANY IMPACTS ENCOUNTERED DUE TO THE EXTRACTION.

      THE ANNUAL REPORT SHALL DISCUSS TRENDS IN OBSERVED WATER LEVELS AND EVALUATE POTENTIAL EFFECTS OF THE QUARRYING ACTIVITIES ON SITE AREA WATER RESOURCES. RECOMMENDATIONS TO ADJUST THE FREQUENCY AND LOCATION OF MONITORING SHALL BE DISCUSSED IN THE REPORT.
   5. A CONTINGENCY PLAN SHOULD BE ESTABLISHED IN THE EVENT THAT THE EXTRACTION OPERATION WILL HAVE AN IMPACT ON NEIGHBOURING WELL(S). THE CONTINGENCY PLAN SHOULD INVOLVE THE TEMPORARY SUPPLY OF POTABLE WATER THROUGH THE USE OF ABOVE GROUND STORAGE TANKS. THIS WOULD AVOID A DISRUPTION IN THE WATER SUPPLY SYSTEM WHILE AN ALTERNATIVE WELL CAN BE CONSTRUCTED. IT IS EXPECTED THAT A NEW WELL(S) COULD BE EXTENDED INTO A DEEPER BEDROCK AQUIFER SOURCE.
   6. WELL COMPLAINTS RECEIVED BY THE FACILITY SHALL BE INVESTIGATED BY A PROFESSIONAL HYDROGEOLOGIST TO PROVIDE RECOMMENDATIONS ON MITIGATION MEASURES, IF APPROPRIATE. EACH COMPLAINT SHOULD BE TREATED SEPARATELY AND DOCUMENTED IN A REPORT RETAINED BY THE FACILITY.
3. A MONITORING EVENT SHALL BE COMPLETED IN APRIL 2005, TO DETERMINE IF SPRING WATER TABLE CONDITIONS HAVE A POTENTIAL TO SIGNIFICANTLY AFFECT DESIGN.

NATURAL ENVIRONMENT (ECOSYSTEMS, SEPTEMBER 2002)

1. THE FISH HABITAT IN AREAS A AND B IS 20 METRES BEYOND THE 30 METRE DISTANCE RECOMMENDED AS ADJACENT LANDS FOR FISH HABITAT BY THE PROVINCE OF ONTARIO. THEREFORE, NO NEGATIVE IMPACT TO THE ECOLOGICAL FUNCTION OF THE FISH HABITAT PRESENT IN THE ADJACENT WATER BODIES IDENTIFIED, IS REASONABLY LIKELY TO BE CAUSED BY THE PROPOSED QUARRY OPERATIONS.

NOISE RECOMMENDATIONS (VALCOUSTICS CANADA LTD., MAY 16, 2003)

1. WITH THE NOISE MITIGATION MEASURES OUTLINED HEREIN, THE SOUND EXPOSURES FROM THE CHRONIC DAILY OPERATIONS WILL BE IN COMPLIANCE WITH MOE NOISE GUIDELINE LIMITS.
2. AS THE OPERATION MOVES OVER THE SITE, ELEVATION, DISTANCE AND SOUND EXPOSURE VARY RELATIVE TO OFF–SITE RECEPTORS. THUS, THE NOISE ANALYSIS HAS BEEN APPROACHED ON THE BASIS OF DETERMINING WORST CASE CONDITIONS TO ENSURE THAT THE DATA PRESENTED DOES NOT UNDER–PREDICT THE POTENTIAL OFF–SITE SOUND EXPOSURES. THE INTERPRETATION OF THE SOUND EXPOSURE PREDICTIONS MUST TAKE THIS INTO ACCOUNT.
3. IT IS RECOMMENDED THAT:

   ROCK DRILLING OPERATIONS AND ACTIVITIES AT THE WORKING FACE OCCUR ONLY BETWEEN 0700 AND 1900 HOURS.

   QUARRYING SHOULD MOVE PROGRESSIVELY FROM SOUTH TO NORTH.

   THE PERMANENT PROCESSING PLANT SHALL BE NEAR THE SOUTHERN BOUNDARY OF THE SITE AND SHOULD BE RELOCATED TO THE BOTTOM ELEVATION OF THE QUARRY AS QUICKLY AS POSSIBLE.

   PERIMETER BERMS SHALL BE CONSTRUCTED FOR NOISE CONTROL PURPOSES BEFORE OPERATIONS ARE WITHIN 600m OF AN OFF–SITE RECEPTOR LOCATION.

   THE QUARRYING OPERATIONS AND NOISE MITIGATION REQUIREMENTS SHOULD BE REVIEWED BEFORE EXTRACTION OCCURS WITHIN 325m OF A NOISE SENSITIVE RECEPTOR LOCATION.

   THE SITE ACCESS SHOULD BE AS FAR SOUTH ON THE SITE AS POSSIBLE.

BLAST IMPACT ANALYSIS (EXPLOTECH ENGINEERING LTD., MARCH 30, 2003)

1. AN INDEPENDENT ENGINEERING FIRM SPECIALIZING IN BLAST MONITORING AND BLAST DESIGN SHALL REVIEW THE DRILL AND BLAST PROPOSAL PRIOR TO THE INITIAL BLASTING PROGRAM AND SHALL MONITOR THE FIRST BLAST.

ARCHAEOLOGICAL ASSESSMENT (STAGE 1)

THE SUBJECT PROPERTY IS CONSIDERED TO BE OF LOW POTENTIAL FOR CULTURAL HERITAGE RESOURCES.

SHOULD ARCHAEOLOGICAL MATERIAL BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE MINISTRY OF CULTURE SHOULD BE NOTIFIED IMMEDIATELY (519) 675–7742. IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING CONSTRUCTION, THE PROPONENT SHOULD IMMEDIATELY CONTACT BOTH THE MINISTRY OF CULTURE AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS (519) 326–8392.

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
6	JULY 2006	AS PER OMB DECISION			
5	MAR 2005	AS PER MNR & PEER REVIEW COMMENT			
4	DEC 2004	AS PER MNR COMMENT			
3	NOV 2004	AS PER MNR VARIOUS AGENCY COMMENTS			
2	MAR23 2004	AS PER MNR COMMENT			
1	FEB16 2004	AS PER MNR COMMENT			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
2	OCT20 2010	ADDED BUILDING EXTENSION			
1	OCT 6 2008	REVISED TRUCK STAGING AREA, ADDED MANUFACTURING AREA, SHIFTED TEMP PLANT SITE AND SINKING CUT TO EAST, AND EXTENSION TO NORTHERN PORTION OF SILT FENCE FROM AREA 1a.			

Site Plan Amendments

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Markham, Ontario. L6G 1A5

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Fax: (905) 294–7623
Offices in Markham and Cambridge

Project Name

STONESCAPE QUARRY

PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY–CAVENDISH & HARVEY (FORMERLY HARVEY), COUNTY OF PETERBOROUGH

Scale	North	Stamp
1:5000 (0 50 100 150 200m)		ASSOCIATION OF LANDSCAPE ARCHITECTS ONTARIO MEMBER

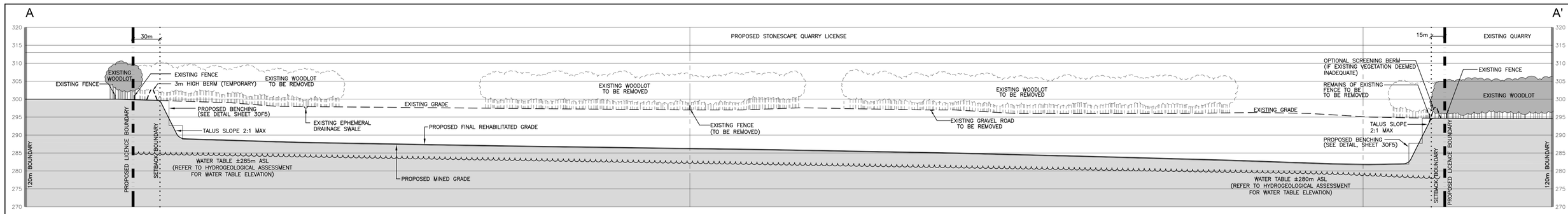
Drawing Status: FINAL ISSUED FOR LICENCE

Drawn	Checked	Issue Date	Project Number
RM	RM/BJ	JULY 2006	03-21

Drawing Title: OPERATIONS PLAN PHASES B,C,D

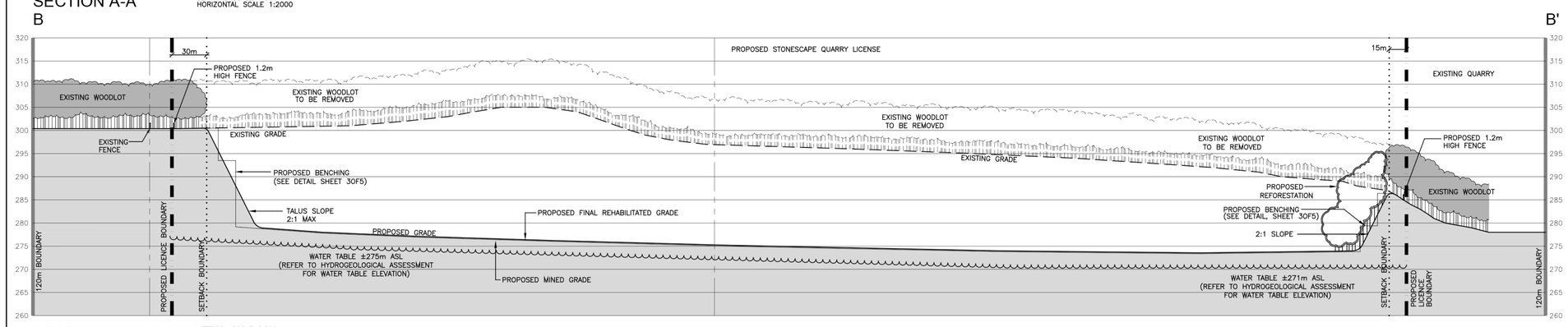
Drawing Number: 3 OF 5

PLOT DATE: OCTOBER 20, 2010
FILE NAME: 0321–3.DWG



SECTION A-A'

VERTICAL SCALE 1:500
HORIZONTAL SCALE 1:2000



SECTION B-B'

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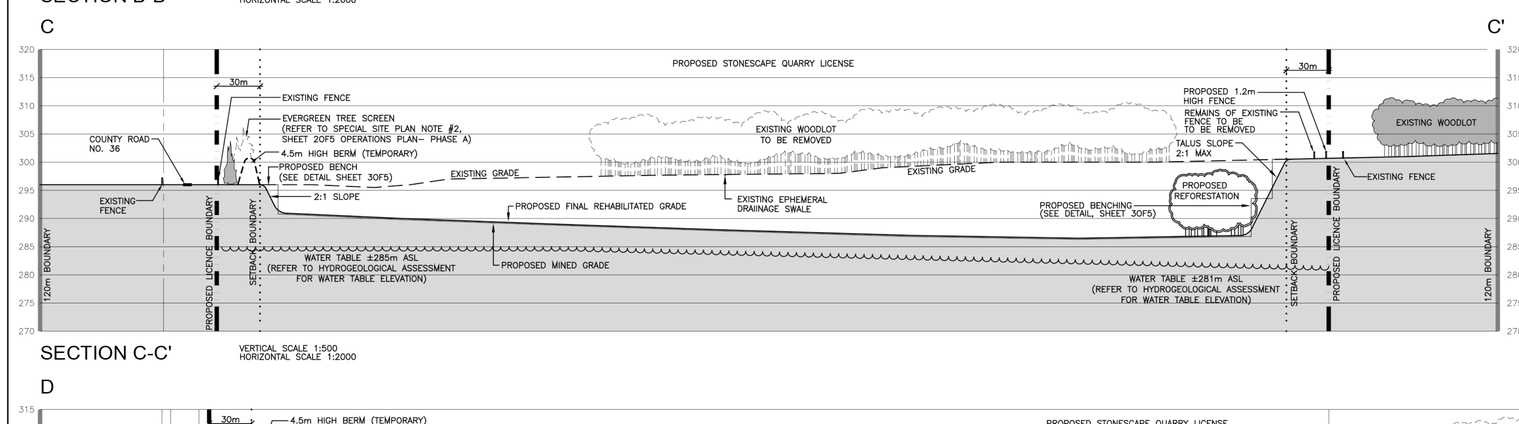
HORIZONTAL SCALE 1:2000



SECTION C-C'

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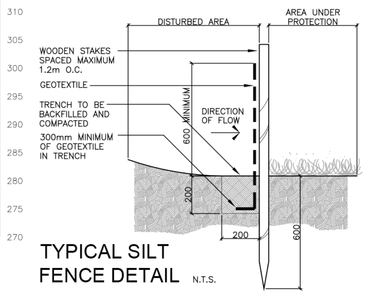
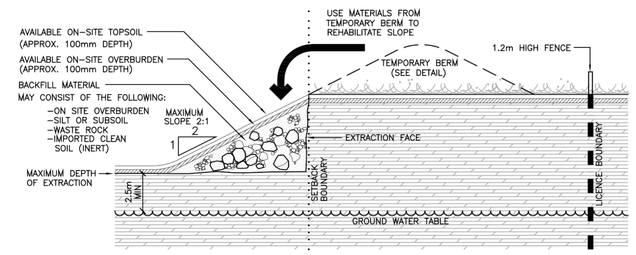
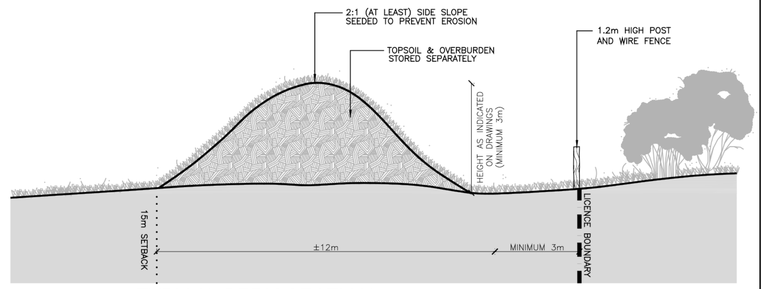
HORIZONTAL SCALE 1:2000



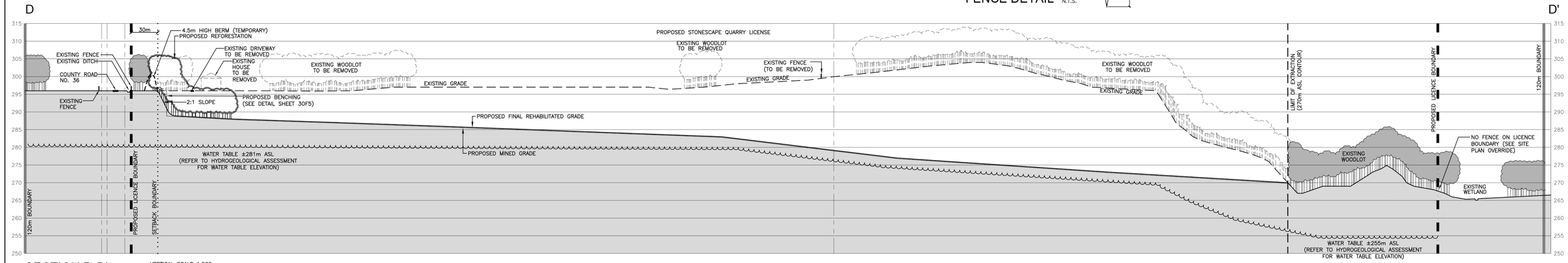
TYPICAL SILT FENCE DETAIL N.T.S.



TYPICAL SIDESLOPE REHABILITATION BY BACKFILLING N.T.S.



TYPICAL BERM SECTION N.T.S.



SECTION D-D'

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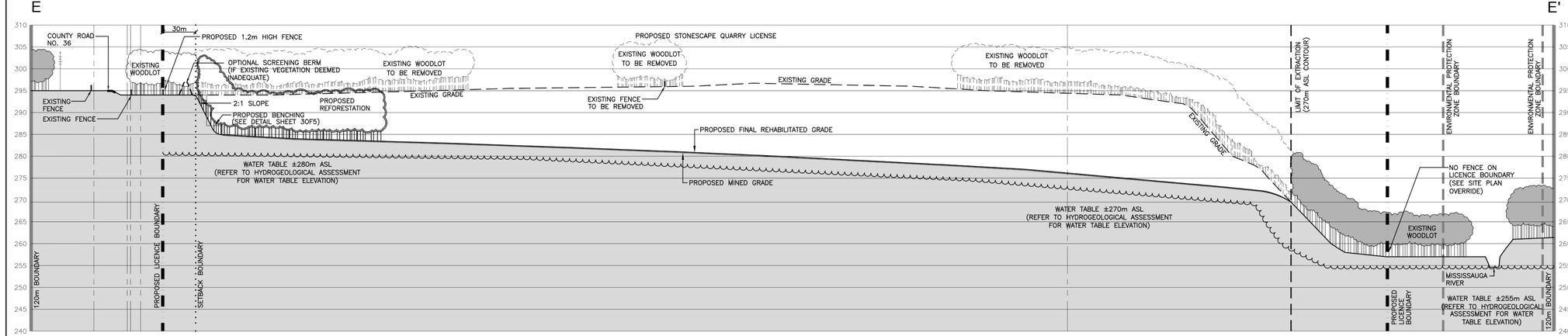
HORIZONTAL SCALE 1:2000



SECTION E-E'

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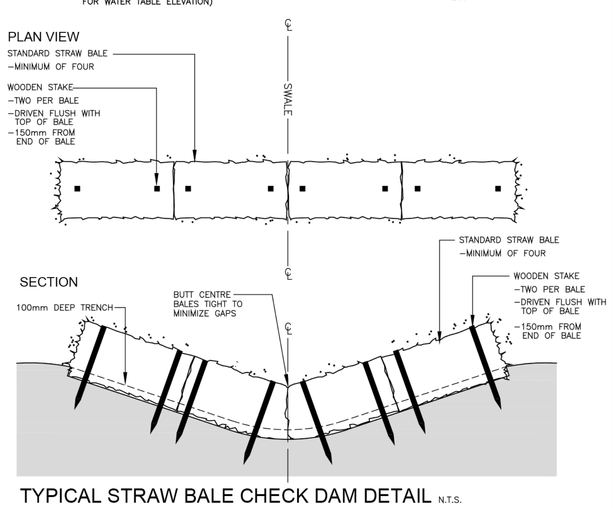
HORIZONTAL SCALE 1:2000



TYPICAL STRAW BALE CHECK DAM DETAIL N.T.S.

BOREHOLE LOGS

TAKEN FROM: HYDROGEOLOGIC INVESTIGATION REPORT
PROPOSED QUARRY OPERATION,
PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY–CAVENDISH AND HARVEY
(HARVEY WARD), COUNTY OF PETERBOROUGH

BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD., DATED NOVEMBER 2004

NOTE: BOREHOLES B–3 AND B–4 WERE DRILLED TO OBTAIN INFORMATION ON THE ELEVATION OF THE WATER TABLE AND DEPTH OF LIMESTONE ONLY. DRILLING STOPPED WHEN GRANITE BEDROCK WAS REACHED (APPROXIMATELY 15.5m DEEP). A DETAILED CORE ANALYSIS WAS NOT CONDUCTED ON THESE TWO SAMPLES.

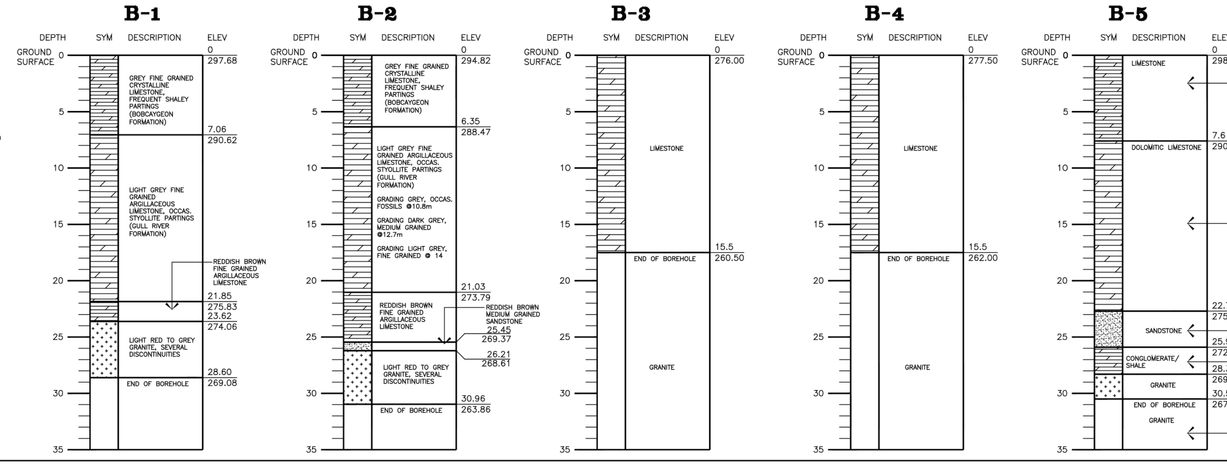


TABLE 1: WATER LEVEL SUMMARY

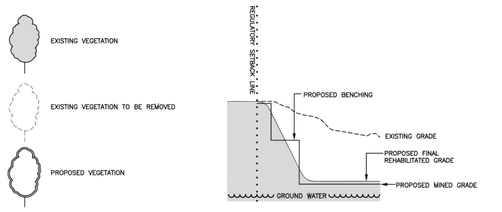
TAKEN FROM: HYDROGEOLOGIC INVESTIGATION REPORT
PROPOSED QUARRY, PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY–CAVENDISH AND HARVEY (HARVEY), COUNTY OF PETERBOROUGH
SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LIMITED
DATED: NOVEMBER, 2004

TABLE A–2: WATER LEVEL SUMMARY
HYDROGEOLOGICAL ASSESSMENT– PROPOSED STONESCAPE QUARRY

PROJECT WELL NO.	WELL ELEVATION (masl)	DEPTH (m)	WATER LEVEL									
			AUGUST 16, 2003		SEPTEMBER 23, 2003		AUGUST 16, 2004		SEPTEMBER 1, 2004		OCTOBER 13, 2004	
			DEPTH (m)	ELEVATION (masl)	DEPTH (m)	ELEVATION (masl)	DEPTH (m)	ELEVATION (masl)	DEPTH (m)	ELEVATION (masl)	DEPTH (m)	ELEVATION (masl)
B–1	297.7	28.60	18.50	279.18			17.93	279.75			17.13	280.55
B–2	294.8	30.96	14.76	280.06			15.14	279.68			14.90	279.92
B–3*	278.0	15.50			6.51	271.49	4.42	273.58			5.13	272.87
B–4*	277.0	15.50			8.73	268.27	6.25	270.75			7.10	269.90
B–5*	298.0	30.50									13.99	284.01
B–6*	258.0	10.10									4.00	254.00
W–1*	296.0	73.90	11.60	284.40			16.17	279.83			14.23	281.77
5		67.06							19.58			
8		72.54							21.85			
10	302.0	46.33							21.30	280.70		
13	302.0	--							22.38	279.62		

LEGEND

- BOUNDARY OF AREA TO BE LICENSED
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION LINE
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY / LOT / CONCESSION LINE



NOTES

1. SECTION LINES ARE INDICATED ON DRAWINGS 1, 2, 3 AND 5.
2. RESOURCE INFORMATION IS OBTAINED FROM BORE HOLES DRILLED IN MAY 2002 (B–1, B–2), SEPTEMBER 2003 (B–3, B–4) AND SEPTEMBER 2004 (B–5, B–6) FOR THE HYDROGEOLOGICAL ASSESSMENT.
3. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM THE REPORT PREPARED BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD.
4. THE WATER TABLE ELEVATION WITHIN THE PROPERTY IS ESTIMATED TO RANGE FROM ±285m ABOVE SEA LEVEL IN THE WESTERN PART OF THE SITE TO ±255m ABOVE SEA LEVEL IN THE EASTERN PART OF THE SITE. (REFER TO HYDROGEOLOGICAL REPORT LISTED ABOVE).
5. TOPOGRAPHIC INFORMATION WAS PREPARED BY J.B. FLEGUEL, PROJECT #1675A DATED JULY 2003. INFORMATION ON SITE AND WITHIN THE 120m INFORMATION BOUNDARY UPDATED BY WOELLMANN DEVELOPMENT SERVICES NOVEMBER 2003 ON BEHALF OF THE APPLICANT.

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
6	JULY 2006	AS PER OMB DECISION			
5	MAR 2005	AS PER MNR & PEER REVIEW COMMENT			
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Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.

Site Plan Amendments

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Project Name

STONESCAPE QUARRY

PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY–CAVENDISH & HARVEY (FORMERLY HARVEY), COUNTY OF PETERBOROUGH

Scale: **AS SHOWN**

North

Stamp: ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS – CERTIFIED LANDSCAPE ARCHITECT – MEMBER

Drawing Status: **FINAL ISSUED FOR LICENCE**

Drawn	Checked	Issue Date	Project Number
JH	RM/BJ	JULY 2006	03-21

Drawing Title: **SECTIONS**

Drawing Number: **4** OF 5

PLOT DATE: SEPTEMBER 15, 2006
FILE NAME: 0321–4.DWG

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- BOUNDARY OF EXISTING LICENCED AREA
- REGULATORY SETBACK LINE
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- PROPOSED 5m CONTOUR LINE
- PROPOSED 1m CONTOUR LINE
- 1 EXISTING BUILDING AND BUILDING NUMBER
- DIRECTION OF SURFACE WATER DRAINAGE
- W-1 ON-SITE WELL
- W-1 OFF-SITE WELL
- B-1 (2002) BOREHOLE # AND LOCATION AND YEAR DRILLED
- WP WITNESS POST
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- EXISTING FENCE
- PROPOSED PERIMETER FENCE
- PROPOSED VEGETATION
- PROPOSED TALUS SLOPE
- PROPOSED PASTURELAND
- PROPOSED EXPOSED BEDROCK

NOTES

1. TOPOGRAPHIC INFORMATION WAS PREPARED BY J.B. FLEGUEL, PROJECT #1675A DATED JULY 2003. INFORMATION ON SITE AND WITHIN THE 120m INFORMATION BOUNDARY UPDATED BY WOELLMANN DEVELOPMENT SERVICES NOVEMBER 2003 ON BEHALF OF THE APPLICANT.
2. REFER TO SHEET 4 OF 5 FOR SECTIONS AND NOTES, SHEET 2 & 3 OF 5 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND TO SHEET 5 OF 5 FOR REHABILITATION PLAN AND NOTES.
3. PROPERTY SHALL BE REHABILITATED TO EXPOSED BEDROCK (35.0 Ha) AND AGRICULTURE/ PASTURELAND (90.82 HA), FOREST (15.00 Ha) AND TALUS SIDESLOPE (5.30 Ha) FOR A TOTAL OF 151.12 HECTARES.
4. REHABILITATION OF SLOPES SHALL BE BY BACKFILLING AND/OR CUT AND FILL METHOD USING AVAILABLE ON-SITE OVERBURDEN, INERT IMPORTED FILL (SUBJECT TO MNR APPROVAL), WASTE ROCK, SUBSOIL AND TOPSOIL FROM WITHIN THE LICENSED AREA. SLOPES SHALL BE A MAXIMUM GRADE OF 2:1. SUBSOIL REPLACED WILL BE APPROXIMATELY 100mm THICK. TOPSOIL REPLACED WILL BE APPROXIMATELY 100mm THICK AND SHALL BE SEEDED AND MAINTAINED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125 KG/HA:

   BUCKWHEAT ALFALFA WHITE CLOVER TALL FESCUE CREEPING BENT GRASS
   PERENNIAL RYE ANNUAL RYE

   PORTIONS OF THE SITE WILL BE REHABILITATED TO TALUS SLOPE (SEE DRAWINGS).
5. AREAS SHALL BE REHABILITATED BACK TO AGRICULTURE (PASTURELAND) AS FOLLOWS:
   - -SPREADING OF APPROXIMATELY 100mm OF OVERBURDEN AND ROUGH GRADING
   - -SPREADING OF APPROXIMATELY 100mm OF TOPSOIL AND FINE GRADING
   - -SEED AREAS WITH SEED MIXTURE NOTED ABOVE.

   ALL VEGETATION PLANTED DURING THIS LICENSE WILL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

   TREE SEEDLINGS WILL BE PLANTED ON SOME REHABILITATED AREAS INCLUDING THE SIDESLOPES (SEE DRAWING) AND MAY INCLUDE THE FOLLOWING SPECIES:

   WHITE SPRUCE WHITE CEDAR SILVER MAPLE RED MAPLE SUGAR MAPLE HEMLOCK AMERICAN BEECH
6. ALL BUILDINGS, EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.
7. FINAL GRADES SHALL BE SLOPED TO DRAIN TOWARDS THE LOW POINTS IN THE EASTERN PORTION OF THE SITE WHERE WATER WILL INFILTRATE THOUGH CRACKS AND FISHERS IN THE ROCK. THERE WILL BE NO OFF SITE DISCHARGE OF WATER IN THE FINAL REHABILITATION.

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.
6	JULY 2006	AS PER OMB DECISION			
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Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H.H.	O.M.N.R.

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Project Name

STONESCAPE QUARRY

PART OF LOTS 19 AND 20, CONCESSION 8
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY (FORMERLY HARVEY), COUNTY OF PETERBOROUGH

Scale: 1:2000 (0 10 50 80m)

North

Stamp: Ontario Association of Landscape Architects, Member

Drawing Status: **FINAL ISSUED FOR LICENCE**

Drawn	Checked	Issue Date	Project Number
RM	RM/BJ	JULY 2006	03-21

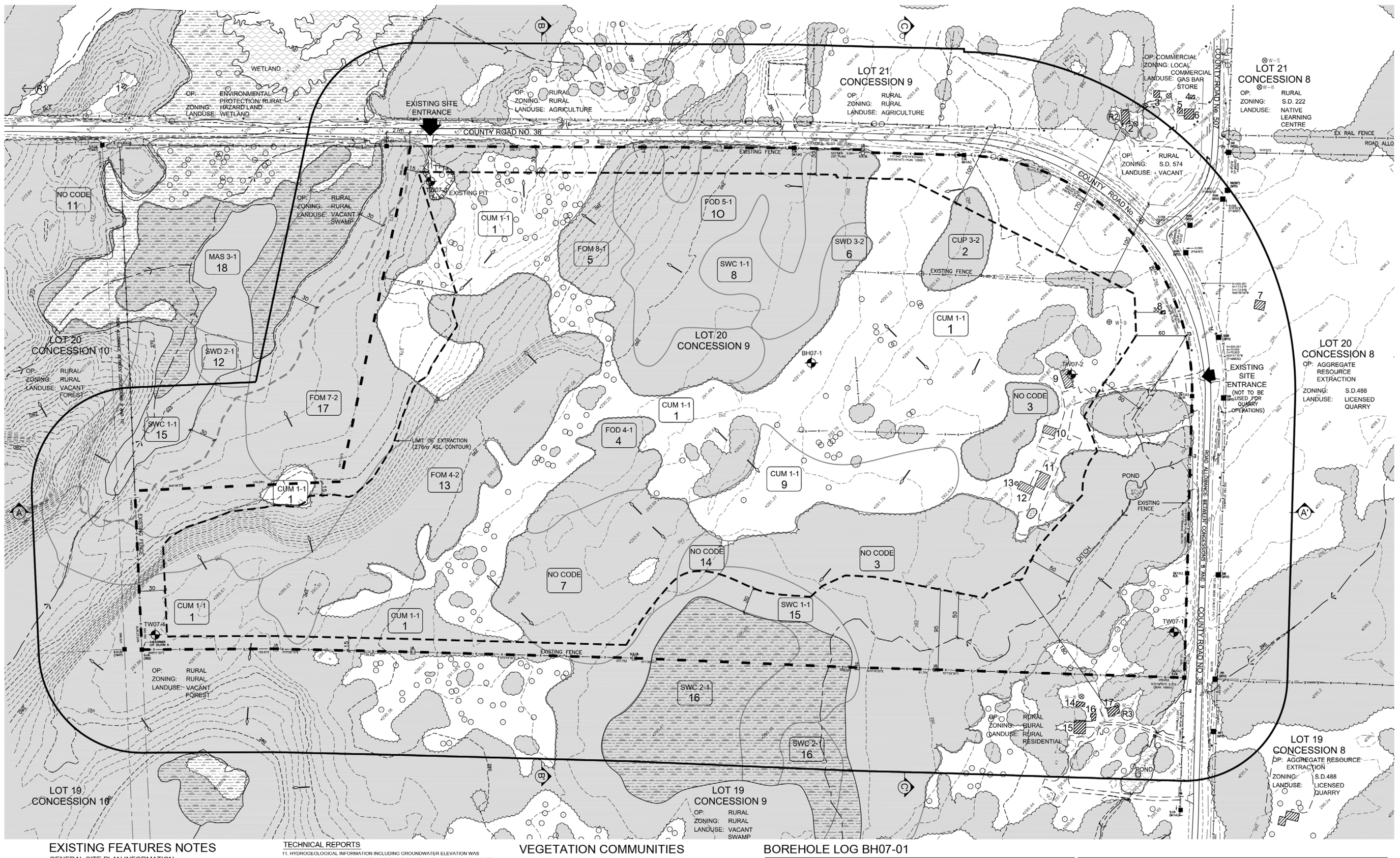
Drawing Title: **REHABILITATION PLAN**

Drawing Number: **5 OF 5**

PLOT DATE: SEPTEMBER 15, 2006
FILE NAME: 0321-5.DWG

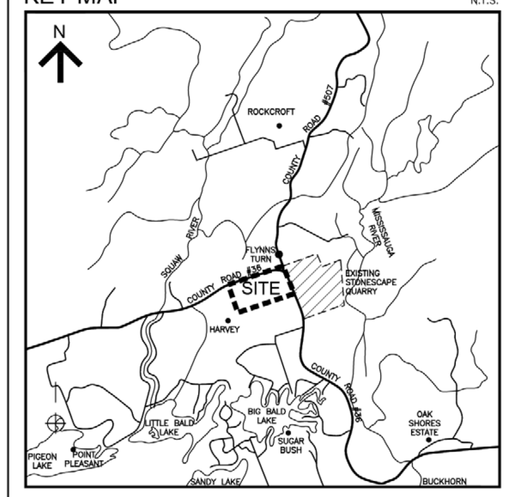
Appendix F

MILKHOUSE SITE PLAN (APPROVED)



KEY MAP

N.T.S.



LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- 290 EXISTING 5m CONTOUR LINE
- 283 EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- 1 EXISTING BUILDING AND BUILDING NUMBER
- W-1 ON-SITE WELL
- W-1 OFF-SITE WELL
- BH07-1 BOREHOLE LOCATION, YEAR DRILLED AND #
- TW07-1 TEST WELL LOCATION, YEAR DRILLED AND #
- SMALL STREAM, AGRICULTURAL DITCH
- FENCE
- DRAINAGE DIRECTION
- R1 LOCATION OF NOISE RECEPTOR
- CUM 1-1 3 VEGETATION COMMUNITY

NO.	DATE	REVISIONS	OWNER	H&M	MHR
4.	JULY 2012	REVISED EASTERN EXTRACTION LIMIT, ADDED SAR MITIGATION MEASURES, REVISED NOTE #6 AND #7, ADDED SPECIAL CONDITIONS, ADDED WETLAND, REVISED ENTRANCE LAYOUT			
3.	MAY 2012	REVISED EXTRACTION LIMIT, REAR SLOPES, ADDED NO-DRILLING ZONE			
2.	JAN21 2011	REVISED NOTE #5 AND WEST LIMIT OF EXTRACTION.			
1.	FEB19 2010	REVISED NOTE #5 AND LIMIT OF EXTRACTION.			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H&M	MHR

Site Plan Amendments

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Markham, Ontario L6B 1A8
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Offices in Markham & Cambridge

Project Name

MILK HOUSE QUARRY

PART OF LOT 20, CONCESSION 9
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY,
COUNTY OF PETERBOROUGH

Scale 1:2000
0 10 50 80m

North

Stamp: ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RICHARD MARTIN — MEMBER

Drawing Status: PRELIMINARY

Drawn R.M. | Checked R.M./B.J. | Issue Date NOV 2008

Drawing Title: EXISTING FEATURES PLAN

Project Number: 06-24

Drawing Number: 1 OF 5

FILE NAME: 0624-COMP.DGN
PLOT DATE: JULY 4, 2012

EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSISTS OF 5 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.

LICENCE INFORMATION

3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES UNDER THE AGGREGATE RESOURCES ACT FOR A CATEGORY 4 - CLASS 'A' LICENCE, QUARRY ABOVE THE WATER TABLE.
4. APPLICANT: DR. DAN SLOBODIAN
   P.O. BOX 249
   BUCKHORN, ONTARIO
   K0L 1J0
5. TOTAL AREA TO BE LICENCED: 60.2 HA
   TOTAL AREA TO BE EXTRACTED: 42.1 HA
   TOTAL AREA TO REHABILITATED: 44.7 HA

BASE INFORMATION

6. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM TOPOGRAPHIC SURVEY FOR LOTS 19 AND 20, CONCESSION 9 PREPARED BY FIRST BASE SOLUTIONS INC. USING 1:20,000 AERIAL PHOTOGRAPHY DATED JULY 13, 2006, REVISED SEPTEMBER 20, 2006.
   PROPERTY BOUNDARIES OBTAINED FROM BENINGER SURVEYING LTD., JOB #23883, DATED SEPTEMBER 6, 2006.
   THE SITE WAS FIELD CHECKED BY WOELLMANN DEVELOPMENT SERVICES.
7. ZONING INFORMATION OBTAINED FROM SCHEDULE, TOWNSHIP OF HARVEY ZONING BY-LAW NO. 89-94, DATED JANUARY 3, 2002.
8. VEGETATION INFORMATION OBTAINED FROM FIELD INSPECTION AND M.N.R. FOREST RESOURCE INVENTORY MAPPING. (NIBLETT ENVIRONMENTAL ASSOCIATES INC., JUNE 2008)

HYDROGEOLOGICAL INFORMATION

9. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORTS BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD DATED FEBRUARY 2008 AND REVISED MARCH 2008.
10. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO RANGE FROM ±271.00m ABOVE SEA LEVEL AT THE WESTERN ESCARPMENT AND LOWER WETLAND AREAS TO ±285.00m ABOVE SEA LEVEL IN THE NORTHEAST QUADRANT OF THE SITE. BASED ON THE HYDROGEOLOGICAL REPORT (SEE ABOVE).

TECHNICAL REPORTS

11. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORTS BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD DATED FEBRUARY 2008 AND REVISED MARCH 2008.
12. LEVEL 1 AND LEVEL 2 NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY NIBLETT ENVIRONMENTAL ASSOCIATES INC. DATED JUNE 2008 (REFER TO SHEET 3 FOR TECHNICAL RECOMMENDATIONS).
13. TRAFFIC ASSESSMENT INFORMATION WAS OBTAINED FROM STUDY BY C.C. TATHAM & ASSOCIATES LTD., DATED MAY 2008
14. ACOUSTICAL INFORMATION WAS OBTAINED FROM NOISE REPORT BY VALCOUSTICS CANADA LTD. DATED JULY 9, 2008, LETTER FROM VALCOUSTICS CANADA LTD. DATED MAY 17, 2012 RE: DRILLING NON-DRILLING ZONES (REFER TO SHEET 3 FOR TECHNICAL RECOMMENDATIONS).
15. BLAST IMPACT INFORMATION WAS OBTAINED FROM BLAST IMPACT ANALYSIS REPORT BY EXPLOTECH ENGINEERING LTD. DATED NOVEMBER 2007 (REFER TO SHEET 3 FOR TECHNICAL RECOMMENDATIONS).
16. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM A STAGE I-II ARCHAEOLOGICAL/ HERITAGE ASSESSMENT, BY YORK NORTH ARCHAEOLOGICAL SERVICES INC., DATED MARCH 31, 2008 (REFER TO SHEET 3 FOR TECHNICAL RECOMMENDATIONS).
17. TRAFFIC IMPACT ASSESSMENT WAS OBTAINED FROM C.C. TATHAM & ASSOCIATES LTD., DATED MAY 2008.

BUILDING LIST

No.	USE
1.	SHED
2.	HOUSE
3.	HOUSE
4.	SERVICE STATION
5.	SERVICE STATION
6.	SERVICE STATION
7.	OLD STONE FOUNDATION
8.	2m x 2m OLD STONE FOUNDATION (MILK HOUSE)
9.	9m x 8.5m HOUSE
10.	8m x 14m METAL QUANSIT HUT
11.	19m x 12m SHED
12.	9m x 17m SHED
13.	5m Dia. ALUMINUM SILO
14.	WORKSHOP / GARAGE
15.	STORAGE SHED
16.	STORAGE SHED
17.	HOUSE

VEGETATION COMMUNITIES

No.	CODE	DESCRIPTION
1.	CUM 1-1	DRY MOIST OLD FIELD MEADOW
2.	CUP 3-2	WHITE PINE CONIFEROUS PLANTATION
3.	NO CODE	WHITE CEDAR/WHITE PINE CONIFEROUS FOREST
4.	FOD 4-1	DRY-FRESH BEECH DECIDUOUS FOREST
5.	FOM 8-1	FRESH-MOIST POPLAR MIXED FOREST
6.	SWD 3-2	SILVER MAPLE MINERAL DECIDUOUS SWAMP
7.	NO CODE	WHITE CEDAR/WHITE PINE CONIFEROUS FOREST
8.	SWC 1-1	WHITE CEDAR MINERAL DECIDUOUS SWAMP
9.	CUM 1-1	DRY MOIST OLD FIELD MEADOW
10.	FOD 5-1	DRY-FRESH SUGAR MAPLE DECIDUOUS FOREST
11.	NO CODE	WHITE CEDAR/WHITE PINE CONIFEROUS FOREST
12.	SWD 2-1	BLACK ASH MINERAL DECIDUOUS SWAMP
13.	FOM 4-2	DRY-FRESH WHITE CEDAR POPLAR MIXED FOREST
14.	NO CODE	WHITE CEDAR/WHITE PINE CONIFEROUS FOREST
15.	SWC 1-1	WHITE CEDAR MINERAL CONIFEROUS FOREST
16.	SWC 2-1	WHITE PINE MINERAL CONIFEROUS SWAMP
17.	FOM 7-2	FRESH MOIST WHITE CEDAR--HARDWOOD MIXED FOREST
18.	MAS 3-1	CATTAIL ORGANIC SHALLOW MARSH

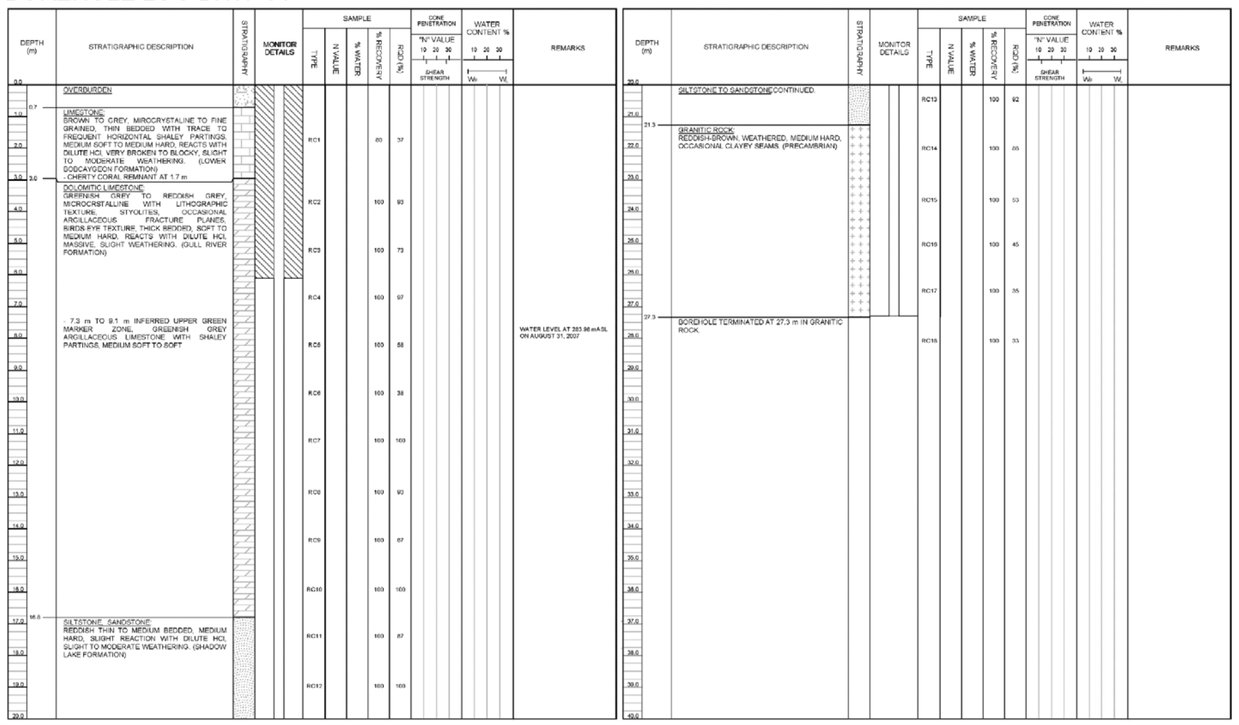
WATER LEVEL MONITORING SUMMARY

TAKEN FROM: STAGE II HYDROGEOLOGIC INVESTIGATION
PROPOSED STONESCAPE QUARRY II, PART OF LOT 20, CONCESSION 8 TOWNSHIP OF GALWAY-CAVENDISH AND HARVEY (HARVEY WARD), COUNTY OF PETERBOROUGH
SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LIMITED DATED: MARCH 2008

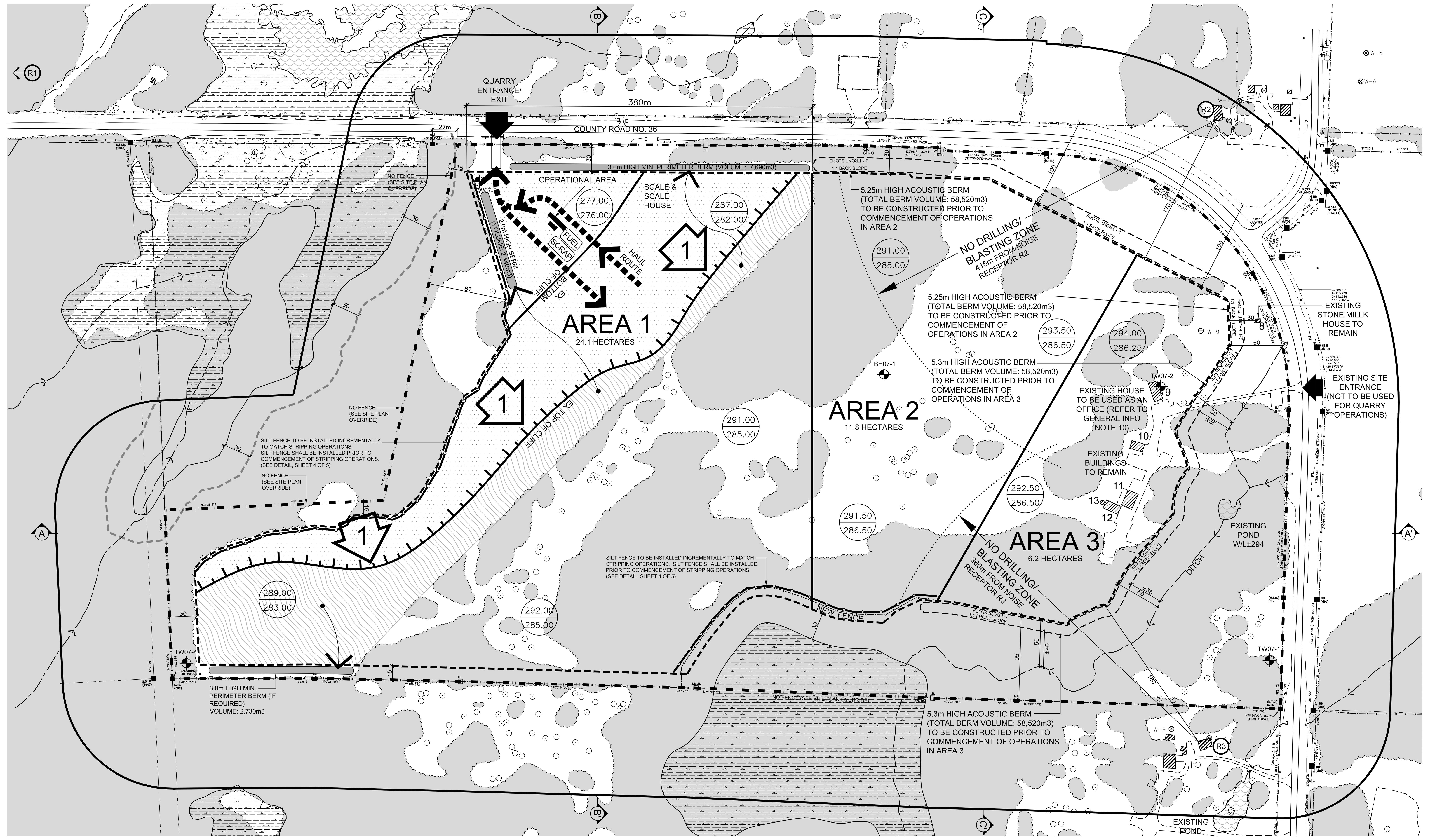
TABLE A-2: WATER LEVEL MONITORING SUMMARY
STAGE II HYDROGEOLOGICAL ASSESSMENT– PROPOSED STONESCAPE QUARRY II

PROJECT WELL NO.	WELL ELEVATION (masl)	DEPTH (m)	WATER LEVEL			
			AUGUST 31, 2007		DECEMBER 13, 2007	
			DEPTH (m)	ELEVATION (masl)	DEPTH (m)	ELEVATION (masl)
BH07-1	292.4	27.3	8.39	283.98	7.64	284.73
TW07-01	299.6	24.6	18.24	281.38	17.74	281.87
TW07-02	294.9	36.6	10.15	284.70	10.0	284.85
TW07-03	274.6	18.3	3.62	271.01	3.49	271.13
TW07-04	288.6	30.5	14.12	274.51	13.67	274.96

BOREHOLE LOG BH07-01



PHASE ONE



LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- EXISTING BUILDING AND BUILDING NUMBER
- W-1 ON-SITE WELL
- W-1 OFF-SITE WELL
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- FENCE
- SILT FENCE
- PROPOSED PERIMETER BERM
- PROPOSED ACOUSTIC BERM (TO BE CONSTRUCTED PRIOR TO COMMENCEMENT OF OPERATIONS IN AREA 2 OR 3)
- AREA UNDER EXCAVATION
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- BH07-1 BOREHOLE LOCATION, YEAR DRILLED AND #
- TW07-1 TEST WELL LOCATION, YEAR DRILLED AND #
- EXTRACTION PHASE/ DIRECTION OF EXTRACTION
- EXTRACTION FACE
- DIRECTION OF TOPSOIL MOVEMENT
- QUARRY ENTRANCE / EXIT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- 330/322 EXISTING ELEVATION / PROPOSED ELEVATION
- R1 LOCATION OF NOISE RECEPTOR

NO.	DATE	REVISIONS	OWNER	H&H	MNR
5.	JULY 2012	REVISED EASTERN EXTRACTION LIMIT, ADDED SAR MITIGATION MEASURES, ADDED HYDRO-G NOTE 7, ADDED SPECIAL CONDITIONS, ADDED WETLAND, REVISED ENTRANCE LAYOUT			
4.	MAY 2012	REVISED EXTRACTION LIMIT, BERM SLOPES, ADDED NO-DRILLING ZONE			
3	APR14 2011	REVISED NOTE FOR NORTHERN BERM, ADDED ACOUSTIC NOTES.			
2.	JAN21 2011	REVISED NOTE #5 AND #13 AND WEST LIMIT OF EXTRACTION.			
1.	FEB19 2010	REVISED LIMIT OF EXTRACTION, ENTRANCE, AREA 3 BERM, NOTE #5, SITE ENTRANCE UPGRADES DETAIL, ADDED BERM TO AREA 1, REMOVED ORIGINAL NOTE #10			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H&H	MNR

Site Plan Amendments

SCALE 1:2000
PHASE ONE NOTES

1. PRIOR TO THE ISSUANCE OF THE LICENCE, THE APPLICANT WILL ENSURE THAT THE HOUSE (BUILDING 9) IS NO LONGER IN USE FOR RESIDENTIAL PURPOSES.
2. ESTABLISH QUARRY ENTRANCE/EXIT TO COUNTY ROAD No. 36 ACCORDING TO APPROPRIATE MUNICIPAL STANDARDS. ESTABLISH SCALES, SCALEHOUSE, AND HAUL ROAD INTO THE SITE AS SHOWN ON THE SITE PLAN (SITE ENTRANCE UPGRADES DRAWING 2 OF 5).
3. PRIOR TO COMMENCING EXTRACTION IN AREA 1, CONSTRUCT OR UPGRADE THE FENCING ON THE PERIMETER OF THE LICENCED BOUNDARIES, PROPERTY LINE AND/OR EXTRACTION LIMIT (SEE SITE PLAN OVERRIDE) TO THE STANDARDS OF THE AGGREGATE RESOURCES ACT, AS REQUIRED. ALL FENCING SHALL BE MAINTAINED FOR THE DURATION OF QUARRY OPERATIONS.
4. PRIOR TO COMMENCING SITE PREPARATION IN AREA 1 INSTALL SILT FENCE AT DRIP LINE OF TREES ALONG WESTERN LIMIT OF EXTRACTION. SILT FENCE WILL BE INSTALLED INCREMENTALLY AS STRIPPING MOVES IN A SOUTHERLY DIRECTION.
5. BEGIN SITE PREPARATION IN AREA 1 BY REMOVING EXISTING TREES AND SCRUB VEGETATION IN THE AREA TO BE EXTRACTED.
6. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1 AND STORE MATERIAL IN PERIMETER BERMS IN THE NORTH AND SOUTH SETBACK BOUNDARIES AND IN STOCKPILE IN OPERATIONAL AREA, AS SHOWN.
7. ESTABLISH OPERATIONAL AREA ON THE QUARRY FLOOR.
8. BEGIN EXCAVATION OF DIMENSIONAL STONE IN PHASE 1, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY BETWEEN AREA 1 AND AREA 2 AND THE EXTRACTION LIMITS, AS IDENTIFIED ON THE PLANS.
9. THE FINAL MINING ELEVATION OF AREA 1, ALONG THE EXTRACTION LIMITS AND THE QUARRY FLOOR, SHALL BE 276.00 TO 285.0 mASL.
10. THE TOTAL MAXIMUM DISTURBED AREA FOR THE AREAS 1 TO 3 IS 25 HECTARES. PRIOR TO THE DISTURBANCE OF AREA 2, A MINIMUM OF 25% OF AREA 1 (6.03 HECTARES) SHALL BE REHABILITATED. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
11. AREA 2 AND AREA 3 SHALL REMAIN UNDISTURBED.

SITE PLAN OVERRIDE

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE REQUIREMENTS OF THE PROVINCIAL OPERATIONAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT, FOR LICENCES.

ITEM	SECTION
NO FENCE REQUIRED ALONG WESTERN LICENCED BOUNDARY AS FENCING ON PROPERTY LINE WILL RESTRICT ACCESS TO THE SITE.	5.1
NO FENCE REQUIRED ALONG A PORTION OF THE SOUTHERN LICENCED BOUNDARY. FENCING ERECTED ON THE EXTRACTION LIMIT AND THE EXISTING WETLAND WILL RESTRICT ACCESS TO THE SITE.	5.1

OPERATIONS NOTES

GENERAL INFORMATION

1. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM TOPOGRAPHIC SURVEY FOR LOTS 19 AND 20, CONCESSION 9 PREPARED BY FIRST BASE SOLUTIONS INC. USING 1:20,000 AERIAL PHOTOGRAPHY DATED JULY 13, 2006, REVISED SEPTEMBER 20, 2006.
2. PROPERTY BOUNDARIES OBTAINED FROM BENINGER SURVEYING LTD., JOB #23883 DATED SEPTEMBER 6, 2006.
3. REFER TO DRAWING 1 OF 5, EXISTING FEATURES, FOR A DESCRIPTION OF EXISTING VEGETATION AND BUILDINGS WITHIN THE 120m BOUNDARY AND ON SITE.
4. SITE PLAN OVERRIDES ARE LISTED IN THE SITE PLAN OVERRIDE TABLE SHOWN ON THIS PAGE.
5. TOTAL AREA TO BE EXTRACTED IS 42.1 HECTARES.
6. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS 1.5 MILLION TONNES.
7. EQUIPMENT TO BE USED IN THE OPERATION OF THE QUARRY MAY INCLUDE THE USE OF TRUCKS, LOADERS, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT. IT IS ANTICIPATED THAT THERE WILL BE NO STORAGE OF EXPLOSIVES ON SITE. HOWEVER, SHOULD THERE BE A NEED TO STORE EXPLOSIVES ON SITE, THEY WILL BE STORED WITHIN AREA 1 AND MEET THE REQUIREMENTS OF THE APPLICABLE FEDERAL LEGISLATION.

   NOTE: NO CRUSHING OF MATERIAL WILL BE CONDUCTED ON SITE.

   ANY EXCESS SURFACE WATER ON THE QUARRY FLOOR WILL BE DIRECTED TO A SUMP HOLE(S). THERE SHALL BE NO EXCESSIVE DISCHARGE OF WATER OFF SITE WITH THE EXCEPTION OF THE RELOCATED DITCH.
8. REHABILITATED SLOPES WITHIN THE LICENSED AREA WILL BE CONSTRUCTED AS SHOWN ON THE CROSS SECTIONS. ALL MATERIALS USED FOR PROGRESSIVE AND FINAL REHABILITATION WORK WILL BE FROM ON SITE OR AN MOEE APPROVED OFFSITE SOURCE OF CLEAN INERT FILL.

   CLEAN INERT FILL MAY BE IMPORTED TO FACILITATE THE ESTABLISHMENT OF 2:1 (HORIZONTAL: VERTICAL) SLOPES ON THE QUARRY FACES. THE LICENSEE/ PERMITTEE MUST ENSURE THAT THE MATERIAL IS TESTED AT THE SOURCE, BEFORE IT IS DEPOSITED ON-SITE, TO ENSURE THAT THE MATERIAL MEETS THE MINISTRY OF THE ENVIRONMENT'S (MOE) CRITERIA UNDER TABLE 1 OF MOE'S SOILS, GROUNDWATER AND SEDIMENT STANDARDS FOR USE UNDER PART XV.1 OF THE ENVIRONMENTAL PROTECTION ACT. SAMPLING RESULTS WILL BE PROVIDED TO MNR UPON REQUEST.

   WHERE THE IMPORTED MATERIAL IS NOT BEING PLACED WITHIN 1.5m OF THE SURFACE, THE CRITERIA UNDER TABLE 1 FOR SODIUM ABSORPTION RATIO AND ELECTRICAL CONDUCTIVITY DO NOT HAVE TO BE MET.
9. THE HAUL ROUTE FOR THIS LICENCE SHALL BE COUNTY ROAD 36 EXCEPT WHEN THIS ROUTE IS NOT AVAILABLE OR FOR LOCAL DELIVERIES.
10. ALL BUILDINGS, EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.

    PRIOR TO THE ISSUANCE OF THE LICENCE, THE APPLICANT WILL ENSURE THAT THE HOUSE (BUILDING 9) IS NO LONGER IN USE FOR RESIDENTIAL PURPOSES. THE STRUCTURE WILL BE RETAINED FOR USE AS A POSSIBLE OFFICE AND SHALL REMAIN UNTIL ACCESS TO AGGREGATE NECESSITATES ITS DEMOLITION (THE FINAL EXTRACTION OF THE SITE).
11. THERE WILL BE NO CLEARING/ CUTTING OF TREES OR VEGETATION ON SITE BETWEEN MARCH 31 AND JULY 31.
12. THE AREAS 1 TO 3 SHOWN ON THE PLAN REPRESENT EXTRACTION AREAS, AND ARE TO STAGE PROGRESSIVE REHABILITATION OF THE SITE. THE PHASES 1 TO 5 SHOWN ON THE PLANS REPRESENT OPERATIONAL PHASES AND ARE TO DISPLAY THE BALANCE OF EXTRACTION AND REHABILITATION TO OCCUR IN EACH EXTRACTION AREA. THE AMOUNT OF PROGRESSIVE REHABILITATION TO BE CONDUCTED IN EACH EXTRACTION AREA IS TO BE SPECIFIED IN TEXT IN EACH PHASE. THE OPERATIONAL PHASING PROVIDES FOR EXTRACTION FLEXIBILITY IN MORE THAN ONE PHASE.

MINING AND PROGRESSIVE REHABILITATION SEQUENCING

13. THE TOTAL EXTRACTION AREA OF 42.1 HA IS SUBDIVIDED INTO THREE AREAS OF 24.1HA, 11.8 HA AND 6.2 HA RESP. THE LIMESTONE EXTRACTION WILL FOLLOW TWO GEOLOGICAL TYPES OF BEDROCK WITHIN EACH PHASE AND WILL INVOLVE THE EXCAVATION OF DIMENSIONAL (BLOCK) STONE. THE FIRST BEDROCK LAYER INVOLVING THE BOBCAYGEON FORMATION WILL TAKE PLACE IN ONE +/-3.0m BENCH. THE SECOND BEDROCK LAYER INVOLVING THE GULL RIVER FORMATION WILL TAKE PLACE IN ONE BENCH OF +/-7.0m. THE MAXIMUM DEPTH OF EXCAVATION FOR THE LICENCED AREA WILL RANGE FROM APPROXIMATELY 273.0 mASL (WEST) TO 285.0 mASL (EAST). THE WATER TABLE HAS BEEN DETERMINED TO EXIST AT THE RANGE OF ELEVATIONS 271.0 mASL (WEST) TO 283.0 mASL (EAST).
14. DUE TO THE QUALITY, JOINT THICKNESS, OR THE MARKET DEMANDS ON THE LIMESTONE PRODUCTS (I.E. DIMENSION STONE), EXTRACTION OPERATIONS MAY EXIST WITHIN MORE THAN ONE AREA. THE EXTRACTION PRIORITY WILL BE TO SEQUENTIALLY DEPLETE RESOURCES WITHIN EACH AREAS BY EXTRACTING THE DIMENSION STONE BY MECHANICAL EQUIPMENT, ASSISTED PERIODICALLY BY LOW LEVEL BLASTING METHODS. THERE WILL BE NO PROCESSING OF MATERIAL BY CRUSHING OR SCREENING METHODS CONDUCTED ON SITE. A COLLECTIVE MAXIMUM DISTURBED AREA OF NO MORE THAN ±25 HECTARES SHALL BE DISTURBED AT ANY GIVEN TIME WITHIN AREAS 1, 2, & 3. THE DISTURBED AREA WILL INCLUDE ALL STRIPPED, EXCAVATION, PROCESSING, STOCKPILE, AND PARTIAL REHABILITATED AREAS.
15. THE PROGRESSIVE CONSTRUCTION OF THE BERMS SHALL BE COMPLETED IN COMPARISON TO THE EXTRACTION PHASES AND IN RELEVANCE TO THE LOCATION OF THE RESIDENCE RECEPTORS. BEYOND THE VOLUME REQUIRED IN THE BERMS, THE PROGRESSIVE REHABILITATION OF THE AREAS 1, 2, & 3, WILL REQUIRE A LARGE AMOUNT OF TOPSOIL AND OVERBURDEN TO BE USED AS COVER MATERIAL ON THE QUARRY FLOOR AND THE 2:1 SIDE SLOPES. THE PROGRESSIVE REHABILITATION OF THE SITE WILL BE MONITORED BY MNR AND IF THE SITE IS NOT REHABILITATED ACCORDING TO THE SPECIFIED RATE ON THE SITE PLANS THE EXTRACTION OPERATIONS WILL BE ORDERED TO CEASE.

HYDROGEOLOGICAL INFORMATION

16. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORTS BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD DATED FEBRUARY 2008 AND REVISED MARCH 2008.
17. THE WATER TABLE ELEVATION WITHIN THE PROPERTY IS ESTIMATED TO RANGE FROM ±271.00m ABOVE SEA LEVEL AT THE WESTERN ESCARPMENT AND LOWER WETLAND AREAS TO ±285.00m ABOVE SEA LEVEL IN THE NORTHEAST QUADRANT OF THE SITE. (REFER TO HYDROGEOLOGICAL REPORT LISTED ABOVE). REFER TO TECHNICAL RECOMMENDATIONS - HYDROGEOLOGY, SHEET 3 OF 5, FOR MONITORING RECOMMENDATIONS.
18. SURFACE DRAINAGE ON THE QUARRY FLOOR WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE.
19. GROUNDWATER MONITORING PROGRAM SHALL BE CONDUCTED AS SPECIFIED ON SHEET 3 OF 5.

AIR QUALITY INFORMATION

20. CRUSHED ASPHALT OR OTHER PROVINCIALLY APPROVED DUST SUPPRESSANTS WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

21. EXISTING VEGETATION WITHIN THE LICENSED AREA SHALL BE MAINTAINED IN A HEALTHY AND VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

22. BOUNDARIES OF THE AREA TO BE LICENSED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 5, EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING AND GATES (AS SHOWN) ON THE LICENSED BOUNDARIES, PROPERTY LINE AND/OR EXTRACTION LIMIT (SEE SITE PLAN OVERRIDE) WILL BE ERECTED OR UPGRADED TO COMPLY WITH THE AGGREGATE RESOURCES ACT (I.E. 1.2m HIGH FARM FENCE) WHERE REQUIRED. (REFER TO PHASING NOTES ON SHEET 2 AND 3 OF 5). ALL FENCING SHALL BE MAINTAINED FOR THE DURATION OF THE QUARRY.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

23. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS OR STOCKPILES. BERMS AND STOCKPILES OF TOPSOIL SHALL BE GRADED TO STABLE SLOPES AND SEEDED WITH A GRASS/LEGUME MIXTURE TO PREVENT EROSION AND MINIMIZE DUST. STOCKPILES SHALL BE AT LEAST 30m FROM LICENCE BOUNDARY OR 90m FROM LAND ZONED FOR RESIDENTIAL OR IN RESIDENTIAL USE WHEN THE LICENCE WAS ISSUED.

BERM INFORMATION

24. BERMS SHALL CREATE AN EFFECTIVE VISUAL BARRIER OR ACOUSTICAL BARRIER TO A MINIMUM OF ±3.0 METRES ABOVE THE EXISTING GRADE. ALL BERMS SHALL BE GRADED TO A STABLE SLOPE (2:1 OR 1:1 GRADIENT, AS SHOWN ON DRAWINGS). ALL BERMS SHALL BE SEEDED IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION. WHEREVER POSSIBLE SUITABLE PLANTS WILL BE ESTABLISHED TO PROMOTE A DEEP ROOT SYSTEM AND ENHANCE SOIL STRUCTURE. SEED MIXTURE MAY BE MODIFIED DUE TO AVAILABILITY AND SOIL STRUCTURE. ALL VEGETATION SHALL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION FOR THE LIFETIME OF THE LICENSE. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 4 OF 5. BERMS (AS SPECIFIED IN NOISE REPORT, MARCH 2008, UPDATED 2012) SHALL CREATE AN EFFECTIVE ACOUSTICAL BARRIER TO HEIGHTS AS SHOWN.

SCRAP STORAGE INFORMATION

25. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED NEAR THE SCALE, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND BE DISPOSED OF ON AN ONGOING BASIS. TREES TO BE REMOVED WITHIN THE EXTRACTION AREA WILL BE UTILIZED FOR FIREWOOD OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

26. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD AND ANY SPILLS SHALL BE REMOVED AND DISPOSED OF IMMEDIATELY AT AN APPROPRIATE MOE APPROVED FACILITY.

PESTICIDES/ HERBICIDES INFORMATION

27. PESTICIDES AND HERBICIDES SHALL BE USED ONLY WHEN REQUIRED TO CONTROL INFESTATIONS AND SHALL BE APPLIED BY A LICENCED PROFESSIONAL WITH PRIOR NOTICE GIVEN TO THE TOWNSHIP OF GALWAY-CAVENDISH & HARVEY.

NOISE MITIGATION INFORMATION

28. ACOUSTICAL INFORMATION WAS OBTAINED FROM NOISE REPORT BY VALCOUSTICS CANADA LTD. DATED JULY 9, 2008 (REFER TO SHEET 3 FOR TECHNICAL RECOMMENDATIONS).
29. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION	06:00-19:00 MONDAY- SATURDAY
EXCAVATION AND PROCESSING	07:00-19:00 MONDAY- SATURDAY
SHIPPING	07:00-19:00 MONDAY- SATURDAY

   (SUNDAY- MAINTENANCE ONLY)

   SHIPPING FOR EMERGENCY PURPOSES MAY OCCUR OUTSIDE THESE DAYTIME HOURS (SEE TECHNICAL RECOMMENDATIONS) AND ANY SUCH EXTENSION TO THESE HOURS WILL REQUIRE PRIOR APPROVAL OF THE TOWNSHIP OF GALWAY-CAVENDISH & HARVEY.
30. THE LICENSEE WILL MONITOR BLASTS FOR GROUND VIBRATIONS AND BLAST OVER PRESSURE AS SPECIFIED IN THE BLAST IMPACT ANALYSIS REPORT TO ENSURE COMPLIANCE WITH CURRENT PROVINCIAL GUIDELINES. 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. ALL BLAST MONITORING REPORTS MUST BE RETAINED BY THE LICENSEE AND MADE AVAILABLE UPON REQUEST BY THE MINISTRY OF NATURAL RESOURCES FOR AUDIT PURPOSES. IT IS ANTICIPATED THAT BLASTING WILL OCCUR ON AN INTERMITTENT BASIS, AS REQUIRED TO MEET MARKET DEMANDS.
31. NOISE MITIGATION ASSESSMENT DID NOT INCLUDE LARGE SCALE BLASTING AND CRUSHING OPERATIONS. NO CRUSHING OR PROCESSING OF AGGREGATE IS ALLOWED ON THE SITE. THE RESIDENCE BUILDING (NO.9) WAS ALSO NOT INCLUDED IN THE NOISE ASSESSMENT AS IT WILL NO LONGER BE IN USE FOR RESIDENTIAL PURPOSES.

TRAFFIC IMPACT ASSESSMENT INFORMATION

32. NO NEGATIVE IMPACTS ARE EXPECTED DUE TO THE OPERATION OF THIS QUARRY.

SPECIAL CONDITIONS

1. THE LICENSEE, PRIOR TO MAKING ANY APPLICATION TO AMEND THE SITE PLAN OR AMEND THE LICENCE CONDITIONS, WILL ADVISE THE TOWNSHIP AND ALL LAND OWNERS WITHIN 120 METRES OF THE LICENCE BOUNDARY OF THE INTENT AND PURPOSE OF THE AMENDMENT IN WRITING.
2. THE LICENSEE WILL ENSURE THAT, PRIOR TO CONSTRUCTION OF THE BERM IN THE VICINITY OF THE MILK HOUSE, A TEMPORARY FENCE WILL BE INSTALLED AROUND THE MILK HOUSE. IN ADDITION, AN EROSION CONTROL FENCE SHALL BE INSTALLED AT THE PROPOSED TOE OF THE BERM AND MAINTAINED UNTIL THE BERM IS VEGETATED TO PREVENT EROSION.
3. NO TREE CUTTING SAVE EXCEPT FOR BERM CONSTRUCTION AND ENTRANCE CONSTRUCTION SHALL BE PERMITTED WITHIN THE SETBACKS.

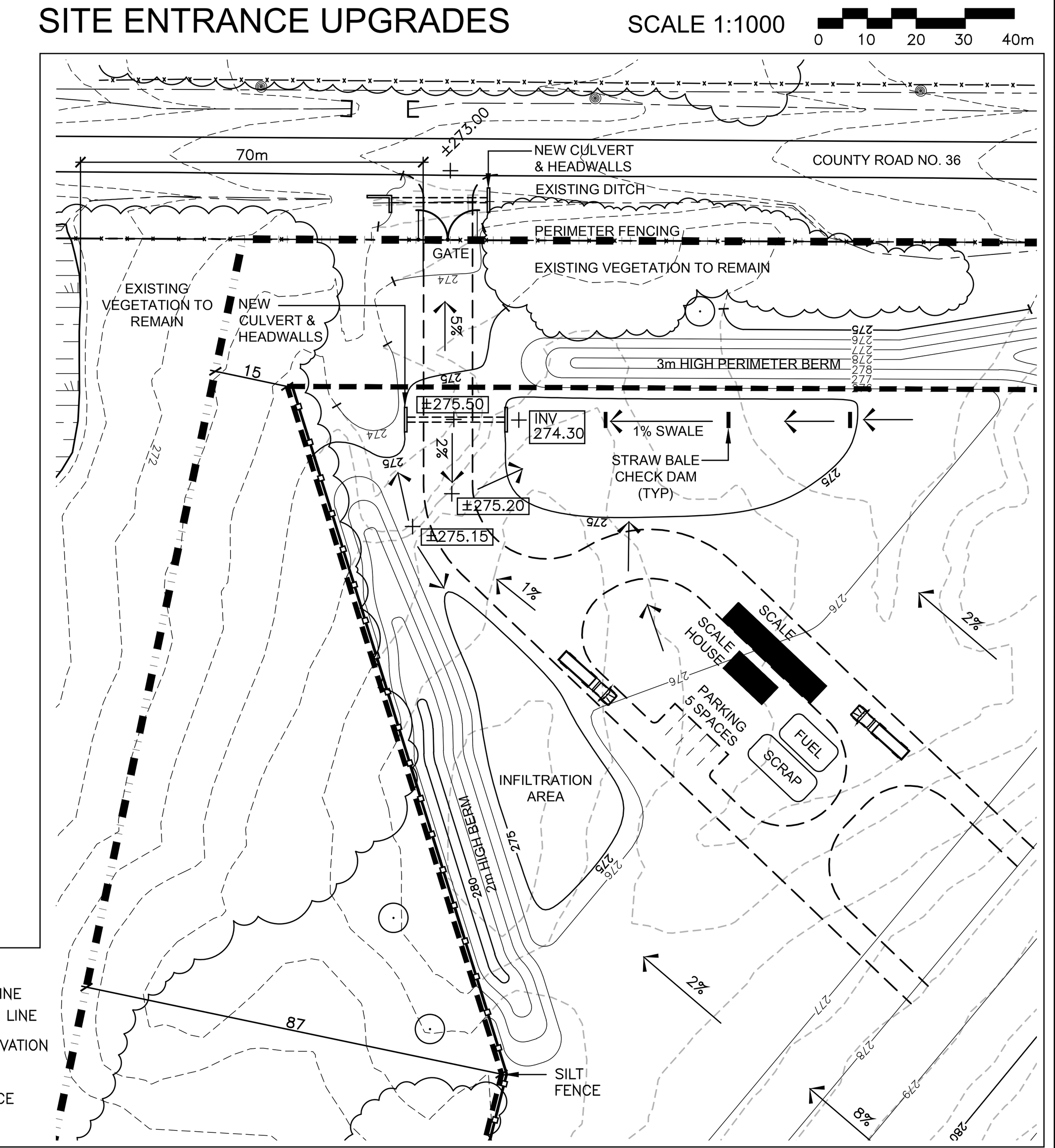
LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- 290 EXISTING CONTOUR LINE
- 289 PROPOSED CONTOUR LINE
- 291.49 PROPOSED SPOT ELEVATION
- EXISTING FENCE
- PROPOSED SILT FENCE
- DRAINAGE

SITE ENTRANCE UPGRADES

SCALE 1:1000

0 10 20 30 40m



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Project Name

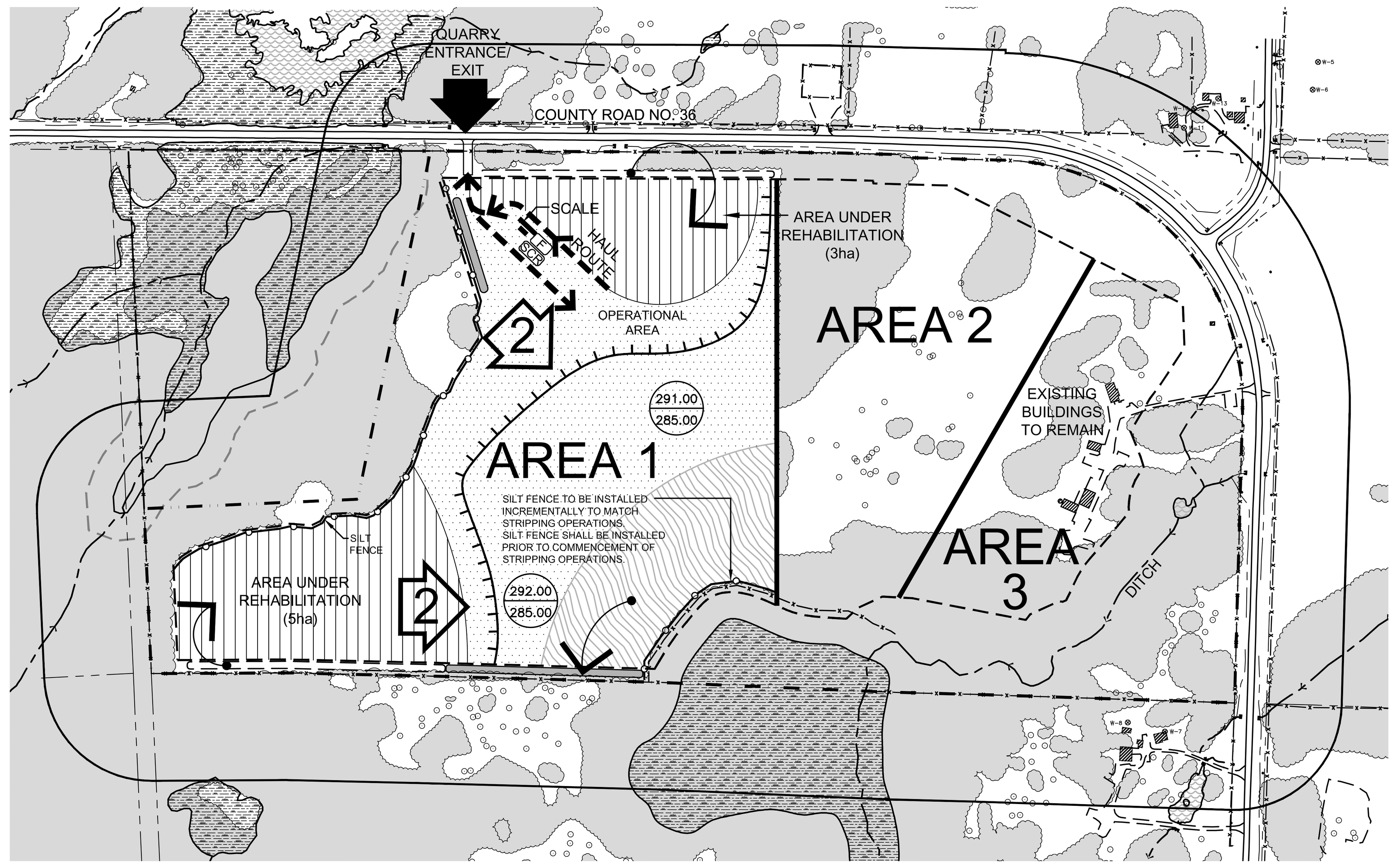
MILK HOUSE QUARRY

PART OF LOT 20, CONCESSION 9
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY,
COUNTY OF PETERBOROUGH

Scale 1:2000 (0 10 50 80m)	North	Stamp
Drawing Status PRELIMINARY		
Drawn R.M.	Checked R.M./B.J.	Issue Date NOV 2008
Drawing Title OPERATIONAL PLAN PHASE ONE		Project Number 06-24
		Drawing Number 2 OF 5

FILE NAME: 0624/COMP/0624-2.DWG
PLOT DATE: JULY 9, 2012

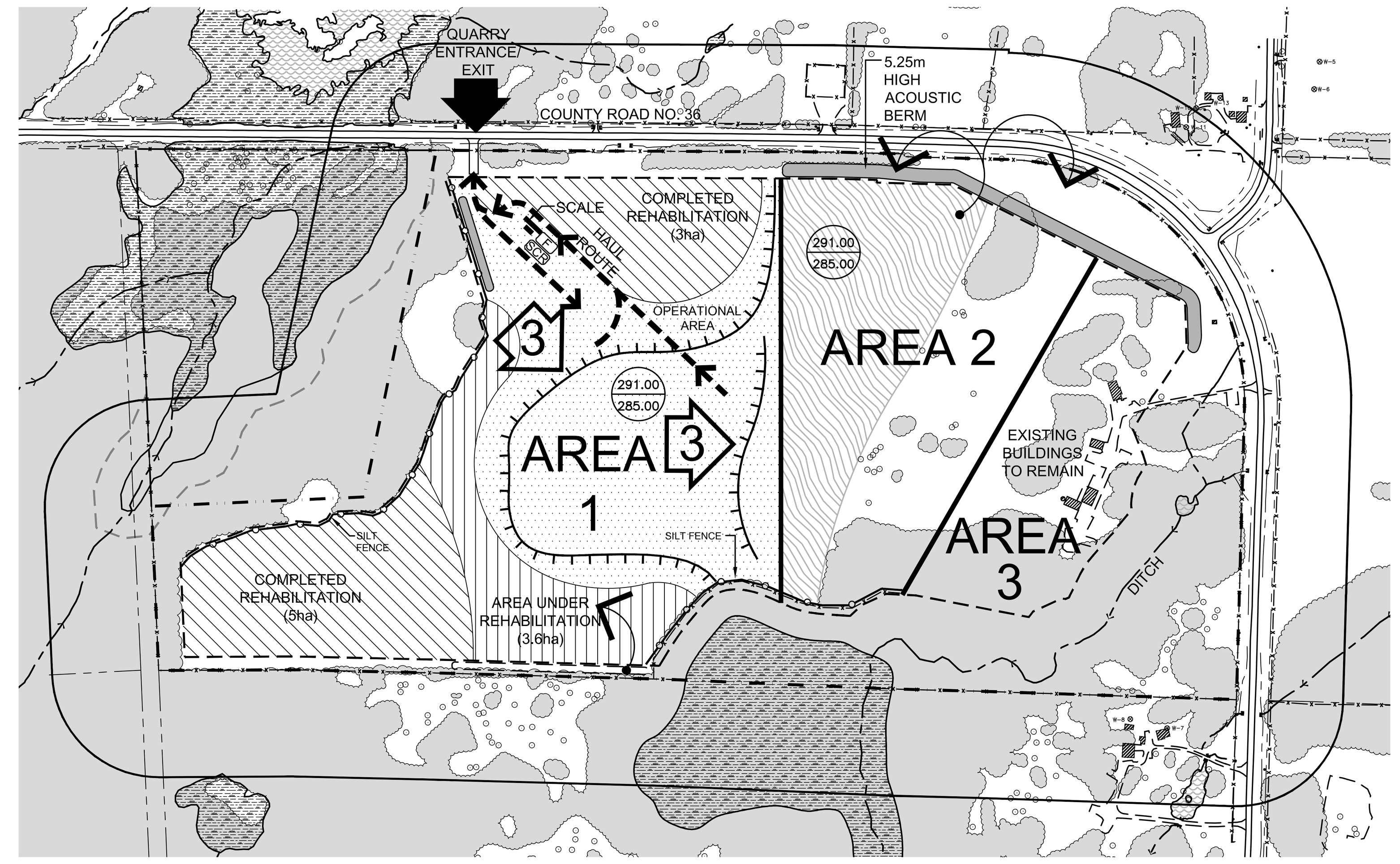
PHASE TWO



PHASE TWO NOTES

1. BEGIN PROGRESSIVE REHABILITATION OF THE QUARRY FLOOR AND SIDE SLOPES OF AREA 1 USING TOPSOIL AND OVERBURDEN FROM THE PERIMETER BERMS. THE FINAL 2:1 SIDE SLOPES SHALL BE CREATED FROM THE LIMIT OF EXTRACTION TO THE PIT FLOOR WITH WASTE AND RUBBLE BACKFILL MATERIAL. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
2. INSTALL SILT FENCE AT DRIP LINE OF TREES ALONG SOUTHERN LIMIT OF EXTRACTION. SILT FENCE WILL BE INSTALLED INCREMENTALLY AS STRIPPING MOVES IN AN EASTERLY DIRECTION.
3. CONTINUE STRIPPING TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 1 AND STORE MATERIAL IN THE PERIMETER BERM IN THE SOUTH SETBACK BOUNDARY, AS SHOWN.
4. CONTINUE EXCAVATION OF DIMENSIONAL STONE IN AREA 1, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY OF AREA 1 AND AREA 2 AND TO THE EXTRACTION LIMITS, AS IDENTIFIED ON THE PLANS.
5. THE TOTAL MAXIMUM DISTURBED AREA FOR AREAS 1 TO 3 IS 25 HECTARES. PRIOR TO THE DISTURBANCE OF AREA 2, A MINIMUM OF 25% OF AREA 1 (6.03 HECTARES) SHALL BE REHABILITATED.
6. THE FINAL MINING ELEVATION OF AREA 1, ALONG THE EXTRACTION LIMITS AND THE QUARRY FLOOR, SHALL BE 285.0 mASL.
7. AREA 2 AND AREA 3 SHALL REMAIN UNDISTURBED.

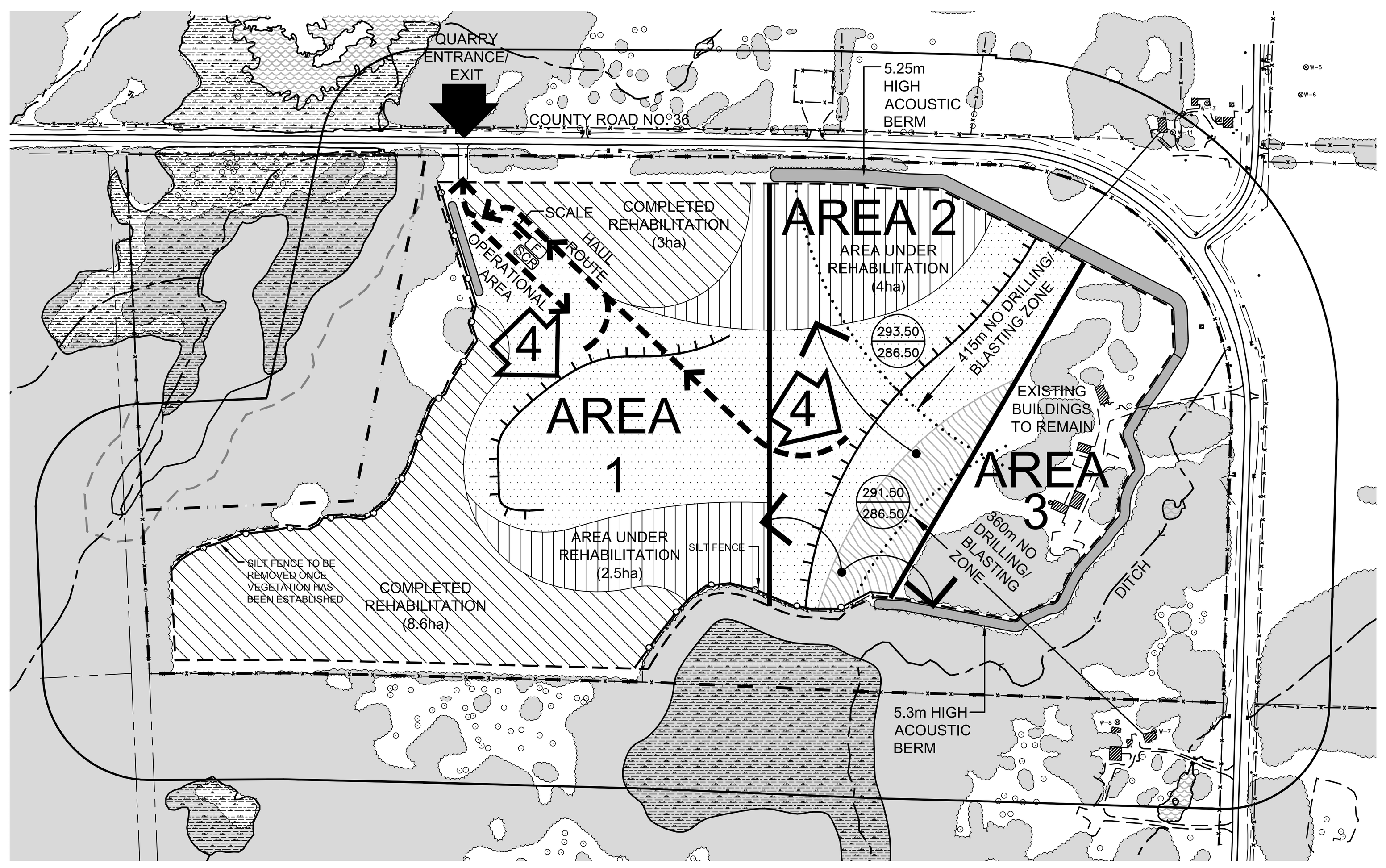
PHASE THREE



PHASE THREE NOTES

1. CONTINUE PROGRESSIVE REHABILITATION OF THE QUARRY FLOOR AND SIDESLOPES OF AREA 1 USING TOPSOIL AND OVERBURDEN FROM THE PERIMETER BERM IN THE SOUTHERN SETBACK BOUNDARY. THE FINAL 2:1 SIDE SLOPES SHALL BE CREATED FROM THE LIMIT OF EXTRACTION TO THE PIT FLOOR WITH WASTE AND RUBBLE BACKFILL MATERIAL. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
2. CONTINUE EXCAVATION OF DIMENSIONAL STONE IN AREA 1, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY OF AREA 1 AND AREA 2 AND TO THE EXTRACTION LIMITS, AS IDENTIFIED ON THE PLANS.
3. PRIOR TO COMMENCING SITE PREPARATION IN AREA 2, COMPLETE INSTALLATION OF SILT FENCE AT DRIP LINE OF TREES ALONG SOUTHERN LIMIT OF EXTRACTION.
4. BEGIN SITE PREPARATION IN AREA 2 BY REMOVING EXISTING TREES AND SCRUB VEGETATION IN THE AREA TO BE EXTRACTED.
5. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE TO CONSTRUCT THE ACOUSTIC BERM AND IN THE NORTH AND NORTHEAST SETBACK BOUNDARY, AS SHOWN. WHEN THE BERM WITHIN AREA 3 IS CONSTRUCTED, THE ENTRANCE TO THE FORMER RESIDENTIAL STRUCTURES SHALL BE CLOSED.
6. THE TOTAL MAXIMUM DISTURBED AREA FOR THE AREAS 1 TO 3 IS 25 HECTARES. PRIOR TO THE DISTURBANCE OF AREA 3, 50% OF AREA 1 AND AREA 2 (COMBINED 17.95 HECTARES) SHALL BE REHABILITATED.
7. AREA 3 SHALL REMAIN UNDISTURBED.

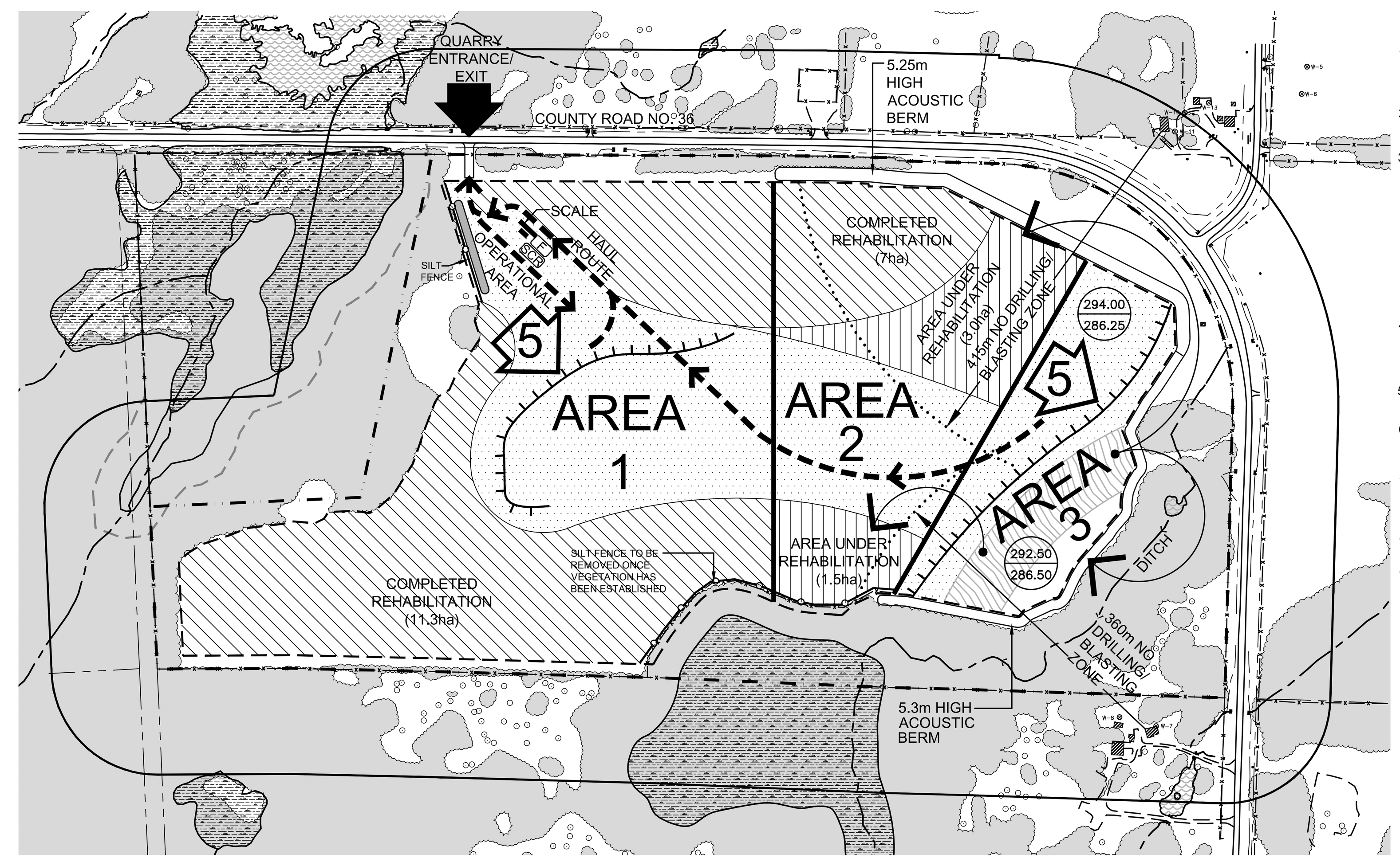
PHASE FOUR



PHASE FOUR NOTES

1. CONTINUE STRIPPING TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE TO COMPLETE CONSTRUCTION THE ACOUSTIC BERM ADJACENT TO THE EXISTING DITCH IN THE SOUTHEAST PORTION OF AREA 3 AND TO REHABILITATE AREA 1 AND AREA 2, AS SHOWN.
2. CONTINUE PROGRESSIVE REHABILITATION OF THE QUARRY FLOOR AND SIDE SLOPES OF AREA 1 USING TOPSOIL AND OVERBURDEN STRIPPED FROM AREA 2. THE FINAL 2:1 SIDE SLOPES SHALL BE CREATED FROM THE LIMIT OF EXTRACTION TO THE PIT FLOOR WITH WASTE AND RUBBLE BACKFILL MATERIAL. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
3. CONTINUE EXCAVATION OF DIMENSIONAL STONE IN AREA 1, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY OF AREA 1 AND AREA 2, AS IDENTIFIED ON THE PLANS.
4. BEGIN EXCAVATION OF DIMENSIONAL STONE IN AREA 2, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY OF AREA 2 AND AREA 3 AND TO THE EXTRACTION LIMITS, AS IDENTIFIED ON THE PLANS.
5. THE FINAL MINING ELEVATION OF AREA 2, ALONG THE EXTRACTION LIMITS AND THE QUARRY FLOOR, SHALL BE 286.50 mASL.
6. BEGIN PROGRESSIVE REHABILITATION OF THE QUARRY FLOOR AND SIDE SLOPES IN THE NORTHERN PORTION OF AREA 2 USING TOPSOIL AND OVERBURDEN STRIPPED FROM AREA 2. THE FINAL 2:1 SIDE SLOPES SHALL BE CREATED FROM THE LIMIT OF EXTRACTION TO THE PIT FLOOR WITH WASTE AND RUBBLE BACKFILL MATERIAL. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
7. THE TOTAL MAXIMUM DISTURBED AREA FOR THE AREAS 1 TO 3 IS 25 HECTARES. PRIOR TO THE DISTURBANCE OF AREA 3, 50% OF AREA 1 AND AREA 2 (COMBINED 17.95 HECTARES) SHALL BE REHABILITATED.
8. AREA 3 SHALL REMAIN UNDISTURBED.

PHASE FIVE



PHASE FIVE NOTES

1. BEGIN SITE PREPARATION IN AREA 3 BY REMOVING EXISTING TREES AND SCRUB VEGETATION IN THE AREA TO BE EXTRACTED.
2. BEGIN STRIPPING TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 3 AND USE TO REHABILITATE AREA 2, AS SHOWN.
3. CONTINUE PROGRESSIVE REHABILITATION OF THE QUARRY FLOOR AND SIDE SLOPES OF AREA 2 USING TOPSOIL AND OVERBURDEN STRIPPED FROM AREA 3. THE FINAL 2:1 SIDE SLOPES SHALL BE CREATED FROM THE LIMIT OF EXTRACTION TO THE PIT FLOOR WITH WASTE AND RUBBLE BACKFILL MATERIAL. ANY DISTURBED AREAS WILL BE REQUIRED TO BE COMPLETELY REHABILITATED TO THE STANDARDS OF THE ACT (APPLICATION OF TOPSOIL AND OVERBURDEN ON QUARRY FLOOR AND SIDE SLOPES, ESTABLISHMENT OF GROUND COVER, AND PLANTING OF REFORESTATION NODES).
4. CONTINUE EXCAVATION OF DIMENSIONAL STONE IN AREA 1, PROCEEDING IN THE DIRECTION SHOWN, TO THE SHARED BOUNDARY OF AREA 1 AND AREA 2, AS IDENTIFIED ON THE PLANS.
5. REMOVE ALL BUILDINGS FROM AREA 3 PRIOR TO COMMENCEMENT OF EXTRACTION IN AREA 3.
6. BEGIN EXCAVATION OF DIMENSIONAL STONE IN AREA 3 PROCEEDING IN THE DIRECTION SHOWN, TO THE EXTRACTION LIMITS, AS IDENTIFIED ON THE PLANS.
7. THE FINAL MINING ELEVATION OF AREA 3, ALONG THE EXTRACTION LIMITS AND THE QUARRY FLOOR, SHALL BE 286.25 mASL.
8. THE TOTAL MAXIMUM DISTURBED AREA FOR THE AREAS 1 TO 3 IS 25 HECTARES.
9. ALL BUILDINGS / STRUCTURES WILL BE REMOVED FROM THE SITE AND ALL DISTURBED LAND WITHIN THE AGGREGATE LICENCE PROPERTY, INCLUDING PROCESSING/STOCKPILING AND BUILDING AREAS WILL BE REHABILITATED WITHIN ONE YEAR FOLLOWING THE COMPLETION OF EXTRACTION OF AREA 3.

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- 1 EXISTING BUILDING AND BUILDING NUMBER
- W-1 OFF-SITE WELL
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- FENCE
- SILT FENCE
- PROPOSED BERM
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- AREA UNDER EXCAVATION
- AREA UNDER REHABILITATION
- REHABILITATED AREA
- 2 EXTRACTION PHASE/ DIRECTION OF EXTRACTION
- EXTRACTION FACE
- DIRECTION OF TOPSOIL MOVEMENT
- QUARRY ENTRANCE / EXIT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- 330/322 EXISTING ELEVATION / PROPOSED ELEVATION

TECHNICAL RECOMMENDATIONS/ OPERATIONAL CONDITIONS

NOISE ASSESSMENT (VALCOUSTICS CANADA LTD., JULY 9, 2008- UPDATED MAY 2012)

1. PRIOR TO EXTRACTION WITHIN AREA 2, A 5.25m HIGH BERM BE CONSTRUCTED ALONG A PORTION OF THE NORTH PROPERTY LINE AND A 5.3m HIGH BERM BE CONSTRUCTED ALONG A PORTION OF THE SOUTH PROPERTY LINE. (SEE SOUND IMPACT ANALYSIS REPORT., JULY 9, 2008) SEE FIGURE 3.
2. EQUIPMENT THAT IS USED FOR CONSTRUCTION ACTIVITY ON THE SITE COMPLY WITH THE MAXIMUM EMISSION LIMITS OUTLINED IN MOE PUBLICATION NPC-115.
3. FOR EQUIPMENT OPERATING ON THE SITE, SUCH AS THE LOADERS AND EXCAVATORS, THEY HAVE BROAD BAND BACK ALARMS TO REDUCE THE POTENTIAL OFF-SITE NOISE IMPACTS. TYPICAL PRODUCT INFORMATION IS INCLUDED IN APPENDIX A (REFER TO VALCOUSTICS CANADA LTD. REPORT)
4. PRIOR TO ANY ROCK DRILLING OPERATIONS, THE LICENCEE SHALL ENSURE THAT THE NOISE IMPACT OF THE DRILLING OPERATION SHALL BE ASSESSED BY A QUALIFIED PROFESSIONAL TO ENSURE COMPLIANCE WITH MOE NOISE GUIDELINES NPC-205.
5. FOR EXTRACTION WITHIN 135m OF R3, THE TOTAL EQUIPMENT OPERATING WITHIN THIS AREA SHOULD BE RESTRICTED TO ONE EXCAVATOR AND ONE FRONT END LOADER.
6. WHEN ANY NEW TYPE OF OPERATIONAL EQUIPMENT IS INTRODUCED TO THE SITE, THE NOISE EMISSIONS OF THIS EQUIPMENT SHALL BE ASSESSED BY A QUALIFIED ACOUSTICAL CONSULTANT TO ENSURE COMPLIANCE OF OPERATIONS WITH MOE NOISE GUIDELINES.
7. NO DRILLING/ BLASTING ACTIVITY MAY OCCUR WITHIN 415m OF NOISE RECEPTOR R2 OR WITHIN 360m OF NOISE RECEPTOR R3 (HEREIN REFEREED TO AS THE NO-DRILLING ZONES).

IF IT IS FOUND IN THE FUTURE THAT DRILLING/ BLASTING WILL BE REQUIRED WITHIN THE NO-DRILLING/ BLASTING ZONES, THE NOISE IMPACT ASSESSMENT SHALL BE UPDATED BY A QUALIFIED ACOUSTICAL CONSULTANT. THE ASSESSMENT SHALL DETERMINE WHICH TYPE OF DRILLING EQUIPMENT THAT MAY BE USED WITHIN THE NO-DRILLING ZONES AND PROVIDE DETAILS ON THE DRILLING EQUIPMENT. THE REPORT SHALL ALSO DETERMINE WHETHER OR NOT ANY MITIGATION MEASURES WILL BE REQUIRED TO ENSURE COMPLIANCE OF OPERATIONS WITH MOE NOISE GUIDELINES.

THE REVISED NOISE IMPACT ASSESSMENT SHALL BE PROVIDED TO THE MINISTRY OF NATURAL RESOURCES PRIOR TO USING DRILLING AND BLASTING EQUIPMENT WITHIN THE NO-DRILLING/ BLASTING ZONES.

ANY NOISE MITIGATION MEASURES DETERMINED NECESSARY FOR COMPLIANCE WITH THE MOE NOISE GUIDELINE LIMITS SHALL BE IMPLEMENTED PRIOR TO COMMENCEMENT OF DRILLING.

ARCHAEOLOGICAL ASSESSMENT (STAGE I & II)
(YORK NORTH ARCHAEOLOGICAL SERVICES INC., DATED MARCH 31, 2008.)

1. THE STONE MILL HOUSE LOCATED IN THE NORTHEASTERN PORTION OF THE STUDY AREA, WITHIN THE REGULATED SETBACK, HAS BECOME A LOCAL LANDMARK AND SHOULD BE LEFT INTACT.
2. IT IS THEREFORE RECOMMENDED THAT MOC ISSUE A CLEARANCE OF THE ARCHEOLOGICAL/ HERITAGE CONDITION IN ORDER TO PERMIT THE PROJECT PROPONENT, STONESCAPE QUARRY, TO CONTINUE WITH THE PROPOSED DEVELOPMENT OF THE STUDY AREA.

SHOULD DEEPLY BURIED ARCHEOLOGICAL/ HERITAGE REMAINS BE FOUND ON THE PROPERTY DURING SITE PREPARATION AND/OR EXTRACTION ACTIVITIES, MOC SHOULD BE NOTIFIED IMMEDIATELY.

IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING SITE PREPARATION AND/OR EXTRACTION ACTIVITIES ASSOCIATED WITH THE PROPOSED DEVELOPMENT OF THE STUDY AREA, THE PROJECT PROPONENT SHOULD IMMEDIATELY CONTACT BOTH MOC AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS AT (416)326-9382.

TRAFFIC IMPACT ASSESSMENT INFORMATION

NO RECOMMENDATIONS PROVIDED.

BLAST IMPACT ANALYSIS (EXPLOTECH ENGINEERING LTD., NOVEMBER 2007)

NOTE: THE EXPLOSIVES BLASTING AT THIS SITE WILL BE TO CREATE AND OPEN SEAMS IN THE ROCK MASS TO PERMIT MECHANICAL PROCESSING. THE EXPLOSIVE LOADS WILL BE LIMITED AND SIGNIFICANTLY REDUCED WHEN COMPARED TO CONVENTIONAL QUARRY OPERATIONS.

1. THE INITIAL FOUR (4) BLASTS WILL BE MONITORED BY AN INDEPENDENT BLASTING CONSULTANT IN ORDER TO OBTAIN SUFFICIENT QUARRY DATA FOR THE DEVELOPMENT OF SITE SPECIFIC ATTENUATION RELATIONS. THIS INITIAL MONITORING PROGRAM WILL BE USED TO CONFIRM THE APPLICABILITY OF THE INITIAL GUIDELINE PARAMETERS AND ASSIST IN DEVELOPING FUTURE BLAST DESIGNS.
2. ALL BLASTS SHALL BE MONITORED FOR BOTH VIBRATION AND OVERPRESSURE AT THE CLOSEST PRIVATELY OWNED SENSITIVE RECEPTORS ADJACENT THE PROPERTY WITH A MINIMUM OF ONE (1) DIGITAL SEISMOGRAPH. MONITORING PRACTICES SHALL CONFORM TO INDUSTRY STANDARDS.
3. ORIENTATION OF THE AGGREGATE EXTRACTION OPERATION WILL BE DESIGNED AND MAINTAINED SO THAT THE DIRECTION OF THE OVERPRESSURE PROPAGATION AND FLYROCK FROM THE FACE WILL BE AWAY FROM STRUCTURES AS MUCH AS POSSIBLE.
4. BLAST DESIGNS SHALL BE CONTINUALLY REVIEWED WITH RESPECT TO FRAGMENTATION, GROUND VIBRATION AND OVERPRESSURE. BLAST DESIGNS SHALL BE MODIFIED AS REQUIRED TO ENSURE COMPLIANCE WITH APPLICABLE GUIDELINES AND REGULATIONS. DECKING, REDUCED HOLE DIAMETERS AND SEQUENTIAL BLASTING TECHNIQUES WILL BE USED TO ENSURE MINIMAL EXPLOSIVES PER DELAY PERIOD INITIATED.
5. MINIMUM COLLAR WILL BE 1.5m ON BODY HOLES AND 2.7m ON FACE HOLES. IN THE EVENT OF THE APPLICATION OF BOREHOLES GREATER THAN 100mm IN DIAMETER, COLLARS WILL BE INCREASED ACCORDINGLY.
6. CLEAR CRUSHED STONE WILL BE USED FOR STEMMING.
7. PRIMARY AND SECONDARY DUST COLLECTORS WILL BE EMPLOYED ON THE ROCK DRILLS TO KEEP THE LEVEL OF ROCK DUST TO A MINIMUM.
8. BLASTING PROCEDURES SUCH AS DRILLING AND LOADING SHALL BE REVIEWED ON A YEARLY BASIS AND MODIFIED AS REQUIRED TO ENSURE COMPLIANCE WITH INDUSTRY STANDARDS.
9. DETAILED BLAST RECORDS SHALL BE MAINTAINED. THE MOE (1985) RECOMMENDS THAT THE BODY OF BLAST REPORTS SHOULD INCLUDE THE FOLLOWING INFORMATION:
   - LOCATION, DATE AND TIME OF BLAST.
   - DIMENSIONAL SKETCH INCLUDING PHOTOGRAPHS, IF NECESSARY, OF THE LOCATION OF THE BLASTING OPERATION, AND THE NEAREST POINT OF RECEPTION.
   - PHYSICAL AND TOPOGRAPHICAL DESCRIPTION OF THE GROUND BETWEEN THE SOURCE AND THE RECEPTOR LOCATION.
   - TYPE OF MATERIAL BEING BLASTED.
   - SUB-SOIL CONDITIONS, IF KNOWN.
   - PREVAILING METEOROLOGICAL CONDITIONS INCLUDING WIND SPEED IN m/s, WIND DIRECTION, AIR TEMPERATURE IN °C, RELATIVE HUMIDITY, DEGREE OF CLOUD COVER AND GROUND MOISTURE CONTENT.
   - NUMBER OF DRILL HOLES.
   - PATTERN AND PITCH OF DRILL HOLES.
   - SIZE OF HOLES.
   - DEPTH OF DRILLING.
   - DEPTH OF COLLAR (OR STEMMING).
   - DEPTH OF TOE-LOAD.
   - WEIGHT OF CHARGE PER DELAY.
   - NUMBER AND TIME OF DELAYS.
   - THE RESULT AND CALCULATED VALUE OF PEAK PRESSURE LEVEL IN dB AND PEAK PARTICLE VELOCITY IN mm/s.
   - APPLICABLE LIMITS.
   - THE EXCESS, IF ANY, OVER THE PRESCRIBED LIMIT.

HYDROGEOLOGICAL INVESTIGATION (STAGE II)
(SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD DATED FEB 2008 AND REVISED MAR 2008)

1. THE PROPOSED QUARRY SHOULD BE DESIGNATED TO BE 2m ABOVE THE GROUNDWATER TABLE INDICATED ON FIGURE 3 (REFER TO REPORT), IN ACCORDANCE WITH PROVINCIAL STANDARDS. SIGNIFICANT GROUNDWATER DEWATERING ACTIVITIES WILL NOT BE REQUIRED IN THE ABOVE WATER QUARRY. AS SUCH, IMPACTS ON THE EXISTING GROUNDWATER RESOURCES IN THE SITE AREA ARE CONSIDERED UNLIKELY.
2. ANNUAL GROUNDWATER FLUCTUATIONS AT THE SITE APPEAR TO BE WITHIN THE 1m RANGE. THE APPLICANT SHOULD COMMIT TO A GROUNDWATER MONITORING PROGRAM TO CONFIRM WATER LEVEL TRENDS AND ADJUST QUARRY DEPTHS, IF APPROPRIATE.
3. SURFACE WATER RESOURCES IN THE SITE AREA INCLUDE LOCALIZED, UNEVALUATED WETLANDS TO THE SOUTH AND WEST OF THE SITE, WHICH ARE CONNECTED TO THE SQUAW RIVER SUB-WATERSHED. TWO PRIVATELY OWNER PONDS EXIST TO THE SOUTH OF THE SITE, WHICH ARE MAINLY FED BY SEASONAL RUN-OFF. THERE IS NO EVIDENCE THAT SURFACE RUN-OFF WILL BE SIGNIFICANTLY IMPACTED AS A RESULT OF THE PROPOSED EXTRACTION ACTIVITIES. SETBACKS AND MAINTENANCE OF SURFACE DRAINAGE PATHS WILL BE INCLUDED IN THE QUARRY DESIGN TO PROTECT LOCAL SURFACE WATER FEATURES, INCLUDING THE UNEVALUATED WETLAND AREAS.
4. WATER FROM PRECIPITATION ACCUMULATING IN THE PROPOSED QUARRY CAN BE CONTROLLED WITH ONSITE DRAINAGE MEASURES. DISCHARGE OF THE WATER FROM THE QUARRY WILL REQUIRE ENVIRONMENTAL CONTROLS AND PROBABLY A CERTIFICATE OF APPROVAL UNDER SECTION 53 OF THE ONTARIO WATER RESOURCES ACT.
5. EXISTING QUARRIES IN THE SITE AREA INCLUDE STONESCAPE QUARRY I TO THE EAST, THE BUCKHORN/ BYERS QUARRY TO THE SOUTHEAST AND THE ORMELL QUARRY TO THE SOUTHEAST, AND THE PLUARD QUARRY TO THE NORTHWEST OF THE SITE. STONESCAPE QUARRY II IS COMPATIBLE WITH THESE LAND USES, WHICH HAVE SUCCESSFULLY OPERATED FOR YEARS WITHOUT CREATING ADVERSE ENVIRONMENTAL IMPACTS.
6. IT IS RECOMMENDED THAT THE WATER MONITORING PROGRAM DISCUSSED IN SECTION3.6 BE IMPLANTED.

WATER MONITORING PROGRAM

A WATER MONITORING PROGRAM IS RECOMMENDED FOR THE STONESCAPE QUARRY II TO CONFIRM THAT THE PROPOSED BASE LEVEL FOR THE QUARRY IS SATISFACTORY, AND TO CONFIRM EXPECTED INSIGNIFICANT QUARRY EFFECTS ON OFFSITE WATER RESOURCES AND DEVELOPMENT. SUBJECT TO THE TIMING OF THE SITE DEVELOPMENT, IT IS RECOMMENDED THAT THE MONITORING PROGRAM BEGIN 2 TO 3YEARS PRIOR TO INITIATION OF EXTRACTION, AND CONTINUE DURING THE EXTRACTION PHASES. MONITORING EVENTS SHOULD OCCUR AT LEAST TWICE A YEAR, AND SHOULD INCLUDE WATER LEVEL MEASUREMENTS AT THE LOCATIONS INDICATED IN TABLE A-2 (REFER TO REPORT). IT IS RECOMMENDED THAT A WATER LEVEL MONITORING EVENT BE COMPLETED IN SPRING (APRIL) 2008 TO CONFIRM ANTICIPATED HIGH GROUNDWATER CONDITIONS AS INPUT TO THE FINAL QUARRY DESIGN.

WATER LEVEL AND WATER QUANTITY AT THE HIGHWAY 36 MARSH CULVERT AND DITCH INLET SHOULD ALSO BE MONITORED. QUALITY MEASUREMENTS SHOULD INCLUDE FIELD READINGS OF TEMPERATURE, PH, CONDUCTIVITY AND TURBIDITY (SUSPENDED SOLIDS). ADDITIONAL SURFACE WATER MONITORING PARAMETERS MAY BE REQUIRED AS A CONDITION OF A CERTIFICATE OF APPROVAL FOR DISCHARGE. SPECIFIC DETAILS ARE BEYOND THE SCOPE OF THIS REPORT.

AN ANNUAL WATER MONITORING REPORT SHOULD BE PREPARED AND SUBMITTED, SUMMARIZING THE MONITORING RESULTS AND PROVING RECOMMENDATIONS FOR ADDITIONAL WORK.

WATER RELATED COMPLAINTS RECEIVED BY THE FACILITY, IF ANY, SHOULD BE INVESTIGATED BY A PROFESSIONAL HYDROGEOLOGIST TO PROVIDE RECOMMENDATIONS ON MITIGATION MEASURES, AS APPROPRIATE. EACH COMPLAINT SHOULD BE TREATED SEPARATELY AND DOCUMENTED IN A REPORT RETAINED BY THE FACILITY.

7. PRIOR TO THE COMMENCEMENT OF EXCAVATION IN AREA #3, THE LICENSEE SHALL UNDERTAKE A SHALLOW GROUNDWATER INVESTIGATION IN THE SOUTH-EASTERN PART OF THE SITE UNDER THE DIRECTION OF A QUALIFIED PERSON (P. ENG. OR P. GEO.) TO VERIFY THAT A SIGNIFICANT SHALLOW WATER BEARING ZONE IS NOT PRESENT. THE INVESTIGATION WILL INCLUDE, AS A MINIMUM, THE FOLLOWING ELEMENTS:
   1. CONSTRUCTION OF 3 MONITORING WELLS (DEPTH 6 METRES) AT REPRESENTATIVE LOCATIONS TO BE DETERMINED BY THE QUALIFIED PERSON.
   2. CONDUCT ANY NEEDED TESTS AS RECOMMENDED BY THE QUALIFIED PERSON.
   3. INCLUSION OF THE MONITORING WELLS IN THE OVERALL QUARRY MONITORING PROGRAM FOR A MINIMUM PERIOD OF 2 YEARS (OR AS DEEMED NECESSARY BY THE QUALIFIED PERSON).
   4. IF, BY THE END OF THE MONITORING PERIOD, THE QUALIFIED PERSON HAS NOT IDENTIFIED AN IMPORTANT SHALLOW GROUNDWATER ZONE OR HAS IDENTIFIED A SHALLOW GROUNDWATER ZONE THAT IS FOUND TO BE INSIGNIFICANT AS A RESULT OF LOW WATER LEVELS, LOW HYDRAULIC CONDUCTIVITY OR EPHEMERAL NATURE, THE MONITORING WILL CEASE AND THE QUALIFIED PERSON WILL DEEM THE ISSUE TO BE FULLY RESOLVED.
   5. IF, AT ANY TIME DURING THE MONITORING PERIOD, THE QUALIFIED PERSON HAS CAUSE TO BELIEVE THAT A SIGNIFICANT SHALLOW GROUNDWATER ZONE EXISTS, THE QUALIFIED PERSON WILL RECOMMEND ANY NEEDED INVESTIGATIONS AND/OR MODIFICATIONS TO THE QUARRY OPERATIONS.
   6. THE QUALIFIED PERSON WILL INCLUDE THE RESULTS OF MONITORING AND/OR ANY ADDITIONAL TESTING IN THE REQUIRED MONITORING REPORT.

NATURAL ENVIRONMENT (LEVEL 1& 2) (NIBLETT ENVIRONMENTAL ASSOCIATES INC., JUNE 2008)

1. THE WETLAND ON THE PROPERTY (NORTHWEST CORNER AND SOUTH END) BE PRESERVED IN THEIR ENTIRETY AND BE OUTSIDE THE EXTRACTION AREA.
2. A QUALIFIED HYDROLOGIST COMMENT ON THE EXISTING CATCHMENT AREA FOR THE WETLANDS AND RECOMMEND APPROPRIATE MITIGATION MEASURES TO MAINTAIN EXISTING FLOWS TO THE WETLANDS TO THE EXTENT PRACTICAL DURING AND POST EXTRACTION.
3. CLEARING OF VEGETATION OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON (MAR. 31ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES.
4. CLEARING OCCUR IN PHASES WITH MINIMAL CLEARING DONE ON THE NEXT PHASE PRIOR TO THE NEED FOR ADDITIONAL AGGREGATE.
5. THE PROGRESSIVE REHABILITATION PLAN END USE TO BE PARTIAL REFORESTATION AND REINSTATEMENT OF THE NATURAL TREE COVER, NORTH TO SOUTH CONNECTIVITY/LINKAGES THROUGH THE CENTRE OF THE EXTRACTION AREA, AS WELL AS REESTABLISHMENT OF FIELD AND MEADOW HABITAT.
6. QUARRY OPERATIONAL PHASING AND PROGRESSIVE REHABILITATION SCHEDULES BE COORDINATED TO LIMIT THE AREA OF DISTURBED TREE COVER AT ANY ONE TIME.
7. THE REFORESTATION PLAN SHOULD INCLUDE ONLY NATIVE TREE AND SHRUB SPECIES INDIGENOUS TO THE BUCKHORN AREA AND BE DERIVED FROM INDIGENOUS STOCK FROM LOCAL NURSERIES. TREES SHOULD BE PLANTED IN MIXED GROUPINGS TO AVOID THE CREATION OF MONOCULTURE STANDS OR PLANTATIONS.
8. A MONITORING PROGRAM BE IMPLEMENTED TO EXAMINE THE WATER QUALITY AND DEPTHS IN THE WETLANDS WHILE EXTRACTION IS OCCURRING IN THE CATCHMENT AREA.

REFER TO SHEET 5 OF 5, REHABILITATION PLAN FOR SPECIES AT RISK MITIGATION MEASURES

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H&H	MNR
5.	JULY 2012	REVISED EASTERN EXTRACTION LIMIT, ADDED SAR MITIGATION MEASURES, ADDED HYDRO-G NOTE 7, ADDED SPECIAL CONDITIONS, ADDED WETLAND, REVISED ENTRANCE LAYOUT			
4.	MAY 2012	REVISED EXTRACTION LIMIT, BERM SLOPES, ADDED NO-DRILLING ZONE			
3	APR14 2011	REVISED NOTE FOR NORTHERN BERM, ADDED ACOUSTIC NOTES.			
2.	JAN21 2011	REVISED WEST LIMIT OF EXTRACTION.			
1.	FEB19 2010	REVISED LIMIT OF EXTRACTION, AREA 3 BERM, PHASE B+D NOTE#2, ADDED NOTE#4 TO NOISE ASSESSMENT AND BERM IN AREA 4.			

Site Plan Amendments

NO.	DATE	REVISIONS	OWNER	H&H	MNR

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Project Name

MILK HOUSE QUARRY

PART OF LOT 20, CONCESSION 9
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY,
COUNTY OF PETERBOROUGH

Scale 1:5000 (0 50 100 150 200m)

North

Stamp

Drawing Status: PRELIMINARY

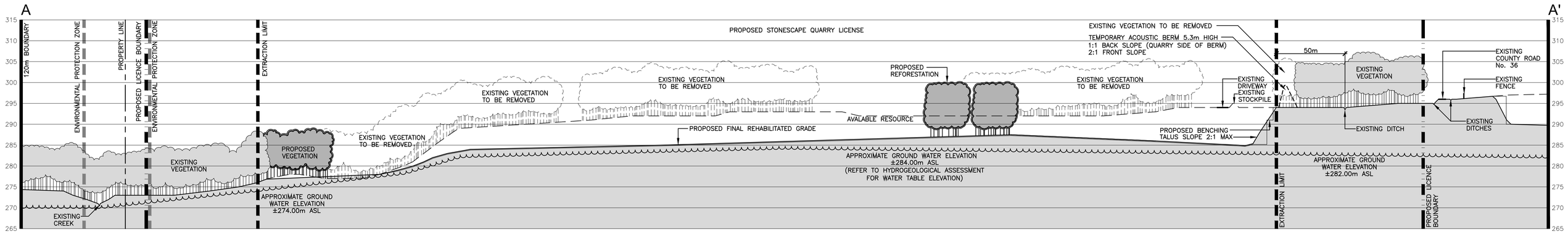
Drawn: R.M. | Checked: R.M./B.J. | Issue Date: NOV 2008

Drawing Title: OPERATIONAL PLAN PHASES TWO TO FIVE

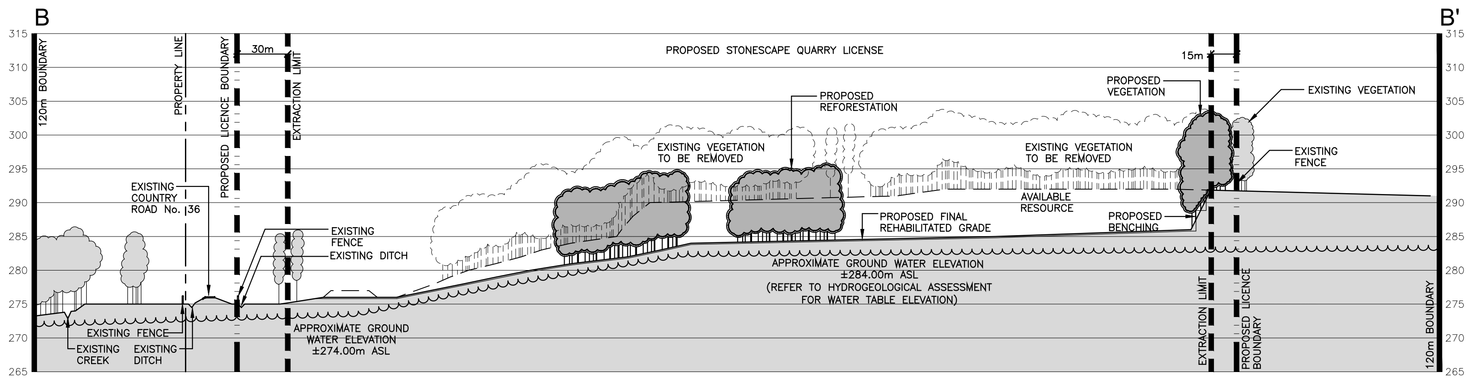
Project Number: 06-24

Drawing Number: 3 OF 5

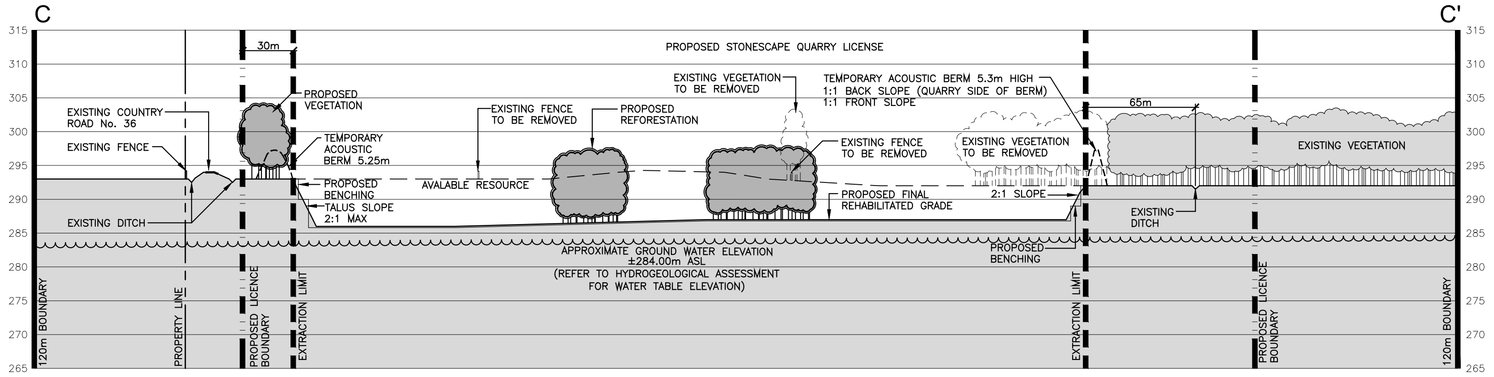
FILE NAME: 0624/COMP/0624-3.DWG



SECTION A-A' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



SECTION B-B' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



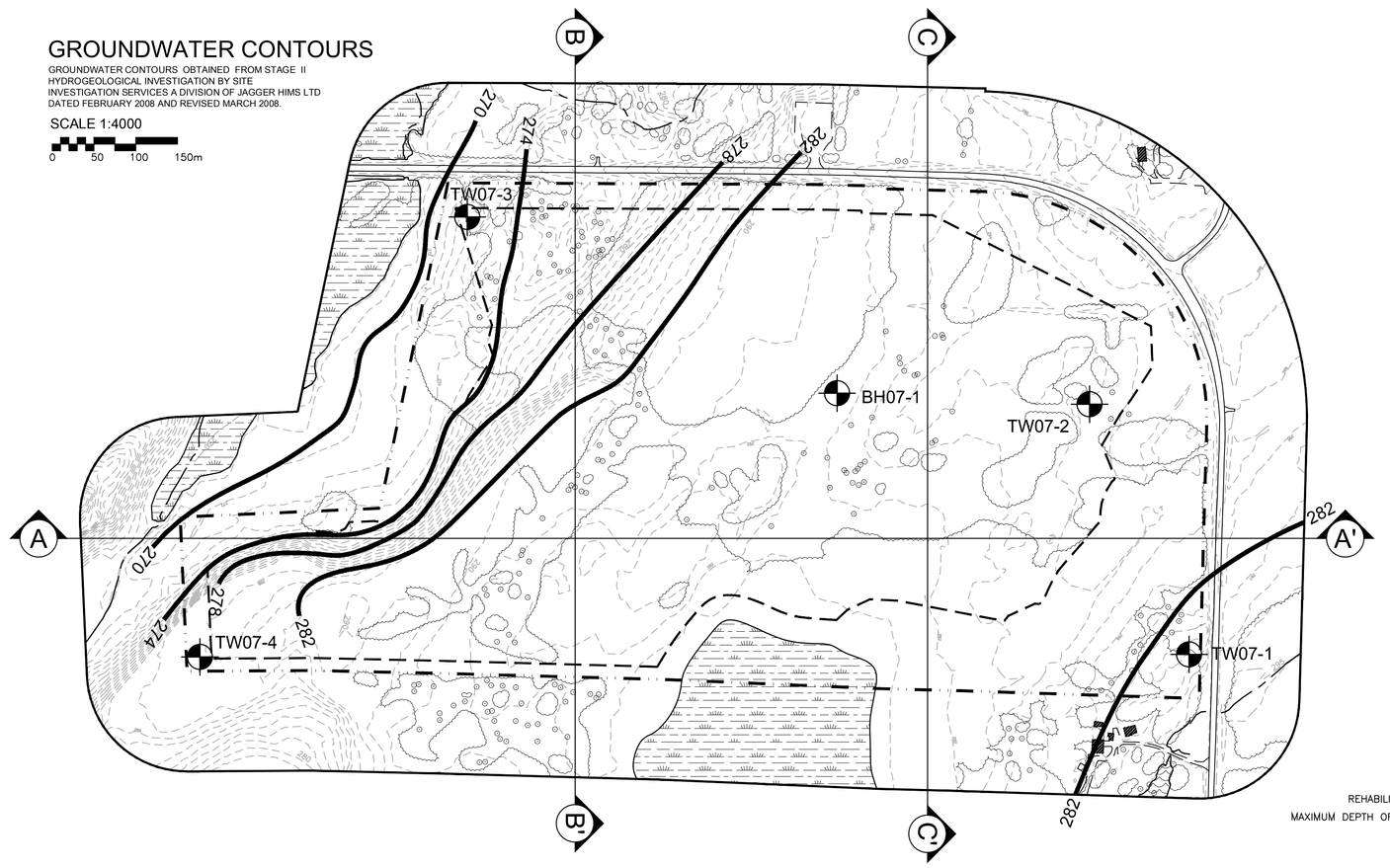
SECTION C-C' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000

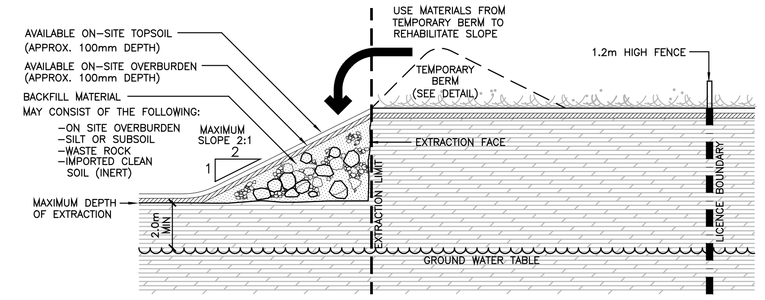
GROUNDWATER CONTOURS

GROUNDWATER CONTOURS OBTAINED FROM STAGE II HYDROGEOLOGICAL INVESTIGATION BY SITE INVESTIGATION SERVICES A DIVISION OF JAGGER HIMS LTD DATED FEBRUARY 2008 AND REVISED MARCH 2008.

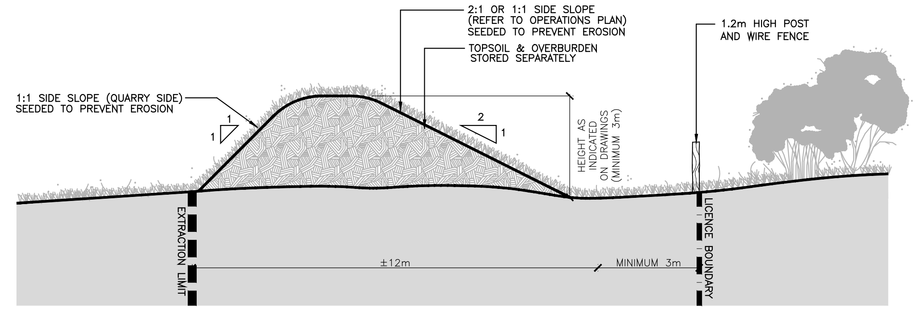
SCALE 1:4000

0 50 100 150m

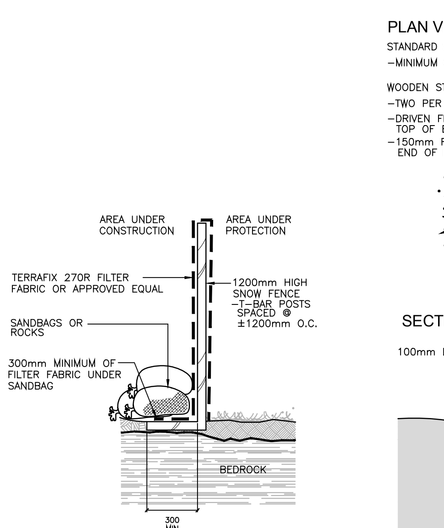




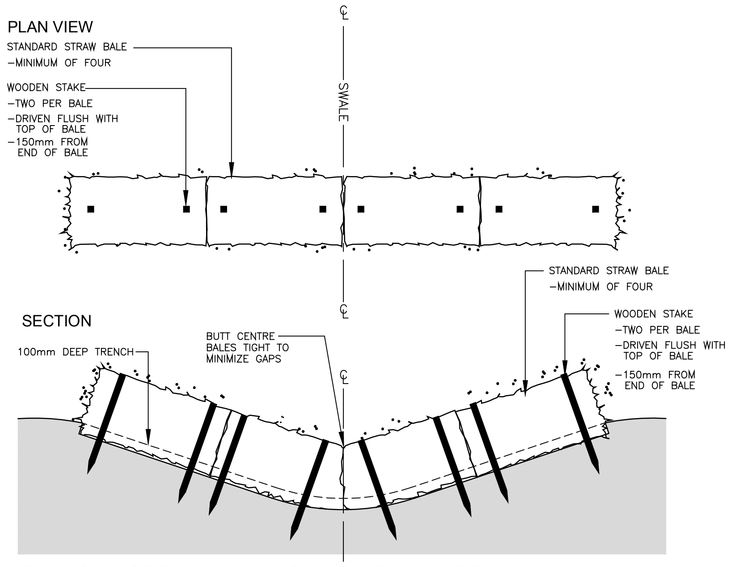
TYPICAL SIDESLOPE REHABILITATION BY BACKFILLING N.T.S.



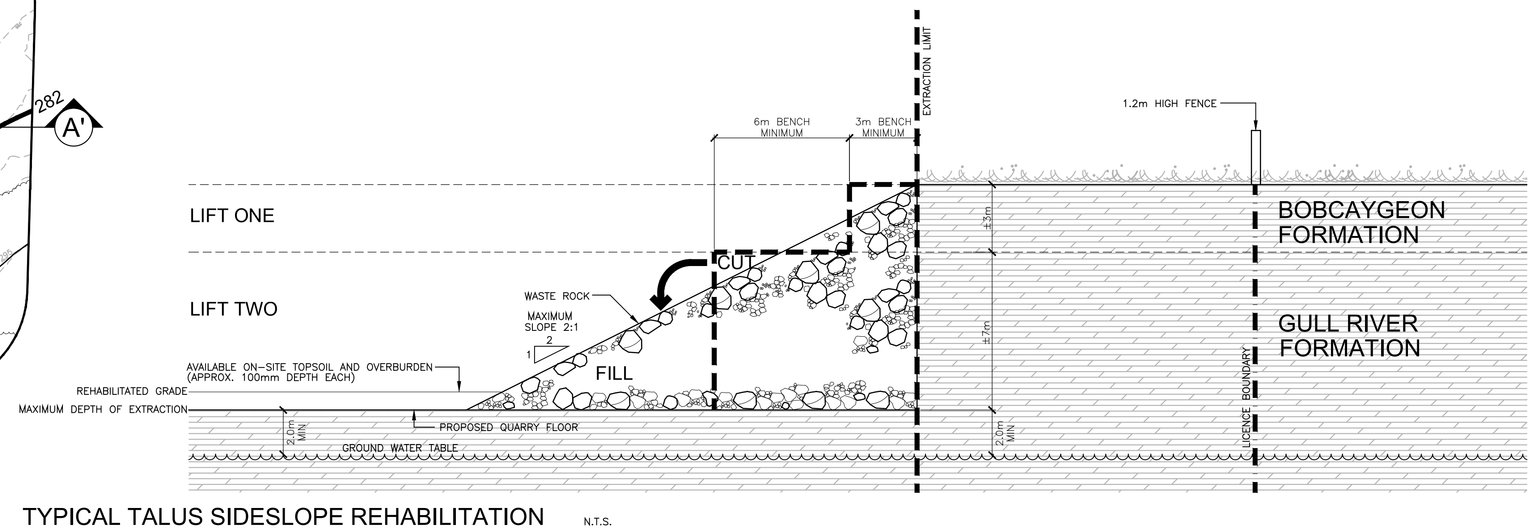
TYPICAL BERM SECTION N.T.S.



TYPICAL SILT FENCE DETAIL N.T.S.



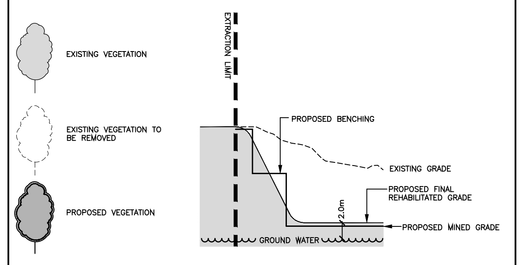
TYPICAL STRAW BALE CHECK DAM DETAIL N.T.S.



TYPICAL TALUS SIDESLOPE REHABILITATION N.T.S.

LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE



NOTES

GENERAL SECTION INFORMATION

1. SECTION LINES ARE INDICATED ON DRAWINGS 1, 2 AND 5.

NO.	DATE	REVISIONS	OWNER	H&H	MHH
4.	JULY 2012	REVISED EASTERN EXTRACTION LIMIT, ADDED SAR MITIGATION MEASURES, ADDED HYDRO-G NOTE 7, ADDED SPECIAL CONDITIONS, ADDED WETLAND, REVISED ENTRANCE LAYOUT			
3.	MAY. 2012	REVISED EXTRACTION LIMIT, BERM SLOPES, ADDED NO-DRILLING ZONE			
2.	JAN21 2011	GROUNDWATER CONTOUR DETAIL (WEST LIMIT OF EXTRACTION).			
1.	FEB19 2010	REVISED SECTION A-A', C-C', GROUNDWATER CONTOUR DETAIL (LIMIT OF EXTRACTION).			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H&H	MHH

Site Plan Amendments

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Offices in Markham & Cambridge

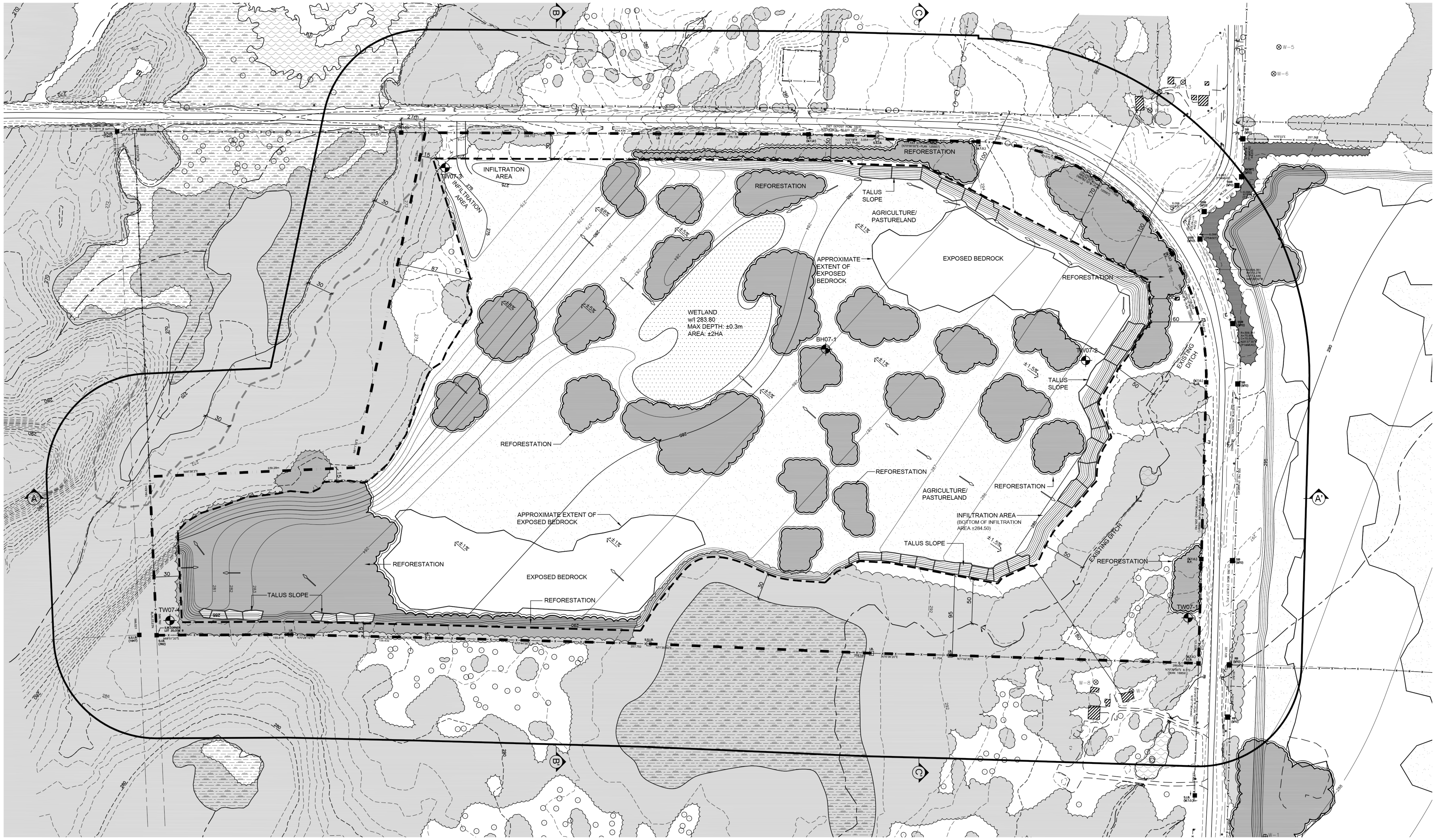
Project Name

MILK HOUSE QUARRY

PART OF LOT 20, CONCESSION 9
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY,
COUNTY OF PETERBOROUGH

Scale AS SHOWN	North	Stamp	
Drawing Status PRELIMINARY			
Drawn R.M.	Checked R.M./B.J.	Issue Date NOV 2008	
Drawing Title SECTIONS AND DETAILS		Project Number 06-24	
		Drawing Number 4 OF 5	

FILE NAME: 0624/COMP/0624-4.DWG



LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- LIMIT OF EXTRACTION
- BOUNDARY OF ENVIRONMENTAL PROTECTION ZONE
- 120m BOUNDARY LINE
- PROPERTY/ LOT/ CONCESSION LINE
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- PROPOSED 5m CONTOUR LINE
- PROPOSED 1m CONTOUR LINE
- EXISTING BUILDING
- DIRECTION OF SURFACE WATER DRAINAGE
- W-1 OFF-SITE WELL
- BH07-1 BOREHOLE LOCATION, YEAR DRILLED AND #
- TW07-1 TEST WELL LOCATION, YEAR DRILLED AND #
- SMALL STREAM, AGRICULTURAL DITCH/ SWALE
- EXISTING FENCE
- PROPOSED REFORESTATION
- PROPOSED TALUS SLOPE
- PROPOSED AGRICULTURE/ PASTURELAND
- PROPOSED EXPOSED BEDROCK
- PROPOSED WETLAND

NO.	DATE	REVISIONS	OWNER	H&H	MNR
4.	JULY 2012	REVISED EASTERN EXTRACTION LIMIT, ADDED SAR MITIGATION MEASURES, ADDED HYDRO-G NOTE 7, ADDED SPECIAL CONDITIONS, ADDED WETLAND, REVISED ENTRANCE LAYOUT			
3.	MAY 2012	REVISED EXTRACTION LIMIT, BERM SLOPES, ADDED NO-DRILLING ZONE			
2.	JAN21 2011	REVISED WEST LIMIT OF EXTRACTION, FINAL GRADES AND NOTE #3.			
1.	FEB19 2010	REVISED LIMIT OF EXTRACTION, FINAL GRADES AND NOTE #3.			

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	H&H	MNR

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PART OF LOT 20, CONCESSION 9
TOWNSHIP OF GALWAY-CAVENDISH & HARVEY,
COUNTY OF PETERBOROUGH

Scale 1:2000 (0 10 50 80m)
North
Stamp: ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS – RICHARD McAVAN – MEMBER

Drawing Status: PRELIMINARY

Drawn: R.M. | Checked: R.M./B.J. | Issue Date: NOV 2008

Drawing Title: **REHABILITATION PLAN**

Project Number: 06-24

Drawing Number: 5 OF 5

FILE NAME: 0624/COMP/0624-5.DWG
PLOT DATE: JULY 9, 2012

REHABILITATION NOTES

GENERAL INFORMATION

1. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM TOPOGRAPHIC SURVEY FOR LOTS 19 AND 20, CONCESSION 9 PREPARED BY FIRST BASE SOLUTIONS INC. USING 1:20,000 AERIAL PHOTOGRAPHY DATED JULY 13, 2006, REVISED SEPTEMBER 20, 2006.
2. REFER TO SHEET 4 OF 5 FOR SECTIONS AND NOTES, SHEET 2 AND 3 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND TO SHEET 5 OF 5 FOR FINAL REHABILITATION PLAN AND NOTES.
3. PROPERTY SHALL BE REHABILITATED TO:

EXPOSED BEDROCK	5.5 HA
WETLAND	2.0 HA
AGRICULTURE / PASTURELAND	22.2 HA
REFORESTATION WITHIN EXTRACTION LIMITS	11.3 HA
REFORESTATION WITHIN SETBACKS	2.6 HA
TALUS SIDESLOPE	1.1 HA
FOR A TOTAL OF	44.7 HECTARES

4. ALL BUILDINGS, EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.
5. FINAL GRADES SHALL BE SLOPED TO DRAIN TOWARDS LOW POINTS IN THE NORTHWEST AND SOUTHEAST PORTIONS OF THE SITE WHERE WATER WILL INFILTRATE THOUGH CRACKS AND FISHERS IN THE ROCK. THERE WILL BE NO EXCESSIVE OFF SITE DISCHARGE OF WATER IN THE FINAL REHABILITATION WITH THE EXCEPTION OF THE RELOCATED DITCH IN THE SOUTHEASTERN CORNER OF THE SITE.

HYDROGEOLOGICAL INFORMATION

6. IT IS ANTICIPATED THAT THE GROUNDWATER ELEVATION ACROSS THE SITE WILL REMAIN RELATIVELY UNCHANGED AT ±271.00m A.S.L. AT THE WESTERN ESCARPMENT AND LOWER WETLAND AREAS AND ±285.00m A.S.L. IN THE NORTHEAST QUADRANT OF THE SITE (REFER TO HYDROGEOLOGICAL REPORT).
7. ALL SURFACE DRAINAGE WILL BE DIRECTED TO THE LOW AREAS REMAINING ON THE QUARRY FLOOR ON SITE SO THAT THE WATER CAN INFILTRATE INTO THE SOUTHEAST AND NORTHWEST PORTIONS OF THE SITE. THERE WILL BE NO SURFACE DISCHARGE WITH THE EXCEPTION OF THE RELOCATED DITCH.

SIDESLOPE/MEADOW REHABILITATION INFORMATION

8. REHABILITATION OF SLOPES SHALL BE BY BACKFILLING AND/OR CUT AND FILL METHOD USING AVAILABLE ON-SITE OVERBURDEN, INERT IMPORTED FILL (SUBJECT TO MNR APPROVAL), WASTE ROCK, SUBSOIL AND TOPSOIL FROM WITHIN THE LICENSED AREA. SLOPES SHALL BE A MAXIMUM GRADE OF 2:1. SUBSOIL REPLACED WILL BE APPROXIMATELY 100mm THICK.

PORTIONS OF THE SITE WILL BE REHABILITATED TO TALUS SLOPE (MAX 2:1 SLOPE, SEE DRAWINGS).

TOPSOILING INFORMATION

9. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION OF THIS SITE. AVAILABLE TOPSOIL REPLACED WILL BE APPROXIMATELY 100mm THICK.

VEGETATION STABILIZATION INFORMATION

10. TOPSOIL SHALL BE SEEDED AND MAINTAINED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125KG/HA:

BUCKWHEAT	RED CLOVER	WHITE CLOVER	ALFALFA
CREEPING BENT GRASS	TALL FESCUE	ANNUAL RYE	PERENNIAL RYE

AGRICULTURE (PASTURELAND) REHABILITATION INFORMATION

11. AREAS SHALL BE REHABILITATED BACK TO AGRICULTURE (PASTURELAND) AS FOLLOWS:
-SPREADING OF APPROXIMATELY 100mm OF OVERBURDEN AND ROUGH GRADING
-SPREADING OF APPROXIMATELY 100mm OF TOPSOIL AND FINE GRADING
-SEED AREAS WITH SEED MIXTURE NOTED IN NOTE #10.

ALL VEGETATION PLANTED DURING THIS LICENSE WILL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION USING ACCEPTED FARMING PRACTICES.

REFORESTATION REHABILITATION INFORMATION

12. ALL VEGETATION PLANTED DURING THIS LICENSE WILL BE MAINTAINED IN A HEALTHY, HEALTHY, VIGOROUS GROWING CONDITION.

TREE SEEDLINGS WILL BE PLANTED ON SOME REHABILITATED AREAS INCLUDING THE SIDESLOPES (SEE DRAWING) AND MAY INCLUDE THE FOLLOWING SPECIES:

WHITE SPRUCE	WHITE CEDAR	SILVER MAPLE	RED MAPLE	SUGAR MAPLE
HEMLOCK	AMERICAN BEECH			

13. UPLAND AREAS SHALL BE REFORESTED, WHERE SHOWN, AS FOLLOWS:
SPECIES MAY INCLUDE THE FOLLOWING (DEPENDENT ON AVAILABILITY)

WHITE PINE	LARGER TOOTH APSEN	SUGAR MAPLE	CHOKEBERRY
RED PINE	WHITE BIRCH	SILVER MAPLE	GREY DOGWOOD
WHITE CEDAR	BUR OAK	RED MAPLE	CHOKECHERRY
WHITE SPRUCE	RED OAK		SNOWBERRY
			NANNYBERRY
			STAGHORN SUMAC
			ELDERBERRY

SETBACK REHABILITATION INFORMATION

14. AFTER SIDESLOPES ARE CREATED AND REQUIRED BERMS ARE REMOVED FROM SETBACKS THESE AREAS WILL BE IMMEDIATELY STABILIZED WITH A SUITABLE GROUNDCOVER AND THEN REFORESTED (AS SHOWN).

SPECIES AT RISK MITIGATION MEASURES

1. BREEDING BIRDS-SPECIES AT RISK

EASTERN MEADOWLARK

- CLEARING OF VEGETATION IN EACH PHASE OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON (MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES
- DISCUSSIONS WITH MNR PETERBOROUGH DISTRICT REGARDING ENDANGERED SPECIES ACT SECTION 17 PERMIT

-ADDITIONAL SURVEYS TO PREPARE INFORMATION GATHERING FORM (IGF) AS PART OF MNR DOCUMENTATION FOR ESA PERMIT
-DOCUMENT NESTING SITES, FORAGING HABITAT AND BREEDING HABITAT ON SITE

- AS THE PHASING OCCURS, RETAIN SUITABLE FIELD HABITAT ON SITE AT ALL TIMES.
- CONDUCT MONITORING OF SITE TO DETERMINE PRESENCE OF EASTERN MEADOWLARKS IN NEXT PHASE BY COMPLETING SUFFICIENT LEVEL OF EFFORT (MULTIPLE VISITS, TIME OF DAY, WEATHER PROTOCOLS AND TIME OF YEAR FOR BEST DETECTING BREEDING)
- REHABILITATION PLAN INCLUDE CREATION OF GRASSLAND HABITAT IN PROGRESSIVE REHABILITATION PHASES (PHASE 2 IS THE MEADOWS IN EASTERN HALF OF PROPERTY).

WHIP-POOR-WILL

- CLEARING OF VEGETATION IN EACH PHASE OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON (MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES
- DISCUSSIONS WITH MNR PETERBOROUGH DISTRICT REGARDING ENDANGERED SPECIES ACT SECTION 17 PERMIT

-ADDITIONAL SURVEYS TO PREPARE INFORMATION GATHERING FORM (IGF) AS PART OF MNR DOCUMENTATION FOR ESA PERMIT
-DOCUMENT NESTING SITES, FORAGING HABITAT AND BREEDING HABITAT ON SITE

- REHABILITATION PLAN INCLUDES MEADOW AND FOREST NODES THAT WILL RECREATE SUITABLE HABITAT
- SURVEY OF WOODLOTS IDENTIFIED, BY A QUALIFIED BIOLOGIST AND AT THE APPROPRIATE TIME OF YEAR (WEATHER, MOON PHASE) BE COMPLETED TO DETERMINE IF HABITAT IS STILL BEING USED BY BIRDS FOR NESTING, ROOSTING OR FORAGING
- NORTHEAST WOODLANDS ARE IN PHASE 2 OF OPERATION SO HABITAT WILL REMAIN UNTIL THAT TIME
- IF WHIP-POOR-WILL ENCOUNTERED IN THE OPERATING PHASE, THE BIRD BE LEFT TO LEAVE ON ITS OWN AND MNR CONTACTED REGARDING LOCATION

BARN SWALLOW

- CLEARING OF VEGETATION IN EACH PHASE OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON (MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES.
- DISCUSSIONS WITH MNR PETERBOROUGH DISTRICT REGARDING ENDANGERED SPECIES ACT SECTION 17 PERMIT

-ADDITIONAL SURVEYS TO PREPARE INFORMATION GATHERING FORM (IGF) AS PART OF MNR DOCUMENTATION FOR ESA PERMIT
-DOCUMENT NESTING SITES, FORAGING HABITAT AND BREEDING HABITAT ON SITE

- EXISTING FARM BUILDINGS BEING RETAINED UNTIL LAST PHASE OF QUARRY
- RE-CREATION OF GRASSLAND FORAGING HABITAT IS PART OF OPERATIONAL PLAN

COMMON NIGHTHAWK

- CLEARING OF VEGETATION IN EACH PHASE OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON (MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES
- DISCUSSIONS WITH MNR PETERBOROUGH DISTRICT REGARDING ENDANGERED SPECIES ACT SECTION 17 PERMIT

-ADDITIONAL SURVEYS TO PREPARE INFORMATION GATHERING FORM (IGF) AS PART OF MNR DOCUMENTATION FOR ESA PERMIT
-DOCUMENT NESTING SITES, FORAGING HABITAT AND BREEDING HABITAT ON SITE

- REHABILITATION PLAN INCLUDES MEADOW AND FOREST NODES THAT WILL RECREATE SUITABLE HABITAT
- SURVEY OF SUITABLE HABITATS AND OPEN ROCK IN OPERATION, BY A QUALIFIED BIOLOGIST AND AT THE APPROPRIATE TIME OF YEAR BE COMPLETED TO DETERMINE IF HABITAT IS BEING USED BY NESTING BIRDS
- SOUTHWEST WOODLANDS ARE PARTIALLY WITHIN FINAL PHASE OF OPERATION AND PARTIALLY OUTSIDE THE EXTRACTION AREA, SO HABITAT WILL REMAIN
- IF NIGHTHAWKS ENCOUNTERED IN THE OPERATING PHASE, THE BIRD BE LEFT ALONE AND MNR CONTACTED REGARDING OPTIONS AND ADVICE

BLACK TERN

- NOT FOUND ON SITE BUT IN WETLAND TO NORTHWEST.
- NO SPECIFIC MITIGATION MEASURES

LEAST BITTERN

- NOT FOUND ON SITE BUT IN WETLAND TO NORTHWEST
- NO SPECIFIC MITIGATION MEASURES

CANADA WARBLER

- NOT FOUND WITHIN THE EXTRACTION AREA, BELOW LEDGE NEAR WETLAND
- SURVEY OF SUITABLE HABITATS BY A QUALIFIED BIOLOGIST AND AT THE APPROPRIATE TIME OF YEAR (WEATHER, TIME OF DAY AND SUITABLE HABITAT) AND ON SEVERAL OCCASIONS BE COMPLETED TO DETERMINE IF HABITAT IS BEING USED BY NESTING BIRDS
- IF DETECTED AND WITHIN EXCAVATION AREA, DISCUSSIONS WITH MNR REGARDING THE ESA REQUIREMENTS WILL BE HELD
- CLEARING OF VEGETATION IN THE PHASE 1 AND BERM AND FENCE WORKS OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON(MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES

GOLDEN-WINGED WARBLER

- NOT FOUND ON SITE CURRENTLY
- SURVEY OF SUITABLE HABITATS BY A QUALIFIED BIOLOGIST AND AT THE APPROPRIATE TIME OF YEAR (WEATHER, TIME OF DAY AND SUITABLE HABITAT) AND ON SEVERAL OCCASIONS BE COMPLETED TO DETERMINE IF HABITAT IS BEING USED BY NESTING BIRDS
- IF DETECTED AND WITHIN EXCAVATION AREA, DISCUSSIONS WITH MNR REGARDING THE ESA REQUIREMENTS WILL BE HELD
- CLEARING OF VEGETATION OCCUR OUTSIDE THE PEAK BREEDING BIRD SEASON(MAY 1ST TO JULY 31ST) AS PER ENVIRONMENT CANADA GUIDELINES

2. MITIGATION AND AVOIDANCE MEASURES

(SNAKES AND TURTLES)

- A BIOLOGIST CHECK THE INITIAL EXCAVATION AREA TO BE STRIPPED AND EXCAVATED PRIOR TO THE OVERBURDEN REMOVAL, INCLUDING THE CLIFF FACE
- PROVIDE SPECIES AT RISK TRAINING TO QUARRY STAFF
- IF A HIBERNACULUM IN THE CLIFF IS FOUND, DISCUSSIONS WITH MNR WILL BE CONDUCTED AND APPROPRIATE MITIGATION MEASURES IMPLEMENTED
- QUARRY STAFF TO BE BRIEFED ON THE SPECIES AT RISK THAT MAY BE FOUND IN THE AREA AND CONTINGENCY/RESPONSE PROTOCOLS ESTABLISHED AND REVIEWED (DURING INITIAL INSPECTION).
- DAILY CHECKS OF ROCK STOCKPILES AND QUARRY FLOOR BE CONDUCTED DURING THE SNAKE'S ACTIVE PERIOD (APRIL-OCTOBER) BY TRAINED SITE STAFF
- IF A SNAKE OR TURTLE IS FOUND, THE SPECIES IS TO BE CONFIRMED AND THE SNAKE AVOIDED TEMPORARILY OR THE ANIMAL BE RELOCATED OUTSIDE THE ACTIVE QUARRY AREA. MNR WILL BE CONTACTED REGARDING HOGNOSE SNAKE SIGHTINGS AND ISSUES.
- ALL PERSONS WHO ENTER THE SITE BE PROVIDED INFORMATION ON SPECIES AT RISK. THIS INCLUDES ALL EMPLOYEES OR CONTRACTORS ON SITE
- THE LICENSEE SHALL INSTALL SIGNS ON SITE AT SUITABLE LOCATIONS TO IDENTIFY THE POSSIBLE PRESENCE OF SPECIES AT RISK
- THE LICENSEE KEEP RECORDS OF THE SEARCH DATES, PERSONNEL AND TIMES AND ACTION TAKEN
- A CONTINGENCY PLAN THAT INCLUDES THE NEED FOR ADDITIONAL VISUAL SEARCHES OF THE QUARRY DURING PARTICULAR SEASONS, HIBERNACULUM EMERGENCE (APRIL/MAY) OR ENTRANCE (SEPT./OCT) AND HATCHING SEASON (LATE AUG/SEPT.). IF THERE ARE MULTIPLE SIGHTINGS OF SNAKES, THE NEED FOR RESTRICTIVE FENCING CAN BE DISCUSSED WITH MNR.

3. ALVAR

a. A REVIEW OF THE LOCATIONS FOR THE SMALL ALVAR COMMUNITIES AND FEASIBILITY OF PRESERVING REPRESENTATIVE PATCHE(S) ALONG THE SOUTHERN PROPERTY LINE
b. MAINTAIN REPRESENTATIVE PATCHES ALONG THE EXTRACTION PHASE BOUNDARIES UNTIL PREVIOUS PHASE HAS BEEN REHABILITATED
c. STONESCAPE WILL PREPARE SEVERAL AREAS OF BARE ROCK, AS PART OF THE REHABILITATION OF PHASES 1 AND 2 AS PER THE REHABILITATION PLAN, WITH ADDITION OF TOPSOIL IN THE FISSURES AND PATCHES BETWEEN THE RECOMMENDED FOREST NODES (SEE OPERATIONAL PLAN AND REHAB PLAN). ADDITIONAL ROCK PATCHES WITHIN REHABILITATION IN PHASE 1 (SOUTHWEST CORNER). THE AREA WILL BE SIMILAR TO (1:1) FOR CURRENT BARE ROCK AREAS
d. A QUALIFIED BIOLOGIST WILL ASSIST IN THE DESIGN AND IMPLEMENTATION OF THE REHABILITATION PROGRAM TO CREATE ALVAR COMMUNITIES
e. MONITOR THE SUCCESS OF THE ALVAR COMMUNITIES OVER THE LONG TERM (YEARS 1, 3, 5 AND 7) AND POSSIBILITY OF EXPANDING THE CREATION OF ALVAR TO ALL SUBSEQUENT REHABILITATION PHASES, WHERE APPROPRIATE CONDITIONS EXIST.
f. OVERSEED WHERE NECESSARY, WITH NATIVE ALVAR SPECIES REPRESENTED IN THE AREA FROM EITHER LOCAL SOURCES OR SPECIALIZED ALVAR PLANT NURSERIES IN ONTARIO.
g. TRANSPLANT PATCHES OF ALVAR SPECIES PRIOR TO STRIPPING THE NEXT PHASE AND PLACE INTO THE REHABILITATED AREAS IN THE PREVIOUS PHASE AND,
h. COLLECT SEED FROM NEXT PHASE AS PART OF PROGRESSIVE REHABILITATION AND SEED INTO THE PHASE BEING REHABILITATED.
i. STONESCAPE QUARRY (MILKHOUSE QUARRY) WILL RETAIN A QUALIFIED BIOLOGIST TO CONDUCT THIS ALVAR HABITAT MANAGEMENT AS PART OF ITS REHABILITATION PROGRAM.

4. BUTTERNUT

RECENTLY, AN AMENDMENT (ON 294/11) TO ZTHE REGULATION ON 242/08 ALLOWS FOR THE REMOVAL OF UP TO 10 RETAINABLE BUTTERNUT TREES BASED ON APPROVAL FROM THE DISTRICT MANAGER AT THE LOCAL MNR OFFICE. COMPENSATION IS REQUIRED FOR THE REMOVAL OR HARMING OF TREES AND A PLANTING PLAN MUST BE SUBMITTED AND APPROVED BY THE DISTRICT MANAGER. MONITORING OF SEEDLINGS AND REPLACEMENT OF DEAD SEEDLINGS IS A REQUIREMENT OF THE PLANTING PLAN. THIS WILL BE DEALT WITH SEPARATELY WITH THE MINISTRY OF NATURAL RESOURCES. THE RATIO FOR NEW PLANTINGS FOR A TREE OF THIS DIAMETER WOULD BE 10:1. STONESCAPE WOULD UNDERTAKE A RATIO OF 20:1 BY INCORPORATING BUTTERNUT INTO THE FOREST NODES AND IN THE BUFFER AREAS AND AREAS OUTSIDE OF THE EXTRACTION AREA.

THE TREE WILL BE ASSESSED BY AN MNR CERTIFIED BUTTERNUT HEALTH ASSESSOR AND THE PROPER DOCUMENTATION SENT TO MNR FOR THEIR REVIEW AND AUDIT. NEA WILL PREPARE A PLANTING PLAN FOR REMOVAL OF THE TREE AS IT IS WITHIN THE EXTRACTION AREA. AS THE TREE IS IN A LATER PHASE AND MAY BE MANY YEARS BEFORE THE EXTRACTION PHASING REACHES IT, THE TREE WILL BE LEFT AND THE TREES AROUND IT RETAINED. WHEN THE TIME COMES TO STRIP THAT PHASE, THE LOCATION WILL BE REVISITED TO DETERMINE IF THE TREE IS STILL PRESENT OR HAS SUCCUMB TO THE CANKER OR HAS GROWN INTO A LARGER SPECIMEN.

5. NORTH-CENTRAL WETLAND

- WETLAND AREA OF SWAMP TO BE DETERMINED FROM MAPPING AND BOUNDARY DELINEATION
- WETLAND AREA TO BE CREATED AS PART OF REHABILITATION PLAN FOR THAT PHASE (SIMILAR AREA)
- STRIPPING TO INCLUDE STOCKPILING OF ORGANIC AND NATIVE SOILS IN A SEPARATE PILE
- GRADING PLAN TO BE MODIFIED TO INCLUDE LOW LYING AREA IN QUARRY FLOOR TO ALLOW SHALLOW PONDING OF RUNOFF, SEASONAL ATTENUATION AND OUTLET TO EXISTING DITCHES
- REHABILITATION TO INCLUDE REINSTATEMENT OF STOCKPILED SOIL
- PLANTING NODES WITHIN WETLAND AREA INCLUDE NATIVE SPECIES SUCH AS RED MAPLE, SILVER MAPLE AND EASTERN WHITE CEDAR

Appendix G

BOREHOLE EXPLANATION FORMS, BOREHOLE LOGS AND WELL RECORDS

BOREHOLE NO. B-5

PROJECT NAME: PROPOSED STONESCAPE QUARRY

PROJECT NO.: 03040291.00

CLIENT: STONESCAPE ONTARIO INC.

DATE: OCTOBER 14, 2004

BOREHOLE TYPE: NQ SIZE (48 mm DIAMETER) CONTINUOUS CORE

SUPERVISOR: LJG

GROUND ELEVATION: 298 m (ESTIMATED FROM SITE PLAN)

REVIEWER: JSA

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
0	GROUND SURFACE										
	LIMESTONE: BROWN TO GREYISH GREEN, MICROCRYSTALLINE TO FINE-GRAINED, THIN BEDDED WITH TRACE TO FREQUENT HORIZONTAL SHALEY PARTINGS, MEDIUM SOFT TO MEDIUM HARD, REACTS WITH DILUTE HCl, VERY BROKEN TO BLOCKY, SLIGHT TO MODERATE WEATHERING (LOWER BOBCAYGEON FORMATION).										WATER LEVEL AT 13.99 m BELOW GROUND SURFACE ON OCTOBER 13, 2004.
2				1RC			100	13			
				2RC			100	44			
4	– ABUNDANT COLONIAL CORAL FROM 1.5 m TO 2.5 m.			3RC			100	62			
6				4RC			100	75			
7.6											
8	DOLOMITIC LIMESTONE: GREEN TO GREYISH GREEN, MICROCRYSTALLINE WITH LITHOGRAPHIC TEXTURE, STYOLITES AT 5 mm TO 3 cm INTERVALS, OCCASIONAL ARGILLACEOUS FRACTURE PLANES WITH SHELL IMPRINTS, OCCASIONAL BIRDS-EYE TEXTURE, THICK BEDDED, MEDIUM SOFT TO MEDIUM HARD, REACTS WITH DILUTE HCl, MASSIVE, SLIGHT WEATERHING (GULL RIVER FORMATION).			5RC			100	95			
10				6RC			100	80			
				7RC			100	64			
12	11.6 – 14.9 m: UPPER GREEN MARKER ZONE; GREENISH GREY ARGILLACEOUS LIMESTONE WITH SHALEY PARTINGS, MEDIUM SOFT TO SOFT WITH GYPSUM FILLED VEINS AND CAVITIES.			8RC			100	89			
14				9RC			100	56			
16				10RC			100	78			
				11RC			100	69			
18				12RC			100	81			
20				13RC			100	92			

BOREHOLE NO. B-5

PROJECT NAME: PROPOSED STONESCAPE QUARRY
PROJECT NO.: 03040291.00
CLIENT: STONESCAPE ONTARIO INC.
DATE: OCTOBER 14, 2004
BOREHOLE TYPE: NQ SIZE (48 mm DIAMETER) CONTINUOUS CORE
SUPERVISOR: LJG
GROUND ELEVATION: 298 m (ESTIMATED FROM SITE PLAN)
REVIEWER: JSA

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
20											
	21.0 – 21.5 m: LOWER GREEN MARKER ZONE; SANDY DOLOMITIC LIMESTONE.			14RC			100	79			
22											
22.7	SANDSTONE: GREENISH–GREY TO REDDISH, THIN TO MEDIUM BEDDED, MEDIUM HARD, REACTS WITH DILUTE HCl, SLIGHT TO MODERATE WEATHERING (SHADOW LAKE FORMATION).			15RC			100	90			
24				16RC			100	97			
25.9	CONGLOMERATE/SHALE: GREY GREEN TO DARK GREY/WHITE MOTTLED, CLASTIC TEXTURE WITH ANGULAR TO SUBROUNDED CLASTS UP TO 15 cm DIAMETER SET IN SANDY TO CLAYEY MATRIX, SOFT, WEATHERED, NO REACTION TO DILUTE HCl BELOW 26.3 m, SHARP LOWER CONTACT (SHADOW LAKE FORMATION).			17RC			100	99			
26											
28				18RC			100	78			
28.3	GRANITE: GREY TO REDDISH MOTTLED, SEVERLY WEATHERED, SOFT, CLAYEY SEAMS (PRECAMBRIAN).			19RC			100	78			
30											
30.5	BORHOLE TERMINATED AT 30.5 m IN GRANITE.			15RC			100	67			
32											
34											
36											
38											
40											

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* Tag#: A195718

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
DAN.	SLOBODIAN. RE STONESCAPE.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
2189 Buckhorn RD.	PETERBOROUGH	ONT.		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
110 HWY. 507.	TRENT LAKES.		

County/District/Municipality	City/Town/Village	Province	Postal Code
PETERBOROUGH	BUCKHORN.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	708903	4943904.		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GREY	LIMESTONE ROCK			0	65.
RED	GRANITE		SOFT.	65	88
BLACK	GRANITE			88	90
	FRACTURES.				
	24-26', 34-36,	44,			

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	3/8 hole plug.	

Method of Construction

☐ Cable Tool ☑ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Other, specify ____

☐ Diamond ☐ Jetting ☐ Driving ☐ Digging

Well Use

☐ Public ☐ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify ____

☐ Commercial ☐ Municipal ☐ Test Hole ☐ Cooling & Air Conditioning

☐ Not used ☐ Dewatering ☑ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6¼	STEEL	188W	0	20'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
	☐ Fresh ☐ Untested	☐	☐
	☐ Fresh ☐ Untested	☐	☐
	☐ Fresh ☐ Untested	☐	☐

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		86'		
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
BURGESS WELL DRILLING	1455.

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
467 EMILY PARK RD	OMEMEE	ONT.	K0L2W0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
705 799 5871	WM. S. BURGESS

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
836		2016/10/16

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: 2016/10/26

Date Work Completed: 2016/10/24

Ministry Use Only

Audit No. Z243404

Received

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BOREHOLE NO. BH15-1

PROJECT NAME: ROCKRIDGE QUARRY | **PROJECT NO.:** 161-00461-00

CLIENT: 2329059 ONTARIO INC. | **DATE COMPLETED:** Feb 27, 2016

BOREHOLE TYPE: 48 mm NQ CORE | **SUPERVISOR:** IAA

GROUND ELEVATION: 301.8 mASL (Approximate) | **REVIEWER:** JSA

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
0.0	301.8	**TOPSOIL:** BROWN SILTY SAND, ROOTLETS, MOIST			SS1			50				
0.4	301.3	**LIMESTONE BEDROCK:** BOBCAYGEON FORMATION, LIMESTONE, LIGHT GREY-BUFF FRESH, GREY-BROWN WEATHERED, MICRITIC, MASSIVE BEDDING, MEDIUM HARD, BROKEN, SLIGHT WEATHERING ON FRACTURE SURFACES, FAIR TO EXCELLENT RQD			RC1			96	61			- ANASTOMOSING AND WISPY 1-4mm THICK STYLOLITES (PRESSURE SOLUTION SEAMS) ALIGNED 90 DEGREES TO THE CORE AXIS, 0.05 m FREQUENCY. - FRACTURING ALONG STYLOLITES, 0.3 m FREQUENCY.
1.0												
2.0		- BROKEN TO BLOCKY, FRESH			RC2			96	66			- FRACTURING ALONG STYLOLITES, 0.3 m FREQUENCY.
3.0												- JOINTS ALLIGNED 45 DEGREES TO THE CORE AXIS AT 2.8 m AND 3.4 m
4.0					RC3			100	95			- mm TO cm SCALE SPARRY CALCITE NODULES PRESENT TO A DEPTH OF 11.3 m - FRACURING ALONG STYLOLITES, 0.15 - 0.3 m FREQUENCY
5.0		- BLOCKY TO BROKEN										- FRACURING ALONG 1-10mm THICK STYOLITES, 0.15 - 0.3 m FREQUENCY
6.0					RC4			100	89			
7.0					RC5			98	92			BLOCKY FROM 6.7 m TO 7.5 m BROKEN FROM 7.5 m TO 8.21 m
7.9	293.9	**LIMESTONE BEDROCK:** GULL-RIVER FORMATION, LIMESTONE, LIGHT GREY, LITHOGRAPHIC, MASSIVE BEDDING, MEDIUM HARD, BLOCKY TO BROKEN, FRESH, GOOD TO EXCELLENT RQD										- CONTACT WITH LIGHT GREY LIMESTONE AT 7.95 m - DECREASE IN STYOLITES, 1 mm IN THICKNESS BLOCKY FROM 8.21 m TO 9.3 m
9.0					RC6			100	97			BROKEN FROM 9.3 m TO 9.75 m
10.0												- FRACTURING ALONG STYLOLITES, 0.15 - 0.3 m

UTM CO-ORDINATES
UTM Zone: NAD:
Easting:
Northing:

WSP GEOLOGIC (METRIC) WITH MASL ROCKRIDGE_DRAFT_LOGS.GPJ WSP_ENV_V1.GDT 12/8/16

BOREHOLE NO. BH15-1

PROJECT NAME: ROCKRIDGE QUARRY | **PROJECT NO.:** 161-00461-00

CLIENT: 2329059 ONTARIO INC. | **DATE COMPLETED:** Feb 27, 2016

BOREHOLE TYPE: 48 mm NQ CORE | **SUPERVISOR:** IAA

GROUND ELEVATION: 301.8 mASL (Approximate) | **REVIEWER:** JSA

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION / "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
10.0												FREQUENCY
					RC7			100	95			
11.0		11.6 to 12.5 m : UPPER GREEN MARKER INTERBEDDED LIMESTONE AND ARGILLACEOUS LIMESTONE, LIGHT GREY TO GREEN-GREY, THINLY LAMINATED TO MASSIVE, MEDIUM HARD, BLOCKY TO BROKEN, FRESH										- FRACTURING ALONG STYLOLITES, 0.15 - 0.3 m FREQUENCY WITHIN LIMESTONE BEDS. - THINLY LAMINATED TO THINLY BEDDED IMPURE LIMESTONE FROM 11.6 TO 12.45 m, GREEN-GREY FRESH - BEDS ALLIGNED 90 DEGREES TO THE CORE AXIS OVER ENTIRE HOLE LENGTH
					RC8			100	83			
12.0												
13.0					RC9			100	100			- FRACTURING ALONG STYLOTITIC LAMINATION AND BEDDING MARGINS, 0.35 m FREQUENCY.
14.0												- WHITE, SOFT, NON-CALCAREOUS CRYSTALLINE LAYER FROM 13.87 TO 13.9 m
14.4	287.4	**DOLOSTONE BEDROCK:** GULL RIVER FORMATION, INTERBEDDED DOLOSTONE AND ARGILLACEOUS DOLOSTONE, GREY TO GREY-GREEN, THINLY LAMINATED TO MEDIUM BEDDED, VERY BROKEN TO BLOCKY (BROKEN OVERALL), MEDIUM HARD, FRESH, EXCELLENT TO GOOD RQD										- EXACT LOCATION OF LIMESTONE - DOLOSTONE CONTACT OBSCURED BY IMPURE / ARGILLACEOUS INTERBEDS.
15.0					RC10			100	85			
16.0		- THINLY LAMINATED TO MASSIVE, BROKEN TO BLOCKY										- MILLIMETER-SCALE VUGS PRESENT VARIABLY WITHIN DOLOSTONE BEDS. - LAMINATIONS EXCLUSIVE TO ARGILLACEOUS DOLOSTONE. - FRACTURING ALONG LAMINATIONS/ BEDS 0.25 m FREQUENCY
					RC11			99	92			
17.0												
18.0					RC12			97	88			- SUB-mm THICK STYLOLITES CONTROL FRACTURING, 0.15 - 0.25 m FREQUENCY
19.0		- LIGHT GREY-BUFF FRESH										- FRACTURING ALONG STYLOLITES, 0.2 m FREQUENCY.
					RC13			100	87			
20.0												

UTM CO-ORDINATES
UTM Zone: NAD:
Easting:
Northing:

WSP GEOLOGIC (METRIC) WITH MASL ROCKRIDGE_DRAFT_LOGS.GPJ WSP_ENV_V1.GDT 12/8/16

BOREHOLE NO. BH15-1

PROJECT NAME: ROCKRIDGE QUARRY | **PROJECT NO.:** 161-00461-00

CLIENT: 2329059 ONTARIO INC. | **DATE COMPLETED:** Feb 27, 2016

BOREHOLE TYPE: 48 mm NQ CORE | **SUPERVISOR:** IAA

GROUND ELEVATION: 301.8 mASL (Approximate) | **REVIEWER:** JSA

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	UTM CO-ORDINATES / REMARKS
20.0												
		- MEDIUM BEDDED WITH INTERBED LAMINATIONS										- NO STYLOLITES PRESENT - FRACTURING ALONG LAMINATIONS/ BEDS, 0.10-0.25 m FREQUENCY
21.0		20.8 to 21.1 m : LOWER GREEN MARKER			RC14			100	80			
22.0												
22.0	279.7	**TERRIGENOUS CLASTICS:** SHADOW LAKE FORMATION, SANDSTONE, MAROON TO GREY-GREEN, THIN TO MEDIUM BEDDED, MEDIUM HARD, MASSIVE, FRESH, GOOD TO EXCELLENT RQD			RC15			95	89			- GRADATIONAL CONTACT INTO INTERBEDDED SANDSTONE AT 22.6 m - SILTY BEDS, LAMINATIONS AND GRADED BEDS PRESENT
23.0		- INTERBEDDED PARA-CONGLOMERATE AND MINOR DOLOSTONE										
24.0					RC16			100	86			- CONTACT AT 24.5 m BETWEEN DOLOSTONE AND ORTHO-CONGLOMERATE
25.0		- SEDIMENTARY PARA BRECCIO-CONGLOMERATE, MAROON, MASSIVE BEDDING										- POORLY CONSOLIDATED SUB-ROUND TO SUB-ANGULAR 1 mm TO 80 mm GRANITIC CLASTS (10mm AVERAGE) SUPPORTED BY A SANDSTONE MATRIX.
26.0					RC17			100	88			
27.0												- GREEN GOUGE (0.10 m) AT 26.4 m, SEPERATING TWO CONGLOMERATES
28.0					RC18			100	85			
28.7	273.1	BOREHOLE TERMINATED AT 28.7 m BELOW GROUND SURFACE IN TERRIGENOUS CLASTICS.			RC19			100	100			- DECREASING CLAST CONTENT OVER FINAL 0.4 m
29.0												
30.0												

WSP GEOLOGIC (METRIC) WITH MASL_ROCKRIDGE_DRAFT_LOGS.GPJ WSP_ENV_V1.GDT 12/8/16

Appendix H

CLIMATE DATA

TABLE H-1: TEMPERATURE AND PRECIPITATION DATA FOR 2012 (TRENT UNIVERSITY CLIMAT/E STATION)

HYDROGEOLOGICAL ASSESSMENT – ROCKRIDGE QUARRY

Our File: 161-00461-00

Month	Mean Maximum Temperature (°C)	Mean Temperature (°C)	Mean Minimum Temperature (°C)	Extreme Maximum Temperature (°C)	Extreme Minimum Temperature (°C)	Total Rain (mm)	Total Snow (mm)	Total Precipitation (mm)
2012								
January	-0.9	-5.2	-9.4	8.5	-24	31.6	45.0	76.6
February	1	-3	-7	7	-17	7.7	24.0	31.7
March	11.4	5	-1.4	25.5	-18	50.1	5.0	55.1
April	11.2	5.8	0.4	24.5	-5.5	38.3	0.0	38.3
May	21.7	14.8	8	29.5	-0.5	42.8	0.0	42.8
June	25.9	20.8	15	31.5	10.5	63.4	0.0	63.4
July	28	21.4	14.8	34	9	95.6	0.0	95.6
August	25.4	19.4	13.3	31	6	21.8	0.0	21.8
September	20.6	14.4	8.1	28.5	1	116.8	0.0	116.8
October	14.1	9.1	4.1	23.5	-6	103.4	0.0	103.4
November	5.9	1.5	-2.9	17.5	-9.5	19.2	1.0	20.2
December	1.7	-1.8	-5.2	15	-14.5	59.7	13.0	72.7
Total						650.4	88	738.4

Note:

T = Trace

D = Data not available

TABLE A-4: TEMPERATURE AND PRECIPITATION DATA (TRENT UNIVERSITY CLIMATIC STATION)

HYDROGEOLOGICAL ASSESSMENT – ROCKRIDGE QUARRY

Our File: 161-00461-00

Month	Mean Maximum Temperature (°C)	Mean Temperature (°C)	Mean Minimum Temperature (°C)	Extreme Maximum Temperature (°C)	Extreme Minimum Temperature (°C)	Total Rain (mm)	Total Snow (mm)	Total Precipitation (mm)
2005								
January	-4.6	-9.5	-14.3	12.0	-29.5	32.5	38.0	70.5
February	-0.6	-6.0	-11.5	7.5	-23.0	13.2	31.0	44.2
March	2.3	-2.9	-8.1	15.5	-22.0	3.0	15.0	15.6
April	12.6	6.5	0.4	25.0	-4.5	82.4	8.0	89.5
May	17.2	10.5	3.8	27.0	-3.0	29.2	T	29.2
June	26.5	20.4	14.3	33.0	5.5	77.2	0.0	77.2
July	28.4	22.2	15.9	35.0	7.0	17.2	0.0	17.2
August	26.9	20.8	14.7	33.5	8.5	64.2	0.0	64.2
September	23.1	16.9	10.7	31.5	3.0	118.0	0.0	118.0
October	13.8	9.6	5.3	27.0	-3.5	38.8	0.0	38.8
November	7.4	3.1	-1.2	17.5	-15.0	87.6	16.4	104.0
December	-2.2	-5.5	-8.9	3.5	-24.0	30.7	31.0	61.7
Total						594	139.4	730.1
2006								
January	D	D	D	D	D	D	D	D
February	D	D	D	D	D	D	D	D
March	D	D	D	D	D	D	D	D
April	13.9	7	0	24.1	-6.9	41.7	T	49.4
May	19.7	13.1	6.5	33.1	-3	89.6	0.0	87.8
June	23.8	17.8	11.7	32.1	7.2	89	0.0	99.5
July	27.5	21	14.4	32.8	9	87	0.0	88.5
August	26.1	19.1	12	36.4	4	40.1	0.0	45.1
September	19.3	13.5	7.7	26.6	-0.1	71.7	0.0	86.2
October	12.7	7.2	1.8	23.9	-4.9	D	D	134.6
November	8.5	4.1	-0.3	14.4	-7.1	D	D	61.9
December	3.7	-0.5	-4.6	10.8	-15.6	D	D	26.4
Total						419.1	0	679.4

Note:

T = Trace

D = Data not available