

**McINTOSH  
PERRY**



# **Level 1 Hydrogeological Report Proposed Cooney Pit Lanark Highlands Township, ON**

***FINAL REPORT***

**Prepared for:**

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**Prepared by:**

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**February 2014**

## **EXECUTIVE SUMMARY**

This report presents the results of a hydrogeological assessment for evaluating the siting of a proposed pit in Township of Lanark Highlands, Ontario. The proposed pit property is owned by Kevin Cooney and Jennifer Cooney and is located on County Road 511 in the former Darling Township (now Township of Lanark Highlands). The legal description of the property is West Half Lot 23, Concession 3, Geographic Township of Darling, now in the Township of Lanark Highlands. The total area of the property is approximately 44 ha. The proposed extraction area for the pit is approximately 18 ha.

Overall the hydrogeological testing indicates that the site is suitable for the proposed pit with respect to potential groundwater and surface water impacts. The proposed location is predominantly cleared and has rolling topography, and has been used for grazing and other agricultural uses in the past. The overburden consists of sand and gravel as well as cobbles. This material is suitable for the use as aggregate for construction, concrete production and other purposes.

The hydrogeological testing involved an assessment of the subsurface and a review of water features and groundwater conditions. This included excavation of test pits and a review of water well records and geologic information.

The proposed pit footprint has few constraints from a hydrogeological perspective. It will be more than 120 metres from the nearest wetland and watercourse. It will be above water and a forested area will remain between the area of extraction and the nearby Area of Natural and Scientific Interest (ANSI). The overburden groundwater is not used for potable purposes in the area. The established groundwater table varies from 2 to 15 metres below the ground surface within the proposed extraction area, depending upon the season and the location on the property.

The site is suitable for a Category 3, Class "A" pit (above water table, >20,000 tonnes/year) from a hydrogeological perspective. The proposed rehabilitation of the property should include grading and some re-vegetation.

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**FIGURES**

Figure 1 - Site Location and Land Uses

Figure 2 - Topography and Drainage

Figure 3 – Surface Runoff

Figure 4 - Test Pit Locations

**APPENDICES**

Appendix A Site Photographs

Appendix B Survey Plan of Property

Appendix C Test Pit Logs

Appendix D Well Record Search Results

## **1.0 INTRODUCTION**

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) was retained by Kevin and Jennifer Cooney to conduct a hydrogeological assessment at a site in the Township of Lanark Highlands, on County Road 511 (Figure 1 and Appendix A (Photos 1 and 2)). The legal description of the property is West Half Lot 23, Concession 3, Geographic Township of Darling, now in the Township of Lanark Highlands. The total area of the property is approximately 44 ha. The proposed extraction area for the pit is approximately 18 ha. An outline of the subject property is presented on an air photo showing the surrounding area (Figure 2 and Appendix B). This study has been prepared in support of an application for approval of a proposed pit in the Township of Lanark Highlands, Ontario. The proponent is seeking a license for an open pit. Depending upon the amount of material to be extracted per year, a Class 'A' (>20,000 tonnes per year), Category 3 (pit above water) licence is being sought.

This work was conducted in general accordance with Ontario Ministry of Natural Resources (MNR) Aggregate Resources Act and pit/quarry licensing program.

The following report describes the studies that were undertaken. This work was initiated by McIntosh Perry in September of 2013. It involved the following:

- Hydrogeological assessment
- Test pit excavations
- Review of topographic survey
- Environmental data review
- Impact Assessment

The proposed development is located near the hamlet of Brightside in the Township of Lanark Highlands, Ontario (Figure 1). The subject property is located on West Half of Lot 23, Concession 3. It is bordered by County Road 511 to the east, an aggregate property to the south, a creek and wetlands to the southwest and forested and rural residential properties to the northwest and north (Figure 2). The total area of the property is approximately 44 ha, with about 18 ha proposed to be licensed (Appendix B).

The work presented herein also includes background information pertaining to the following:

- General site setting information
- Geological and Hydrogeological Background
- Site Specific Conditions
- Groundwater elevation assessment

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## **2.0 BACKGROUND**

### **2.1 Site Setting**

The subject property is located on County Road 511 (No. 9779), in a rural area of the Township of Lanark Highlands (Appendix B).

The subject property covers an area of approximately 44 ha and is comprised of mainly open land used for grazing as well as forested areas and a former extraction area (Photos 1 and 2). There are no buildings on site. The proposed extraction area covers approximately 18 ha in the centre of the property.

This region is characterized by sand and gravel deposits, underlain primarily by gneissic rocks. The climate is humid continental with cool winters and warm summers. The mean annual precipitation is approximately 796 mm with 171 cm as snow. The mean daily temperature is approximately 5°C (Environment Canada Weather Normal's (1985-2010) for Renfrew)).

The site is located at elevations between 198 and 230 m above sea level (asl). The lowest point is located at the southwestern edge of the subject property along the Creek (Figure 2 and Appendix B). The land surface is very rolling with no distinct direction of slope.

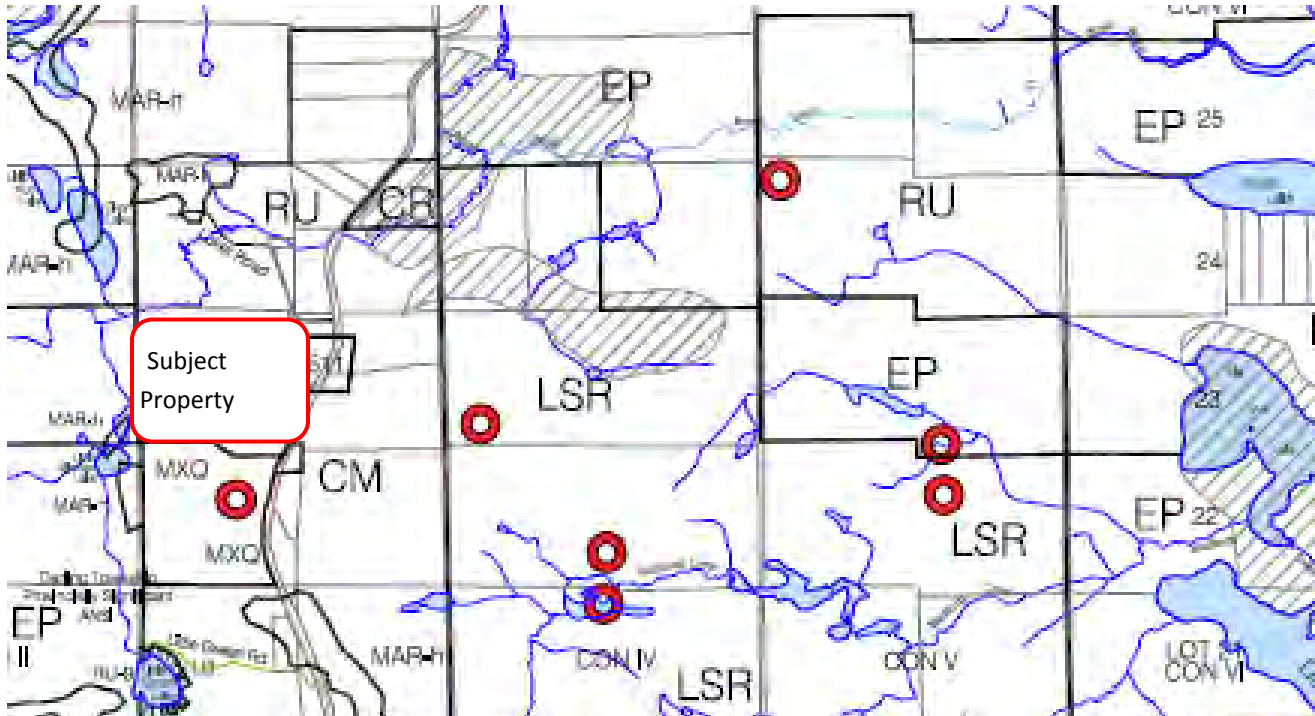
### **2.2 Neighbouring Properties and Land Uses**

The site is located on extractive Resource Lands (Mineral Aggregate Reserve), south of Renfrew (Figure 1), on County Road 511 in a rural, generally undeveloped area of the Township of Lanark Highlands. There are three residences bordering the property to the east and northeast on County Road 511 and Lukers Road. The property to the south is already used for aggregate extraction. Land on the east side of Road 511 is forested and undeveloped. The surrounding area has no municipal services. Surrounding land uses are shown on Figure 2.

Based on the Official Plan for Lanark Highlands the present zoning of the subject property is Limited Service Residential (LSR). As noted on Figure 1 (and on the portion of the Township of Lanark Highlands Zoning By-law Map below), the neighbouring properties are zoned:

- LSR to the north, northwest, southwest and northeast
- EP (Environmental Protection) to the southwest
- CM (Commercial Industrial) to the southeast on the opposite side of County Road 511
- MXQ (Mineral Extraction Quarry) to the south/southeast

There are also two small areas to the southwest that are designated MAR-h (Mineral Aggregate Reserve (holding)).



### 2.3 Hydrology

The subject site occurs within the Madawaska River - Ottawa River watershed. The ground surface of the extraction area is relatively permeable and there is little overland flow. Surface water flow is generally to the west, southwest and south, towards the Area of Natural and Scientific Interest (ANSI - creek and wetland (Photo 3)). There may be some flow to the north, near County Road 511. The creek connects with Craig's Creek to the northwest of the subject property.

Craig's Creek connects with Broad Brook about 1200m north of the subject property. Broad Brook flows into White Lake (Figure 2). The nearby creek and associated ANSI is the only permanent water body within 500 m of the proposed extraction area. There is a mature forest (Photo 4) between the proposed extraction area and the wetland.

Surface drainage on the property is mainly to the southwest towards the creek (Photo 5), located adjacent to the site to the southwest. Because of the rolling topography, runoff will occur in all directions from highpoints within the proposed extraction area (Figure 3).

## **2.4 Background Geology and Hydrogeology**

The surficial geology at the site is coarse textured granular deposits described as sand, gravel, with minor silt and cobbles. Based on test pits (Figure 4) that were excavated within the proposed extraction area, the overburden material ranges from silt to cobbles and is generally well-sorted. Well-sorted sand appears to predominate. The material is predominantly ice-contact stratified deposits with some bedrock drift complexes in the Precambrian terrain (OGS, 2013). As expected there are organic deposits in the low-lying areas to the south that form the ANSI and streambed area.

The bedrock beneath the site consists of tectonites, straight gneisses, porphyroclastic gneisses, unsubdivided gneisses in major deformation zones, mylonites and protomylonites (OGS, 2013). Based on test pits and visual observations, the depth to bedrock varies from 0m (i.e. exposures) to >5m.

Water supply for domestic purposes in the area is provided from drilled wells completed in the bedrock. There are no wells on the subject property, but neighbouring properties are all serviced by private bedrock wells.

### *2.4.1 Recharge/Discharge Areas*

Information from topographic/geological maps and field observations indicates that the site is probably a groundwater recharge zone. Recharge occurs by precipitation and infiltration, and is of a dispersed nature, in that it occurs over a wide area by means of diffuse inter-granular infiltration through soil. Recharge will occur over much of the property at most times of the year.

The ANSI area is a groundwater discharge area.

### *2.4.2 Hydrogeologically Sensitive Features*

The primary factors that determine the relative 'hydrogeological sensitivity' of an area are the type of recharge and the way that groundwater moves in the subsurface. The rate of recharge is controlled by seasonal variations in precipitation and infiltration. Recharge in the area is dispersed over a wide area (i.e. precipitation infiltrates over a wide area in more or less the same way and at the same rate). The rate of infiltration is relatively slow due to the finer-grained overburden material. The 'sensitivity' associated with this type of recharge is relatively low compared to areas where infiltration is controlled by structural elements such as sinkholes, karst features or open faults. There are bedrock outcrops on, and within 500 m of, the subject property.

Hydrogeologically sensitive features such as wetlands, or areas that limit or promote infiltration, are located in the vicinity of the site. The ANSI area is a sensitive feature as its hydrologic function is controlled to some extent by groundwater discharge, whose source is partly infiltration of precipitation on the subject property, including the proposed extraction area.



### *2.4.3 Potential Sources of Contamination*

A windshield survey of the area was conducted in combination with a review of maps, and zoning information for the subject property and surrounding area. The site is located in rural area and is designated 'Rural'. The surrounding lands are zoned Rural or Mineral Extraction. Most of the surrounding land is unused (forested), used for agriculture or aggregate extraction, or used for residential properties.

The only three potential sources of contamination were therefore limited to farming operations, the presence of above ground fuel storage tanks on neighbouring properties and septic systems. None of these potential sources of contamination is significant with respect to potential water supply well impact or long-term groundwater impact.

## **3.0 HYDROGEOLOGICAL ASSESSMENT**

McIntosh Perry conducted this hydrogeological assessment in support of an application for a Pit Licence, as required by the Aggregate Resources of Ontario, Provincial Standards, Version 1.0; Category 3 – Class "A" Pit Above Water. The objective of this assessment was to determine the requirements for the operation of a pit at this site in accordance with the Aggregate Resources Act with respect to the protection of groundwater resources. In particular, the following were evaluated:

- Impact on water resources (groundwater and surface water)
- Depth to water table
- Setback requirements (property boundaries, waterways, etc.)

### **3.1 Results**

#### *3.1.1 Water Level Assessment*

Four test pits were excavated within the proposed extra area. All were located at lower ground surface elevations within this area. These data are presented in the test pit logs (Appendix C).

#### *3.1.2 Water Well Record Review*

McIntosh Perry requested a search of the Ontario Ministry of the Environment (MOE) well record database (i.e. the Water Well Information System) for wells in the vicinity of the subject property. Ten records that occur within 1000m of the proposed extraction area were identified (Appendix D, Figure 4 and Table 1). It is noted that the locations of the wells on this figure are not considered accurate as some of the historical input data in the MOE Well Record database are incorrect.

The well depths range from 22.9 to 152.4 meters below ground surface (m bgs). The depth to bedrock at these locations varied from 0 m bgs to 4.9 m bgs. All the wells were completed in bedrock. The average depth to bedrock was 2.7m.

**Table 1  
Summary of Well Record Search**

<b>Well ID</b>	<b>Date Completed</b>	<b>Total Depth (m)</b>	<b>Depth to Bedrock (m)</b>	<b>Static Water Level (m bgs)</b>
3500669	27/10/1958	22.9	4.6	4.6
3504550	26/05/1976	22.9	4.3	4.9
3505798	10/07/1976	27.4	3.0	3.7
3505799	10/07/1976	27.4	0.3	3.0
3507180	16/08/1985	73.2	3.7	12.2
3508517	23/09/1988	54.9	2.1	12.2
3508836	11/04/1989	56.1	0.9	10.7
3513178	25/11/2000	30.5	3.0	9.8
3514583	18/06/2004	50.0	4.9	6.8
7115722	17/10/2008	152.4	0.0	11.5
	Minimum	22.9	0.0	3.0
	Maximum	152.4	4.9	12.2
	Mean	51.8	2.7	7.9

*Total of 10 bedrock wells within 1 km of proposed pit boundary*

## **4.0 SUMMARY OF CONDITIONS**

McIntosh Perry prepared this report to present the results of a hydrogeological assessment for evaluating the siting of a proposed pit in Township of Lanark Highlands, Ontario. The proposed pit property is owned by Kevin Cooney and Jennifer Cooney and is located on County Road 511 in the Township of Lanark Highlands. The legal description of the property is West Half Lot 23, Concession 3, Geographic Township of Darling, now in the Township of Lanark Highlands. The total area of the property is approximately 44 ha. The proposed extraction area for the pit is approximately 18 ha.

### **4.1 Hydrogeology**

The surficial geology at the site consists predominantly of coarse-textured ice contact deposits described as sand, gravel, with minor silt and cobbles. This material is saturated over most of the extraction area and is relatively permeable. Since these deposits are discontinuous, being interrupted by bedrock outcrops, flow directions are difficult to define. It is expected that groundwater flow is predominantly to the south and west except near County Road 511, where there will be flow to the north.

The bedrock beneath the site consists predominantly of gneiss. It is expected that this material is fractured based on observations of outcrops. Groundwater flow in the bedrock will be through these fractures. The predominant shallow bedrock flow direction will be to the north (White Lake).

### **4.2 Impact Assessment**

The two potential impacts from the operation of the pit are potential negative effects on nearby groundwater users (residential wells) and on water quality in the nearby ANSI (wetland and coldwater stream).

#### *4.2.1 Potential Well Impacts*

It is highly improbable that there will be any negative impact on groundwater supplies in the area for the following reasons:

- There are only 5 wells (existing or proposed within 500 metres of the proposed extraction area)
- All wells are completed in bedrock
- The pit will extract only unconsolidated material (overburden)
- The pit will not extract aggregate from below the water table.

As such, aggregate extraction above water in the proposed area not on Figure 1 will not impact nearby water supply wells.

#### *4.2.2 Potential ANSI Impacts*

The proposed extraction area represents less than 10% of the watershed of the ANSI from Little Green Lake to the confluence with Craig's Creek near the western corner of the subject property. At the present time, the proposed extraction area is less than 20% treed. Overall the proposed extraction of aggregate from above the water table will result in a less than 2% reduction in the forested area of the immediate watershed. There will be no change in the vegetative conditions (area noted in Photo 6) within 120 metres of the ANSI. The effect of the extraction will be to remove overburden resulting in a minor decrease in the depth of material above the water table. This may have a marginal impact on the temperature of infiltrating water during the summer, but no impact on the overall temperature of water in the nearby wetland and watercourse. At the time of the site investigations, the wetland area was very dry already (Photo 3).

The surface runoff directions are noted on Figure 4. After extraction, these are not expected to change significantly as the high points within the proposed extraction area are bedrock knobs. As such, they will not be disturbed and the ground surface will be lowered in most areas, but the relative elevations will not change significantly. It is expected that infiltration of precipitation will be slightly increased after extraction compared to the present conditions.

The overburden material will only be disturbed above the water table and this will have no impact on the quality of groundwater which will eventually discharge to the ANSI. Normal construction precautions are required within the extraction areas to protect water quality during work at the pit. These include a prohibition on equipment fuelling and the use of road salt on the property. A spill kit on-site is to be kept on site along with an environmental emergency response plan. These will be detailed in the approved Site Plan for the proposed pit.

Re-vegetation of the extracted area as part of the rehabilitation of the worked out pit will also be required to stabilize material and prevent erosion. Vegetation will also promote infiltration and moderate temperatures.

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## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

A hydrogeological assessment was conducted for a rural property located in in the Township of Lanark Highlands. This study has been prepared in support of a proposed development of an aggregate pit on the subject property (Figure 3). The proposal is for a pit above water.

This assessment shows that a pit can be developed under the following conditions:

- A 120 metre separation between extraction area and water bodies is maintained
- Vegetation in this 120 metre buffer is not removed
- Pit remains above water (floor of pit is more than 1.5 metres above established groundwater table)
- Prohibition on equipment fuelling and the use of road salt within the extraction area
- A spill kit is on-site any time operations are underway
- An environmental emergency response plan is developed for the site
- There is no consumptive water taking or transfer without a Permit to Take Water
- Two monitoring wells are to be installed – one between the pit and Creek and one on the north side of the extraction area.
- There is no extraction within 60 metres of any domestic water supply wells

It is recommended that regular water level and temperature monitoring be conducted at the two overburden monitoring wells on a quarterly basis (four times per year) during the course of active operations. Active is defined as extraction of more than 2,000 tonnes of aggregate per year. The water level and temperature should also be measured in the Creek, downstream of the pit, on a quarterly basis during active operations as well.

The data are to be reviewed annually by a qualified professional (P.Geo. or P.Eng.) to assess possible impacts to groundwater/surface water regime during active operations. Wells within the extraction area should be abandoned as per O.Reg. 903 when extraction at the water table occurs within 15 metres or they otherwise interfere with aggregate extraction.

## 6.0 QUALIFICATIONS AND SIGNATURES

Field assessment and reporting for this report was undertaken by Mark Priddle of McIntosh Perry. Mr. Priddle is a senior hydrogeologist with McIntosh Perry. Over the past twenty years, he has conducted over one-hundred hydrogeological studies for rural developments such as pits and quarries, subdivisions, commercial operations for government agencies, corporations and individuals.

Mr. Priddle is a Professional Geoscientist in Ontario and a Qualified Person (QP) under O.Reg. 153/04, as amended. At present, Mr. Priddle is the manager of Environmental Science and Engineering with McIntosh Perry.

McIntosh Perry is licensed to practice engineering and geoscience in the Province of Ontario. McIntosh Perry holds Certificates of Authorization with the Professional Engineers of Ontario (PEO) and the Association of Professional Geoscientists of Ontario (APGO) and is a full member of the Consulting Engineers of Ontario (CEO).

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,  
McIntosh Perry Consulting Engineers Ltd.



Mark Priddle, P.Ge.  
Project Manager and Senior Hydrogeologist



Ref.: OCP-13-0289\_Cooney - Hydrogeo\_rpt Final 26.feb.14.doc

## **7.0 LIMITATIONS**

This report has been prepared, and the work referred to in this report has been undertaken by, McIntosh Perry Consulting Engineers Ltd. for Kevin and Jennifer Cooney. It is intended for the sole, and exclusive use of Kevin and Jennifer Cooney, any affiliated companies and partners and their respective financial institutions, insurers, agents, employees and advisors (collectively, 'Kevin and Jennifer Cooney'). The report may not be relied upon by any other person or entity without the express written consent of McIntosh Perry Consulting Engineers Ltd. (in the form of a Reliance Letter).

Any use which a third party makes of this report, or any reliance on decisions made based on it, without a Reliance Letter are the responsibility of such third parties. McIntosh Perry Consulting Engineers Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The investigation undertaken by McIntosh Perry Consulting Engineers Ltd. with respect to this report and any conclusions or recommendations made in this report reflect McIntosh Perry Consulting Engineers Ltd.'s judgment based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of the preparation of this report.

This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary. Some of the information presented in this report was provided through maps, air photographs, and interviews. Although attempts were made, whenever possible, to obtain a minimum of two confirmatory sources of information, McIntosh Perry Consulting Engineers Ltd., in certain instances, has been required to assume that the information provided is accurate.

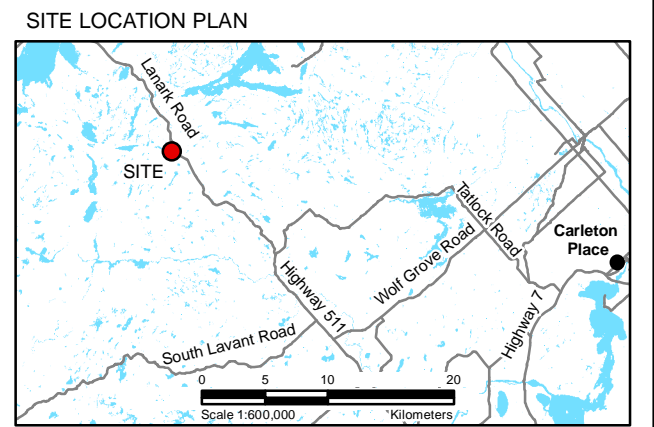
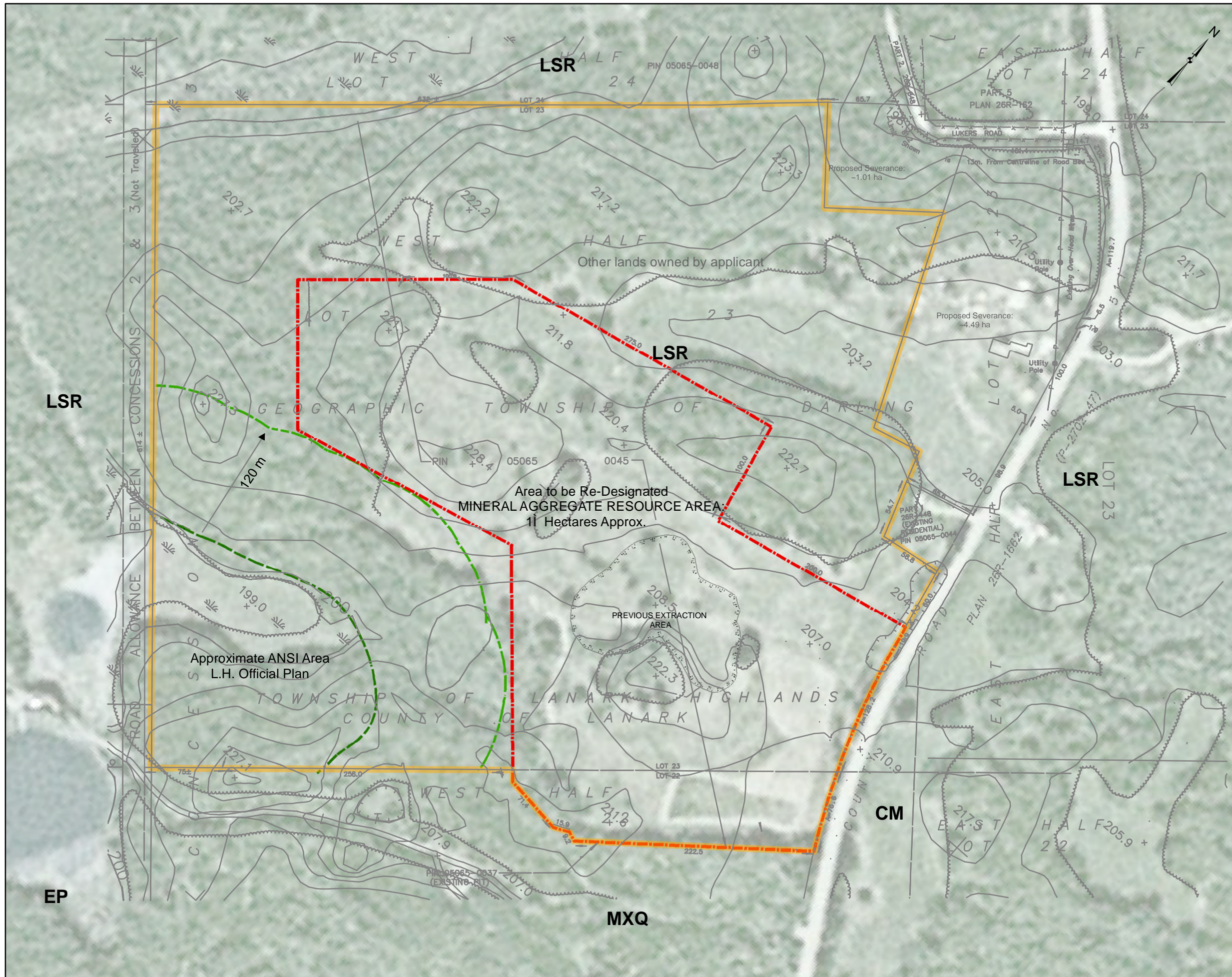
Should additional information become available, McIntosh Perry Consulting Engineers Ltd. requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

## 8.0 REFERENCES

- Canadian Climate Normals, Environment Canada, 2014.  
[http://climate.weather.gc.ca/climate\\_normals/index\\_e.html](http://climate.weather.gc.ca/climate_normals/index_e.html)
- Ontario Geological Survey (OGS) – Google Earth™ website (2013):  
[http://www.mndmf.gov.on.ca/mines/ogs\\_earth\\_e.asp](http://www.mndmf.gov.on.ca/mines/ogs_earth_e.asp)



**FIGURE 1  
SITE LOCATION AND LAND USES**



- LEGEND**
- Proposed Area for Re-designation
  - Limit of lands owned by applicant
  - Approximate ANSI Designated Area
  - Approximate 120 m ANSI Buffer Area
  - Previous Extraction Area
  - Source CAD data ( G. A. Smith Surveying Ltd.)

- ZONING**
- LSR** - Limited Services Road
  - MXQ** - Mineral Aggregate Resources Quarry
  - EP** - Environmental Protection
  - CM** - Commercial Industrial

**REFERENCE**

Digital Data provided by the Ontario Ministry of Natural Resources, 2013.  
Imagery provided by Google Earth, 2009

NOTE: TO BE READ IN CONJUNCTION WITH CONTRACT DOCUMENTS

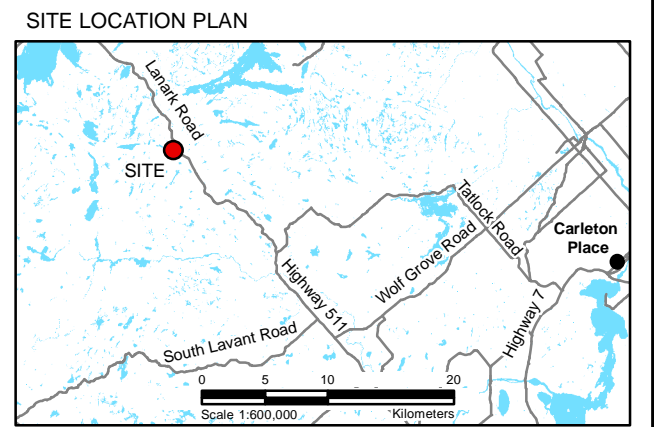
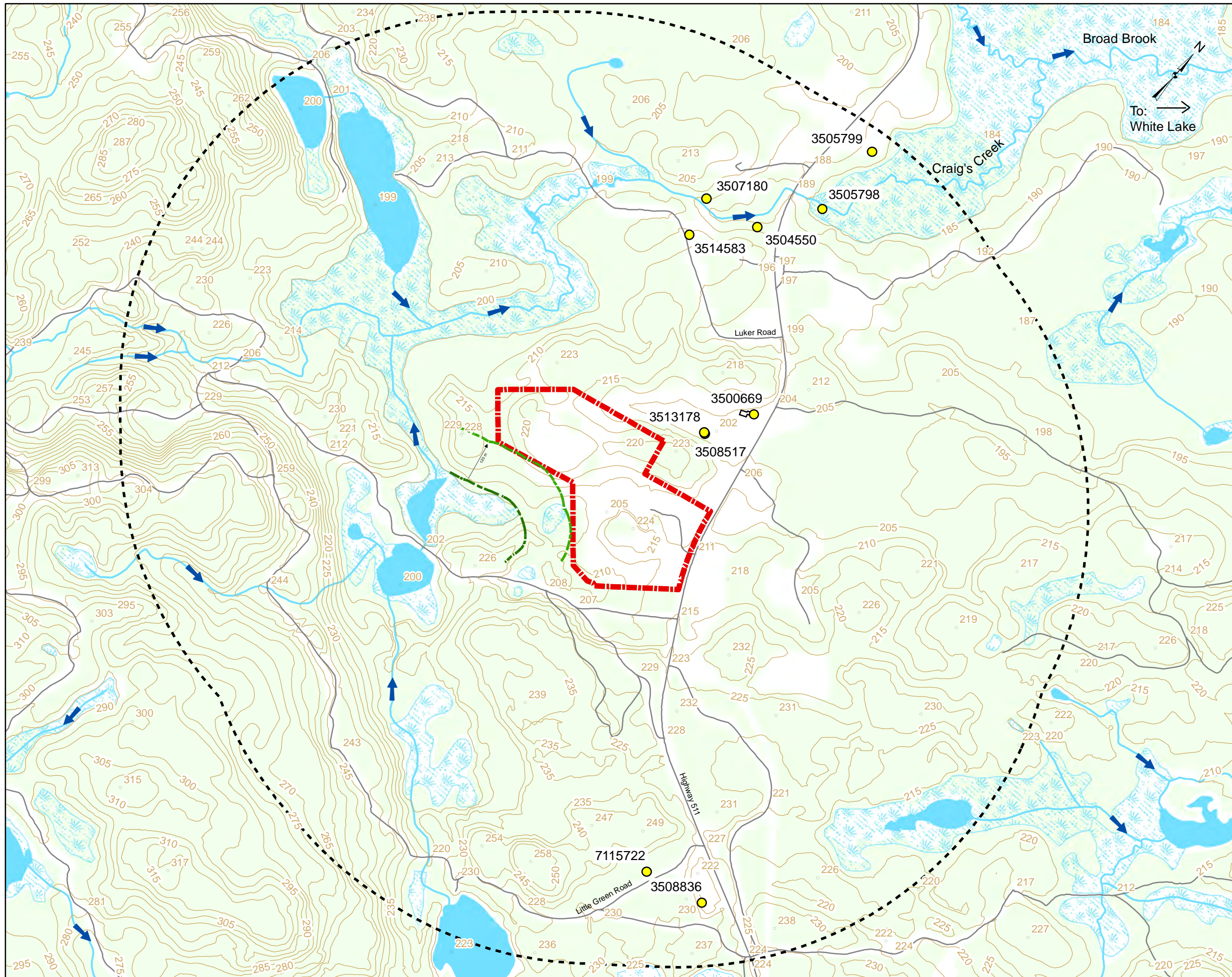


CLIENT:	COONEY CONSTRUCTION	
PROJECT:	LEVEL 1 HYDROGEOLOGY	
TITLE:	SITE LAYOUT AND LAND USE	

	PROJECT NO: CP13-0289	FIGURE:	1
	Date	Dec.30, 2013	
	Checked By	MP	

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**FIGURE 2**  
**TOPOGRAPHY AND DRAINAGE**



- LEGEND**
- MOE Well Record Location
  - Proposed Extraction Area
  - 1 km Radius
  - Approximate ANSI Designated Area
  - Approximate 120 m ANSI Buffer Area
  - Building
  - Spot Elevation ( masl )
  - Contour ( masl )
  - Wooded Area
  - Wetland
  - Waterbody
  - Watercourse
  - ➔ Flow Direction

**WELL DATA**

Well ID	Date Completed	Depth	Depth Bedrock	Static Level
3500669	27/10/1958	22.9	4.6	4.6
3504550	26/05/1976	22.9	4.3	4.9
3505798	10/07/1976	27.4	3	3.7
3505799	10/07/1976	27.4	0.3	3
3507180	16/08/1985	73.2	3.7	12.2
3508517	23/09/1988	54.9	2.1	12.2
3508836	11/04/1989	56.1	0.9	10.7
3513178	25/11/2000	30.5	3	9.8
3514583	18/06/2004	50	4.9	6.8
7115722	17/10/2008	152.4	0	11.5

**REFERENCE**

Digital Data provided by the Ontario Ministry of Natural Resources, 2013.  
 Well Data provided by the Ontario Ministry of Environment, 2013  
 Flow Data provided by Natural Resources Canada, 2013



CLIENT: **COONEY CONSTRUCTION**

PROJECT: **LEVEL 1 HYDROGEOLOGY**

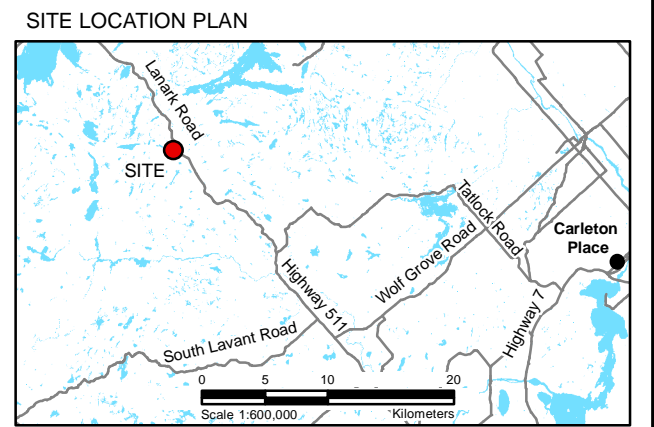
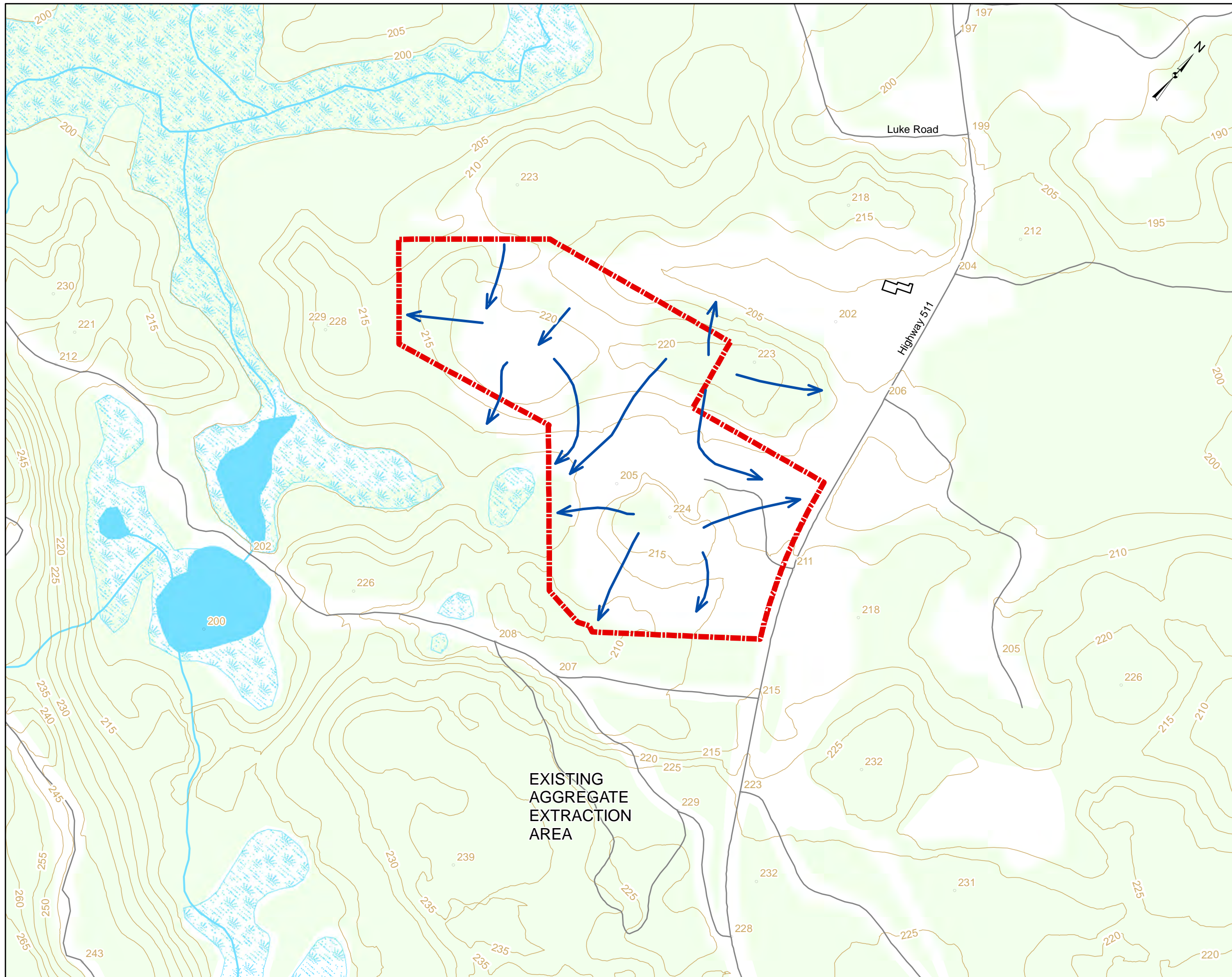
TITLE: **TOPOGRAPHY AND DRAINAGE**

<b>MINTOSH PERRY</b> MP	PROJECT NO: CP13-0289	FIGURE:
	Date: Dec.30, 2013	<b>2</b>
	GIS: ED	
Checked By: MP		

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 Tel: 613-836-2184 Fax: 613-836-3742

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**FIGURE 3**  
**SURFACE RUNOFF**



- LEGEND**
- Proposed Extraction Area
  - Building
  - Spot Elevation ( masl )
  - Contour ( masl )
  - Wooded Area
  - Wetland
  - Waterbody
  - Watercourse
  - Surface Water Runoff Direction

**REFERENCE**  
 Digital Data provided by the Ontario Ministry of Natural Resources, 2013.



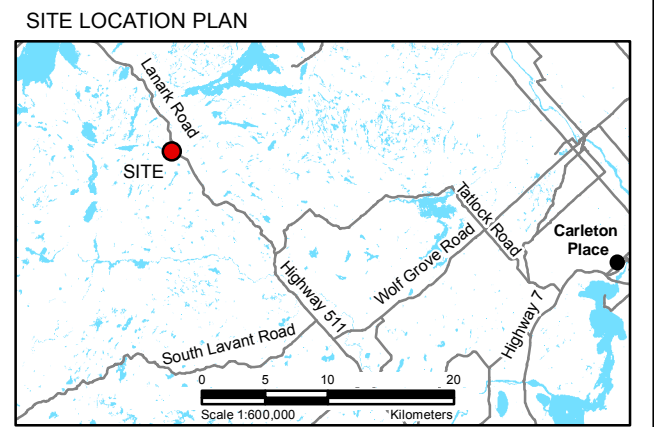
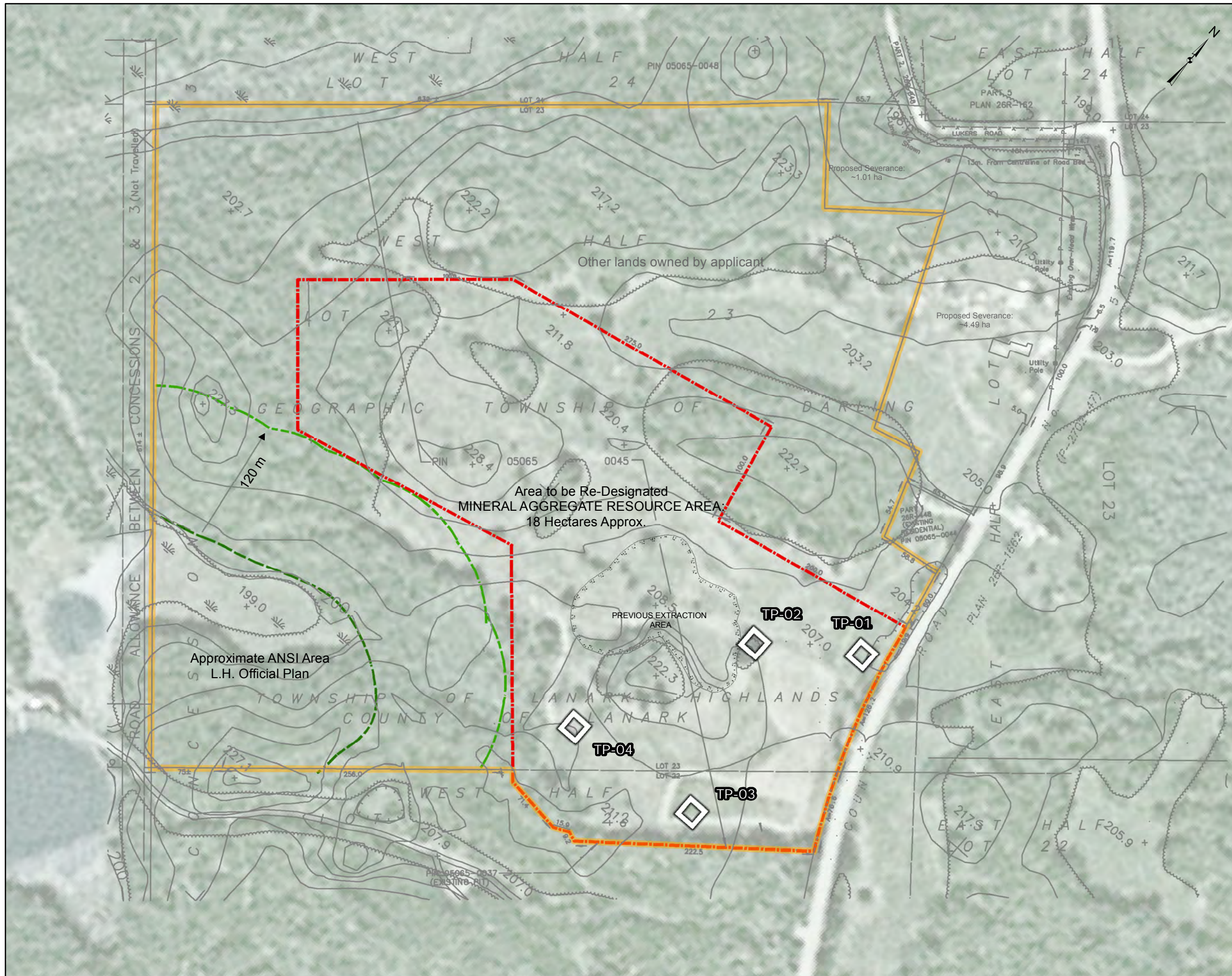
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PROJECT:	LEVEL 1 HYDROGEOLOGY	
TITLE:	SURFACE RUNOFF	

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	GIS: ED	
Checked By: MP		

115 Walgreen Rd., RR#3, Carp, ON K0A1L0  
 Tel: 613-836-2184 Fax: 613-836-3742

Document Path: H:\01 Project - Proposals\2013 Jobs\0CP-13-0289 Cooney Proposed Pl. Lanark Highlands\GIS\mxd\CP130289\_SurfaceRunoff.mxd

**FIGURE 4**  
**TEST PIT LOCATIONS**



- LEGEND**
- Proposed Area for Re-designation
  - Limit of lands owned by applicant
  - Approximate ANSI Designated Area
  - Approximate 120 m ANSI Buffer Area
  - Previous Extraction Area
  - Source CAD data
  - Test Pit Location

**TEST PIT DATA**

	Total Depth (m bgs)	Approx. Ground (m asl)	Depth to water (m bgs)
TP-1	3.9	207	3.6
TP-2	3.7	210	>3.7
TP-3	3.9	210	>3.9
TP-4	3.1	205	2.1

**REFERENCE**

Digital Data provided by the Ontario Ministry of Natural Resources, 2013. Imagery provided by Google Earth, 2009

NOTE: TO BE READ IN CONJUNCTION WITH CONTRACT DOCUMENTS



CLIENT:	COONEY CONSTRUCTION		
PROJECT:	LEVEL 1 HYDROGEOLOGY		
TITLE:	TEST PIT LOCATIONS		
	PROJECT NO: CP13-0289	FIGURE:	4
	Date: Dec.30, 2013		
	GIS: ED		
	Checked By: MP		

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## **APPENDIX A SITE PHOTOGRAPHS**



**Photo 1: Looking south over centre of proposed extraction area**



**Photo 2: Looking north from subject property to nearest residence and County Road 511**



**Photo 3: View of former wetland area forming part of the ANSI**



**Photo 4: Deciduous forest between ANSI and proposed extraction area**

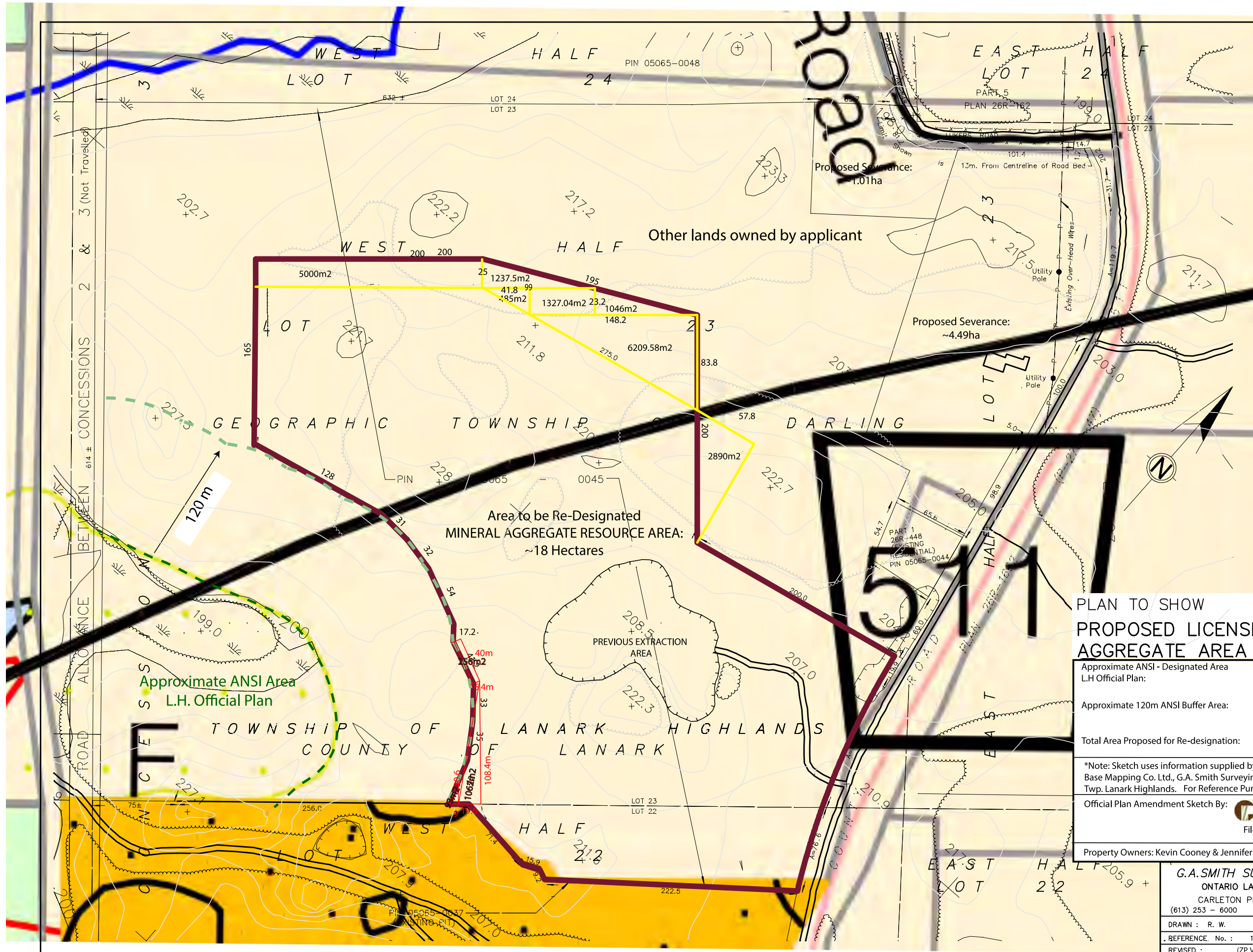


**Photo 5 Creek to the south of the subject property**






**Photo 6 Mixed forest at the south edge of the proposed extraction area**

**APPENDIX B  
SURVEY PLAN OF PROPERTY  
From G.A. Smith Surveying Ltd.**



**PLAN TO SHOW  
PROPOSED LICENSE  
AGGREGATE AREA**

Approximate ANSI - Designated Area L.H. Official Plan:	
Approximate 120m ANSI Buffer Area:	
Total Area Proposed for Re-designation:	<b>~18.0 ha</b>
*Note: Sketch uses information supplied by Base Mapping Co. Ltd., G.A. Smith Surveying Ltd., Twp. Lanark Highlands. For Reference Purposes Only.	
Official Plan Amendment Sketch By:	 File Date: Feb. 21st, 2013
Property Owners: Kevin Cooney & Jennifer Cooney	

**G.A. SMITH SURVEYING LTD.**  
ONTARIO LAND SURVEYOR  
CARLETON PLACE, ONTARIO  
(613) 253 - 6000 Fax (613) 253 - 6001

DRAWN : R. W.      CHECKED : G.A.S.  
REFERENCE No. : 12-4135 (2)  
REVISED : (ZP.VERS. DATE: 19-09-13)

**APPENDIX C  
TEST PIT LOGS**

### Test Pit Log

**Proposed Cooney Pit, Lanark Highlands**

McIntosh Perry No. OCP-13-0289

Site Visit: September 17, 2013

Personnel: Mark Priddle. P.Ge. (McIntosh Perry)

	Total Depth (m bgs)	Approx. Ground Surface Elev. (m asl)	Depth to bedrock (m bgs)	Depth to water (m bgs)	Stratigraphy		
					From (m bgs)	To (m bgs)	Material
<i>Test Pit TP1</i>	3.9	207	Not encountered	3.6	0.00	0.20	Topsoil
					0.20	2.20	beige silty fine sand, some gravel/cobbles & roots
					2.20	3.50	beige fine-medium sand
					3.50	3.90	beige to grey medium sand





### Test Pit Log

**Proposed Cooney Pit, Lanark Highlands**

McIntosh Perry No. OCP-13-0289

Site Visit: September 17, 2013

Personnel: Mark Priddle, P.Geo. (McIntosh Perry)

	Total Depth (m bgs)	Approx. Ground Surface Elev. (m asl)	Depth to bedrock (m bgs)	Depth to water (m bgs)	Stratigraphy		
					From (m bgs)	To (m bgs)	Material
Test Pit TP2	3.7	210	Not encountered	dry	0.00	0.20	Topsoil
					0.20	0.80	beige silty fine sand, some roots
					0.80	1.80	beige-grey sand, gravel and cobbles
					1.80	3.70	beige to grey medium sand with gravel



### Test Pit Log

**Proposed Cooney Pit, Lanark Highlands**

McIntosh Perry No. OCP-13-0289

Site Visit: September 17, 2013

Personnel: Mark Priddle. P.Geo. (McIntosh Perry)

	Total Depth (m bgs)	Approx. Ground Surface Elev. (m asl)	Depth to bedrock (m bgs)	Depth to water (m bgs)	Stratigraphy		
					From (m bgs)	To (m bgs)	Material
Test Pit TP3	3.9	210	Not encountered	dry	0.00	0.20	Topsoil
					0.20	0.90	beige silty fine sand
					0.90	3.50	grey fine-medium sand
					3.50	3.90	grey medium sand



### Test Pit Log

**Proposed Cooney Pit, Lanark Highlands**

McIntosh Perry No. OCP-13-0289

Site Visit: September 17, 2013

Personnel: Mark Priddle. P.Geo. (McIntosh Perry)

	Total Depth (m bgs)	Approx. Ground Surface Elev. (m asl)	Depth to bedrock (m bgs)	Depth to water (m bgs)	Stratigraphy		
					From (m bgs)	To (m bgs)	Material
Test Pit TP4	3.1	205	Not encountered	2.1	0.00	0.15	Topsoil
					0.15	0.70	beige silty fine sand; some gravel and roots
					0.70	2.50	beige-grey sand, gravel and cobbles
					2.50	3.10	caving sand, gravel and cobbles



**APPENDIX D  
WELL RECORD SEARCH RESULTS**

<b>Well ID</b>	<b>Date Completed</b>	<b>Depth</b>	<b>Depth Bedrock</b>	<b>Static Level</b>
3500669	27-10-1958	22.9	4.6	4.6
3504550	26-05-1976	22.9	4.3	4.9
3505798	10-07-1976	27.4	3	3.7
3505799	10-07-1976	27.4	0.3	3
3507180	16-08-1985	73.2	3.7	12.2
3508517	23-09-1988	54.9	2.1	12.2
3508836	11-04-1989	56.1	0.9	10.7
3513178	25-11-2000	30.5	3	9.8
3514583	18-06-2004	50	4.9	6.8
7115722	17-10-2008	152.4	0	11.5