

February 13, 2019
File: PE0191-LET.02

Tamarack (Nepean) Corporation
225 Metcalfe Street, Suite 708
Ottawa, Ontario
K2P 1P9

Attention: **Ms. Michelle Taggart**

Subject: **Phase I - Environmental Site Assessment Update
The Meadows Phase 7 and 8
Part of 3640 Greenbank Road
Ottawa, Ontario**

154 Colonnade Road South
Ottawa, Ontario
Canada, K2E 7J5
Tel: (613) 226-7381
Fax: (613) 226-6344

Geotechnical Engineering
Environmental Engineering
Hydrogeology
Geological Engineering
Materials Testing
Building Science
Archaeological Studies

www.patersongroup.ca

Dear Ms. Taggart,

Further to your request, Paterson Group (Paterson) conducted a Phase I Environmental Site Assessment (ESA) Update for part of 3640 Greenbank Road. This report updates a previous Phase I ESA report prepared by Paterson, dated December 6, 2018, and is intended to meet the requirements for a Phase I ESA as per the Ministry of the Environment, Conservation and Parks (MECP) Ontario Regulation 153/04 as amended. This report has been prepared to support the filing of a Record of Site Condition in the MECPs Environmental Site Registry and is to be read in conjunction with the previous report.

Site Information

The Phase I Property is located approximately 350m east of Borrisokane Road and approximately 275m south of Cambrian Road. The Phase I Property has an area of approximately 13.5 hectares. Paterson Group originally conducted a Phase I ESA for the Phase I Property in February of 2018, with an additional site visit in December of 2018 to confirm the conditions of the site.

Based on a review of historical records, part of the Phase I Property was used as a sand pit in the 1960's/1970s. Other parts of the property were vacant or agricultural fields. No specific historical potentially contaminating activities (PCAs) were identified on the Phase I Property.

Surrounding properties were historically used for agricultural and mineral aggregate extraction purposes. A review of the historical records identified no specific on- or off-site PCAs that were considered to result in areas of potential environmental concern (APECs) on the subject land.

Numerous test holes have been excavated on the property by Paterson Group during previous environmental and geotechnical investigations conducted in 2009 and 2018. During these investigations, no indications of contamination or fill were observed. Based on this previous work, it does not appear that the previous aggregate extraction operation has had any significant impact on the subject land.

Following the historical review, a site visit was conducted. The Phase I Property existed as vacant, tree covered land. No environmental concerns were identified on the Phase I Property at the time of the site visit, although some surficial waste items (including furniture) have been discarded along the trail/gravel road leading onto the western part of the site. A subsequent site visit was completed in December 2018. The ground surface in the area of the former aggregate pit was observed to consist of wetlands with bulrushes along the southern edge of the property, and of topsoil in the central part of the property.

The surrounding land use consisted of aggregate extraction (sand and gravel) land, residential, and vacant properties. No specific PCAs were identified in the Phase I Study Area. The Trail Road landfill is situated over 500m to the southwest of the Phase I Property. This activity is considered a PCA; however, given its separation distance and orientation relative to the subject land, and information available with regard to its operations, the landfill is not considered to represent an APEC on the Phase I Property.

Based on the previous industrial use of the property as an aggregate pit, a record of site condition (RSC) was deemed necessary in order to change the land use to residential and a Phase II ESA was recommended to support the filing of the RSC.

Past and Current Uses of the Phase I Property

The Phase I Property was owned by various private individuals and used for agricultural or other purposes from the mid 1800's through 1959, when the property was partially used as an aggregate pit. Based on a review of aerial photographs, aggregate extraction activities may have occurred on-site as late as the early 1990's. The land was owned by A.H. McCoy Construction Co. Ltd. and/or private individuals during this period of time. The subject land was purchased by the current owner, Tamarack (Nepean) Corporation, in 2004. A table of past and current uses of the Phase I Property is appended to this letter report.

Updated Conceptual Site Model

Existing Buildings and Structures

The subject site is vacant land. No buildings or permanent structures exist on the Phase I Property.

Geological and Hydrogeological Setting

The subject site is located in an area of dolomite bedrock with offshore and nearshore marine sediment, and areas of organic deposits, with overburden of 10 to 25m in depth. Groundwater flow is expected to flow to the north, towards the Jock River.

Water Bodies

The closest major water body is the Jock River, located approximately 1.12km to the north of the site. There are no water bodies on the subject site.

Areas of Natural Significance

No areas of natural significance were identified within the Phase I Study Area.

Water Wells

A search of the MECP's web site for all drilled well records within 250m of the Phase I Property was conducted February 2019. Based on the search results, no wells are located on the Phase I Property. One well record, with no information, was identified within the Phase I Study Area, further northeast of the Phase I Property. Approximately 500m to the east, new developments have received full municipal services.

Neighbouring Land Use

Neighbouring land use in the Phase I Study Area is currently vacant, residential or aggregate extraction.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Although aggregate extraction is not identified as a potentially contaminating activity in Column A of Table 2 within Schedule D of O.Reg.153/04 as amended, the previous industrial use of the Phase I Property is considered to represent an area of potential environmental concern (APEC) on the subject land.

The current industrial use of the adjacent property to the south for aggregate extraction is also considered to represent an APEC on the Phase I Property based on the proximity. The PCAs and APECs are outlined in the table below.

Table of Areas of Potential Environmental Concern Part of 3640 Greenbank Road - Ottawa					
Area of potential environmental concern	Location of area of potential environmental concern on phase one property	Potentially contaminating activity	Location of PCA (on-site or off-site)	Contaminants of potential concern	Media potentially impacted (Groundwater, soil and/or sediment)
APEC 1 (resulting from former industrial land use: on-site aggregate extraction operations)	Western and southern portions of the Phase I Property	PCA: Other (use of heavy equipment during aggregate extraction activities)	On-site	BTEX PHCs (F ₁ -F ₄)	Soil and Groundwater
APEC 2 (resulting from former off-site industrial land use: aggregate extraction operations, on adjacent land to the west)	Western portion of the Phase I Property	PCA: Other (use of heavy equipment during aggregate extraction activities)	Off-site	BTEX PHCs (F ₁ -F ₄)	Soil and Groundwater
APEC 3 (resulting from existing off-site industrial land use: aggregate extraction operations, on adjacent land to the south)	Southern portion of the Phase I Property	PCA: Other (use of heavy equipment during aggregate extraction activities)	Off-site	PHC F ₁ -F ₄ BTEX	Soil and groundwater

Contaminants of Potential Concern

Contaminants of potential concern for the Phase I Property consist of benzene, toluene, ethylbenzene and xylenes (BTEX) and petroleum hydrocarbons (PHCs).

Based on the findings of the previous geotechnical and environmental investigations on the Phase I Property (note the past environmental investigation also included the land to the west of the subject land), no evidence of fill material was observed. Metals are therefore not considered to be a contaminant of potential concern.

Assessment of Uncertainty and/or Absence of Information

There were no material deviations to the Phase I ESA requirements set out in O.Reg. 153/04 that would cause uncertainty or absence of information that would affect the validity of the findings of the Phase I ESA or this Phase I CSM.

It is the opinion of the qualified person (QP_{ESA}) that based on the information obtained and reviewed as part of this Phase I ESA, the former or existing use of the subject and adjacent lands for aggregate extraction purposes, have resulted in APECs on the Phase I Property. No other PCAs or APECs are considered to be associated with the subject land.

Conclusions

Based on the findings of the Phase I ESA Update, no new APECs were identified on the subject land. A Phase II ESA is currently underway.

Statement of Limitations

This Phase I - Environmental Site Assessment Update report has been prepared in general accordance with O.Reg. 153/04. The conclusions presented herein are based on information gathered from a historical review and field inspection program. The findings of the Phase I ESA Update are based on a review of readily available geological, historical and regulatory information and a cursory review made at the time of the field assessment.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment. This report was prepared for the sole use of Tamarack (Nepean) Corporation. Permission and notification from Tamarack and this firm will be required to release this report to any other party.

We trust that this submission satisfies your current requirements. Should you have any questions please contact the undersigned.

Paterson Group Inc.

Karyn Munch

Karyn Munch, P.Eng., QP_{ESA}



Mark S. D'Arcy, P.Eng., QP_{ESA}

Report Distribution:

- Tamarack (Nepean) Corporation (1 copy)
- Paterson Group (1 copy)

Attachments:

- Figure 1 - Key Plan
- Figure 2 - Topographic Map
- Drawing PE0190-3R - Site Plan
- Drawing PE0190-4R - Surrounding Land Use Plan
- Table of Current and Past Uses of the Phase One Property
- Qualifications of Assessors

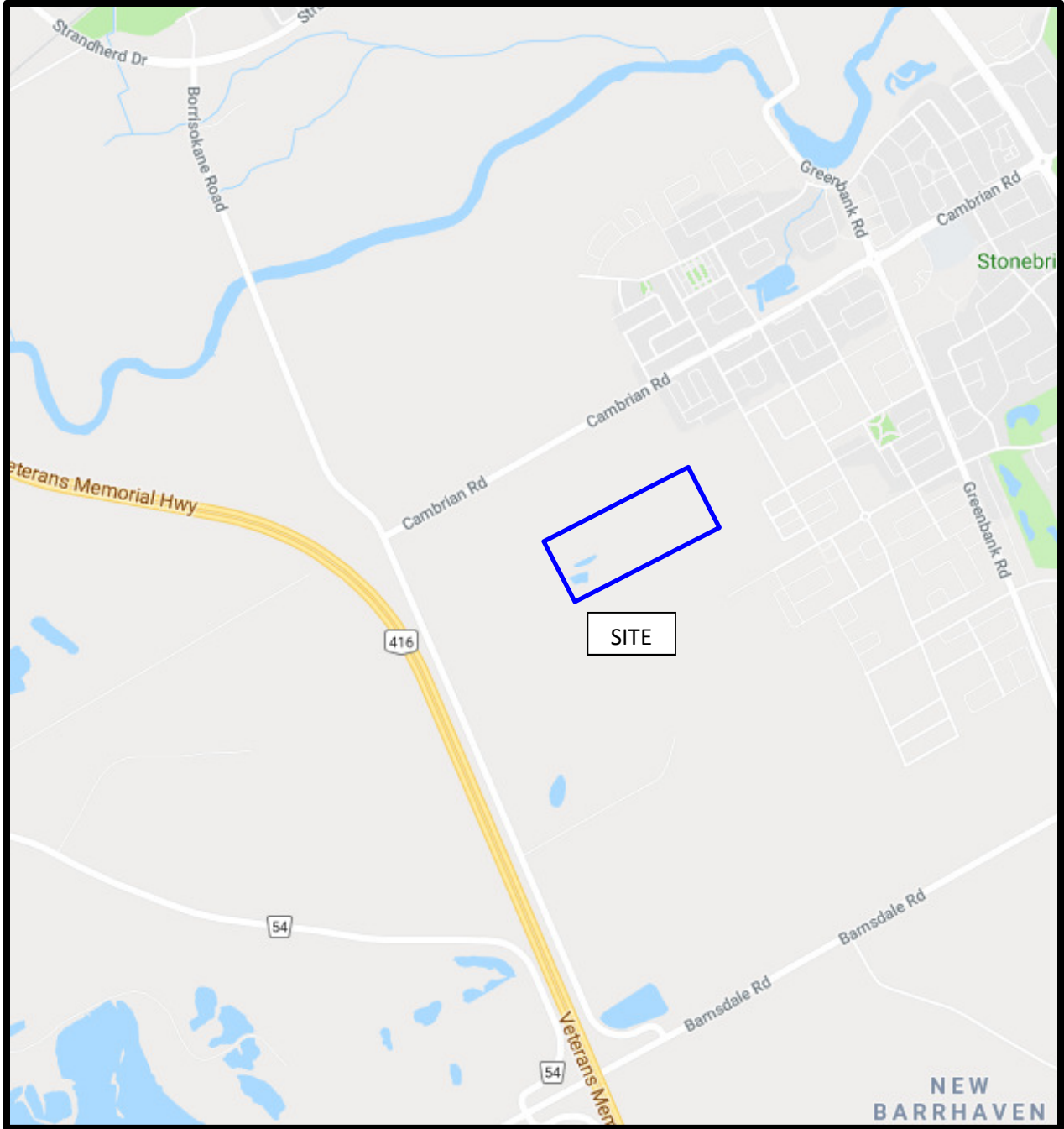


FIGURE 1
KEY PLAN

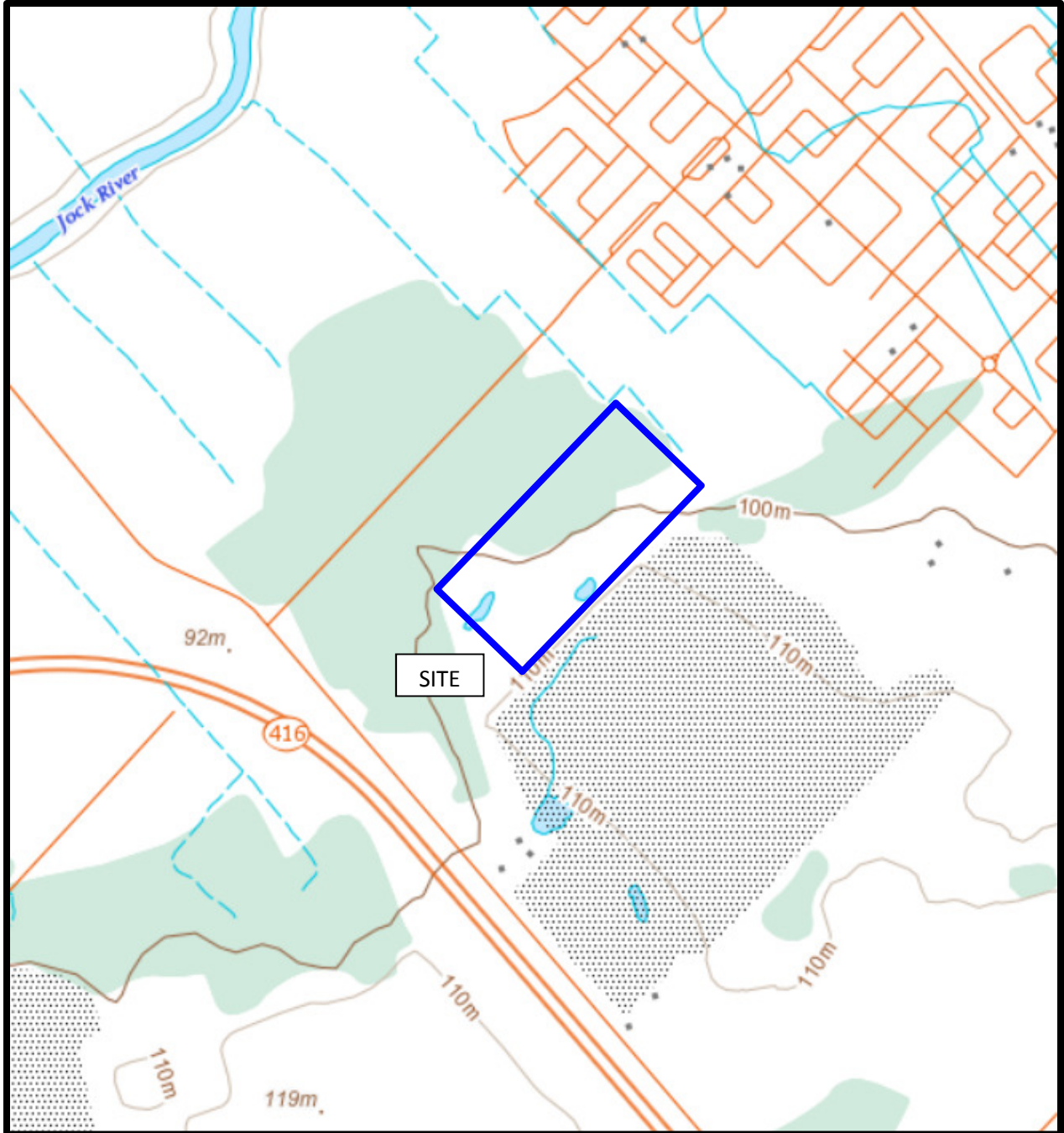
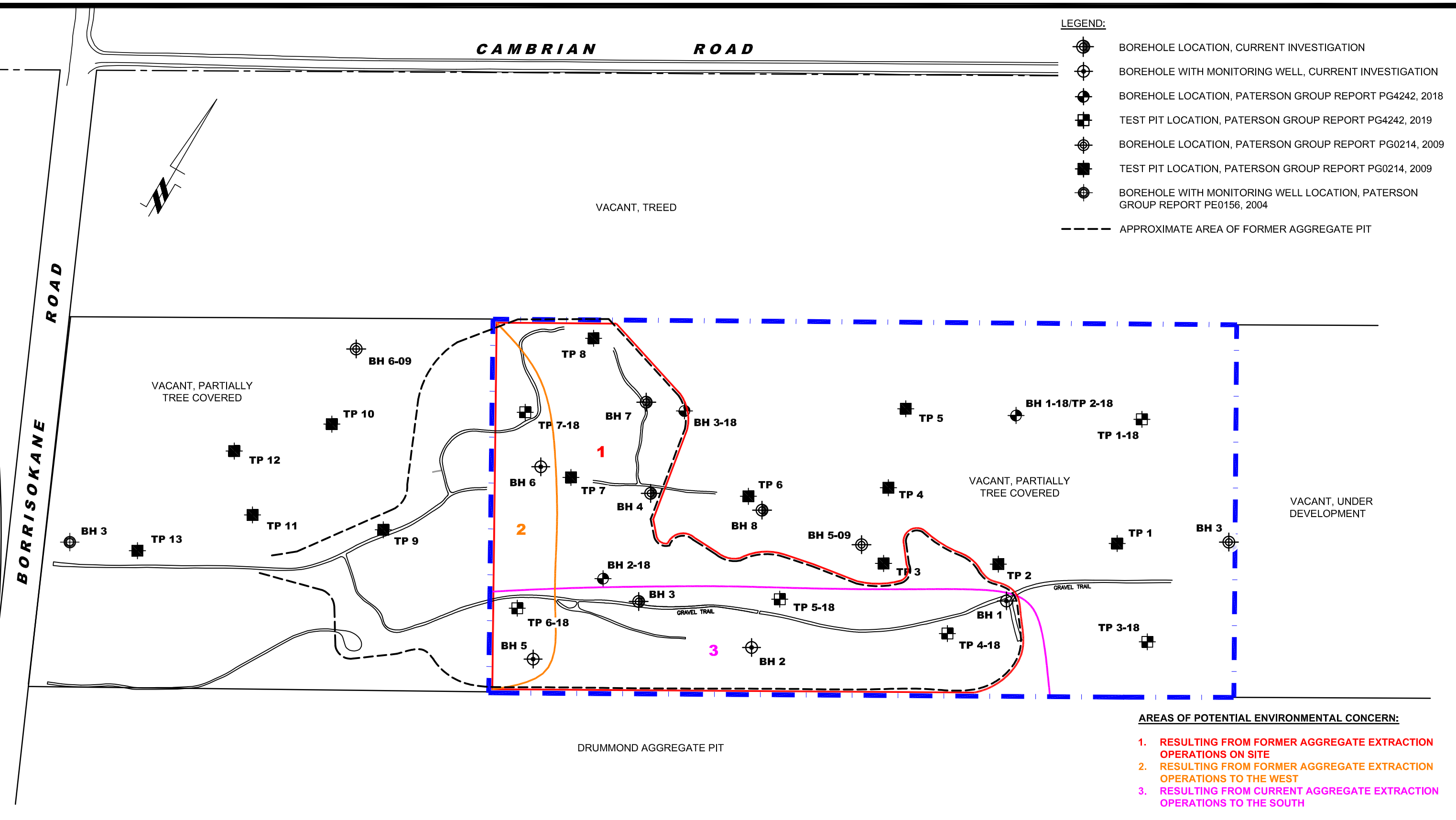


FIGURE 2
TOPOGRAPHIC MAP



- LEGEND:**
- BOREHOLE LOCATION, CURRENT INVESTIGATION
 - BOREHOLE WITH MONITORING WELL, CURRENT INVESTIGATION
 - BOREHOLE LOCATION, PATERSON GROUP REPORT PG4242, 2018
 - TEST PIT LOCATION, PATERSON GROUP REPORT PG4242, 2019
 - BOREHOLE LOCATION, PATERSON GROUP REPORT PG0214, 2009
 - TEST PIT LOCATION, PATERSON GROUP REPORT PG0214, 2009
 - BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE0156, 2004
 - APPROXIMATE AREA OF FORMER AGGREGATE PIT

- AREAS OF POTENTIAL ENVIRONMENTAL CONCERN:**
1. RESULTING FROM FORMER AGGREGATE EXTRACTION OPERATIONS ON SITE
 2. RESULTING FROM FORMER AGGREGATE EXTRACTION OPERATIONS TO THE WEST
 3. RESULTING FROM CURRENT AGGREGATE EXTRACTION OPERATIONS TO THE SOUTH

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

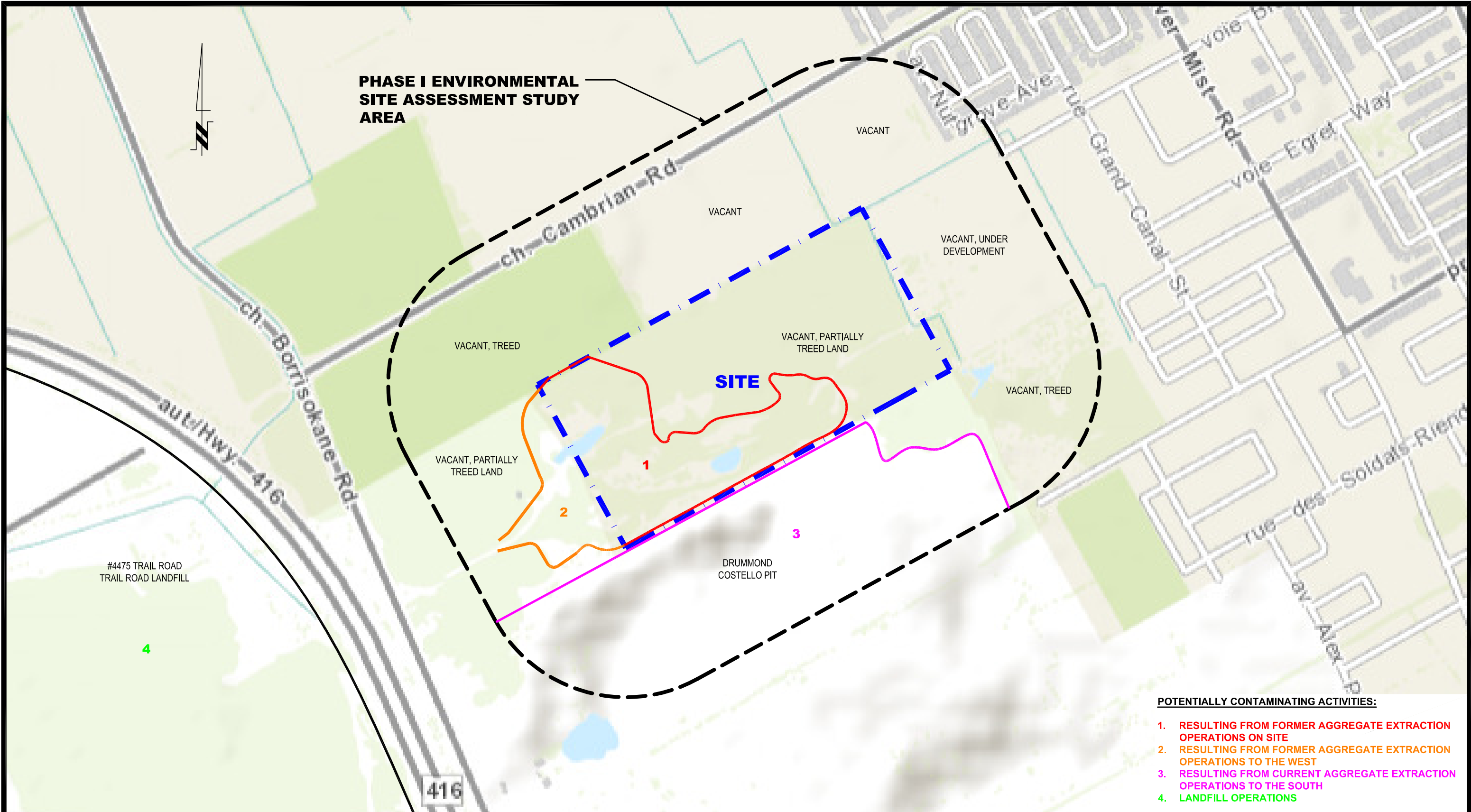
TAMARACK (NEPEAN) CORPORATION
PHASE I - ENVIRONMENTAL SITE ASSESSMENT
PART OF 3640 GREENBANK ROAD

OTTAWA, ONTARIO

Title: **SITE PLAN**

Scale:	1:3000	Date:	12/2018
Drawn by:	MPG	Report No.:	PE0190-LET.02
Checked by:	AG	Dwg. No.:	PE0190-3R
Approved by:	MD	Revision No.:	0

p:\autocad drawings\environmental\pe0190\pe0190-let.02.rvt



- POTENTIALLY CONTAMINATING ACTIVITIES:**
1. RESULTING FROM FORMER AGGREGATE EXTRACTION OPERATIONS ON SITE
 2. RESULTING FROM FORMER AGGREGATE EXTRACTION OPERATIONS TO THE WEST
 3. RESULTING FROM CURRENT AGGREGATE EXTRACTION OPERATIONS TO THE SOUTH
 4. LANDFILL OPERATIONS

patersongroup
 consulting engineers

154 Colonnade Road South
 Ottawa, Ontario K2E 7J5
 Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

TAMARACK (NEPEAN) CORPORATION
 PHASE I - ENVIRONMENTAL SITE ASSESSMENT
 PART OF 3640 GREENBANK ROAD

OTTAWA, ONTARIO

Title: **SURROUNDING LAND USE PLAN**

Scale:	1:6000	Date:	12/2018
Drawn by:	AG	Report No.:	PE0190-LET.02
Checked by:	MD	Dwg. No.:	PE0190-4R
Approved by:	MSD	Revision No.:	0

p:\autocad drawings\environmental\pe0190\pe0190-4-4.dwg

Table of current and past uses of the phase one property Part of 3640 Greenbank Road - Ottawa				
Year	Name of owner	Description of property use	Property use	Other observations from aerial photographs, fire insurance plans, etc
Part of Lot 10, Concession 3 RF Nepean (Part of PIN 04592-2811 (LT))				
1857 to 1863	William Clarke	Unknown	Agricultural or Other	No additional information was available for the Phase I Property or the Phase I study area, for this period of time.
1863 to 1872	Michael Clarke	Unknown	Agricultural or Other	No additional information was available for the Phase I Property or the Phase I study area, for this period of time.
1872 to 1877	Andrew Kennedy	Unknown	Agricultural or Other	No additional information was available for the Phase I Property or the Phase I study area, for this period of time.
1877 to 1878	James Kennedy	Unknown	Agricultural or Other	No additional information was available for the Phase I Property or the Phase I study area, for this period of time.
1878 to 1893	William Clark	Unknown	Agricultural or Other	No additional information was available for the Phase I Property or the Phase I study area, for this period of time.
1893 to 1908	Patrick Clark	Unknown	Agricultural or Other	No the additional information was available for the Phase I Property or Phase I study area, for this period of time.
1908 to 1951	William Casey	Unknown	Agricultural or Other	Based on 1946 aerial photograph, entire Phase I Property was undeveloped, partially treed land. No additional information is available for this time period.
1951 to 1959	Michael Casey	Unknown	Agricultural or Other	Based on 1956 aerial photograph, entire Phase I Property remains unchanged from previous 1946 photograph. No additional information is available for this time period.
1959 to 1965	Michael Casey	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on 1959 aerial photograph, this portion of the Phase I Property (part of PIN 04592-2811 (LT)) is vacant and partially tree covered. No additional information is available for this time period.
1965 to 1987	William Lawrence Casey	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on 1966 aerial photograph, the surface of the western portion of this parcel of the Phase I Property appears to have been disturbed and used for aggregate extraction. No significant change in land use observed in 1979 or 1984 aerial photographs, from previous 1966 aerial.
1987 to 1993	Peter Curkovic	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on the review of a 1987 aerial photograph, the land use appears to remain unchanged from the 1984 aerial.

**Table of current and past uses of the phase one property
Part of 3640 Greenbank Road - Ottawa**

Year	Name of owner	Description of property use	Property use	Other observations from aerial photographs, fire insurance plans, etc
Part of Lot 10, Concession 3 RF Nepean (Part of PIN 04592-2811 (LT)) - Continued				
1993 to 1997	Peter Curkovic	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	The Phase I Property appears to be vacant, unused land in a 1993 aerial photograph. At this time, some of the previously cleared land is tree-covered.
1997 to 2004	Peter Curkovic Limited	Vacant, unused land	Industrial	No change in land use identified in subsequent 2001 aerial photograph.
2004 to present	Tamarack (Nepean) Corporation	Vacant, unused land	Industrial	No change in land use identified in 2008 and 2011 aerial photographs. No change in land use identified in 2014 or 2017 aerial photograph. At the time of the December 2018 site visit, the western portion of the this parcel of the Phase I Property was a flat open area.

**Table of current and past uses of the phase one property
Part of 3640 Greenbank Road - Ottawa**

Year	Name of owner	Description of property use	Property use	Other observations from aerial photographs, fire insurance plans, etc
Part of Lot 9, Concession 3 RF Nepean (Part of PIN 04592-2486 (LT))				
1848 to 1888	M. Murphy	Unknown	Agricultural or Other	No additional information is available for the Phase I Property or the Phase I study area, for this period of time.
1888 to 1904	John Murphy	Unknown	Agricultural or Other	No additional information is available for the Phase I Property or the Phase I study area, for this period of time.
1904 to 1907	William Murphy	Unknown	Agricultural or Other	No additional information is available for the Phase I Property or the Phase I study area, for this period of time.
1907 to 1942	Thomas Costello	Unknown	Agricultural or Other	No additional information is available for the Phase I Property or the Phase I study area, for this period of time.
1942 to 1959	Ernest Todd	Unknown	Agricultural or Other	Based on 1946 aerial photograph, the entire Phase I Property was undeveloped, partially treed land. No changes in land used observed in 1956 aerial photograph. No additional information is available for this time period.
1959 to 1960	Ernest Todd	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on 1959 aerial photograph, an unpaved roadway transects the northern portion of this parcel (part of PIN 04592-2486 (LT)) of the Phase I Property, in an approximate east-west direction. A small portion of land along the southern property limit appears to be disturbed and possibly used for aggregate extraction. No additional information is available for this time period.
1960 to 1967	A.H. McCoy Construction Co. Ltd.	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on 1966 aerial photograph, the surface of the western and central portions of this parcel of the Phase I Property appears to have been disturbed and used for aggregate extraction. No other information available for this time period.
1967 to 1969	Ernest Todd	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	No additional information is available for the Phase I Property or the Phase I study area, for this period of time.
1969 to 1985	Willis Todd	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	No significant change in land use observed in 1979 aerial photograph, from previous 1966 aerial. In subsequent 1984 aerial, the quarry operations on this portion of the Phase I Property appear to have been abandoned.

**Table of current and past uses of the phase one property
Part of 3640 Greenbank Road - Ottawa**

Year	Name of owner	Description of property use	Property use	Other observations from aerial photographs, fire insurance plans, etc
Part of Lot 9, Concession 3 RF Nepean (Part of PIN 04592-2486 (LT)) - Continued				
1985 to 1993	Josip and Iva Curkovic	Partially used for aggregate extraction, remainder of site vacant, unused land	Industrial	Based on the review of a 1987 aerial photograph, the land use appears to remain unchanged from the 1984 aerial.
1993 to 2004	Josip and Iva Curkovic	Vacant, unused land	Industrial	The entire Phase I Property appears to be vacant, unused land in a 1993 aerial photograph. At this time, some of the previously cleared land is tree-covered. No change in land use identified in subsequent 2001 aerial photograph.
2004 to 2011	Tamarack (Nepean South Corporation)	Vacant, unused land	Industrial	No change in land use identified in 2008 and 2011 aerial photographs.
2011 to present	Tamarack (Nepean) Corporation	Vacant, unused land	Industrial	No change in land use identified in 2014 or 2017 aerial photograph. At the time of the December 2018 site visit, the area of the former aggregate operation was observed to be covered with bulrushes.

Geotechnical
Engineering

Environmental
Engineering

Hydrogeology

Geological
Engineering

Materials Testing

Building Science

Archaeological
Services

POSITION

Intermediate Environmental Engineer

EDUCATION

Carleton University, B.Eng. 2002
Environmental Engineering

MEMBERSHIPS AND AWARDS

Professional Engineers of Ontario
Ottawa Geotechnical Society

EXPERIENCE

2011-present

Paterson Group Inc.
Consulting Engineers
Geotechnical and Environmental Division
Intermediate Engineer

2009-2010

Department of Indian and Northern Affairs
Contaminated Sites Division
Environment Officer (PC-02)

2003 to 2009

Paterson Group Inc.
Consulting Engineers
Geotechnical and Environmental Division
Intermediate Engineer

2002 to 2003

Dessau Soprin Inc.
Consulting Engineers
Environmental Division
Junior Engineer

SELECT LIST OF PROJECTS

Billings-Hurdman Interconnect Watermain - Ottawa
Telus Building Remediation - Ottawa
Block D Lands Remediation and Redevelopment – Kingston
Gladstone Avenue Reconstruction - Ottawa
Lees Avenue Coal Tar Site - City of Ottawa
Nortel Networks Environmental Monitoring Program
3W Zone Feedermain – Ottawa
Bank Street Reconstruction – Ottawa
Lees Avenue Remediation Program – Ottawa
Colonnade Road North Development – Ottawa
Montreal Road Reconstruction – Ottawa
Designated Substance Surveys – Residential and Commercial Sites - Ottawa
Phase I & II Environmental Site Assessments – Residential, Commercial and Industrial Sites – Ottawa (CSA Z768-01 and O.Reg 269/11)
Brownfields Applications and Records of Site Condition – Residential and Commercial Redevelopment

Geotechnical
Engineering

Environmental
Engineering

Hydrogeology

Geological
Engineering

Materials Testing

Building Science

Archaeological
Services

POSITION

Associate and Supervisor of the Environmental Division
Senior Environmental/Geotechnical Engineer

EDUCATION

Queen's University, B.A.Sc.Eng, 1991
Geotechnical / Geological Engineering

MEMBERSHIPS

Ottawa Geotechnical Group
Professional Engineers of Ontario

EXPERIENCE

1991 to Present

Paterson Group Inc.

Associate and Senior Environmental/Geotechnical Engineer
Environmental and Geotechnical Division
Supervisor of the Environmental Division

SELECT LIST OF PROJECTS

Mary River Exploration Mine Site - Northern Baffin Island
Agricultural Supply Facilities - Eastern Ontario
Laboratory Facility – Edmonton (Alberta)
Ottawa International Airport - Contaminant Migration Study - Ottawa
Richmond Road Reconstruction - Ottawa
Billings Hurdman Interconnect - Ottawa
Bank Street Reconstruction - Ottawa
Environmental Review – Various Laboratories across Canada - CFIA
Dwyer Hill Training Centre – Ottawa
Nortel Networks Environmental Monitoring - Carling Campus – Ottawa
Remediation Program - Block D Lands – Kingston
Investigation of former landfill sites – City of Ottawa
Record of Site Condition for Railway Lands – North Bay
Commercial Properties – Guelph and Brampton
Brownfields Remediation – Alcan Site - Kingston
Montreal Road Reconstruction - Ottawa
Appleford Street Residential Development - Ottawa
Remediation Program - Ottawa Train Yards
Remediation Program - Bayshore and Heron Gate
Gladstone Avenue Reconstruction – Ottawa
Somerset Avenue West Reconstruction - Ottawa