Stage 1 Archaeological Background Study Report

621 Dundas St. East, Belleville,
Part of Lot 11-13, Broken Front Concession, Part of Lot 11-13, Concession 1
Township of Thurlow, County of Hastings

Original Report

Project Information:

Archaeological License: P1024 (Sarah MacKinnon MSc.)
MCM PIF#: P1024-0283-2022
Project File #: 163-2022

January 5th, 2024

New Era ARCHAEOLOGY
neweraarchaeology.ca
contact@neweraarchaeology.ca

EXECUTIVE SUMMARY

This report describes the Stage 1 Archaeological Background Study of 621 Dundas St. East, Belleville, Part of Lots 11-13, Broken Front Concession, and Part of Lots 11-13, Concession 1, Township of Thurlow, County of Hastings. The study was conducted under Professional Archaeological License P1024 issued by the Minister of Citizenship and Multiculturalism (Ontario) to Sarah MacKinnon. The Stage 1 Archaeological Background Study was undertaken as a requirement under Ontario Regulation 544/06 under the Planning Act (RSO 1990) in support of development application as part of the pre-submission. This report confirms that all of the work conducted as part of this assessment conforms to the Standards and Guidelines for Consultant Archaeologists (MCM 2011) and the Ontario Heritage Act (MCL 2005).

The objective of the Stage 1 Archaeological Background Study is to determine if the project area has the potential to contain archaeological resources and determine if any past use activities within the project area have removed areas of potential. The *Checklist for Determining Archaeological Potential* and the 2011 *Standards and Guidelines for Consultant Archaeologists* published by the Ontario Ministry of Citizenship and Multiculturalism (MCM 2011) outlines features and the buffers around these features within which there is potential for archaeological resources. There are two groups of features, one for Indigenous (pre-contact) potential and one for Euro-Canadian (post-contact) archaeological potential. The main feature, which indicates potential for Indigenous archaeological resources, is the proximity to a potable water source. Additional features include topography, soil type and proximity to previously identified archaeological sites. Historic potential is based on proximity to historic features such as structures, roads, railways, settlements and previously identified archaeological sites.

New Era Archaeology Inc. was contracted to complete the Stage 1 Archaeological Background Study of 621 Dundas St. East and was given permission to access the property to conduct all required archaeological fieldwork activities. The Stage 1 Archaeological Background Study involved the review of historical records, historic maps, local knowledge, current aerials, and project area inspection to confirm the current conditions of the project area. Both historic and current resources are consulted to identify areas of archaeological potential and previous activities conducted within the project area, which have removed potential. This information together with a site visit is used to determine if the project area has archaeological potential, note areas of no potential, and recommend appropriate Stage 2 strategies for areas of archaeological potential. The current conditions of the project area were confirmed during the site visit on October 13th, 2022.

As a result of the Stage 1 Archaeological Background Study the project area was determined to have potential for both Indigenous and Euro-Canadian resources, however, due to extensive disturbance and soil contamination archaeological potential has been removed from portions of the project area. It is noted that the potential for archaeological resources within the Bay of Quinte waters has not been evaluated through this land-based archaeological assessment and is not considered cleared of Marine Archaeological Potential. Map 15 illustrates the results of the Stage 1 Archaeological Background Study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF MAPS

LIST OF PLATES

PROJECT PERSONAL

LICENSED ARCHAEOLOGIST:	Sarah MacKinnon MSc. (P1024)
FIELD DIRECTOR:	Sarah MacKinnon MSc. (P1024)
FIELD ASSISTANTS:	Kayleigh MacKinnon MSc. (P384)
REPORT PREPARATION:	Sarah MacKinnon MSc. (P1024)
REPORT MAPPING:	Sarah MacKinnon MSc. (P1024)

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

This report describes the Stage 1 Archaeological Background Study of 621 Dundas St. East, Belleville, Part of Lots 11-13, Broken Front Concession, and Part of Lots 11-13, Concession 1, Township of Thurlow, County of Hastings. The study was conducted under Professional Archaeological License P1024 issued by the Minister of Citizenship and Multiculturalism (Ontario) to Sarah MacKinnon. The Stage 1 Archaeological Background Study was undertaken as a requirement under Ontario Regulation 544/06 under the Planning Act (RSO 1990) in support of a Draft Plan of Subdivision and Zoning By-law Amendment. This report confirms that all of the work conducted as part of this assessment conforms to the Standards and Guidelines for Consultant Archaeologists (MCM 2011) and the Ontario Heritage Act (MCL 2005).

New Era Archaeology Inc. was contracted to complete the Stage 1 Archaeological Background Study of 621 Dundas St. East and was given permission to access the property to conduct all required archaeological fieldwork activities. The Stage 1 Archaeological Background Study field visit was conducted on October 13th, 2022 consisting of visual inspection and documentation.

1.2 HISTORICAL CONTEXT

1.2.1 General Indigenous Overview

Table 1: General Indigenous History Throughout Ontario

Period	Date Range	Cultural Group	Diagnostic Material	Period Details
Paleo-Indian – ca. 11,000-7,500 BC				
Early	ca. 11,000-8,500 BC	Clovis, Plano	Fluted projectile points	The continental glacier covering Ontario continued to recede north exposing more habitable land for flora and fauna attracting the nomadic hunters from the southwest. These hunter-gatherers set up sites along shorelines, with fish a main dietary staple and would periodically gather into larger groups typically during the summer months when food was more abundant. The Clovis culture remained in Southern Ontario whereas the Plano culture moved into Northern Ontario
Late	ca. 8,500-7,500 BC		Plano, Holxombe, Hi-Lo projectile points	
Archaic – ca. 7,800-1,000 BC				
Early	ca. 7,800-6,000 BC	Shield Archaic, Laurentian Archaic	Bifurcate, nettling projectile points	Small nomadic hunter-gatherer bands slowly transitioned to small territorial camps. There is a continuation of gathering into larger groups in the summer and dispersing into smaller groups over the winter. Dependence on hunting meant that great distances were often covered throughout the year. There is an increase in the use of localized material and the re-purposing of stone tools. Local and long-distance trade networks appeared leading to an influx of exotic materials and goods, including natural copper and conch shells, often used as grave offerings. Trading often occurred in the summer months when groups came together at the mouths of rivers to take advantage of the spawning fish. The open water also allowed for easier travel over longer distances.
Middle	ca. 6,000-2,000 BC		Brewerton, Stanly, Side-notched projectile points	
Late	ca. 2,500-1000 BC		Lamoka, Adder Orchard, Genesee, Lamoka, Innes, Crawford Knoll, Innes, Hind projectile points	

				The bow and arrow was adopted towards the end of the period, which was already in use on the east coast. The Plano cultural group are the ancestors of the Shield Archaic and the Clovis are ancestors of the Laurentian Archaic.
Woodland – ca. 1,000 BC – AD 1600				
Early	ca. 1000-400 BC	Meadowood, Middlesex	Birdstones, Cache blades, Kramer, Meadowood projectile points	Hunter-gatherer groups continue to come together in the warmer months and disperse in the fall occupying the margins of Southern Ontario. Both large and small campsites have been identified. The same trade networks are maintained. One distinguishing characteristic of this period is the introduction of pottery. Burial ceremonialism is also practiced.
Middle	ca. 400 BC - AD 700	Point Peninsula, Saugeen	Vanport, Snyder, Saugeen projectile points	Hunter-gatherers, but evidence of increased sedentism and seasonal site reuse and emergence of horticulture. Diets expanded to include the collection of wild fruits and wild rice. More intricate burial ceremonialism was adopted from Hopewell culture to the south, as a result of trade networks, including the use of burial mounds. More decorative pottery techniques also appear including stamped and scalloped techniques. Items from the Ohio Valley also start to appear for the first time including stone platform pipes, copper ear spools and copper panpipes. Point Peninsula sites in the Toronto, Quebec and New York areas. Saugeen sites are found in the area between Lake Huron and Lake Erie west of Toronto.
Transitional	ca. AD 600 - 1000	Princess Point, Laurel	Princess Point pottery, Triangular projectile points	Princess Point sites remain smaller in size located along the north shore of Lake Erie and the west end of Lake Ontario. They were the first to adopt corn in Ontario, which spread northeast from Mexico. Princess Point pottery decorative techniques include cord-wrapped stick and punctuates. The Shield Archaic are ancestors of the Laurel culture who occupied Northern Ontario, Western Quebec and areas to the west and received their pottery knowledge from Point Peninsula and Saugeen cultures. The Laurel also created some of the largest burial mounds.
Late - Early	ca. AD 900 - 1300	Glen Meyer, Pickering	Glen Meyer Tanged-Triangular projectile point	The Pickering culture developed out of the Point Peninsula culture and occupied an area between Lake Ontario and Georgian Bay to Lake Nipissing. The Glen Meyer culture developed out of the Princess Point culture and occupied southwestern Ontario between Long Point and Lake Huron. Small single-family houses change to larger multi-family longhouses within small village sites with the appearance of palisades at some. There is an increase in corn agriculture. Pottery vessels are thinner walled with improved manufacturing. There is a switch in burial customs to the use of burial pits, a precursor to large ossuaries. Towards the end of the period, pipes become more common.
Late - Middle	ca. AD 1300 - 1400	Uren, Middleport, Lalonde	Middleport projectile points	Increase in village size and reliance on agriculture including corn, beans and squash. Farming provided increased food resources with better nutrition allowing populations to grow. Decrease in decorated pottery vessels and an increase in decorative pipes including effigy pipes. Some sites still include a palisade.

Late - Late	ca. AD 1400 - 1600	Ontario Iroquoian	Nanticoke, Daniels Triangular projectile points	Village size increased and locations were strategically picked to ensure enough arable land as their diets were heavily dependent on agriculture. Locations were also chosen for their proximity to woodlots for both heating and building, proximity to water and a location which could be easily defended. Good hunting grounds to support the growing village population became important and as a result, hostilities over these hunting grounds increased with neighbouring communities. Emergence of tribes and territories. Dogs were domesticated and large ossuaries became common. Towards the end of the period, the first European goods appear periodically in Ontario through trade networks with groups further east who were in contact with the first French explorers who had reached the St. Lawrence.
Contact-Historic – ca. AD 1600-1800				
European Contact	AD 1600-1650	Huron, Neutral, Petun, Odawa, Ojibwa	Minimal European items	Establishment of the fur trade. Increase in warfare resulted in tribal disbursement leaving much of the area between Lake Ontario and Lake Simcoe with no permanent large villages. Many villages move north of Lake Simcoe further away from the Iroquois. Continued warfare from the Iroquois to the south resulted in the dispersal of the remaining Huron-Wendat and the abandonment of their remaining villages and resettlement in Quebec at the closing of this period. The French arrived in Ontario with an increase in Jesuit missionaries and European goods.
Late	AD 1650- ca. 1800	Algonquin, 6 Nations Iroquois,	Mixture of Indigenous and European items	The Iroquoian continued to use their conquered land of Southern Ontario as mainly hunting grounds with a few settlements located along the shoreline of Lake Ontario. The Iroquoians were then challenged and pushed out of the region by the Anishinaabeg (Ojibway, Chippewa, Odawa). Trade continued with both English and French. Numerous migrations and resettlements. The end of this period saw an influx of European and American settlers transitioning to the historic period.

Southern Ontario

As the glaciers that covered southern Ontario began to retreat approximately 12,500, they left the area habitable for the Paleo-Indian hunting bands arriving between 11, 000 and 10,500 years ago to find large melt water lakes formed in the wake of the retreat. The lakes were accompanied by relatively barren tundra interspersed with areas of open boreal forest. The Paleo-Indian hunters focused on the large Pleistocene mammals including mastodon, moose, elk, and especially herds of caribou that roamed the area. As a result of their following the herds of animals, the Paleo-Indian groups traveled long distances and seldom stayed in one campsite for a significant length of time which resulted in little material culture remaining. Stone tools and by-products of their flaked stone industry are virtually all that remains, with large distinctive spear points that have a prominent channel or groove on each face being the hallmark of the period. Campsites from this period are frequently found adjacent to remnant shorelines of the large post-glacial lakes indicating that camping sites were set up along the shores of lakes to intercept migrating herds. Due to the water levels of the Lake Ontario basin falling in the early post-glacial period and subsequently rising again to modern levels resulted in camp sites now being situated more than a kilometre into the lake (Archaeological Services Inc. 2014).

The Archaic Period (7,000 B.C – 1,000 B.C) saw a mixed needle and broadleaf forest cover established in Ontario and nomadic hunter-gatherers hunted deer, moose, as well as other animals, fished and gathered plant resources while moving relatively large distances over the landscape during the course of the year. From the archaeological record the technological and cultural change can be identified including a wide variety of tools produced which resulted in shifts in hunting strategies to adjust to a constantly evolving environment. During the Late Archaic period hunter-gatherer bands most likely settled into familiar hunting territories. Two types of sites evolved as a result of their hunting patterns, the small inland camps that were occupied by small groups of related families during the fall and winter where they could harvest nuts and hunt deer, and the larger spring and summer settlements that were located near river mouths where groups of families came together to trade, exploit spawning fish resources and to bury their dead. Many of the ground stone tools have both social and symbolic functions where they would have day-to-day uses, but their inclusion in burials ascribes to them a sacred intent (Archaeological Services Inc. 2014).

The Woodland period is distinguished from the previous Archaic period with respect to settlement patterns and subsistence pursuits and is most specifically marked by the instruction of ceramics into Ontario. Though the appearance of these ceramics provides a temporal marker for archaeologist their use does not seem to have profoundly changed the hunter-gatherer lifestyle of the previous period. The Iroquoian society flourished in the southern Great Lakes region in the Late Woodland period. Increasingly sophisticated burial ceremonies and increase in trade of exotic items developed which may have come out of the need for greater social solidarity as the population increased causing competition for resources. Trade with communities living south of the Great Lakes introduced maize and squash creating a transition to food production that then reduced reliance on naturally occurring resources and lead to less movement as people tended to their crops. As sites were more intensively occupied the need for a greater degree of internal spatial organization came about which can be seen on the archaeological record. The ancestors of the Neutral, Huron, and Petun resided along the central north shore of Lake Ontario and the ancestral Iroquoians became the Five Nation Iroquois (Seneca, Cayuga, Onondaga, Oneida, and Mohawk) occupied the south of Lake Ontario in what is now central New York State. Though there ware most likely interactions between these Iroquoian-speaking groups it was not until the mid to late 17th century that the Five Nation Iroquois inhabit the Toronto area. The focus on agricultural practices lead to a more sedentary lifestyle with larger communities coming together and forming alliances with separate villages. Some villages were fortified with palisade walls with land cleared around them for crops. By the time European explorer and missionaries arrived in Ontario at the beginning of the 17th century the villages were under the direction of various chiefs elected from the principal clans and subsequently allied within powerful tribal confederacies (Archaeological Services Inc. 2014).

By 1600 most of the Lake Ontario north shore communities had moved northward joining communities in Simcoe County to form the Petun and Huron. Though the movement of these communities took place over many generations the conflict with the Five Nations Iroquois of New York State was the final impetus. The collapse and dispersal of the three Ontario Iroquoian confederacies (the Huron, the Petun, and the Neutral) during the first half of the 17th century was caused by intertribal warfare with the Five Nations Iroquois and exacerbated by the intrusion of Europeans (Archaeological Services Inc. 2014).

1.2.2 Hastings County Historic Overview

As part of the 1792 Proclamation by Governor Simcoe that divided Upper Canada into nineteen counties the Township of Hastings was created. In reference to the County the Proclamation noted:

> *That the eleventh of the said counties be hereafter called by the name of Hastings; which county is to be bounded on the east by the westernmost line of the County of Lennox; on the south by Bay Quinte, until it meets the boundary on the easternmost line of the River Trent; thence along*

> *the said river until it intersects the rear of the ninth concession; thence by a line running north, sixteen degrees west, until it intersects the Ottawa, or Grand River; thence descending along the said river until it meets the north-westernmost boundary of the County of Addington. The said County of Hastings to comprehend all the islands of the said Bay of Quinte and River Trent nearest to the said county in the whole, or greater part fronting the same.*
>
> (H. Belden & Co. 1878)

The Proclamation allowed for the Counties of Hastings, Northumberland, and Lennox were made into one division and therefore allowed one representative forming part of the first parliament of Upper Canada. The County of Hastings was separated from the Midland district in 1839 (H. Belden & Co, 1878).

The settling and development of the County of Hastings followed closely with its geography with settlers gaining their livelihood from the forest, fields and mines. Covering an area of 2,323 square miles, Hastings County is the second largest and second longest county in Ontario with a length of 100 miles north to south. The northern two-thirds of the County is covered by the rocky Canadian Shield and as a result was sparsely settled. However, as the Great Lakes – St. Lawrence Lowlands soil within the southern third provided easier farming land the most towns were settled into this area. The southern limit of the Canadian shield is marked by an escarpment that passes through Hungerford, Huntingdon, Rawdon and Marmora townships. A thin layer of stony tills covers the bedrock of granite gneiss, chlorite, gabbro, quartzite and marble throughout the Canadian Shield section. The movement of the glacier throughout Southern Ontario and the County was overall beneficial to those looking to mine in the central and norther sections where iron, gold and uranium was plentiful. The southern portion is characterised by shallow to deep tills tending towards stoniness with the surface features of the Trenton limestone in the southwest reaching a maximum thickness of close to 200 feet within the Oak Hills. Drumlins, noted as whaleback shaped, with the steep slope facing towards the north-east were made up of calcareous loam that was derived in part from the Black River limestones as well as the soft and easily weathered Trenton limestones. Eskers are interspersed with the drumlins are characterised by long gravel and sand ridges that were formed when water from the top of the glacier melted and sank and formed rivers beneath the glacier. The resulting Lake Iroquois flooded much of Tyendinaga, Sidney, and Thurlow Townships. However, once the glacier retreated to the north from the St. Lawrence Valley Lake Iroquois disappeared as the melt-water found an outlet to the Atlantic Ocean through the St. Lawrence Valley resulting in the river pattern that is present today. The County is drained by the York River, tributaries of the Madawaska, the Trent, Moira, and Salmon Rivers (Boyce, 1967).

Champlain is considered to be the first explorer to visit Hastings County when he passed down the Trent River system in 1615 with a band of Huron on the way from the Lake Couchiching area to attack a rural Iroquois village south of Lake Ontario. His exploits throughout the region resulted in the Bay of Quinte-Trent System became one of the main French routes to travel from the St. Lawrence to the Upper Lakes (Boyce, 1967).

1.2.3 Thurlow Township Historic Overview

Considered to be the ninth town in the U. E. Loyalist order of Bay numbers the Township of Thurlow is one of the oldest settled municipalities on the Bay of Quinte. Bounded on the north by Huntingdon Township, on the east by Tyendinaga Township, on the south by the Bay of Quinte, and on the west by Sidney Township (H. Belden & Co, 1878). Thurlow Township was named after Edward A. Thurlow, an outstanding British statesman who strongly supported King George III during the American Revolution and became the first Baron of Thurlow (1731-1806). First surveyed in 1787 by Louis Kotte, who left Lot 4, Concession 1 as a reserve for a Mississauga burial ground, around which the City of Belleville grew (Boyce, 1967). The railroad and steamboat access and close proximity to the city of Belleville has allowed the settlers to increase in prosperity in agriculture throughout the Township. The majority of the Townships inhabitants are descendants of the United Empire Loyalist that chose to settle in the area after the end of the Revolutionary War. The early settlers found interminable forests of timber with dense

undergrowth largely inhabited by bear and wolf. The soil is considered to be generally a fine quality of calcareous loam mixed with clay. With undulating surface and good climate the farms are well watered through abundant springs (H. Belden & Co, 1878).

Though typical of early settlements some settlers were already established in the area, and in Thurlow Township this included an established trading post set up by George Singleton and Israel Furguson with goods obtained from Kingston. Based on land grant information an influx of settlers arrived after 1789, many of whom came from Prince Edward County and moving up the Moira River concentrating near the settlement of Foxboro. John Taylor, considered to be the founder of Belleville, arrived in 1790 where he purchased Lot 5, Concession 1 (Boyce, 1967). Early days of the Township saw hardship for the settlers were compounded by the provisions that were required could not be found any closer than Kingston with the nearest grist mill at Napanee Creek, with a distance of forty miles. With the absence of oxen and horses the settlers had to carry their grain on their backs to be ground into flour. Louis Lotte, considered to be the only available civil engineer, surveyed and laid out the front concession in the year 1787. Settled by the families of Capt. John Singleton, Lieutenant Ferguson – an Indigenous Trader, David Vanderhyden, John and Alex Chisholm, and Capt. John Walter Myers prior to his move to Sidney. A grist mill and saw mill was built on the east bank of the Moira River by Myers in 1790 and considered to be the foundation of Belleville and the reason for the change of name to Myers' Creek (H. Belden & Co, 1878).

Running south-west through the Township the Moira River and its tributaries water the farms while emptying itself at Belleville into the Bay of Quinte and has many mills and manufactures located along its banks. The first dam was created by John Walter Myers at the mouth of the Moira River where Belleville stands. There are several apple orchards have been cultivated throughout the Township and were grown in such quantities as to become a quality export. Where the soil is good within the Township wheat can been grown with a yield of fifty bushels per acre with other cereals in proportion. Cheese of such quality as to command high market price is produced in the Township and exported in large quantities to the old world (H. Belden & Co, 1878).

Prior to 1798 the Townships of Thurlow and Sidney were united for municipal purposes, though at this year the Township of Sidney has records of holding their own town meetings. Generally the records of the township of Thurlow prior to 1862 have been lost with only a reference in Dr. Canniff's "History of the Settlement of Upper Canada" to the first town meeting held in Thurlow was noted as being in March 5th 1798 with a list of who was elected as the town officers with J.J. Farley noted as the first Reeve of Thurlow. Located in the village of Cannifton was the Town Hall made of brick of significant size as to "accommodate the wants of the ratepayers" (H. Belden & Co, 1878). The Township is considered to be approximately 65,800 acres in total with an assessed value of real and personal property of approximately $2,400,000 as of 1878 with a population of approximately 6,750, of which 1,334 are ratepayers. The significant amount of value in the Township from such few ratepayers suggests significant prosperity and enterprise of its inhabitants. Throughout the township the Common School Education system was used with comfortable school houses located at convenient points, all of which are under the supervision of experienced teachers. The importance of education was shown through the early settlements where the three 'R's' were taught as soon as the log houses were constructed and crops planted. Similarly, the spiritual and religious needs of the Township were met every few miles along the principal road (H. Belden & Co, 1878).

Roadways were created to run throughout the Township to all parts of the back country through the macadamizing process along with the Belleville and Grand Junction R.R. and the Moira Valley R.R to Tweed and Marmora. Named after the Earl of Moira the Moira River (earlier known as Sagouaska by the Indigenous people) flows rapidly through the Township and was used to float large quantities of saw logs from the north woods to the many mills along the banks (H. Belden & Co, 1878). The river Moira was used to drive mills, including the one founded by Capitan John W. Meyers in the 1790s with the Reeds following his lead in 1800 establishing a flouring mill on the 6th concession just below the rapids. Continuing to grow the mills, taverns, and settlers, the population grew to approximately 872 persons by 1818 with 240 houses, 16 stores, 7 taverns, 4 grist mills, 6 sawmills, 4 schools, as well as 2 doctors. The Township however lacked churches or meeting houses. Labour and goods costs varied from

other Townships with a 200 acre farm renting for 25 Pounds per year, a general labourer earning 30 Pounds per year, a blacksmith 5 Pounds per month, women hired at 5 shillings a week. For commodities a work horse might cost 20 Pounds and an acre of uncleared land costing 20 Pounds (Boyce, 1967).

The principal town within the Township was Cannifton, situated upon the river Moira, approximately four miles from Belleville and settled in approximately 1806 by the family of John Canniff who gave the town its name. A flouring mill was made by Canniff in 1812 using the river for power. The Town and surrounding Township was still covered in wilderness when his brother James Canniff, father of Dr. Canniff, settled further down the river and began to clear the forest. As the town of Belleville grew so did the surrounding villages. Flouring, saw, paper and woollen mills, tanneries, and other manufacturing establishments along the river with Corby's flouring mill and distillery becoming one of the largest institutions in the country. Within the village of Roslin, situated at the north east corner of the Township there were several stores as well as an extensive carriage manufactory of Wm. Hudson, the 1st Deputy Reeve of Thurlow. The village of Foxboro (formerly Smithville) is situated at the elbow of the river Moira in the western part of the Township approximately 8 miles from Belleville and founded by Wm. Ashley who purchased lot 2, concession 5 in 1824 and began in 1835 began manufacturing waggons that formed the nucleus of the village. The town grew to include an extensive cheese factory, other manufactories, stores, schools, churches as well as beautiful private dwelling houses (H. Belden & Co, 1878).

1.2.4 Bakelite Thermosets Plant Overview

Operating from 1949 to its closure in 1989 the Bakelite Thermosets plant located within the project area was responsible for the manufacturing of phenolic resins, hexamethylene tetramine, formaldehyde, epoxy resins and hardeners, supplied primarily to the forest, construction and automotive industries as well as producing household items and accessories including synthetic plastic-based appliances and dinner plates produced under different company names including Union Carbide Canada Limited. As a result of the manufacturing of Bakelite (polyoxybenzylmethylenglycolanhydride) material a variety of chemical by-products were released onto the site as well as temporarily stored in tanks and drums throughout the project area. Since its closure the structures associated with the plant have been demolished leaving only some cement foundations and a pump house located on the shore of the Bay of Quinte (EcoVue Consulting Services Inc, 2020, Intelligencer, 1989). During the early days of manufacturing the regulations regarding storage, disposal, and documentation of hazardous materials was not subject to universal specific regulations which resulted in an incomplete history of the events that took place within the plant and surrounding area.

The Intelligencer Newspaper operating in Belleville documented some of the goings on at the site and the subsequent attempts to remove the existing buildings and clean the contaminated soil. When new environmental regulations came into effect the Bakelite Thermosets Ltd. Company began to track and document their activities: "Bakelite Thermosets Ltd. Each day use some of the most hazardous chemicals used in industry, says a plant spokesman, but the company's emergency preparedness is so complete it is teaching other city industries how to properly handle dangerous goods in their plants" (Intelligencer, 1986). However, investigations by the Ministry of Environment after two incidents resulted in charges: "The Ministry of Environment's investigations branch charged Bakelite last year following incidents in June and October. The ministry charges that between June 2 and June 3, 1988 the company discharged, or caused to be discharged, phenolic waste into the Bay of Quinte that may have impaired the quality of the water. They say at the same time the company failed to report the spill. … Bakelite is also charged with failing to keep PCBs properly stored between Oct. 15, 1986 and May 2, 1988" (Intelligencer, 1989).

After the closure of the plant several attempts have been made to clean up the project area in order to return it from a brownfield abandoned area to a developable area. Conestoga-Rovers and Associates consulting engineers applied for Ministry and Municipal permission to remediate approximately 2000 cubic metres of soil that has been found

to be contaminated with unacceptable levels of phenolic resin residuals. The plan included building a berm around the plant area and the placing of an overlay of 40 to 60mm thick HDPE (plastic) liner to prevent water and soils from leaking in or out of the area. Additionally, soil from the area would be dug from the area where the plant had formerly stored barrels and drums and trucked across the site for remediation with the intention to replace it from where it was dug (Intelligencer, 1995). Further details regarding the actual extent of completion of the decontamination process are not specific as to how much of the plan was carried out.

The Union Carbide Inc. company claimed to have

> *removed more than 100 truckloads of contaminated soil and more than 500 drums of industrial waste from the property, excavated two lagoons and a settling basin and conducted environmental assessment of the marsh area. Meanwhile, Bakelite Thermosets commissioned a soil survey, removed storage tanks, emptied and removed asbestos from buildings, remediated several specific areas of land and has planned to clean up one additional area*.
>
> (Intelligencer, 1997)

Throughout the 1990s the project area was subject to a number of environmental assessments and had several parts of the facility were decommissioned. Extensive earthworks were carried out between 2005 and 2010 under the new property owner who had intention to develop the property including drainage and dredging of the central marsh as well as large portions of the east march. Between 2005 and 2008 the main factory and surrounding buildings and tanks were demolished with brick, mortar and other building debris were scattered around the footprint of the former plant and it has been determined that the previous earthworks conducted has resulted in significant disturbance (WESA, 2012).

In an attempt to move the property forward the City of Belleville Council agreed to purchase an 8.4 acre parcel of land within the larger property in addition to the acceptance of the donation of two adjacent parcels of land designated as provincially significant wetlands. The large property has seen “decades of remediation on the site to remove toxic compounds as ordered by the Ministry of Environment … the brownfield property was one of the worst biohazards on the Great Lakes (Intelligencer, 2022). It is noted that this agreement is no longer in place with the current owner (2255718 Ontario Ltd.) of the lands.

A summary of the available information of previous owners of the project area can been found within Appendix C attached to this report. Information has been edited for clarity.

1.2.5 Historical Mapping

Map 2 illustrates the location of the project area and environs as of 1878. The *Illustrated Historical Atlas of the Counties of Hastings and Prince Edward, Ont.* (H. Belden & Co. 1878) illustrates the project area on the northern shore of the Bay of Quinte. One lot of the project area - Lot 12, Broken Front Concession – is shown to be owned by L. Carscallen and three (3) structures are depicted within the project area. An unnamed historic road is illustrated within the northern edge of the project area and may correspond to the Old Kingston Road. A small stream course runs through the north-western top corner of the project area, continuing outside of the project area towards the Bay of Quinte.

The project area is in close proximity to early historic roads and historic structures; therefore, this suggest that there is potential for Euro-Canadian occupation or land use within the project area in the past.

1.3 ARCHAEOLOGICAL CONTEXT

1.3.1 Previously Registered Sites

According to the Ministry of Citizenship and Multiculturalism Archaeological Site Database (ASD) there are no (0) sites located within 1km of the project area and no previous reports document archaeological fieldwork conducted within or adjacent to the limits of the project area.

1.3.2 Current Land Use and Field Conditions

The project area is approximately 30.9 hectares in size and consists of existing vacant brownfield land and both evaluated and unevaluated wetland. The project area includes areas of significant disturbance as a result of previous use, as well as the previous and ongoing removal of contaminated soils, factory and associated buildings, holding tanks, vaults, railway, and smokestack. A large berm surrounds the area of the former plant location with only concrete foundation remaining. Several areas of soil mounds are found throughout the project area as well as areas where the soil has been removed down to bedrock. Three general marsh areas are located within the southern portion of the project area including two Provincially Significant wetlands and a central march associated with the former sludge lagoon. An area of gravel is located within the north-eastern corner of the project area formerly used as a parking area, as well as several gravel roadways. Overgrown areas of gravel are located throughout the project area. The project area is bounded on the north by existing railway, on the east by existing commercial properties, on the south by the Bay of Quinte and on the south by existing vacant land. Maps 7 to 10 illustrate the past land use. Plates 29-42 show the past land use and occupation.

A description of the disturbance found throughout the project area can be found within Appendix A attached to this report.

1.3.3 Physiographic Region

The study area is situated within the physiographic region of the Napanee Plain. The Napanee Plain is comprised of a flat-to-undulating plain of limestone that has been stripped of most of the overburden as a result of the movement of glaciers. The limestone which makes up most of the underlaying plain is based mainly on that of the Gull River and Bobcaygeon Formations, that is a counterpart of the smaller Carden plain and the larger Smiths Falls plain that is underlain by mainly sandstones and dolostones of the Beekmantown Group. Though most of the region the soil is only a few inches deep with some deeper glacial till occurring within the stream valleys and toward the north where the region borders on the Dummer Moraines. Additionally, there are a few scattered long, thin drumlins. Some depressions in the south have shallow deposits of stratified clay that provide better soil including the Amherst and Wolfe Islands. The lowest areas of the region are the valleys of the Salmon and Napanee Rivers that are cut into the rock plain to a depth of 50 to 100 feet. Throughout the region the original forest was most likely dominated with sugar maples along with white elm, silver and red maple as well as white cedar occupying the low ground. White spruce, white pine, hemlock, balsam fir, basswood, beech, and burr oak were also important trees. White cedar has begun to invade old pastures with hawthorne, hickory, burr oak, and black ash moving in as well. The plants of the pastures are common Canada blue grass, mullein, blueweed, and ground juniper (Chapman and Putnam, 1984).

1.3.4 Water Resources

The project area is located adjacent to the Bay of Quinte that drains into the larger Lake Ontario. The project area also includes an area of Provincially Significant Wetland and a central marsh area.

The project area is in close proximity to water suggest that there is potential for Pre-contact Indigenous occupation or land use within the project area in the past.

1.3.5 Environmental Assessment Information

Environmental investigation carried out by WESA has found twenty-two areas of environmental concern found throughout the project area with an estimated 50,000 cubic meters impacted. Throughout their assessment the layout of buildings related to the factory as well as various disposal areas, holding tanks, caustic lagoon, pre-treatment lagoon, and several fill areas have been identified. Appendix A reproduces a summary chart of their findings relating to the twenty-two areas of environmental concern.

BluMetric Environmental carried out a Phase 1 ESA that identified several areas of potential environmental concern (APECs) and potentially contaminating activities (PCAs) that are contained within the project area including:

- Acid and alkali manufacturing, processing, and bulk storage
- Adhesives and resins manufacturing, processing and bulk storage
- Chemical manufacturing, processing and bulk storage
- Gasoline and associated products storage in fixed tanks
- Importation of fill material of unknown quality
- Rail yards, tracks, and spurs
- Solvent manufacturing, processing and bulk storage
- Storage, maintenance, fueling, and repair of equipment, vehicles, and material used to maintain transportation systems
- Waste disposal and waste management, including thermal treatment, landfilling and transfers of waste, other than use of biosoils as soil conditioners
- Area of application of de-icing agent for purpose
- Storage of PCB waste
- Surface water collection

(BluMetric Environmental, 2023)

The results of the Phase 1 ESA have been included with the results of the Stage 1 Inspection results included as Map 14. The draft table of APEC's has been provided in Appendix B. It is noted that all activities relating to soil disturbance, contamination, and attempted removal of contaminants was completed by previous business use and owners prior to the transfer of ownership to 2255718 Ontario Ltd.

2.0 FIELD METHODS

2.1 FIELD VISIT

The Stage 1 Archaeological Background Study field visit was conducted on October 13, 2022 consisting of visual inspection and documentation. The project area was generally found to be disturbed through the removal of contaminated soil, the movement of contaminated soil throughout the project area, the creation of a large berm, the removal of holding tanks and drums, the removal of a railway line. Large areas of gravel and exposed bedrock were noted as well as areas of marsh. As part of the field visit the approximate locations of structures noted on the 1878 historic map were inspected to determine possible extent of disturbance to note if any remains could have survived. The structure located within Lot 13, Broken Front Concession appears to correlate to an area where ditches and vaults were used as part of the manufacturing plant and subsequently removed. The structure located at the corner of the project area within Lot 11, Concession 1 appears to correlate to the building and subsequent removal of a railway line that went to the factory. The final structure located within Lot 1, Broken Front Concession appears to correlate to within the Evaluated Wetland. Map 14 illustrates the results of the Stage 1 field visit. The project area was delineated through mapping, survey markers, and GPS.

Several aerial photos taken between 1948 and 2020 were used to determine the historical use of the property to note the overall effect of long term disturbance throughout the project area. Map 12 illustrates the results of the analysis of these aerial photos as well as previously mapped disturbance areas.

3.0 DOCUMENTARY RECORD INVENTORY

Table 2: Documentary Record Inventory

Type of Documentation	Description
Field Notes	1 page of field notes describing the daily site activities, weather, personal
Maps	1 map showing the project activities
Photographs	58 digital photographs showing the current conditions encountered during the field visit, and all notable features
Weather	Ideal for field visit

4.0 ANALYSIS AND CONCLUSIONS

4.1 STAGE 1 BACKGROUND RESULTS

As a result of the background study it was determined that the project area has potential for Indigenous and Euro-Canadian archaeological resources. A field visit was conducted consisting of visual inspection and documentation to assist with the determination of the extent of disturbance as identified through historical documentation and ongoing environmental assessment. As part of the environmental assessments that have been conducted throughout the project area it has been determined that several areas that were used to bury waste barrels and tanks that have since been dug up and removed as well as contaminated soils that contain elements of the demolished buildings, asbestos, and chemicals. Additionally, throughout the use of the property areas of caustic lagoons, sludge lagoons, ditches and vaults, roadways, a branch of CPR, areas of waste storage and disposal were located throughout the project area. Borehole analysis indicates that the disturbance is not located in a specific location but throughout the project area with much extending as far as bedrock and where areas of soil have been completely removed down to bedrock.

5.0 RECOMMENDATIONS

As a result of the Stage 1 Archaeological Background Study the project area was determined to have potential for both Indigenous and Euro-Canadian resources, however, the extent of disturbance throughout the project area is such that it meets the requirements under Standard 1.3.2 Features indicating that archaeological potential has been removed including major landscaping involving grading below topsoil, building footprints, and infrastructure development. Additionally, the MCM does not suggest or encourage carrying out any form of subsurface excavation where there may be a risk to health and safety, consequently the following recommendations are made:

1. Stage 2 Archaeological Assessment is not recommended for the portions of the project area where archaeological potential has been removed in accordance with Sections 1.3.2 of the Ministry of Citizenship and Multiculturalism Standards and Guidelines for Consultant Archaeologists (MCM 2011). These are illustrated on Map 15.

2. It is noted that the potential for archaeological resources within the Bay of Quinte waters has not been evaluated through this land-based archaeological assessment and is not considered cleared of Marine Archaeological Potential. Therefore, a Marine Archaeological Assessment is recommended prior to any alteration within this area (Map 15).

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

a. This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act,* R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

b. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act.*

c. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act.* The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act.*

d. The *Cemeteries Act,* R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act,* 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

e. Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

7.0 BIBLIOGRAPHY

ASI. (2019). *County of Simcoe Archaeological Management Plan.* Toronto, Ontario.

Beers, J.H & Co. (1877). *Illustrated Historical Atlas of the County of Ontario, Ont.* J.H. Beers & Co., Toronto.

BluMetric Environmental. (2021). *621 Dundas Street East, Osprey Shores Property, Belleville, ON Full Site Plan.* Kingston, ON.

Boyce, Gerald E. (1967). *Historic Hastings.* Hastings County Council, Belleville, Ontario.

Britton, Evan. (2020). *The East Bayshore Trail in Belleville, Ontario.* Available from: https://mappingspaceblog.wordpress.com/2020/02/18/the-east-bayshore-trail-in-belleville-ontario/

Chapman, L.J. & D.F. Putnam. (1984). *The Physiography of Southern Ontario (Third Edition).* Ontario Geological Survey, Special Report #2. Ontario Ministry of Natural Resources, Toronto.

City of Belleville. (1965). *The City of Belleville, Hastings County.* Ontario. *https://discover.cabhc.ca/uploads/r/community-archives-of-belleville-and hastingscounty/7/5/3/753e388218b6fa70ccb476df19cbf016f6045e1653a2873209a6ef1e4ce27567/City_of_Belleville_1965.pdf*

EcoVue Consulting Services Inc. (2020). *Planning Justification Report in support of an Official Plan Amendment to Redesignate Lands at 621 Dundas Street East, City of Belleville "Osprey Shores".* Peterborough, On.

Farewell, J. E. (1907). *County of Ontario Short Notes as to the Early Settlement and Progress of the County and Brief References to the Pioneers and Some Ontario County Men Who Have Taken a Prominent Part in Provincial and Dominion Affairs.* Gazette-Chronicle Press, Whitby.

Google Earth (Version 6.0.3.2197) [Software]. (2009). Available from http://www.google.com/earth/index.html.

Google Maps. (2012). Available from: http://maps.google.ca/?utm_campaign =en&utm_source=en-ha-na-ca-bk-gm&utm_medium=ha&utm_term =google%20maps.

Inquintenews. (2020). Bakelite Property Moves Forward Toward Redevelopment. Available from: https://inquinte.ca/story/bakelite-property-moves-forward-toward-redevelopment

Malette, Chris. (2013). Bakelite: The Back Story and Hope Ahead. Available from: https://www.intelligencer.ca/2013/06/07/bakelite-the-back-story-and-hope-ahead

Ministry of Public and Business Service Delivery. (2023). *Archives of Ontario*. Available from: http://www.archives.gov.on.ca/en/

Natural Resources Canada. (2013). National Air Photo Library. Ottawa, On.

Ontario Ministry of Citizenship and Multiculturalism (MCM). (2011). *Standards and Guidelines for Consultant Archaeologist.* (Programs and Services Branch: Culture Programs Unit, Toronto).

Ontario Heritage Amendment Act, SO (2005), Government of Ontario. (Queen's Printer, Toronto).

Ontario Planning Act, RSO (1990). Government of Ontario. (Queen's Printer, Toronto).

Simcoe County. *Simcoe County Interactive Mapping.* Available from https://maps.simcoe.ca/public/.

Sprague, Terry. (2022). City of Belleville Purchases Bakelite Property. Nature Stuff. Available from: https://naturestuff.net/web/city-of-belleville-purchases-bakelite-property/

Stojanovic Land Surveying. (2021). *Topographical Plan Part of Front range Lot 17, Being Part of Indian Subdivision Lot 17-9 Crown Lands Survey 51974, Township of Rama, County of Simcoe.* Toronto, Ontario.

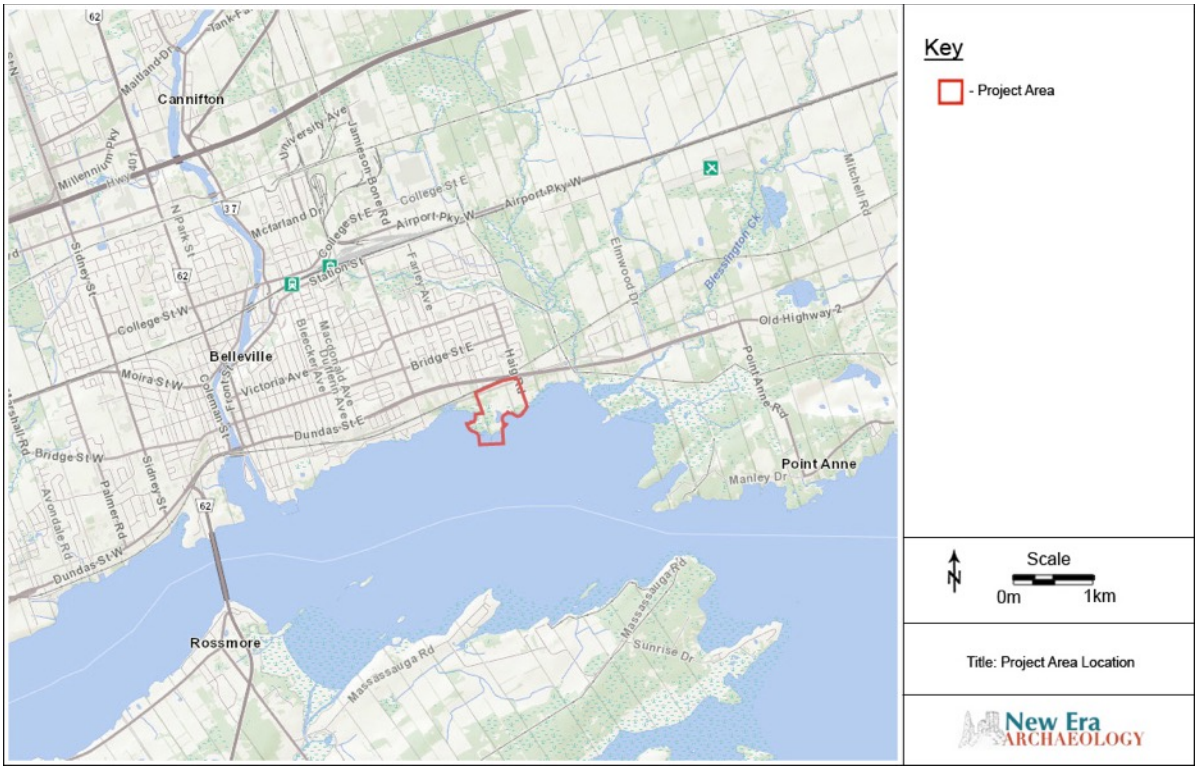
The Intelligencer (Belleville). (1989). Belleville's Bakelite to pay $100,000: Firm Fines for Mishandling Waste. Available from: https://vitacollections.ca/BellevilleHistory/details.asp?ID=2800793

The Intelligencer (Belleville). (1997). Union Carbide Lauded by MOE for Remedial Work at Bakelite. Available from: https://vitacollections.ca/BellevilleHistory/2800839/data

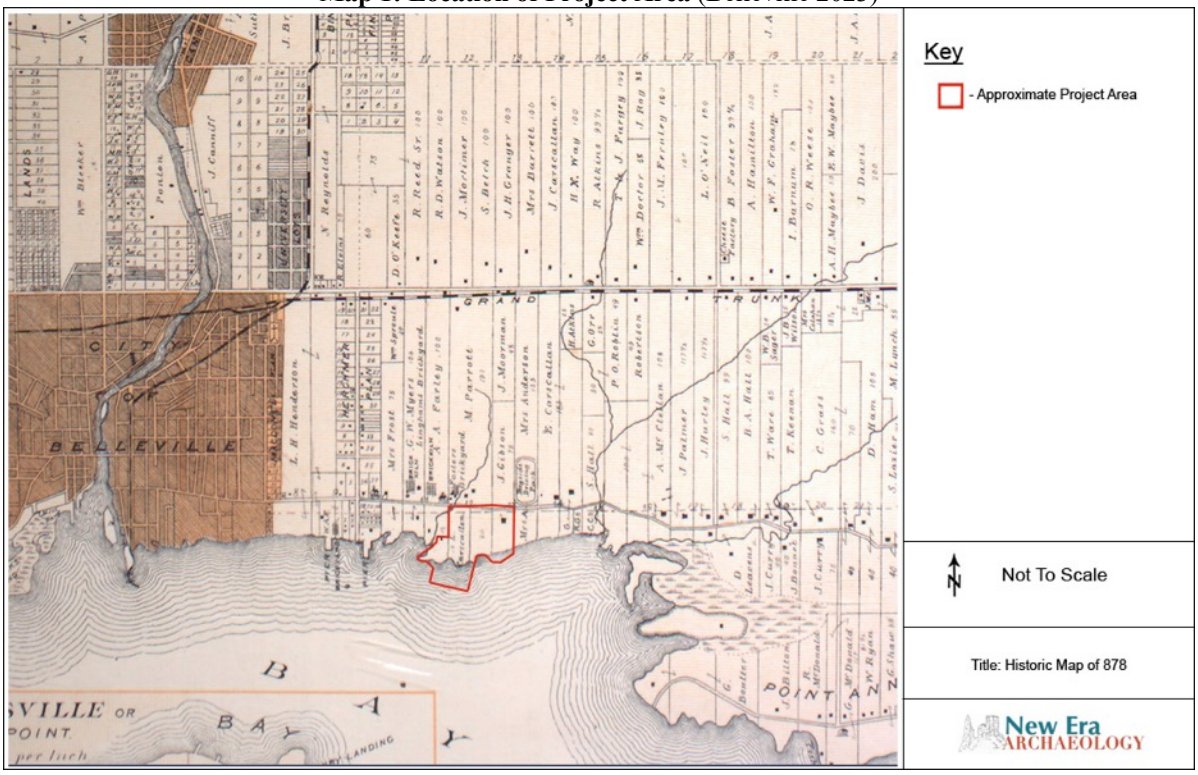
The Intelligencer (Belleville). (2004). Rexcan Building to Come Down. Available from: https://vitacollections.ca/BellevilleHistory/3392432/data

WESA. (2011). *Phase I Conceptual Site Model.* Kingston, On

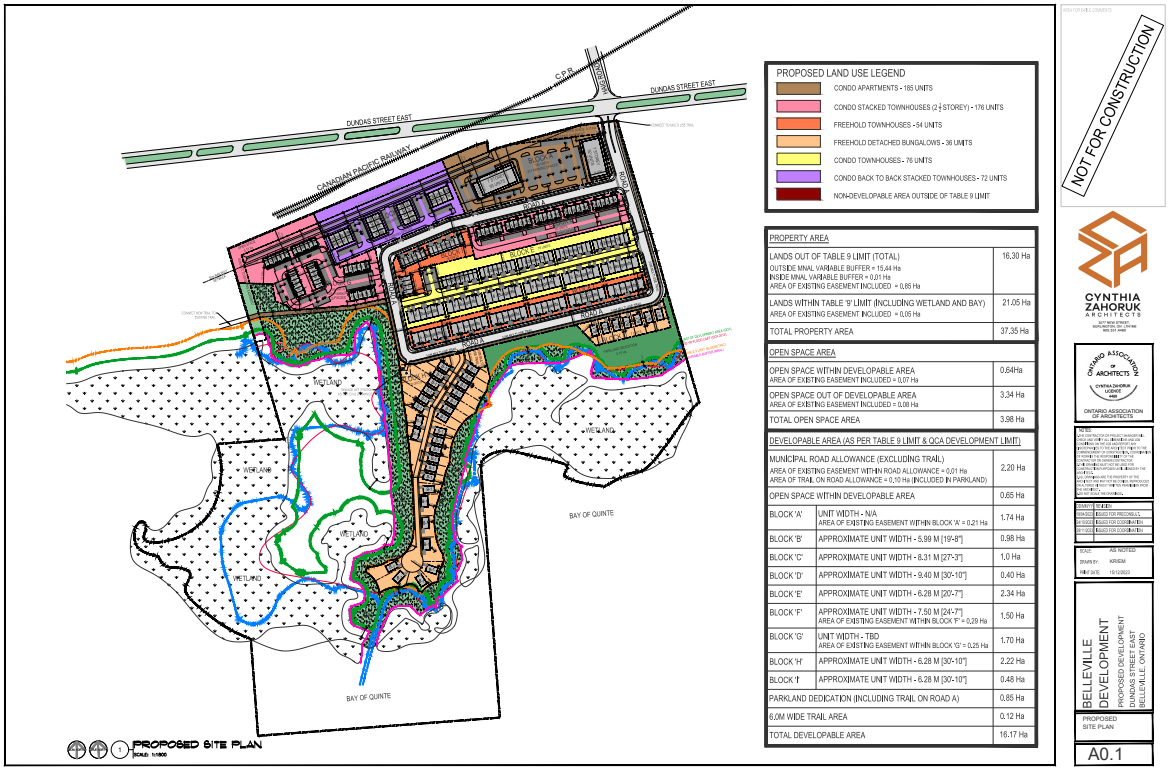
8.0 MAPS



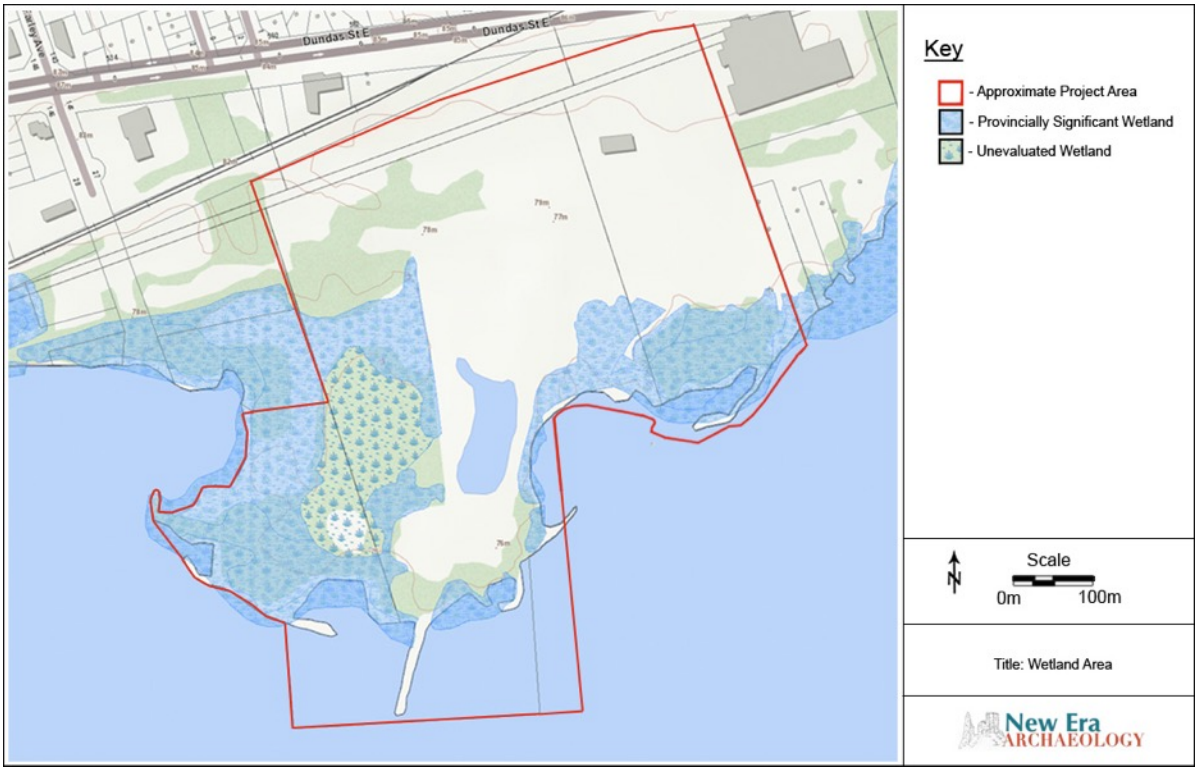
Map 1: Location of Project Area (Belleville 2023)



Map 2: Historic Map Illustrating the Environment Surrounding the Property Area (Beers & Co. 1877)



Map 3: Belleville Development Proposed Development Dundas Street East (Cynthia Zahoruk Architects 2023)

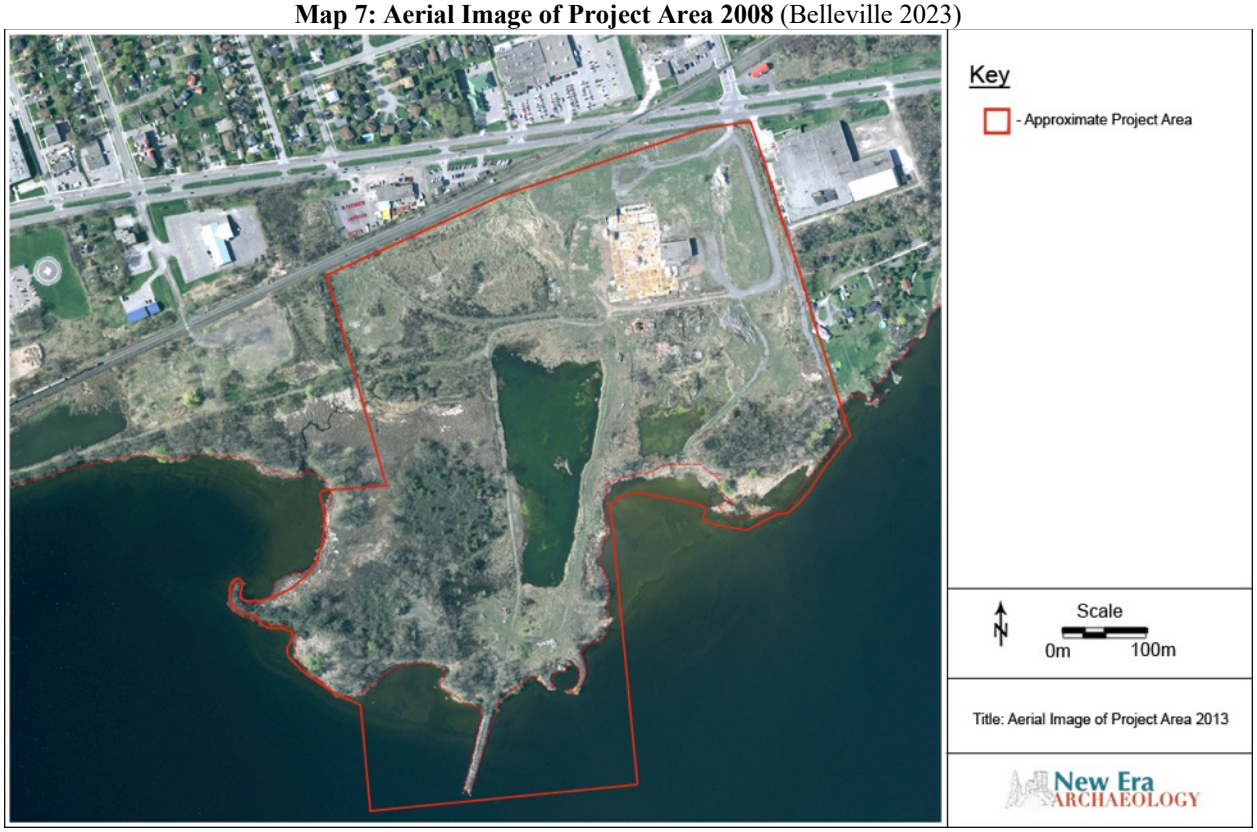


Map 4: Wetland Area (MNR 2023)

Map 5: Quinte Conservation Regulated Area (Quinte Conservation 2023)

Map 6: Phase I Conceptual Site Model (WESA 2011)

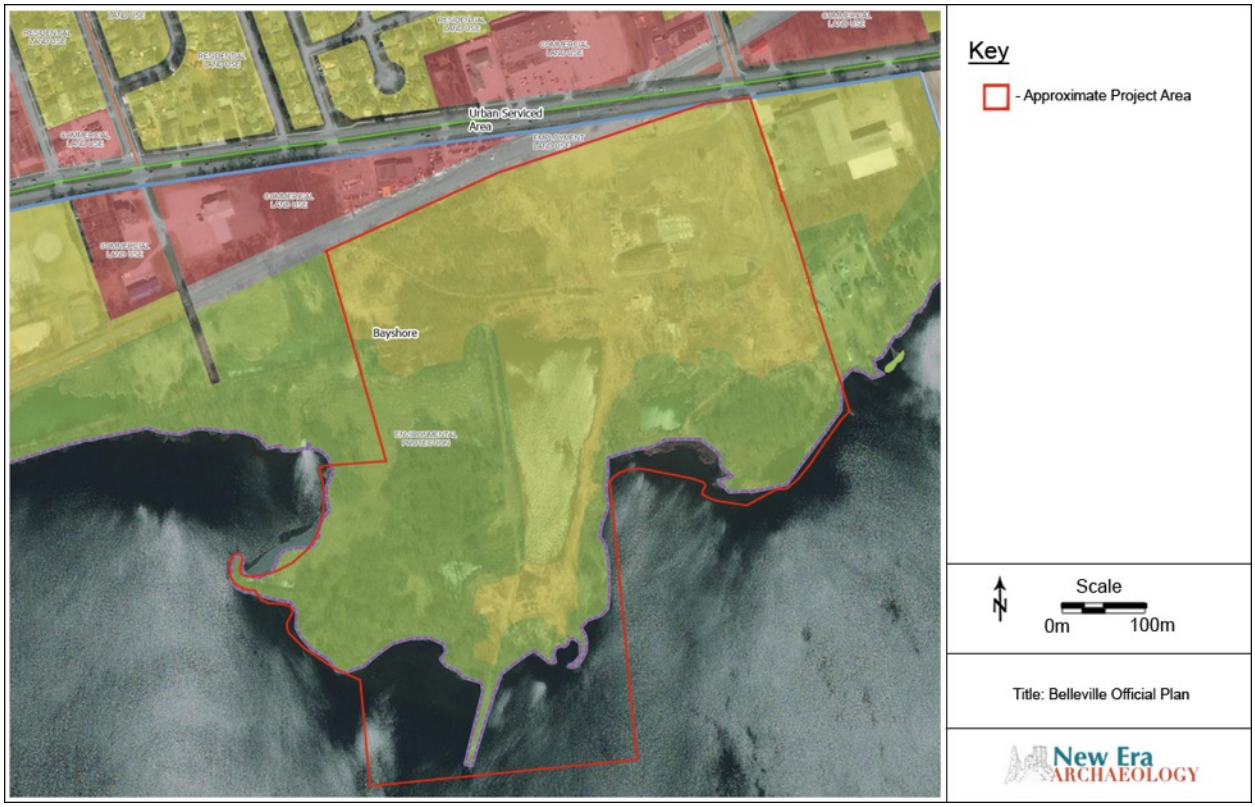
Map 7: Aerial Image of Project Area 2008 (Belleville 2023)



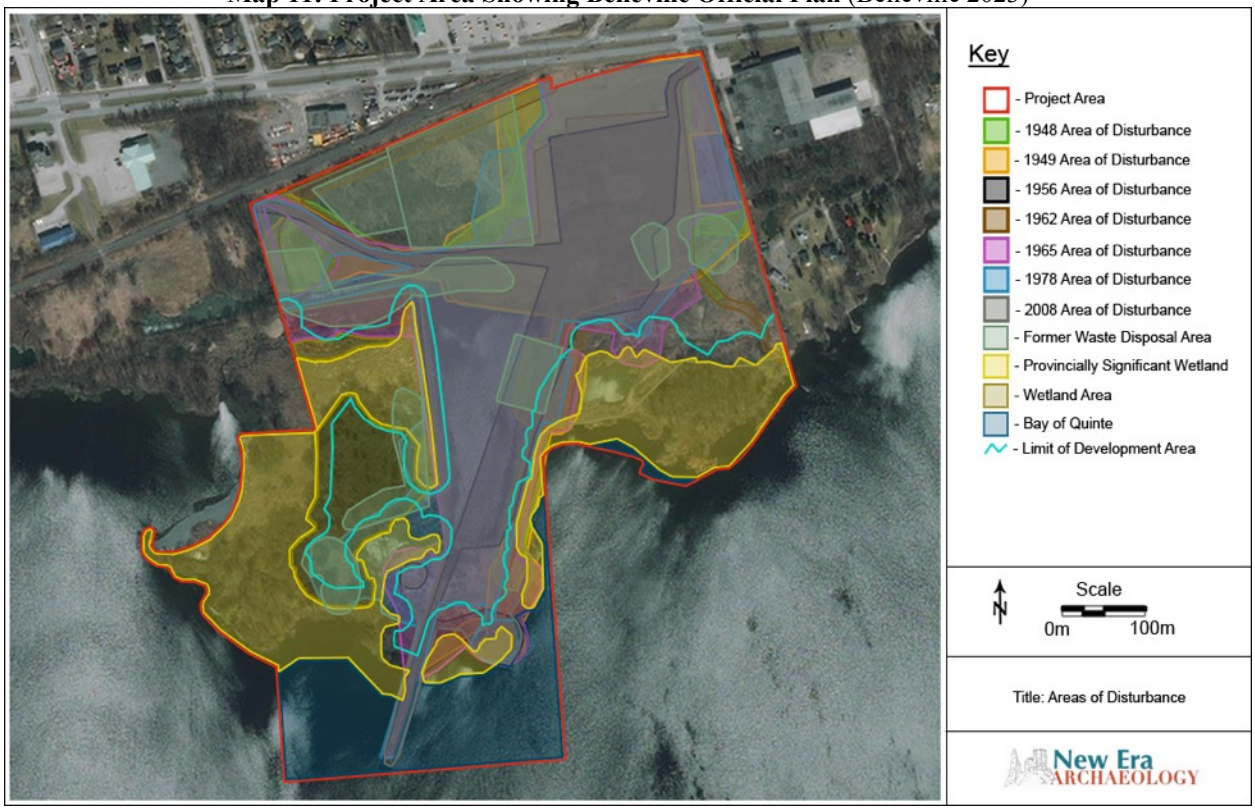
Map 8: Aerial Image of Project Area 2013 (Belleville 2023)

Map 9: Aerial Image of Project Area 2019 (Belleville 2023)

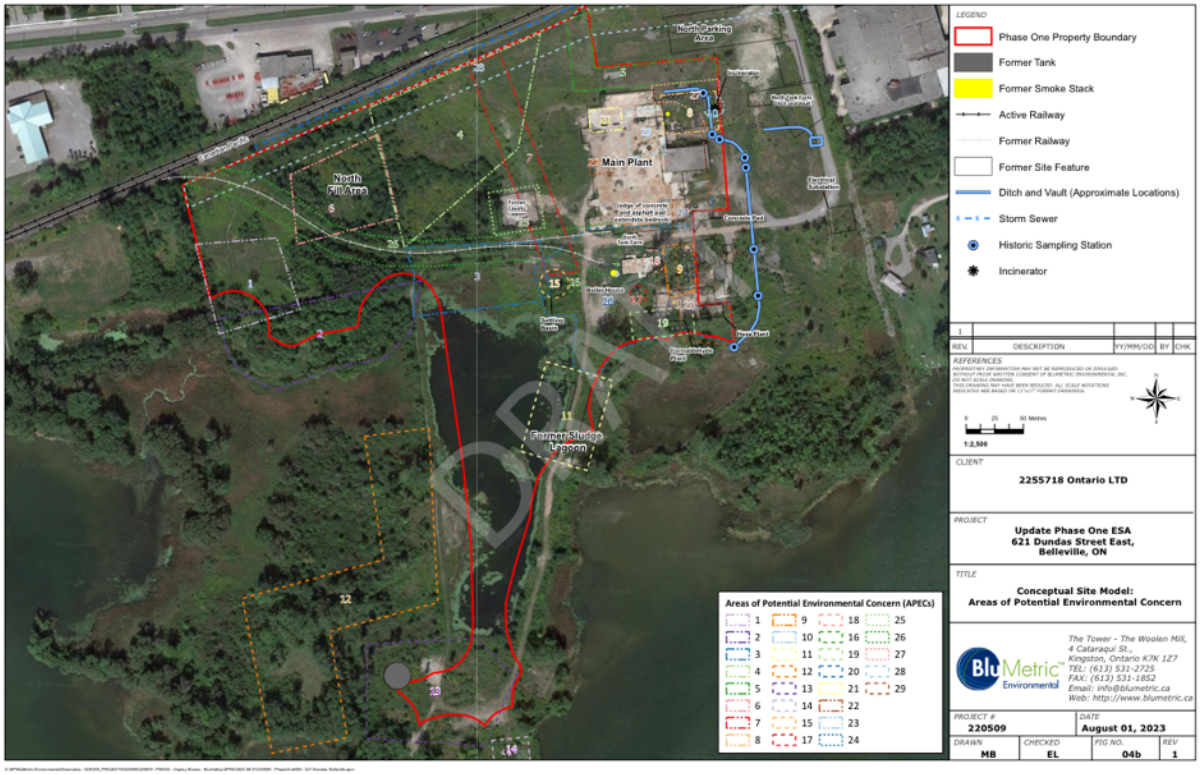
Map 10: Aerial Image of Project Area 2020 (Belleville 2023)



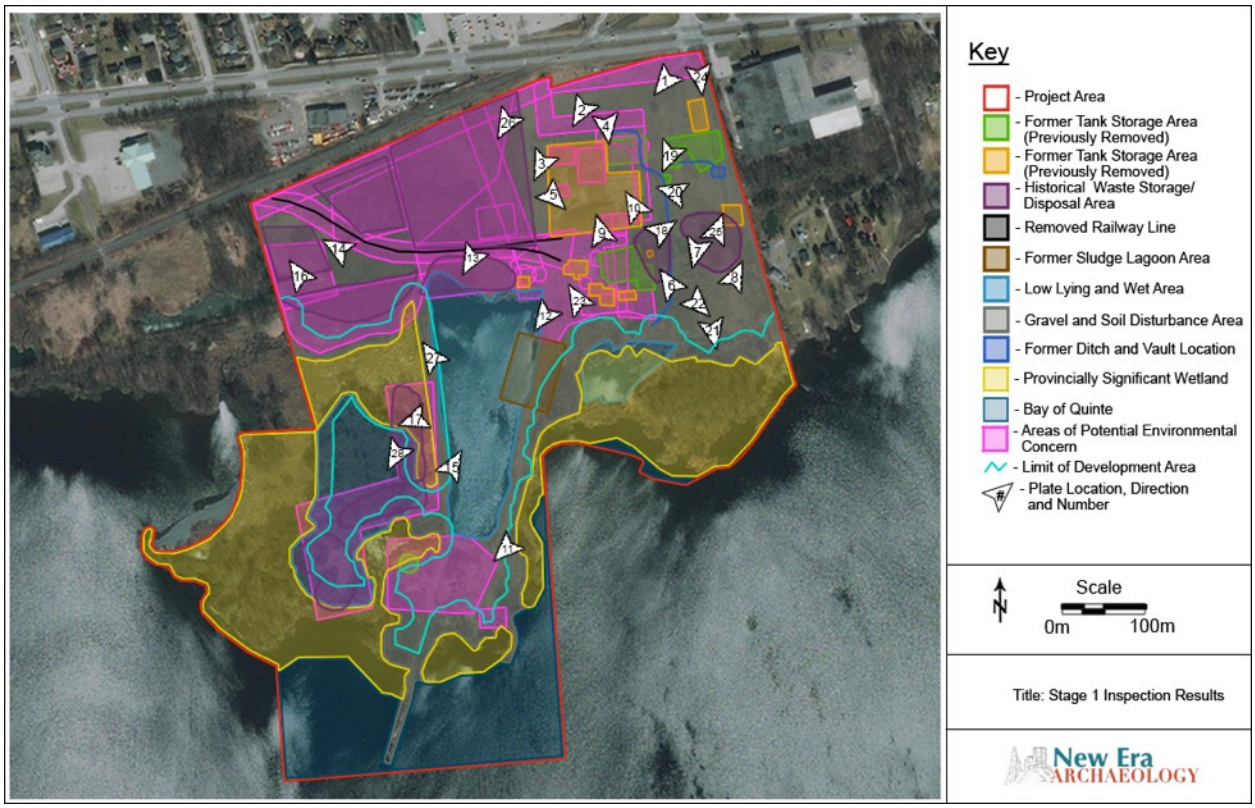
Map 11: Project Area Showing Belleville Official Plan (Belleville 2023)



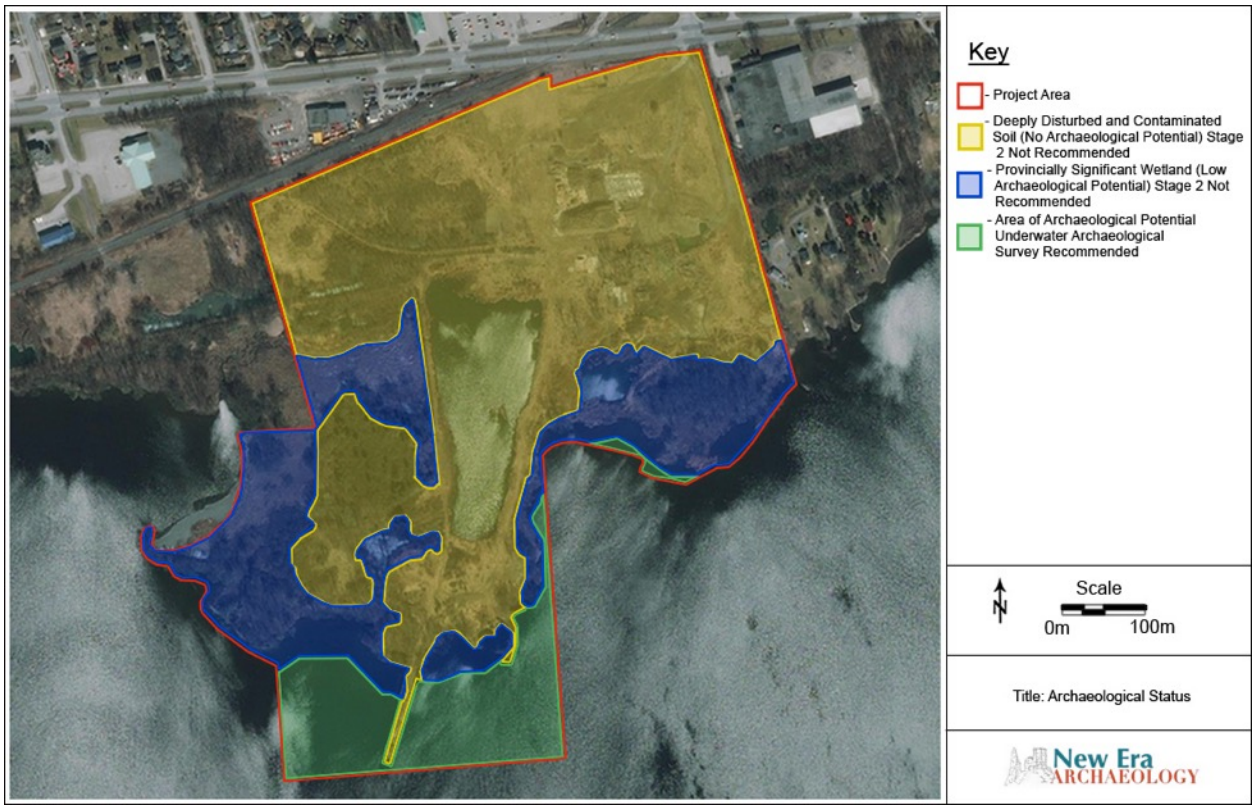
Map 12: Area of Disturbance within Project Area (Belleville 1948-2008)



Map 13: Site Plan of Mapped Disturbance (DRAFT) (BluMetric 2023)



Map 14: Stage 1 Inspection Results (Belleville 2023)



Map 15: Stage 1 Recommendations (Belleville 2023)

9.0 PLATES

Plate 1: Gravel Disturbance Area

Plate 2: Overgrown Gravel Area

Plate 3: Overgrown Disturbed Area

Plate 4: Building Removed Area with Dirt Mounds

Plate 5: Building and Asphalt Debris

Plate 6: Gravel and Exposed Bedrock Area

Plate 7: Exposed Bedrock from Soil Removal

Plate 8: Building Debris and Soil Mound

Plate 9: Building Debris

Plate 10: Building Foundation

Plate 11: Overgrown Gravel Area

Plate 12: Pond Area

Plate 13: Building Debris

Plate 14: Overgrown Gravel Area

Plate 15: Pond Area

Plate 16: Overgrown Gravel Area

Plate 17: Low-Lying and Wet Area

Plate 18: Overgrown Gravel Area

Plate 19: Gravel Roadway

Plate 20: Building Debris and Soil Mound

Plate 21: Wetland Area

Plate 22: Exposed Bedrock and Soil Mound

Plate 23: Overgrown Gravel Area

Plate 24: Gravel Roadway

Plate 25: Gravel Roadway

Plate 26: Overgrown Disturbed Area

Plate 27: Asphalt Area

Plate 28: Low-Lying and Wet Area

Plate 29: Aerial Image of the Project Area in 1948

Plate 30: Aerial Image of the Project Area in 1948

Plate 31: Aerial Image of the Project Area in 1956

Plate 32: Aerial Image of the Project Area in 1962

Plate 33: Aerial Image of the Project Area in 1963

Plate 34: Aerial Image of the Project Area in 1965

Plate 35: Aerial Image of the Project Area in 1978

Plate 36: Aerial Image of the Project Area in 1987

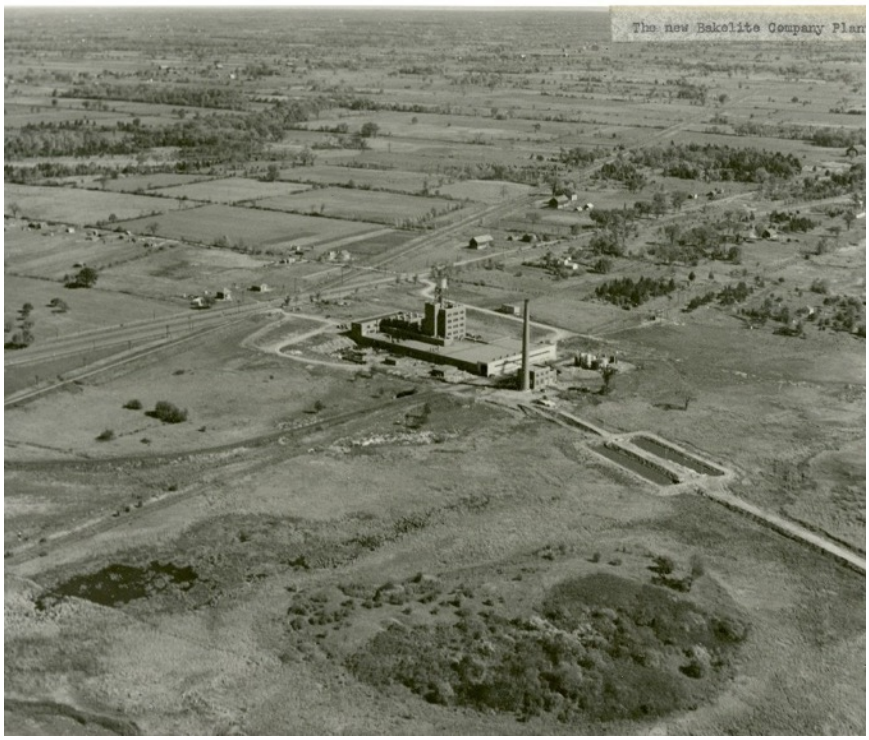


Plate 37: Bakelite Company Plant

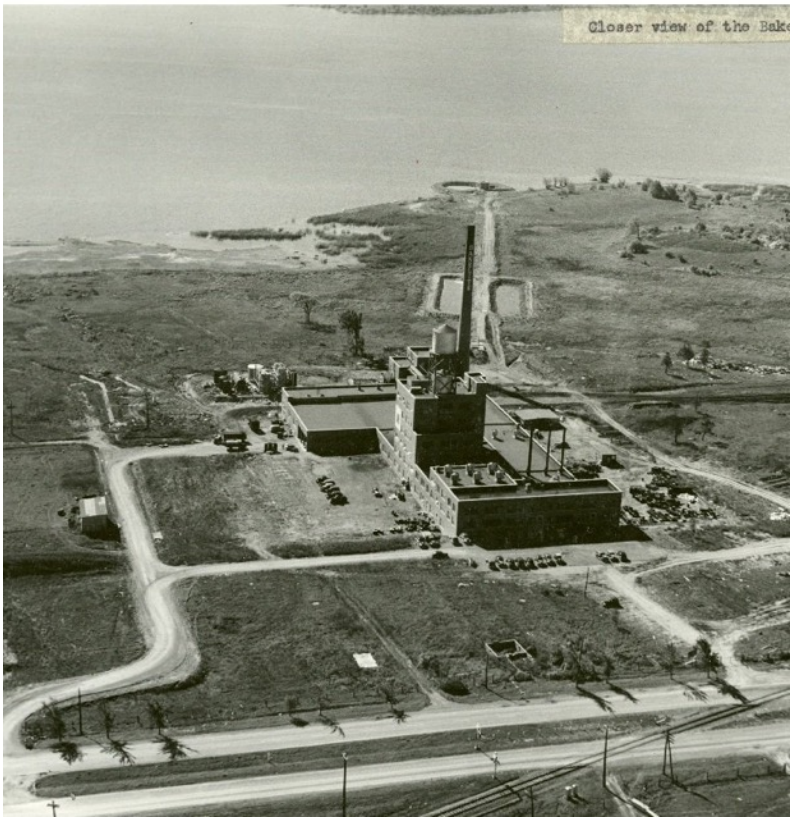


Plate 38: Aerial Image of the Project Area in 1987

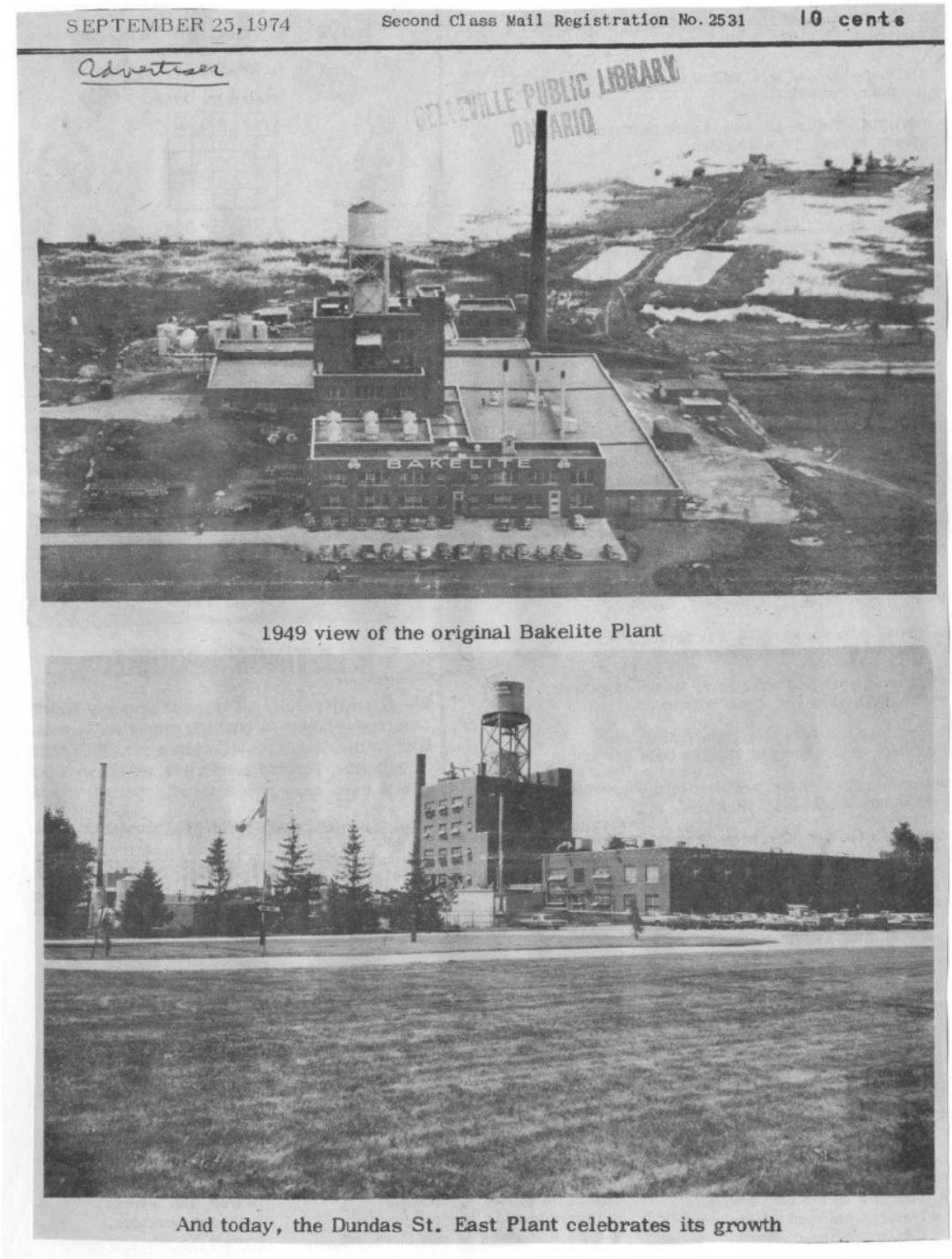


Plate 39: Newspaper Clipping of the Bakelite Plant

Plate 40: Aerial Image of the Project Area in c.1990

Plate 41: Aerial Image of the Project Area in 1948

Plate 42: Aerial Images of the Project Area in 2006 (WESA 2011)

Plate 43: Aerial Images of the Project Area in 2006 (WESA 2011)

10.0 APPENDIX A

Area of Concern (AEC)	Contaminants of Concern (COC) Identified in the Phase II Investigation	Contaminant Source and Assessment
AEC 1 - North Drum and Waste Disposal Area (NDWDA)	Soil Metals, PHC, BTEX, SVOC/PAHs Groundwater Metals, PHC, SVOC/PAHs, VOC Sediment Metals, PAHs Surface water None fond	• Buried drums, debris and stained soil were previously removed from this area. The soil impacts identified in this study constitute residual contamination. Residual impacts in this area were found at depth and along the bedrock interface. Soil impacts are well delineated. • Impacts in groundwater samples suggest that soils are acting as a source. TCE impacts were found in one well at the north extent of the area. This requires further investigation. • Impacts in surface sediments from the ditch likely represent historical impacts from surface run-off and possible effluent from the factory. Depth delineation was not carried out. These impacts do not appear to be migrating by dissolution or transport in surface water.
AEC 2 - Area C	Soil Metals, PHC, BTEX, PCB, SVOC/PAH Groundwater Metals Sediment Metals, PAHs, PCBs Surface water Metals	• Buried drums, debris and stained soil were previously removed from this area. The soil impacts identified in this study constitute residual contamination. Residual impacts in this area extended across most of the area and appear to be limited to the upper 1.2 m of overburden with exception of the vicinity of BH133 where they extend to approx. 1.8 mbgs. Soil impacts are well delineated. • Impacts in groundwater samples suggest that soils are acting as a source. However groundwater impacts appear to be limited to metals parameters. • Impacts in sediments from the southern toe of the area likely represent historical impacts from surface run-off and possible effluent from the factory. These impacts may be migrating westward by sediment transport and/or dissolution in surface water.
AEC 3 - Area D	Soil PCB Groundwater Metals Sediment Metals, PAHs, PCBs Surface water None found	• Buried drums, debris and stained soil were previously removed from this area. The soil impacts identified in this study constitute residual contamination. Residual impacts in this area extended across most of the area and appear to be limited to the upper 0.6 m of overburden. Bedrock is relatively shallow in this area. Soil impacts are well delineated. • Impacts in groundwater samples do not correspond with those parameters measured in soil. Groundwater impacts appear to be limited to metals parameters and may constitute naturally elevated concentrations. Additional sampling is recommended to confirm metals concentrations. • Impacts in sediments from the southern toe of the area likely represent historical impacts from surface run-off and possible effluent from the factory. These impacts may be migrating

		westward by sediment transport, but do not appear to be dissolving in surface water.
AEC 4 - Area E (west of plant) + Caustic Lagoon + Pre-treatment Lagoon	Soil PCB, SVOC/PAHs, PHC Groundwater Metals Sediment Not assessed Surface water Not assessed	• A caustic lagoon was located in the south end of this area. One of the main ditches that transmitted effluent from the plant to settling basins and lagoons ran north-south along the east edge of the area. This was a likely source of the soil impacts seen in the area. Further, demolition works by the previous owner has scattered a considerable amount of building debris across the surface of a large area surrounding the former factory footprint. The debris is confirmed to be impacted with PAHs and F4 PHCs. The lateral extent of debris is visually discernible and vertical impacts appear to me limited to the upper 0.6 m except at the southwest corner of the factory footprint where impacts appear to extend to at least 1.6 mbgs. Soil impacts are well delineated. • Groundwater impacts were found in one location in the northwest corner of this area and are associated with road salt. The source is possibly from run-off from Dundas Street or possibly from historical snow clearing in the north plant parking directly north of the factory footprint. Additional groundwater monitoring is recommended to confirm groundwater chemistry. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 5 - North Parking Area	Soil PHC Groundwater Metals Sediment Not assessed Surface water Not assessed	• The area appears to have historically been used for plant staff parking. Mr Sinclair maintained several storage trailers and a living trailer at the west end of the area in the late 2000s. An unknown volume of uncharacterized fill was imported and dumped along the western extent of parking area. Soil impacted with F4 PHCs was identified in BH49 directly north of the North Tank Farm. The impact is only partially delineated and appears to extend to a depth of 1.22 mbgs, but is not likely extensive because F4 PHCs are not typically mobile. It is likely that this impact is the result of a surface spill. Groundwater in the vicinity is not impacted indicated that soil is not acting as a source. • Groundwater impacts were found in one location in the northwest corner of this area and are associated with road salt. The source is possibly from run-off from Dundas Street or possibly from historical snow clearing in the north plant parking directly north of the factory footprint. Additional groundwater monitoring is recommended to confirm groundwater chemistry. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.

AEC 6 - North Fill Area	Soil PCB, Metals, PHC Groundwater None found Sediment Not assessed Surface water Not assessed	• Historically, the North Fill Area was an unused portion of the subject property. Between 2008 and 2009 sediments from the embayment and other uncharacterized fill were deposited within this area. Impacts in soil were found in one location (BH126). These impacts remain undelineated to the south, east and west, but appear to be limited to the upper 1.8 m of overburden/fill. Additional soil sampling is recommended to identify the extent of the impacts in this area. • Currently, the groundwater does not appear to be impacted in this area. If additional investigation work finds extensive soil impacts, additional wells should be installed along the north side of the rail spur to further assess the groundwater. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 7 - Main Plant + West Ditch	Soil SVOC/PAHs Groundwater None found Sediment Not assessed Surface water Not assessed	• The plant operated from the late 1940s to 1989. Areas directly adjacent to the plant were used for bulk chemical storage, and waste storage. There was also an open ditch running along the west side of the plant that transmitted effluent to the treatment lagoons. This was a likely source of the soil impacts seen in the area. Further, demolition works by the previous owner has scattered a considerable amount of building debris around the plant footprint. The debris is confirmed to be impacted with PAHs and F4 PHCs. The lateral extent of debris is visually discernible and is most prominent around the west, south and southeast edges of the plant footprint. Vertical impacts appear to be limited to the upper 0.6 m along the west, and increase to depths of up to 2.13 mbgs along the south and southeast edges. • Soil impacts are well delineated. • Soil impacts do not appear to be acting as a source for contaminant migration to groundwater as impacts were not found in that medium. Groundwater is not a concern. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 8 - North Tank Farm and Dowtherm heat exchanger	Soil SVOC/PAHs, PHC, BTEX Groundwater None found Sediment Not assessed	• The area historically housed several bulk tanks containing liquid resin, distillate, caustic and toluol. Several spills were reported to provincial regulators throughout the operation of the plant. Exact spill locations were not available. Soil impacts are consistent with the storage and spill or organic liquids containing PAHs, phenol and volatiles. Impacted soils appear to extend from surface to bedrock at a depth of 1.5 m. Soil impacts are well delineated.

	Surface water Not assessed	• Soils do not appear to be acting as a contaminant source since there were not impacts found in groundwater from surrounding wells. Groundwater is not a concern. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 9 - South Tank Farm	Soil Metals, SVOC/PAHs, PHC, BTEX, PCBs Groundwater Metals, SVOC/PAHs, BTEX, VOC. Sediment Not assessed Surface water Not assessed	• The area historically housed several bulk tanks containing toluol, caustic, phenol, methanol and anhydrous ammonia, formaldehyde. Several spills were reported to provincial regulators throughout the operation of the plant. Exact spill locations were not available. Buildings and tanks were removed prior to the site investigation. A considerable amount of debris remains on and around the pad. Soil appears to have been scrapped and the overburden surrounding the pad is 1.2 m thick or less. Soil impacts are consistent with the storage and spill or organic liquids containing PAHs, and volatiles. Impacted soils appear to extend from surface to bedrock at a depth of 1.2 m. Soil impacts are well delineated. • Soil contamination appears to be acting as a contaminant source since a similar contaminant profile was observed in groundwater downgradient of the area. Groundwater impacts were not extensive and are expected to attenuate naturally once the contaminant source (i.e. soil) is removed. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 11 - Boiler House South containment reservoir	Soil Metals, SVOC/PAHs, PHC, BTEX, PCBs Groundwater Metals, SVOC/PAHs, BTEX, VOC. Sediment Not assessed Surface water Not assessed	• The area historically held two small plants for manufacturing formaldehyde and hexamethylene as well as several bulk tanks containing formaldehyde, methanol and sulphuric acid. Several spills were reported to provincial regulators throughout the operation of the plant. Exact spill locations were not available. The building and tanks were removed by the previous owner, prior to the site investigation. A considerable amount of debris remains on and around the pad. Impacted soils appear to extend from surface to the bedrock interface at depths between 1.2 and 1.8 m. Soil impacts are well delineated. • Soil contamination appears to be acting as a contaminant source since a similar contaminant profile was observed in groundwater downgradient of the area. Groundwater impacts are not extensive and are expected to attenuate naturally once the contaminant source (i.e. soil) is removed. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.

AEC 12 - Formaldehyde Plant + Hexa Plant	Soil Metals, SVOC/PAHs, PHC, BTEX, PCBs Groundwater Metals, SVOC/PAHs, BTEX, VOC. Sediment Not assessed Surface water Not assessed	• The area historically housed several bulk tanks containing toluol, caustic, phenol, methanol and anhydrous ammonia, formaldehyde. Several spills were reported to provincial regulators throughout the operation of the plant. Exact spill locations were not available. Buildings and tanks were removed prior to the site investigation. A considerable amount of debris remains on and around the pad. Soil appears to have been scraped and the overburden surrounding the pad is 1.2 m thick or less. Soil impacts are consistent with the storage and spill of organic liquids containing PAHs, and volatiles. Impacted soils appear to extend from surface to bedrock at a depth of 1.2 m. Soil impacts are well delineated. • Soil contamination appears to be acting as a contaminant source since a similar contaminant profile was observed in groundwater downgradient of the area. Groundwater impacts were not extensive and are expected to attenuate naturally once the contaminant source (i.e. soil) is removed. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 14 - Area P + SE Plant Parking	Soil SVOC/PAHs Groundwater None found Sediment Not assessed Surface water Not assessed	• This area was historically used as additional parking and for drummed liquid and solid waste storage. Demolition works by the previous owner scattered a considerable amount of building debris around the plant footprint and across Area P. The debris is confirmed to be impacted with PAHs and F4 PHCs. The lateral extent of debris is visually discernible and is most prominent around the west, south and southeast edges of the plant footprint, extending into Area P. Vertical impacts appear to extend from surface to a depth of 1.5 m. Soil impacts are well delineated to the west, north and east. Additional delineation work should be completed south of BH63 and BH66 to confirm a clean edge. • Soil impacts do not appear to be acting as a source for contaminant migration to groundwater as impacts were not found in that medium. Groundwater is not a concern. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 15 - Area F (Former Drum Storage)	Soil Metals, SVOC/PAHs Groundwater Metals, PAHs Sediment Not assessed Surface water Not assessed	• The area was historically used for barrel and waste processing. Industrial waste also appears to have been buried in this area. Buried debris and stained soil were previously removed from this area. The soil impacts identified in this study constitute residual contamination. Residual impacts in this area were found along the inferred northern and southern extent of the previous waste excavation. In the southern part, PAH impacts appear to be limited to the upper 0.7 m of soil. On the north side of the area metals and PAHs appear to extend deeper, to a depth of 2.0 m. Soil impacts are well delineated, except to the east of BH 20 and BH 47, where additional sampling should be done to confirm a clean edge. • Soil contamination appears to be acting as a contaminant source since a similar contaminant profile was observed in

		groundwater downgradient of the area. Groundwater impacts were not extensive and are expected to attenuate naturally once the contaminant source (i.e. soil) is removed. • Sediment and surface water were not present at the time of this investigation and thus were not assessed.
AEC 16 - NE Substation (Adjacent to Area F)	Soil Metals, SVOC/PAHs Groundwater Metals, PAHs Sediment Not assessed Surface water Not assessed	• Area formerly housed an electrical substation that serviced the plant. The area was assessed in conjunction with Area F, above.
AEC 17 - West Marsh	Soil Not assessed Groundwater Not assessed Sediment Metals, PAHs, PCBs Surface water Metals	• This area is a Provincially Significant Wetland and remains largely undisturbed. The West Marsh receives much of the properties drainage, either directly or from a creek that runs from the Central Pond. Sediment contamination is likely the result of historical discharges of plant effluent or other overland spills. Current sources of impacts to the West Marsh include Area C and NWDWDA directly north. Contaminated sediments were found at the outflow of the West Marsh which would suggest that impacts are reaching the Bay of Quinte. A risk assessment is recommended for human health and ecological receptors to determine an appropriate contaminant management strategy. • Some dissolution may be occurring based on the metals impacts in surface water. Field filtered samples also had detectable metals concentrations. Total suspended solids were very low or not detectable.
AEC 18 - Central Marsh (and Pond)	Soil Not assessed Groundwater Not assessed Sediment Metals, PAHs, PCBs Surface water None found	• Historically this area received a considerable amount of effluent from the plant. In recent years it has been heavily disturbed and no longer resembles a marsh. Sediment contamination is likely the result of historical discharges of plant effluent or other overland spills. Current sources of impacts to the Central Marsh include Area D and settling basin directly north, and the former west lagoon on the Marsh's east bank. Contaminated sediments were limited to the immediate vicinity of these potential sources. The only outflow of the Central Marsh is currently to the West Marsh. • Contaminant dissolution in surface water is not a concern in this area and suspended solids were very low or not detectable.

AEC 19 - East Marsh	Soil Not assessed Groundwater Not assessed Sediment Metals, PAHs, PCBs Surface water None found	• Historically this area received some effluent from the plant and run-off from the east side of the property. In recent years it has been heavily disturbed, with significant areas being excavated to bedrock. Sediment contamination is likely the result of historical discharges of plant effluent or other overland spills. Current sources of impacts to the East Marsh include the south tank farm, Formaldehyde and Hexa Plants, the boiler house and areas P and F. Contaminated sediments were concentrated along the northern boundary of the marsh, downgradient of these potential sources. The East Marsh seeps through a berm and flows to the Bay of Quinte. • Contaminant dissolution in surface water is not a concern in this area and suspended solids were very low or not detectable.
AEC 20 - Former East and West Lagoon	Soil None found Groundwater Not assessed Sediment Metals, PCBs Surface water None found	• This area historically received effluent from the plant. PCB impacted sludge was previously removed from these lagoons and disposed off site. Sediment impacts constitute residual concentrations. Sediment impacts were addressed as part of the Central Marsh.
AEC 21 - Area A	Soil PHCs Groundwater Not assessed Sediment Not assessed Surface water Not assessed	• Historical reports suggest this area was a waste disposal area. Previous investigations and magnetic surveys did not identify contamination or debris. Soil impacts were found in one location near the bedrock interface. Observations and chemistry from shallower soils at this location and from adjacent locations did not indicate the impact was widespread. Further delineation is recommended in this area to confirm the extent of PHC impacts at depth. • Contaminated soil does not appear to be acting as a source since groundwater impacts were not measured in the vicinity.
AEC 24 - Pump House	Soil SVOC/PAHs, PHC, BTEX Groundwater Not assessed Sediment Not assessed Surface water Not assessed	• Historically the Pump House held diesel pumps to bring water to the Plant. There were two USTs outside the building that were removed by a previous consultant. No impacted soils were found in the former tank nest during this study. Impacts were found in very shallow soil (0 - 0.4 m) approximately 40 m west of the Pump House. The impacted area is not delineated but based on the contaminants found it is expected to be limited. The source is likely historical disposal of waste oil from the diesel pumps.
AEC 26 - Settling Basin	Soil PCB, Metals, SVOC/PAHs	• This area historically received effluent from the plant. PCB and PAH impacted sludge was previously removed from this area and disposed off site during decommissioning activities.

	Groundwater Metals Sediment Metals, PAHs, PCBs Surface water None found	Soil impacts constitute residual concentrations. Impacts extend from surface to the bedrock interface at 0.6 mbgs. Impacts are well delineated. • Soil contamination appears to be acting as a partial contaminant source since there is a partial overlap in contaminant profile observed in groundwater downgradient of the area. Groundwater impacts were not extensive and are expected to attenuate naturally once the contaminant source (i.e. soil) is removed. • Sediment impacts were addressed as part of the Central Marsh.
AEC 27 - Area S/W	Soil None found Groundwater Metals, BTEX, PHCs Sediment Not assessed Surface water Not assessed	• The historical use of the area is not well understood. Reports suggest it was used as munitions bunker and firing range during the first and possibly second World Wars. Aerial photos from 1965 show the existing clearing and some activity and disturbance. There is a large soil mound present at the west side of the clearing. Soil impacts were not found in the 6 boreholes tested. • The sodium and chloride concentrations in groundwater at MW10 are very elevated. It is possible that salt was stored or spilled in this area when the wharf was in use, which may account for the lack of re-vegetation in the clearing after several decades of un- use. PHC/BTEX impacts in the groundwater cannot readily be explained by the environmental data collected in this study. A source is not apparent. Further investigation is required in the area to identify and delineate the source of groundwater contamination.

11.0 APPENDIX B

BluMetric Environmental APEC Table (Draft)

APEC [1]	Location of APEC on Phase One Property	PCA [2]	Description	Location of PCA (on-site or off-site)	COPCs[3]	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 1a North Drum and Waste Disposal Area (NDWDA)	Northwest portion of property, north of the west marsh	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Magnetometer survey identified two areas of buried drums: drum contents included toluene, phenolics, some reason solids. 500+ drums removed and disposed off-site (Dames & Moore 95). Residual soil impacts remained; area backfilled with clean clayey soil from offsite (D&M 97).	On-Site	PCBs, VOCs, Metals, As, Sb, Se, Hg, PAHs, PHCs, BTEX, CPs, ABNs	Soil Groundwater
APEC 1b NDWDA	Northwest portion of property, north of the west marsh	30. Importation of fill material of unknown quality	Area backfilled with clean clayey soil from offsite after waste removal was undertaken (D&M 97).	On-Site	Metal (As, Sb, Se, Hg, Cr(VI)), PCBs, PAHs, PHCs, BTEX, pH, B-HWS (soil only)	Soil
APEC 2 Area C	Northwest portion of property	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Magnetometer survey and test pits found full and empty buried drums & resin debris; phenolics detected in soil, VOCs N/D; PAH, metals, PHCs, PCB, not tested (CRA 90). Large amounts of debris excavated/removed from area; no liquids found in drums; soil & fine debris replaced in excavation; PCB, VOC detected in soil (D&M Sep 11 95a). SSRA found no risk to human receptors from soil impacts and residual buried waste; cover or cap recommended to further reduce risk (UCC Apr 97). MW3, MW4: VOC including BTEX, Phenolics detected; tetraline, epichlorohydrin N/D; metals, PCBs, PAH not tested (S&P 99)	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater
APEC 3 Area D	Central portion of property, north of the central marsh	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Forty-three intact and damaged drums found; elevated PCB fluids; magnetometer survey and test pits found only buried resin; phenolics detected in soil, VOC, PCB N/D; metals, PAH, PHCs not tested (CRA 90). Very shallow soil ~0.2 m; peaty and organic; no staining or odours noted; toluene, xylene, low phenolics, low PCB detected; metals, PAH, not tested (S&P 99). Based on marsh testing, MOE suspects possible PCB source in Area D (MOE 08). Area disturbed during 06-08 earthworks by J Sinclair. Some waste and drums were landfilled/buried on the Property.	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHCs, BTEX, CPs, ABNs	Soil Groundwater
APEC 4 Area E	West of the former plant	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Magnetometer survey did not identify buried debris; resin debris and light staining found in three TPs; low phenolics detected; VOC N/D; metals, PCB, PAH, PHC not tested (CRA 90). PCB sediment dumped from central wetland.	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater
APEC 5a North Parking Area	North of the former plant	30. Importation of fill material of unknown quality	Imported fill for backfilling excavated soils. Uncharacterized fill imported by J. Sinclair (personal communication from Jon Morrish, MOE March 21, 2011). No information available for the source or quality of the imported material.	On-Site	Metal (As, Sb, Se, Hg, CN, Cr(VI)), PCBs, PAHs, PHCs, BTEX, pH, B-HWS (soil only)	Soil Groundwater
APEC 5b North Parking Area	North of the former plant	Other – Application of De-cing Agent for purpose of Pedestrian & Vehicular Safety under Conditions of Snow or Ice	De-icing icing agents may have been applied to the north parking area.	On-Site	SAR, EC (soil only), Na, Cl (ground water only)	Soil Groundwater
APEC 6 North Fill Area	Northwest corner of property	30. Importation of fill material of unknown quality	In 2005/2006, the central pond, central marsh, and east marsh drained to embayment area through ditches excavated by J Sinclair. Embayment sediments impacted with PCB above sediment criteria. Sediments excavated to bedrock and moved to North Fill Area at NW part of site; rock check berm removed (QCA 10). Several rounds of soil sampling by MOE and Bruce A. Brown Associates Limited (BBA) have found varying levels of PCB across the area (MOE 98, BBA 07, BBA 08). Sediments from embayment and other uncharacterized fill deposited here (QCA 10). Sampling has focused on PCBs. No other limited information on other PCOCs.	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater

APEC [1]	Location of APEC on Phase One Property	PCA [2]	Description	Location of PCA (on-site or off-site)	COPCs[3]	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 7 West Ditch	Extending south along west side of plant to the lagoons	Other: Surface water collection ditch	Slag and debris found in soil near rail shed; resins found in west ditch; phenols, metals detected in sediments from ditch; soil staining/odours along west wall of plant; BTEX, phenolics, metals detected in ditches inside the plant (S&P 99). Tanks: sulfuric acid, phosphoric acid, water, liquid resin, (Bakelite Tanks Survey, 81). Asbestos is likely present in soil and debris piles remaining on site (personal communication from Jon Morrish, MOE, March 29, 11). Ditch has been filled in a graded over during the extensive earthworks and building demolitions that occurred in the Mid-2000s by J Sinclair.	On-Site	VOCs, PAHs, ABNs, PHCs, BTEX, CPs	Soil Groundwater
APEC 8a	North Tank Farm Adjacent to the northeast of the former ain plant	1. Acid and Alkali Manufacturing, Processing, and Bulk Storage	Historical location of a tank farm and dowtherm heat exchanger. All tanks removed. Solvent and strong caustic (epichlorohydrin) odours; black staining; BTEX, phenolics, detected; epicholohydrin ND. Tetraline detected near Dowtherm equipment; low metals detected; PCBs not tested; possible Dowtherm constituents (VOC) (S&P 99). Tanks: liquid resin, distillate, caustic, toluol (Bakelite Tanks Survey 81) Tanks in north tank farm: 59 (Flaker resin), 29 & 30 (caustic), 28 (recovered toluol), 53 (BRL 1213), 54 (BRL 2557), 55 (SW 400), 3 (distillate), 31 (BLSA 3623), 32 (distillate), 33 (kraft liquor) Tanks 14, 19, 41, 42 not in service	On-Site	Metals (As, Sb, Se, Hg), VOCs, PHCs, BTEX, PAHs, ABNs, CPs, pH (soil only)	Soil Groundwater
APEC 8b		8. Chemical Manufacturing, Processing, and Bulk Storage		On-Site	VOCs, PHCs, BTEX, PAHs, ABNs, CPs	Soil Groundwater
APEC 8c		28. Gasoline and Associated Products Storage in Fixed Tanks		On-Site	VOCs, PHCs, BTEX, PAHs	Soil Groundwater
APEC 8d		51. Solvent Manufacturing, Processig, and Bulk Storage		On-Site	BTEX, VOCs	Soil Groundwater
APEC 9a	South Tank Farm Southeast corner of the former main plant building	1. Acid and Alkali Manufacturing, Processing, and Bulk Storage	Solvent odours, staining to depth; slag layer noted at 1.8mbg; VOC ND, low phenolics detected, tetraline ND, low metals detected; PCBs not tested (S&P 99). Tanks: toluol, caustic, phenol, formaldehyde, methanol, anhydrous ammonia (Bakelite Tanks Survey 81). MW1, MW2: VOC including BTEX, phenolics detected; epichlorohydrin, tetraline N/D; metals, PAH, PHCs, PCB not tested (S&P 99).	On-Site	Metals (As, Sb, Se, Hg), VOCs, PHCs, BTEX, PAHs, ABNs, CPs, pH (soil only)	Soil Groundwater
APEC 9b		8. Chemical Manufacturing, Processing and Bulk Storage		On-Site	VOCs, PHCs, BTEX, PAHs, ABNs, CPs	Soil Groundwater
APEC 9c		51. Solvent Manufacturing, Processing, and Bulk Storage		On-Site	BTEX, VOCs	Soil Groundwater
APEC 9d		30. Importation of fill material of unknown quality		On-Site	Metal, As, Sb, Se, Hg, CN, Cr(VI), PAHs, PHCs, BTEX,pH, B-HWS (soil only)	Soil Groundwater
APEC 10 Incinerator	East of the North Tank Farm	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners.	Industrial liquid waste incinerator, used for disposal of high strength phenolic liquids, CofA#42-5-96 (Apr 1972). (MOE Report, Aug 15 89). No other information available.	On-Site	PAH, ABNs, CPs	Soil Groundwater
APEC 11 Former East and West Lagoon	Central portion of property to the east of the Central Marsh	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners.	Became inactive in 1971 when pre-treatment lagoon was installed and discharge to sanitary began (D&M Mar 3 95). Sludge contained PCBs; confirmatory samples in East Lagoon found PCBs, phenol and VOCs in base and berms of East Lagoon (D&M Sep 11 95c). Testing of sludge in West Lagoon: PCBs, Ba, toluene (other VOCs detected above Table 1 & 9); PAH, Phenols, other metals not tested in the West Lagoon (D&M Sep 12 95). Confirmatory testing of base and berms of West Lagoon found residual PCB, VOC, Phenols (D&M Sep 11 96). Berms were re-graded (no details available). Significant earthworks from 2006-2008 by J Sinclair. Extensive earthworks / dredging 2005-2009	On-Site	Metals (As, Sb, Se, Hg), PAHs, PCBs, VOCs, PHC, BTEX, CPs, ABNs	Soil Groundwater

APEC [1]	Location of APEC on Phase One Property	PCA [2]	Description	Location of PCA (on-site or off-site)	COPCs[3]	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 12 Area A & B waste disposal	South portion of property	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners.	Former Union Carbide waste disposal area. **Area A:** Magnetometer survey did not identify buried debris; no debris or staining/odours noted in three test pits; no samples collected (CRA 90). Magnetometer and test pits did not identify significant buried debris; one soil sample tested for Metals, ABN, VOC, PCB, Phenols, glycol, formaldehyde - All N/D, low metals detected. MDLs mostly higher than current criteria (D&M Sep 11 95a). **Area B:** Magnetometer survey did not identify buried debris; no debris or staining/odours noted in three test pits; VOC, Phenolics, epichlorohydrin N/D (CRA 90). 200 drum carcasses, construction debris, metal debris removed from area; Confirmatory sampling conducted - results not available (D&M Sep 11 95a). No staining or odours noted in one test pit; PCBs N/D; VOC, metals, PAH not tested (S&P 99).	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater
APEC 13 Former Methanol Tank	South portion of property	8. Chemical Manufacturing, Processing, and Bulk Storage	No staining or odours noted in four test pits; VOCs, Phenolics N/D, low PCBs detected (0.01 ppm); metals, PAHs not tested (S&P, 99). Tanks: methanol tank (Bakelite Tanks Survey, 81).	On-Site	VOCs, Metals (As, Sb, Se, Hg), PCBs	Soil Groundwater
APEC 14 Pump House	South tip of the property	28. Gasoline and Associated Products Storage in Fixed Tanks	Two USTs 2,273 litre (500 gallon) removed by CRA; no staining or odours noted in surrounding soil; BTEX, TPH N/D; low lead detected (CRA 90). No staining or odours noted in two test pits; VOC, PCB N/D; metals, PAH, PHC not tested in soil (S&P 99). An additional tank containing stove oil 5,127 litres (1,128 gallons) was historically located in this area.	On-Site	Metals, PHC, PAH, BTEX	Soil Groundwater
APEC 15 Settling Basin	North of the Central Marsh	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Sludge impacted with PCBs, toluene, trace VOC; sludge removed as PCB waste; basin cleaned; concrete tested clean and backfilled with clean fill; no soil testing outside the concrete basin (D&M May 28 96). Solvent odours, black staining; toluene, xylene, dichlorobenzene, PCB detected in soil; metals, PAHs not tested (S&P 99). Settling basin removed during extensive earthworks in mid-2000s by J Sinclair.	On-Site	Metals, As, Sb, Se, Hg, PAHs, PHC, BTEX, PCBs, VOCs, CPs, ABNs	Soil Groundwater
APEC 16 Tank 27	Northeast of settling basin	28. Gasoline and Associated Products Storage in Fixed Tanks	A 910-litre (200 gallon) gasoline tank was located in this area, no other details available.	On-Site	PHCs, BTEX, PAHs	Soil Groundwater
APEC 17 Tank 40	South of boiler house	28. Gasoline and Associated Products Storage in Fixed Tanks	A 11,365 litre (2,500 gallon) bunker oil tank was located in this area, no other details available.	On-Site	PHCs, BTEX, PAHs	Soil Groundwater
APEC 18 Tank 22	East of boiler house	28. Gasoline and Associated Products Storage in Fixed Tanks	A 27,276 litre (6,000 gallon) light fuel oil tank was located in this area, no other details available.	On-Site	PHCs, BTEX, PAHs	Soil Groundwater
APEC 19 Formaldehyde Plant tank farm	South of formaldehyde plant	8. Chemical Manufacturing, Processing and Bulk Storage	Tanks positioned in two clusters as Tanks 23, 24, 25 and (50, 51, 52, 57), and Tanks 23, 24, 50, 51, 52 contained formaldehyde. Tanks 25 and 57 contained methanol.	On-Site	VOCs, PHCs, BTEX PAH	Soil Groundwater
APEC 20 Area of drainage	Southwest of main plant building	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Area of underground structures and open ditches conveying process cooling water and potentially liquid process wastewater to septic tank and bed, settling pond sludge lagoons and to the central and east marches.	On-Site	Metals (As, Sb, Se, Hg), PCBs, VOCs, PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater
APEC 21 Maintenance shop (including Tank 68)	Northwest part of former main plant building	28. Gasoline and Associated Products Storage in Fixed Tanks	Tank 68 is condensate (volume not specified) and Tank 67 is a hot water tank, so not of environmental concern. No additional information on types of activities occurring at this location were available.	On-Site	Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs, VOCs	Soil Groundwater

APEC [1]	Location of APEC on Phase One Property	PCA [2]	Description	Location of PCA (on-site or off-site)	COPCs[3]	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 22 PCB Waste Storage Area	Southwest part of former main building	Other – Storage of PCB waste	Verbal communication from MECP environmental officer Jon Morrish (Mar, 2011). There is no specific information available regarding the quantities and time frames of PCB storage.	On-Site	PCBs	Soil Groundwater
APEC 23 Indoor bulk chemical storage	Northeast part of former main building	1. Acid and Alkali Manufacturing, Processing, and Bulk Storage	Tanks 44, 45A, 45 are sulphuric acid and phosphoric acid. Tank 64 is labelled as 0909 – unknown substance, no information available.	On-Site	PHCs, BTEX, PAHs, VOCs, ABNs, CPs, pH (soil only)	Soil Groundwater
APEC 24 Indoor and outdoor bulk chemical storage	Southeast part of the former main building	8. Chemical Manufacturing, Processing and Bulk Storage	Tank 1 (1210), Tanks 2, 4 and 5 (BRL 1134). The substances within these tanks are unknown. Tanks 6, 48 & 49 not in service as of the 1981 tanks inventory list. Unknown as to what the tanks may have contained previously, or there after.	On-Site	PHCs, BTEX, PAHs, VOCs, ABNs, CPs, pH (soil only)	Soil Groundwater
APEC 25 Caustic Lagoon and Pre-treatment Lagoon	West of main plant building	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Pre-treatment Lagoon: no staining or odours noted; low phenolics, low PCBs, toluene, detected; epichlorohydrin N/D, tetraline, VOC suite, metals not tested (S&P 99).	On-Site	PCBs, VOCs, Metals (As, Sb, Se, Hg), PAHs, PHC, BTEX, CPs, ABNs	Soil Groundwater
APEC 26 Former Rail Spur	Northwest area of property	46. Rail Yards, Tracks and Spurs	A former rail spur located on the Phase One Property from the northwest corner to the north central area of the Site.	On-Site	Metals, PAHs, PHCs	Soil Groundwater
APEC 27a East ditch	Northeast area of property, near north tank farm	Other: Surface water collection ditch	Collected surface drainage from the north tank farm and the east adjacent property and directed the runoff southward to eventually discharge to the East marsh.	On-Site	VOCs, PAHs, ABNs, PHCs, BTEX, CPs	Soil Groundwater
APEC 27b East ditch				Off-Site		
APEC 28a Off-Site PCAs to the North	Entire northern boundary of the property	28. Gasoline and Associated Products Storage in Fixed Tanks	A Taxi company and automobile dealership is located northwest adjacent to the Phase One Property.	Off-Site	PHCs, BTEX	Groundwater
APEC 28b Off-Site PCAs to the North		46. Rail Yards, Tracks, and Spurs	A CP Rail line is located along the northern property boundary of the Phase One Property.		Metals (As, Sb, Se, Hg), PAHs, PHCs, BTEX	Groundwater
APEC 28c Off-Site PCAs to the North		52. Storage, Maintenance, Fueling, and Repair of Equipment, Vehicles, and Material Used to Maintain Transportation Systems	A Taxi company and automobile dealership is located northwest adjacent to the Phase One Property.		PHCs, BTEX	Groundwater
APEC 29a Off-Site PCAs to the east	Northeast edge of the RSC Property	1. Acid and Alkali Manufacturing, Processing, and Bulk Storage	Bakelite occupied the east adjacent property and completed manufacturing activities from 1940s to 1980s.	Off-Site	Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs, VOCs, ABNs, CPs	Groundwater
APEC 29b Off-Site PCAs to the east		2. Adhesives and Resins Manufacturing, Processing and Bulk Storage	Bakelite occupied the east adjacent property and completed manufacturing activities from 1940s to 1980s.		Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs, VOCs, ABNs, CPs,	
APEC 29c Off-Site PCAs to the east		8. Chemical Manufacturing, Processing and Bulk Storage	The east adjacent property had a northeast tank farm consisting of tanks for bulk storage of nonylphenol and finished resin product.		Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs, VOCs, ABNs, CPs	
APEC 29d Off-Site PCAs to the east		28. Gasoline and Associated Products Storage in Fixed Tanks	A diesel fuel storage tank was located south of the Northeast Tank Farm on the east adjacent property. South tank farm (APEC 9) extends off the RSC property to the east with additional bulk storage.		Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs	

APEC [1]	Location of APEC on Phase One Property	PCA [2]	Description	Location of PCA (on-site or off-site)	COPCs[3]	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC 29e Off-Site PCAs to the east		51. Solvent Manufacturing, Processing and Bulk Storage	Bakelite occupied the east adjacent property and completed manufacturing activities from 1940s to 1980s.		VOCs	
APEC 29f Off-Site PCAs to the east		58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners	Several areas of buried waste and debris located Off-Site. Previously identified on the east adjacent property as Area P Buried debris and subsurface staining and odours were observed; extent not found (S&P 99). Additionally, Area F on the east adjacent property was identified as containing buried wastes.		Metals (As, Sb, Se, Hg), PHCs, BTEX, PAHs, VOCs, ABNs, CPs,	

Notes:
[1] area of potential environmental concern means the area on, in or under a phase one property where one or more contaminants are potentially present, as determined through the phase one environmental site assessment, including through, (a) identification of past or present uses on, in or under the phase one property, and (b) identification of potentially contaminating activity.
[2] potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a phase one study area.
[3] when completing this column, identify all contaminants of potential concern using the Method Groups as identified in the "Protocol for the Assessment of Properties under Part XV.1 of the Environmental Protection Act, March 9, 2004, amended as of July 1, 2011, as specified below:
- ABNs, PCBs, Metals, Electrical Conductivity, SAR, CPs, PAHs, As, Sb, Se, Cr (VI), 1,4-Dioxane, THMs, Na, Hg, Dioxins/Furans, PCDDs/PCDFs, VOCs, B-HWS, Methyl Mercury, OCs, BTEX, Cl- , high pH, PHCs, Ca, Mg, CN-, low pH

12.0 APPENDIX C

Available Lot Ownership Information

Date	Lot 11	Broken Front Concession
	From:	To:
February 14, 1912	Crown	James J. Bleken Farley
March 29, 1912	Farley	Canadian Northern Ontario Railway Company
April 17, 1913	Farley	F. McDonald*
October 6, 1913	Alfred A. McDonold	The Campidld Lake Catian and Heslan Railway Company
October 8, 1938	Frederick McDonold	Alfred A. McDonald
January 26, 1939	King George VI	Fred S. Parrott
May 30, 1945	Pete Stabkouvich	Joseph Rew (Dew?)
September 11, 1945	Pete Stabkouvich	Henree Emmerson
September 20, 1945	Pete Stabkouvich	Joseph Sew?
May 3, 1947	Parrott	Bakelite Company Canada Limited
June 1, 1959	Bakelite Company Canada Limited	Union Carbide Canada Limited
December 1, 1976	UCCL	345501 Ontario Limited
November 6, 1978	UCCL	Bakelite Company Canada Limited
January 6, 2006	Bakelite Company Canada Limited	Thermosets Limited
December 29, 2006	Thermosets Limited	Sinclairs Landing Inc.
January 12, 2011	Sinclairs Landing Inc.	2255718 Ontario Inc.

Date	Lot 12	Broken Front Concession
	From:	To:
March 9, 1908	Crown	Rachel Redner
October 19, 1910	Redner	King George 5th
December 2, 1910	Redner	The Canadian Northern Ontario Railway Company
April 8, 1941	King George 5th	Fred S. Parrott
May 5, 1947	Parrott	Bakelite Company Canada Limited
September 8, 1947	CNOR	Bakelite Company Canada Limited
Jan 1, 1959	Bakelite Company	Union Carbide Canada Limited

December 1, 1976	UCCL	345501 Ontario Limited (Bakelite Thermoset Limited)
December 29, 2006	Thermosets	Sinclairs Landing Inc.
January 12, 2011	Sinclair Landing Inc.	2255718 Ontario Inc.

Date	**Lot 13 W**	**Broken Front Concession**
	From:	**To:**
June 10, 1833	Crown	William & Ralph Gibson
Oct 8, 1853	Gibson's	Henry Fanning (West Half)
Oct 8, 1853	Gibson's	William Gibson (East Half)
April 4, 1856	Fanning	B. Young
Jan 18, 1854	Young	Ralph Gibson
September 20, 1865	Ralph Gibson	Robbert Gibson, William Gibson
January 23, 1911	Gibson	The Canadian Northern Ontario Railway Company
July 23, 1934	Gibson	William Burton Gibson
March 2, 1947	Gibson	Bakelite Company Canada Limited
September 8, 1947	CNORC	Bakelite Company Canada Limited
January 1, 1959	Bakelite Company Canada Limited	Union Carbide Canada Limited
December 1, 1976	UCCL	345501 Ontario Limited
November 6, 1978	UCCL	Bakelite Company Canada Limited
January 6, 2006	Bakelite Company Canada Limited	Thermosets Limited
December 29, 2006	Thermosets Limited	Sinclairs Landing Inc.
January 12, 2011	Sinclairs Landing Inc.	2255718 Ontario Inc.

Date	**Lot 13**	**Concession 1**
	From:	**To:**
June 30, 1949	Corporation of the Township of Thurlow	Bakelite Company Canada Limited
January 1, 1959	Bakelite Company Canada Limited	Union Carbide Canada Limited
December 1, 1976	UCCL	345501 Ontario Limited
November 6, 1978	UCCL	Bakelite Company Canada Limited
January 6, 2006	Bakelite Company Canada Limited	Thermosets Limited
December 29, 2006	Thermosets Limited	Sinclairs Landing Inc
January 12, 2011	Sinclairs Landing Inc.	2255718 Ontario Inc.

Date	**Water Lots**	
	From:	**To:**
January 22, 1948	Crown	Bakelite Company Canada Limited
March 26, 1952	Crown	Bakelite Company Canada Limited

June 1, 1959	Bakolite Company Canada Limited	Union Carbide Canada Limited
December 1, 1976	UCCL	345501 Ontario Limited
November 6, 1978	UCCL	Bakelite Thermosots Limited
December 29, 2006	Bakelite Thermosots Limited	Sinclair Landing Inc
January 12, 2011	Sinclair Landing Inc.	2255718 Ontario Inc.

Date	**Road Allowance**	
	From:	**To:**
January 30, 1949	Corporation of the Township of Thurlow	Bakelite Company Canada Limited
January 1, 1954	Bakelite Company Canada Limited	Union Carbide Canada Limited
December 1, 1976	UCCL	345501 Ontario Limited
November 6, 1978	UCCL	Bakelite Thermosets Limited
January 6, 2006	Bakelite Thermosets Limited	Thermosets Limited
December 29, 2006	Thermosets Limited	Sinclairs Landing Inc.
January 12, 2011	Sinclairs Landing Inc.	2255718 Ontario Inc.

*Names Transcribed as shown