MASTER PLAN OF ARCHAEOLOGICAL RESOURCES
CITY OF KINGSTON

TECHNICAL REPORT

Submitted to:

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EXECUTIVE SUMMARY

An Archaeological Master Plan with a comprehensive potential model is the latest response to an old problem — how to deal with evidence of the past that is, for the most part, not visible because it is buried underground (or under water). The City of Kingston has a long cultural history that begins approximately 10,000 years ago and continues to the present. The archaeological sites that are the physical remains of this lengthy settlement history represent a fragile and non-renewable cultural heritage resource.

The common response of “out of sight, out of mind,” however, is no longer possible in today’s political and legal climate. Recent court cases involving Aboriginal land claims, not to mention stop-work orders issued when human remains are uncovered on a development site, are but two examples of the ways in which archaeological resources affect property owners and the municipalities in which they are located. Policy initiatives, such as those found in the report of the Ipperwash inquiry, recommending that every municipality in Ontario adopt a master plan for archaeological resources so as to identify their flashpoints and put in place a way of dealing with them before they happen, coupled with more stringent heritage resource conservation policies in the Provincial Policy Statement (Planning Act), the Ontario Cemeteries Act, and the Ontario Heritage Act, require municipalities to more wisely plan for the conservation of archaeological resources. In other words, cities such as Kingston have no choice but to address archaeology, preferably by preparing archaeological master plans.

The good news is that such plans are an excellent tool for municipalities. First, they tell you what has been found by providing an inventory and evaluation of known archaeological resources. Second, they tell you where undiscovered archaeological resources are most likely to be found by identifying areas of archaeological resource potential. Both of these inventories are mapped onto the City’s GIS database, making them very accessible to staff and the public alike. Third, they tell you what to do with both the known and probable places in which archaeological resources are likely to be encountered, by providing the step by step process for managing such resources. Fourth, they structure this advice within a clear, logical framework based on an historical analysis of the city and using international best practices for preparing cultural resource management plans. In this way, they are effective and robust, able to withstand challenges and suited to updating as new information emerges.

Once an Archaeological Master Plan is in place, the risk of unfortunate surprises occurring (such as disturbing a burial site) is significantly reduced, and public awareness of archaeological resources considerably increased. Property owners, developers, and prospective buyers know beforehand whether they will have to conduct archaeological investigations if they want to develop or redevelop a site. Citizens will know their community’s history better and, it is hoped, appreciate its heritage more fully. And with more cultural heritage resources identified and interpreted within Kingston, tourists will have a greater selection of places to visit. Indeed, careful planning for the conservation and interpretation of cultural heritage resources will promote economic growth and offer opportunities for improving local quality of life.

The preparation of such a plan is particularly crucial for the City of Kingston, which underwent amalgamation eleven years ago. It is anticipated that the population of the municipality will increase by approximately 12% over the next 20 years.

In recognition of these facts, the City of Kingston retained Archaeological Services Inc. (ASI), in association with Carl Bray and Associates Ltd., to prepare the master plan.

The Archaeological Master Plan of the City of Kingston has three major goals:
1) the compilation of inventories of registered and unregistered archaeological sites within the City and the preparation of an overview of the area's settlement history as it may be expected to pertain to archaeological resources;

2) the development of an archaeological site potential model, based on known site locations, past and present land uses, and environmental and cultural-historical data; and

3) a review of the current federal, provincial, and municipal planning and management guidelines for archaeological resources, as well as the identification of a new recommended management strategy for known and potential archaeological resources within the City.

To date, more than 90 archaeological sites have been registered within the City, which date from the earliest period of human occupation in the region 10,000 years ago through to the nineteenth and early twentieth centuries.

In order to understand the manner in which additional, as yet undocumented archaeological sites may be distributed within the City, an archaeological potential model was developed using the City’s Geographic Information System (GIS) to map various sets of information as separate, but complementary, layers of spatial data on 1:2,000 scale digital base maps. The zones of pre-contact archaeological potential were determined only after a detailed consideration of the past natural and cultural environments in the City. The zones were then based on distance to various forms of potable water, soil drainage characteristics and slope attributes. Examination of the early historic mapping of the City, together with consideration of the basic historical themes that have been most influential in the development of the historic core of the City and the former townships of the City, led to the identification of areas of early settlement, commercial, industrial and transportation development and the mapping of these zones as areas of historic archaeological potential.

The final task in the analysis was to eliminate areas where previous development has resulted in extensive landscape disturbance. The remaining lands falling within the zones of pre-contact and historic potential encompass approximately 66% of the total landmass of the City. The tool that the City currently uses to require assessments, provided by the Ministry of Tourism and Culture, currently captures about 88% of the City.

The role of the municipality in the conservation of these resources is crucial. Planning and land use control are predominantly municipal responsibilities and the impact of municipal land use decisions on archaeological resources is significant, especially since municipally-approved developments constitute the majority of land disturbing activities in the Province. The primary means by which these resources may be protected is through the planning application process. Furthermore, review of development applications for archaeological resource concerns are made directly by the City. In recognition of these facts, the final task of the Master Plan research was the identification of a series of policies for incorporation in the Official Plan and of practices within the development applications process that will ensure the conservation of these valuable cultural heritage resources within the overall process of change and growth in the City.

The results of this work were compiled in two reports entitled Master Plan of Archaeological Resources City of Kingston, Technical Report and Planning for the Conservation of Archaeological Resources in the City of Kingston, both dated March 2010.

The major recommendations resulting from this study include:

- That the policies attached as Appendix A be incorporated into the Official Plan.
• It is recommended that the archaeological potential and Archaeologically Sensitive Area (ASA) mapping be used in determining requirements for archaeological assessments.

• It is recommended that the Planning and Development Department work with City departments to establish protocols that ensure that in all appropriate circumstances, construction projects undertaken by developers, ratepayers and the City of Kingston that may impact archaeological resources on public lands (e.g., trail, playground, playing field, public washroom, parking lot construction, road widening/extension, trunk sewer and watermain construction, stormwater management facility construction, municipal building and structure construction, etc.) and which are located in areas of archaeological potential or areas identified as being archaeologically sensitive, are subject to archaeological assessment prior to any land disturbing activity.

• It is recommended that when there are any new designations of heritage properties (which include constructions dating before 1920) under Part IV of the Ontario Heritage Act, that the property footprint be added to the final potential mapping (Appendix B). If the newly designated property is surrounded by greenfields, the newly designated property should be buffered by 100 metres for archaeological potential.

• No Stage 4 archaeological investigations on Aboriginal sites should be undertaken within the City of Kingston without first filing a First Nations consultation report with the Planning and Development Department.

• Archaeological assessment reports should contain advisories on the steps to be taken should unanticipated deeply buried archaeological remains or human remains be found on a property during construction activities.

• In order to ensure the long term viability of the Archaeological Master Plan, it should be subject to comprehensive review on a five year basis and should be carried out by a licensed archaeologist in co-ordination with the five year review of the City’s Official Plan.

• Procedures outlined in the Memorandum of Understanding between the Ministry of Tourism and Culture and the City of Kingston should be followed regarding the sharing of information concerning archaeological site locations.

• It is recommended that the City develop and adopt, in consultation with the Ministry of Tourism and Culture, relevant Aboriginal communities, other agencies, landowners, and the public, a “Contingency Plan for the Protection of Archaeological Resources in Urgent Situations.”

• The City of Kingston should implement a public awareness initiative by which the general public might be made more knowledgeable of the wide range of archaeological resources present within the City.

• The City of Kingston should consider preparing both an accurate and comprehensive inventory of the archaeological collections currently held by museums and consulting archaeologists and a guideline encouraging the curation of material from archaeological sites within Kingston at local museums.

In summary, cities can no longer avoid dealing with archaeological resources especially since provincial planning policy has been strengthened in this regard. More importantly, there are clear precedents in law.
that demonstrate the severe financial and political costs of avoiding this responsibility. Kingston is making a wise choice in building on their past commitment and joining with other major municipalities in Ontario (e.g., Windsor, London, Region of Waterloo, Toronto, Ottawa) in adopting progressive policies for the wise use and conservation of their archaeological records.
PROJECT PERSONNEL

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Lower Brewer’s Mills (Washburn)
Cunningham’s Corners (Code’s Corners)
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Early Economic Activity, Industry and Agriculture

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1  INTRODUCTION

The role of the municipality in the conservation of archaeological resources is crucial. Planning and land use control are predominantly municipal responsibilities and the impact of municipal land use decisions on archaeological resources is significant, especially since municipally-approved developments constitute the majority of land disturbing activities in the Province. The primary means by which these resources may be protected is through the planning approvals process. Moreover, the review of development applications for archaeological resource concerns is now made directly by the City. In recognition of these facts, the City of Kingston retained Archaeological Services Inc. (ASI), in association with Carl Bray and Associates Ltd., to prepare an archaeological master plan for the City. The ultimate objective of the project was the preparation of a planning study which identifies, analyses, and establishes priorities concerning archaeological sites located within the boundaries of the City.

While a previous Archaeological Master Plan was developed for the City in the late 1980s by Cataraqui Archaeological Research Foundation (CARF), it only addressed the former City of Kingston and not the former Townships of Kingston and Pittsburgh. The plan was never formally adopted by the City and is now out-of-date. The City has no comprehensive mapping for the amalgamated City or database for identifying areas of archaeological potential and for rationalizing requirements for archaeological assessments in advance of development. Indeed, it now relies on the application of generic Ministry of Tourism and Culture criteria which covers needlessly approximately 88% of the City’s lands.

It is anticipated that the population of the City of Kingston will increase by approximately 12% over the next 20 years. Change and growth within the City must be guided by sound planning and management policies, all of which must be consistent with recent changes to provincial archaeological resource conservation legislation and policy. In the case of pre-contact archaeological sites, any efforts undertaken by the City to identify and protect such sites will be viewed very positively by First Nations. Any attempt to avoid this responsibility would be viewed very dimly by First Nations.

While the City of Kingston Archaeological Master Plan is an important document in-and-of itself, information gathered through the Archaeological Master Plan will also serve as an important contribution to the Cultural Plan for the City of Kingston. The development of a Cultural Plan was identified as one of the priorities for the Planning and Development Department (Sustainability and Growth Group). An Archaeological Master Plan is also a means to address related issues within the Focus Kingston: Community Strategies Plan 2000-2010 report concerning the need for a heritage strategy and the need for protecting and identifying important cultural resources.

The study was designed within a framework that comprised three phases of research, the results of which are presented in two separate reports. Phases 1 and 2 entailed the collection, assessment and synthesis of information from various public and private sources. The major goals of this research were:

1) the compilation of inventories of registered and unregistered archaeological sites and of lands that no longer have archaeological integrity due to previous development activity;

2) the preparation of an overview of the settlement history of various sectors of the City, as it may be expected to pertain to archaeological resources; and

3) the development of an archaeological site potential model based on known site locations, past and present land uses, and environmental and cultural-historical data.
The final task of the Master Plan research was the identification of a series of policies for incorporation in the Official Plan, and of practices within the development approvals process that will ensure the conservation of these valuable heritage resources within the overall process of change and growth in the City.

The results of the technical research and modelling are fully presented in this document. A separate report (Planning for the Conservation of Archaeological Resources in the City of Kingston), presents a discussion of the implications of the archaeological potential modelling exercise and a review of the current planning and management guidelines for archaeological resources that have been developed by various jurisdictions. It concludes with a recommended management strategy for the conservation of known and potential archaeological resources within the City.

1.1 DEFINING ARCHAEOLOGICAL RESOURCES

The 2005 Provincial Policy Statement defines archaeological resources (Section 6.0, Definitions) as including “artifacts, archaeological sites and marine archaeological sites.” Individual archaeological sites (that collectively form the archaeological resource-base) are distributed in a variety of locational settings across the landscape, being locations or places that are associated with past human activities, endeavours, or events. These sites may occur on or below the modern land surface, or may be submerged under water. The physical forms that these archaeological sites may take include: surface scatters of artifacts; subsurface strata which are of human origin, or incorporate cultural deposits; the remains of structural features; or a combination of these attributes. As such, archaeological sites are both highly fragile and non-renewable.

The Ontario Heritage Act (Ontario Regulation 170/04) defines "archaeological site" as "any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest"; "artifact" as "any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest"; and "marine archaeological site" as “an archaeological site that is fully or partially submerged or that lies below or partially below the high-water mark of any body of water”. Archaeological fieldwork is defined as “any activity carried out on, above or under land or water for the purpose of obtaining and documenting data, recovering artifacts and remains or altering an archaeological site and includes monitoring, assessing, exploring, surveying, recovering and excavating.”
2 THE ARCHAEOLOGICAL RESOURCES OF THE CITY OF KINGSTON: AN OVERVIEW

2.1 PRE-CONTACT CULTURAL-HISTORICAL OUTLINE FOR SOUTHERN ONTARIO

For over ten millennia, temporary encampments and semi-permanent villages of various sizes were established along the river valleys and lake shores of southern Ontario. The Aboriginal occupants of these sites left no written record of their lives. However, their legacy includes the oral histories and traditions passed on to their descendants, and the archaeological traces of their settlements. There tends to be little widespread awareness of the depth of this pre-contact settlement history, or general knowledge of the societies that inhabited Ontario prior to the onset of Euro-Canadian settlement. The terms used to describe the temporal periods were developed during the last century to recognize key shifts in environmental adaptation, subsistence strategies or technologies.

<table>
<thead>
<tr>
<th>Date</th>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
</table>
| A.D. 1650 - A.D. 1400 | Late Iroquoian (Late Woodland) | - complex agricultural society  
- villages, hamlets, camps  
- politically allied regional populations |
| A.D. 1400 - A.D. 1300 | Middle Iroquoian (Late Woodland) | - major shift to agricultural dependency  
- villages, hamlets, camps  
- development of socio-political complexity |
| A.D. 1300 - A.D. 900 | Early Iroquoian (Late Woodland) | - foraging with limited agriculture  
- villages, hamlets, camps  
- socio-political system strongly kinship based |
| A.D. 900 - A.D. 600 | Transitional Woodland | - incipient agriculture in some regions  
- longer term settlement occupation and reuse |
| A.D. 600 - 400 B.C. | Middle Woodland | - hunter-gatherers, spring/summer congregation and fall/winter dispersal  
- large and small camps  
- band level society with kin-based political system  
- some elaborate mortuary ceremonialism |
| 400 B.C. - 1000 B.C. | Early Woodland | - hunter-gatherers, spring/summer congregation and fall/winter dispersal  
- large and small camps  
- band level society with first evidence of community identity  
- mortuary ceremonialism  
- extensive trade networks for exotic raw materials |
| 1,000 B.C. - 7,000 B.C. | Archaic | - hunter-gatherers  
- small camps  
- band level society  
- mortuary ceremonialism  
- extensive trade networks for exotic raw materials |
| 7,000 B.C. - 9,000 B.C. | Paleo-Indian | - first human occupation of Ontario  
- hunters of caribou and now-extinct Pleistocene mammals  
- small camps  
- band level society |
Paleo-Indian Period (9,000 B.C.-7,000 B.C.)

It is thought that Paleo-Indian hunting bands arrived in southern Ontario sometime between approximately 11,000 and 10,500 years ago, soon after the area became habitable. During the previous millennia, glaciers had covered much of southern Ontario. As these glaciers began to retreat, large meltwater lakes formed in their wake. The landscape that subsequently emerged was one of relatively barren tundra interspersed with areas of open boreal forest, an environment which supported large Pleistocene mammals such as mastodon, moose, elk and especially herds of caribou.

Figure 2-1: Depiction of Early Paleo-environment in Ontario

The latter of these were a major focus of Paleo-Indian hunters. Evidence concerning the Paleo-Indian peoples is very limited since their populations were not large. Furthermore, in following the herds, Paleo-Indian groups traveled extremely long distances over the course of the year, and seldom stayed in any one place for a significant length of time. Therefore, virtually all that remains of their culture are the tools and by-products of their flaked stone industry, the hallmark being large distinctive fluted spear points. Paleo-Indian sites are frequently found adjacent to the shorelines of large post-glacial lakes, suggesting that their camping sites were located along the shores of lakes to intercept migrating caribou herds.

Figure 2-2: Paleo-Indian Hunters (ASI)
Figure 2-3: Fluted Projectile Points
Archaic Period (7,000 B.C.-1,000 B.C.)

The Archaic period is commonly divided into three sub-periods: Early Archaic (circa 7,000-6,000 B.C.), Middle Archaic (circa 6,000-2,500 B.C.), and Late Archaic (circa 2,500-1,000 B.C.). Few Early or Middle Archaic period sites have been investigated and they, like Paleo-Indian sites, are often identified on the basis of the recovery of isolated projectile points. Paleo-environmental data suggest that a mixed needle and broadleaf forest cover had been established in Ontario by 7,000 B.C. allowing the nomadic hunter-gatherers of this period to exploit deer, moose and other animals, as well as fish and some plant resources. However, they still moved relatively large distances during the course of the year.

![Figure 2-4: Landscape during the Archaic period](image)

Over the following millennia, significant technological and cultural change is evident in an expansion of the variety of tools produced, including ground-stone tools and notched or stemmed projectile points, with an increased reliance on local chert sources. This in turn reflects the shifts in hunting strategies necessitated by a constantly evolving environment, allowing for greater exploitation of the newly abundant environment as indicated by an increase in the numbers and sizes of sites. Subsistence strategies which developed during the Archaic period are generally considered to be based on increased exploitation of seasonally abundant resources. Small hunting and gathering bands (20-50 people) utilized the lake shores during the spring and summer months, then broke into family groups and moved inland for the fall and winter. Food would have been plentiful during the warm months of the year – the lakes and rivers were teeming with many species of fish, aquatic birds, and mammals, while nuts, berries and edible roots could be found in the forests and marshes. The fall would have been a busy time because food would have to be stored and clothing made ready for the winter. During the winter, people moved inland to hunt and trap fresh food and furs.

The Early Archaic period witnessed a change in lithic procurement practices as a wider range of chert sources was exploited. The lithic tool kit became increasingly dominated by small “disposable” tools, and for the first time, heavy wood-working tools manufactured from ground stone are evident.
During the Middle Archaic, many of the artifact types considered characteristic of the Archaic period as a whole first appear in quantity. These include netsinkers and ornate ground stone items such as bannerstones. The use of raw materials in the production of flaked and ground stone tools was increasingly limited to locally available material. In southeastern Ontario, a number of sites dating to the Middle Archaic period have yielded evidence of the use of copper to produce a range of decorative and prosaic items. This eastern expression is frequently referred to as the “Laurentian Archaic”, and also boasted a wide array of ground stone tool forms.
By about 3000 B.C., there is evidence for increased population levels localized to smaller areas which were exploited year-round. Sites were larger and occupied for longer periods of time, at least in areas characterized by more stable and productive natural environments. Despite a reduction in the territory used by individual hunter-gatherer groups, long-range exchange remained important.

By the Late Archaic period, hunter-gatherer bands had likely settled into familiar hunting territories. Their annual round of travel likely involved occupation of two major types of sites. Small inland camps, occupied by small groups of related families during the fall and winter, were situated to harvest nuts and to hunt the deer that also browsed in the forests, and which congregated in cedar swamps during the winter. Larger spring and summer settlements located near river mouths were places where many groups of families came together to exploit rich aquatic resources such as spawning fish, to trade, and to bury their dead, sometimes with elaborate mortuary ceremonies and offerings.

Excavations of regional sites have also yielded important insights into long-distance trade and elaborate mortuary ceremonies shared with distant groups throughout northeastern North America. By approximately 3,000 years ago, many of the stone tools, and especially those made from ground stone, possessed both social and symbolic functions. Many of these objects were made of banded slate and were carved and ground to resemble animals. While they may have had day-to-day uses such as weights for spear-throwing devices, their inclusion in burials also ascribes to them a sacred intent. Regardless of the context in which they were used or found, they rival any of the art produced anywhere in the world.
Woodland Period (1,000 B.C.-A.D. 1650)

The Woodland period is divided into four sub-periods: Early (circa 1,000 – 400 B.C.), Middle (circa 400 B.C. – A.D. 600), Transitional (circa 600 – A.D. 900) and Late (circa 900 – A.D. 1650). The Late Woodland period, which witnessed the ascendance of Iroquoian society in the southern Great Lakes region, is further divided into the Early, Middle and Late Iroquoian stages.

The Early Woodland period differed little from the previous Late Archaic period with respect to settlement-subsistence pursuits. This period is, however, marked by the introduction of ceramics into Ontario. Although a useful temporal marker for archaeologists, the appearance of these ceramics does not seem to have profoundly changed the hunter-gatherer lifestyle. There is compelling evidence, however, for an expanding network of societies across northeastern North America that shared burial rituals in the Early Woodland period. A common practice, for example, was the application of large quantities of symbolically important red ochre (ground iron hematite) to human remains and the inclusion in graves of offerings of objects that represented a considerable investment of time and artistic skill. Moreover, the nature and variety of these exotic grave goods suggest that members of the community outside of the immediate family of the deceased were contributing mortuary offerings.

The most significant change during the Early and subsequent Middle Woodland periods was an increase in trade of exotic items, no doubt stimulated by contact with more complex, mound-building cultures in the Ohio and Mississippi valleys. These items were included in increasingly sophisticated burial ceremonies that occasionally involved the construction of burial mounds by local groups. These developments may have emanated from the need for greater social solidarity among growing aboriginal populations that were competing for resources.

The pace of cultural change seems to have accelerated during the Transitional Woodland period. Much of this change was brought about by the acquisition of tropical plants species, such as maize and squash, from communities living south of the Great Lakes. The appearance of these plants initiated a transition to food production that reduced the traditional reliance on naturally occurring resources, thereby leading to a decrease in...
group mobility as people tended to their crops. Sites were more intensively occupied and subject to a greater degree of internal spatial organization. Revolutionary changes continued in the settlement-subsistence regimes of regional populations. As the most populous and the most involved in the development of this new life-style, Ontario Iroquoian societies often form a distinct focus of Late Woodland archaeology. The people who resided along the west end and central north shore of Lake Ontario were the ancestors of the Neutral, Huron, and Petun, while those who lived to the south of Lake Ontario, in what is now central New York State, became the Five Nation Iroquois (Seneca, Cayuga, Onondaga, Oneida and Mohawk). Those ancestral Iroquoians who occupied the St. Lawrence valley in eastern Ontario appear to have contributed people to both the historic Huron and Five Nations Iroquois. While there were most certainly interactions between these Iroquoian-speaking groups, the Five Nation Iroquois did not inhabit southern Ontario until the mid-to-late seventeenth century.

Early Iroquoian society represents a continuation of Transitional Woodland subsistence and settlement patterns. Villages tended to be small, palisaded compounds with longhouses occupied by either nuclear or, with increasing frequency, extended families. These extended families formed the basis of social and political relationships within each village and between communities. The camps and hamlets around villages served as temporary bases from which to collect wild plants or to hunt game. While some corn appears to have been an important dietary component at this time, its role was still more that of a supplementary nature than a staple.

The Middle Iroquoian period marks the stage in Iroquoian cultural evolution at which a fully developed horticultural system (based on corn, bean, and squash husbandry) and complex political means for regulating village affairs and linking separate villages had developed. Widespread similarities in pottery and smoking pipe styles also point to increasing levels of inter-community communication and integration. The commitment to producing food through agriculture involved abandoning the group mobility that had characterized aboriginal life for millennia. Instead, base settlements were established and land cleared around them for crops, while hunting, fishing, and gathering parties were sent out to satellite camps to harvest additional naturally occurring resources.

By the beginning of the fourteenth century and due to the increasing reliance on horticulture, most Iroquoian people inhabited large, sometimes fortified villages throughout southern Ontario, including the north shore of Lake Ontario.
Communities continued to change during the fourteenth and fifteenth centuries. Certain village households, for example, consistently grew larger and more variable in membership than others within the same community – a trend which peaked around the turn of the sixteenth century. Some villages attained a size of over four hectares with populations as high as 2,000 individuals (see layout of village). This may reflect changes in the fortunes and solidarity of dominant lineages within villages and/or the movement of families between allied communities. During the sixteenth century, longhouses became smaller again. This modification of residential patterning suggests that changes had occurred in the kin-based political system, which may reflect increased importance of clans over lineages. Since clan membership cut across related communities, this aspect of kinship was an important source of tribal integration.

When European explorers and missionar ys arrived in Ontario at the beginning of the seventeenth century, Iroquoian villages were under the direction of various chiefs elected from the principal clans. In turn, these villages were allied within the powerful tribal confederacies. Most, if not all, of the Lake Ontario north shore communities, had moved by about 1600 from Lake Ontario northward, joining with other groups in Simcoe County to form the Petun and Huron, or westward to join other ancestral groups of the Neutral, who were situated around the west end of lake Ontario and in the Niagara Peninsula. Those who had lived in the St. Lawrence valley had likely amalgamated in the sixteenth century with contemporary Huron or Iroquois communities. While this movement of communities likely took place over many generations, the final impetus was conflict with the Five Nations Iroquois of New York State.
Years leading up to the Contact Period (late sixteenth century)

The first well-documented record of European activity on the edge of the Great Lakes region was written by Jacques Cartier, in 1534 (right). His memoirs indicate that some of the Aboriginal people he met on the St Lawrence had encountered Europeans previously, had traded furs for foreign goods, and had stored pelts in anticipation of future contacts.

Similarly, the archaeological record provides evidence that some European goods had reached the Aboriginal inhabitants of southern Ontario by the late sixteenth century. For instance, excavations of sites of this period have yielded glass trade beads. Trade beads are often accompanied by other trade goods such as hatchets, bells, rings, mirrors, and items of a similar nature. It is possible that these beads and other artifacts had arrived with Indigenous traders who obtained them farther east, either directly from Europeans, or from Aboriginal intermediaries.

Initially, Europeans came to the St. Lawrence on a seasonal basis to fish and trade. However, by 1608, the first successful permanent European settlement on the river was established when Samuel de Champlain founded Quebec as part of his efforts to expand French trading opportunities in Canada.

The Contact Period (1615-1763)

The first recorded arrival of Europeans in southern Ontario occurred during the second decade of the seventeenth century. At this time, Ontario Aboriginal populations belonged to two major language families: the Iroquoian-speaking peoples, such as the Huron, Petun, and Neutral, who were primarily horticulturists; and the Algonquian-speaking peoples, such as the Algonquin (Algonkin), Ojibwa (Anishnabe, or Chippewa), Nipissing, and Ottawa (Odawa), who were mainly hunter-gatherers. The Huron (Wendat) inhabited the region between Lake Simcoe and Georgian Bay, the Petun (Khionontateronon) lived southwest of the Huron, and the Neutral (Attiouendaronk) were located along the northeast shore of Lake Erie, the Niagara Peninsula, and areas immediately west of Oakville. To the north of Lakes Huron and Superior dwelt the Ojibwa, while the Five Nations Iroquois – a confederacy comprised of the Seneca, Cayuga, Onondaga, Oneida and Mohawk – lived to the south of Lake Ontario, in what is now New York State. The Europeans, by virtue of their travels along the St. Lawrence, initially encountered those groups inhabiting the region of Lake Ontario – the Huron and the Five Nations Iroquois.

Although they had long been in a state of constant competition, the increasing European presence led to an escalation of warfare among the Five Nations Iroquois and the Huron. The Five Nations Iroquois were allied first with the Swedes and Dutch and later with the English whereas the Hurons allied themselves with the French.
Figure 2-15: The Aboriginal nations and confederacies of the Lower Great Lakes were comprised of two major linguistic groups – Iroquoians and Algonkians.
Some Aboriginal groups, particularly the Huron and Iroquois, accepted the Jesuits, an order of Roman Catholic missionaries, to live among them. It is from the Jesuits’ journals that we are able to gain insight into the Huron and Iroquois. However, in promoting the faith of the Europeans and as some Aboriginals converted to Christianity, the French priests began to undermine not only the beliefs but also the social structures of the people. As a result, factionalism began to develop within the communities as conflict arose between those who were Christian and/or pro-French and those who longed for the traditional way of life and wanted to be rid of the Europeans, if not their trade goods. The ways the various Ontario Iroquoians responded to this breakdown of their social and cultural order differed markedly.

Antagonism between the Hurons and the Iroquois was encouraged by both the English and the French in order to gain increased supplies of furs for competing traders and as extensions of the wars between the European powers. There was also greater access on the part of the Iroquois to European guns and a devastating depopulation of the Ontario Iroquoians by diseases, which had not yet had as big an impact on the New York Iroquoians. These trends as well as the break down of social and political cohesion among the Hurons and Petuns, and increased raiding by the Iroquois in the late 1640s, led to this dispersal as well as the Neutral by 1650s.

Thus, by the mid-to-late 1600s, the Five Nations Iroquois, in particular the Seneca and Cayuga, were using the north shore of Lake Ontario for hunting, fishing, and participation in the European fur trade. Their main settlements were located strategically along the north shore of Lake Ontario from Burlington to the Kingston area.

Figure 2-16: Iroquoians, especially the Neutrals and Petun, were described by early Europeans as having been covered in tattoos from head to foot in such forms as eagles, snakes, lizards, squirrels or other figures.
Figure 2-17: The 1680 map *Lac Ontario ou de Frontenac*—*Lac de Torento* showing the north shore Iroquois villages
Due, in large part, to increased military pressure from the French upon their homelands south of Lake Ontario and conflict with northern Anishnaubeg groups, the Iroquois abandoned their north shore frontier settlements by the late 1680s, although they did not relinquish their interest in the resources of the area, as they continued to claim the north shore as part of their traditional hunting territory. The settlement vacuum, however, was immediately filled by the Anishnaubeg.

At the time of European contact in the early seventeenth century, the Anishnaubeg “homeland” was a vast area extending from the east shore of Georgian Bay, and the north shore of Lake Huron, to the northeast shore of Lake Superior and into the upper peninsula of Michigan. Individual bands were politically autonomous and numbered several hundred people. These groups were highly mobile, with a subsistence economy based on hunting, fishing, gathering of wild plants, and garden farming. During the Late Woodland period, extensive exchange systems had developed between the Odawa, Ojibwa and Cree of northcentral and northeastern Ontario and the Huron and other Iroquoian groups to the south. The Odawa, in particular, played an important role in this trade through dominating traffic in goods on the upper Great Lakes.

Upon the expansion southward from their homeland in the upper Great Lakes in the later seventeenth century, the Anishnaubeg (including the Mississauga) inhabited the villages abandoned by the Iroquois and it was with their descendants that the British began to negotiate land surrenders, many of which remain the subject of considerable debate to this date.
2.2 INVESTIGATION OF SIGNIFICANT ABORIGINAL SETTLEMENT

Archaeological investigations, pertaining to the pre-contact Aboriginal occupation of Kingston, have been previously described by others (Stewart et al. 1988, 1989; Bazely 2001; Adams 2006). Nevertheless, this topic warrants reviewing as it outlines the research foundation on which the current pre-contact culture history of Kingston is based and gives specific insights into the breadth and depth of that culture history.

In 1986, Nick Adams (1986a:5) noted that there was neither documentary nor archaeological evidence to suggest the presence of any major Iroquoian villages in the Kingston area prior to A.D. 1673, and this observation remains true today. While noting evidence that Late Woodland peoples made seasonal use of the area for hunting, fishing, and as a travel route, he has pointed to the non-sustainability of traditional agriculture due to impoverished soils as a significant constraint on Iroquoian settlement in the area (Adams 1986a: 5-9; 2006: 96). Nevertheless, when Fort Frontenac was established in 1673, the French community attracted settlement by Five Nations Iroquois and, with a few interruptions involving hostility between the French and Iroquois and Iroquois and Algonquians between the late 1680s and the Montreal Peace Treaty of 1701, this settlement remained until the fort was taken over by the British in 1758. One notable interruption was an attack on the Iroquois settlement by Mississaugas around 1703, an example of the growing incursion of Algonquian (Ojibwa) peoples into the north shore of Lake Ontario through the eighteenth century (Adams 1986a: 9-16). Early maps show that the Iroquois settlement was initially situated south of Fort Frontenac (Figure 1: “Sauvages”) but after the Algonquian attack the longhouses were re-located to the area immediately around the fort (Figure 2:“Cabanes des Sauvages”). Archaeological evidence of this occupation includes the recovery of Iroquoian clay pipes from excavations in the vicinity of Fort Frontenac (Adams 1986a: 16-19). Adams (2006: 95) also notes the recovery of Middle Woodland period artifacts from the site.
With the arrival of the British in 1758, the Mississauga had control of the area, and by 1783 had ceded Kingston and the surrounding territory to the British crown (Surtees 1994:102-103). Mississauga Point, which had been the site of a brief Loyalist encampment (1784), is mapped as the location of an “Indian Camp” in a plan of Kingston dated 1801 (Anonymous 1801 [reproduced in Stewart et al. 1988: Figure 26]). James Peachey’s 1783 watercolour view of the mouth of the Cataraqui River (Figure 3) illustrates several clusters of Aboriginal tepee-style tents scattered around the Kingston area, and the toponym “Mississauga Point” was no doubt derived from this occupation. Mississauga Point was subsequently employed by the British as the location of a battery during the War of 1812 (Stewart et al. 1988:123; Dubeger 1814), but by 1829 it was being referred to as an “old battery” (Durnford 1829) and was being assimilated into the layout of the town within a newly proposed defensive perimeter (Nightingale 1829) (Figures 4 & 5).

Figure 2-19: Fort Frontenac, 1720

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1 The following text is from a plaque erected at Mississauga Point by the Ontario Heritage Foundation:

*Loyalist Landing at Cataracou 1784. Following the end of the American Revolution in 1783, Frederick Haldimand, Governor of Quebec, approved the resettlement of loyalist refugees in what is now southern Ontario. Favourable reports on the Cataracou area led to its occupation by British forces in the spring of 1783 and to the commencement of surveys the following October. In June 1784 a party of Associated Loyalists from New York State under the command of Captain Michael Grass, part of a loyalist flotilla travelling from Montreal, established a camp here on Mississauga Point. Grass later recalled: "I led the loyal band, I pointed out to them the site of their future metropolis and gained for persecuted principles a sanctuary, for myself and followers a home.*
Figure 2-20: “A South East View of Cataraqui on Lake Ontario, painted in August 1783” by James Peachey

Figure 2-21: “Plan of Kingston and its Vicinity from Collins Bay past Cedar Island” by J.B. Duberger, Jr. 1814. (Note battery on Mississauga Point)
Re-development of Mississauga Point as a ship-building slip and dry dock was initiated in 1836 by the Marine Railway Company (1836-1862). Constructed in the midst of the old battery ramparts, it was reported in the November 11th, 1840 edition of the Kingston Chronicle and Gazette that the graves of 15 to 20 Aboriginal people were encountered in the course of construction excavations (see also Stewart et al. 1988: 105; Bazely 2001: 25). These shallow (~10 inches below grade) graves were reported to have included beads and (metal?) knives and were wrapped in bark which was still preserved along with portions of the skeletons. Given the location, preservation, and description of the graves, this was likely a Mississauga cemetery associated with the camp that had stood on the spot only a few decades before. Archaeological investigations of Mississauga Point by the Cataraqui Archaeological Research Foundation (Stewart et al. 1988: 123-125) determined that post-1840s industrial development had eradicated all evidence of earlier activity.

The accidental discovery of Aboriginal artifacts, campsites, and burials has occurred occasionally throughout the history of Kingston’s development right up to the present (cf. Stewart et al. 1988: 105; Zukowsky 1983). While some finds have been brought to the attention of the scientific community, others either remain in private hands or have found their way into the hands of artifact collectors or museums. Two such find spots came to light during the previous Kingston archaeological master plan project (Stewart et al. 1989:15). The first comprised four Aboriginal flaked stone projectile points discovered on high ground overlooking the lake, about 300 metres west of Mississauga Point, while digging in a back yard in 1946. Six test pits excavated in the vicinity in 1988 encountered disturbed soil and bedrock at a depth of 0.5 metres, and no evidence of pre-contact Aboriginal occupation (Stewart et al. 1989:146). The second was a Laurentian Archaic (ca. 5,000 B.P.) ground slate point recovered from a garden on the eastern edge of the Little Cataraqui Creek valley (Stewart et al. 1989:15).
One particularly significant accidental find was made by Mr. Wilford Holder in 1949 near the head of Collins Bay. While grading a hill in his yard, Mr. Holder uncovered two skeletons covered with red ochre about a metre below the surface. He turned them over to D.C. Matheson, professor of anatomy at Queen’s University, who identified them as an adult female roughly 35 to 40 years of age and a child of about 5 or 6 years.

This discovery came to the attention of Mr. William Ritchie (Figure 6), State Archaeologist for the New York State Museum and Science Service, who spent four days investigating the site in 1952 (Ritchie 1955). Heavy staining of copper salts on the juvenile skeleton indicated the former presence of one or more copper artifacts, although none were recovered at the time of discovery. Also recovered from the burial site were red ochre encrusted fragments of cremated human bone as well as three marine shell ornaments. One was a shell pendant simulating a bear canine tooth, while the other two were “sandal sole” shell gorgets. Further investigations by Ritchie revealed two additional red ochre burials, one a cremation, as well as evidence of other, disturbed, burials (Ritchie 1955: 72-73). Ritchie (1955:73) attributed these burials to the Glacial Kame culture, now recognized as an Aboriginal mortuary complex dating to the Late Archaic period, circa 3,000 to 2,800 B.P. (Ellis et al. 1990: 115ff.).

The site was registered with the Ontario Archaeological Sites Database (OASD) as the Collins Bay Burial site (BbGd-13) by Phillip Wright, Eastern Ontario Regional Archaeologist for the Ministry of Culture, in the 1980s.

Ritchie (1955:73) reported that the grave goods were given by Mr. Holder to a local resident, C. Hutcheson, and to local avocational archaeologist Guy Blomeley. The late Mr. Blomeley donated his collection to the Cataracti Archaeological Research Foundation in 1987 (Adams 1989). His investigation of archaeological sites around Collins Bay, the mouth of Collins Creek, at the headwaters of Little Cataracti Creek, on Horsey Bay, Wolfe Island, the Cataracti River, and on Loughborough, Camden, and Collins Lakes have been documented and registered in the OASD by Mr. Hugh Daechsel (Adams 2006: 93).

Some of the more interesting material in the Blomeley collection was obtained at auction from a farm near Verona, less than 10 kilometres northwest of Kingston. First reported as a major discovery of Aboriginal artifacts and hundreds of human skeletons by the Kingston Whig Standard in 1935, the York site (BeGe-8) was professionally investigated by Phillip Wright in 1981. The collection has been analysed subsequently by the Cataracti Archaeological Research Foundation, and the site and collection have been summarized by Adams (1989). The site complex is described as including five separate localities, including a burial mound. The site has yielded artifacts spanning over 5,000 years of Aboriginal culture history, including: Middle Archaic period ground slate projectile points; a bevelled adze attributed to the Lamoka complex of the Late Archaic period; a variety of exotic marine shell gorgets, a rare cannel coal gorget, and a bar-type birdstone attributable to the Lake Archaic period Glacial Kame mortuary complex; Early Woodland period, Meadowood complex cache blades and points; a “bar amulet” attributed to the Middlesex complex of the Early Woodland period; a banded slate gorget, several small gorgets and pendants, and pottery attributed to the Middle Woodland period; and pottery sherds and projectile points attributed to the Late Woodland period (Adams 1989).
Around the same time that Ritchie was investigating the Collins Bay site, Dr. James Pendergast (Figure 7) spent three or four days during the 1952 and 1953 field seasons carrying out test excavation of approximately 25 square metres at the Kingston Outer Station site (BbGc-2). Situated on the west bank of the Cataraqui River immediately south of the marsh, the site had been brought to Dr. Pendergast’s attention by Guy Blomeley (Stewart et al. 1989:177). The artifact assemblage recovered by Pendergast included approximately 120 potsherds, which are now in the collections of the Archaeological Survey of Canada. In 1988, the Cataraqui Archaeological Research Foundation carried out a systematic test-pit survey of a portion of the site measuring approximately 30 by 130 metres along the shore. Positive test pits throughout this area suggest that the site extends beyond the area tested. In addition to a collection of some 790 artifacts recovered by Mr. Blomeley over the years, the test-pit survey recovered 1065 items, including stone tools (n=4), ceramics (n=488), bone tools (n=1), faunal remains (n=435), and historic artifacts (n=137). The ceramic and faunal assemblages suggest that the site was used repeatedly as a fishing camp between about A.D. 700 and 1500 (Stewart et al. 1989: 176-182). In 1999, Mr. Hugh Daechsel carried out an archaeological assessment of an adjacent property and subsequent Stage 3 investigation of an historic structure (Daechsel 1999). This work helped to further define the limits of the Kingston Outer Station site, and in October 2006, the Planning Committee of the City of Kingston amended the zoning by-law pertaining to the property to place a holding restriction to prevent any site disturbance pending completion of a Stage 4 salvage excavation (City of Kingston, 2006a; 2006b).

About 1.5 kilometres southeast of the Kingston Outer Station site is another pre-contact Aboriginal site that was first documented and monitored for many years by Mr. Blomeley. The Belle Island site (BbGc-6) is situated on its namesake (legally Bells Island), a roughly 15 hectare feature located in the centre of the Cataraqui River and now connected to the mainland by a landfill causeway. A systematic test-pit survey of the site, conducted by the Cataraqui Archaeological Research Foundation in 1988, estimated the site to encompass nearly 0.5 hectares, and up to seven human burials were documented. In addition to 103 artifacts recovered by Mr. Blomeley and another 227 artifacts in another (Thomas) collection, the test-pit survey recovered 1063 items, including stone tools (n=219), ceramics (n=751), and faunal remains (n=93). The ceramic assemblage suggests that the main occupation occurred during the late Middle Woodland period (ca. A.D. 500 – 900), although a few earlier Middle Woodland period sherds and a single Late Woodland sherd were also recovered. The diversity of faunal remains suggests the site was repeatedly occupied as both a hunting and fishing camp (Bazely 2001: 28-29; Stewart et al. 1989: 94-99). In 2000, CARF carried out a Stage 2 archaeological assessment of certain localities on the Belle Island site to determine their suitability as re-burial sites for previously recovered human remains (Bazely 2000). The re-interment took place on December 1, 2000. Subsequent to that event, the City of Kingston entered into consultations with the Algonquins of Golden Lake, the Tyendinaga Mohawks, the Haudenosaunee, the Algonquins of Ardoch, the Algonquins of Sharbot Lake, the Mohawk Council of Akwesasne, the Wendat (Hurons) of Wendake, the Council of the Mohawks of the Bay of Quinte, as well as provincial representatives of the Ministry of Consumer and Business Services (representing the Cemeteries Act), the Ministry of Tourism and Culture (representing the Heritage Act), and various other federal and provincial agencies, in order to develop protective measures for the site (City of Kingston 2006c). A draft joint ownership and stewardship agreement between First Nations and the City of Kingston was approved by council on October 3, 2006 (City of Kingston 2006d).

Several lesser-known sites were also documented by avocational and professional archaeologists working in the Kingston area during the latter half of the twentieth century. In 1961, James Pendergast collected...
material from the Treasure Island site (BbGc-4), a campsite of undetermined cultural affiliation situated on an island in the St. Lawrence River at the mouth of Abbey Dawn Creek (OASD).

Although technically just south of the Kingston city limits, the Brophy Point site (BbGc-1) on the north shore of Wolfe Island is worth noting. In 1968, James Pendergast recorded the site as a campsite of unknown cultural affiliation based on his recovery of a relatively large (2435+) artifact assemblage (OASD). Adams (2006: 94) also mentions former burial mound sites on the south side of Wolfe Island.

In 1978, between Brophy Point and the mainland, James V. Wright of the Archaeological Survey of Canada documented the Milton Island site (BbGc-5) during his survey of St. Lawrence Islands National Park. Described as a scatter of flakes and quartzite detritus, the age, extent, and cultural affiliation of the site are undetermined (OASD).

Originally researched by Phillip Wright, the Collins Creek site (BbGd-1) was registered by Hugh Daechsel in 1987. Situated near the mouth of Collins Creek, the site yielded a small assemblage of faunal remains (n=13), Trent Valley chert flakes (n=10), and ceramic sherds (n=3). The ceramics suggested a Middle and/or Late Woodland period age (OASD).

Also in 1987, Hugh Daechsel documented the Horsey Bay site (BbGd-5), a campsite badly disturbed by cottage development along the Lake Ontario shore between Collins Bay and Catararaqui Bay. Recovered from the site were 21 artifacts, including faunal remains (n=9), Trent Valley chert debitage (n=7), and ceramic sherds (n=5). The ceramics suggest a transitional Middle to Late Woodland period age for the site (OASD).

Another Lake Ontario shoreline site documented by Hugh Daechsel in 1987 was the Topliss site (BbGb-9), a campsite situated at the mouth of Grass Creek. Documented from a private collection, the site had yielded 19 artifacts, including Late Woodland period ceramics, lithics, and a conch shell fragment (OASD).

Since the late 1980s, archaeological assessments conducted pursuant to the requirements of the Planning Act and Environmental Assessment Act prior to land development projects have added several pre-contact Aboriginal sites to the local inventory. In 1991, Nick Adams documented two significant new sites. The Speros site (BcGc-7), situated just outside of the Kingston city limits on the north side of Collins Lake, yielded evidence of both mid-nineteenth century Euro-Canadian and Middle Woodland period occupations. The Arbor Ridge site (BbGd-10), situated on a limestone plateau overlooking the valley of Little Catararaqui Creek to the east, was a small early fifteenth century Iroquoian settlement, the first of its kind documented in the City of Kingston. The site was subsequently the subject of a complete salvage excavation (Figure 8) encompassing an area of 1575 square metres (Adams 2002; 2003).
In 1992, Gordon Dibb recovered an isolated Early Woodland projectile point in the course of an archaeological assessment of the Greenwood Park subdivision, east of Highway 15, west of Butternut Creek, and north of CFB Kingston. This isolated find spot was registered as BbGc-22 (OASD).

In 1993, Lawrence Jackson recovered an isolated stemmed point attributed to the Late Archaic period in the course of a survey of the St. Lawrence Islands National Park. Registered as the Cedar Island Northwest Bay site (BbGc-71), the site is located roughly 650 metres southeast of Fort Henry (OASD).

In 2000, Hugh Daechsel and his associates, Jeff Earl and Brenda Kennett, recovered the mid-section of a Late Paleo-Indian period Plano point during an archaeological assessment of a proposed subdivision at Allen Point on the north end of Colonel By Lake (Catararaqui River) (Kennett and Earl 2000). To date, this isolated find represents the earliest evidence of Aboriginal occupation in Kingston (Adams 2006: 93).

Excavations in 2004 for a new dormitory on the Royal Military College property, on Point Frederick west of Navy Bay, yielded evidence of a multi-component camp producing more than 1500 artifacts, five isolated projectile points spanning the period from Archaic to Late Woodland times as well as various historic artifacts (Adams 2006: 94; Bazely 2004). Middle Woodland pottery has been found at two other locations on the point (Nick Gromhoff, personal communication).

In 2005, Hugh Daechsel documented and salvage excavated two scatters of lithic artifacts and an isolated stone tool attributed to the Late Archaic period (Adams 2006; Daechsel personal communication 2007). The Westbrook Creek 1, 2, and 3 sites (BbGd-22, -23, & -24) are situated on the eastern edge of the Glenvale Creek valley, north of Highway 2 and to the west of the hamlet of Westbrook.

Although not the product of a systematic archaeological prospection effort, several important insights can be gleaned from the foregoing inventory of archaeological discoveries across the City of Kingston. First, it provides concrete, if somewhat sketchy, evidence that Kingston has been occupied by Aboriginal people throughout the Holocene, and that there are sites representing virtually all major time horizons. Second, the Lake Ontario waterfront and environs seems to have been a principle focus of Aboriginal land use and settlement, an observation which is consistent with patterns observed throughout the Great Lakes region. Third, the major inland lakes and waterways have been an important secondary focus of Aboriginal land use and settlement, again a pattern consistent with expectations. Fourth, although present throughout pre-contact history, the density of Aboriginal occupation in Kingston seems relatively light in comparison with other areas of southern Ontario. This observation is supported by the many decades of work undertaken by keen avocational archaeologists—especially Mr. Guy Blomeley—pursuing leads about archaeological discoveries, as well as over two decades of work by local professional archaeologists. While there are undoubtedly many more important pre-contact Aboriginal archaeological discoveries to be made in Kingston, it is anticipated that the order of magnitude of such discoveries will be in the hundreds, not thousands. This in no way diminishes the importance of such discoveries; indeed, it should render each new discovery that more precious to the people of Kingston and area.

### 2.3 Investigation of Significant Historic Euro-Canadian Sites

Given the detailed historical archaeology that has been undertaken recently at a number of federal, provincial and municipal sites, this section should not be misconstrued for an exhaustive review of previous archaeological investigations undertaken within the region. We have focussed, however, on the early archaeological investigations of sites within the City to stress the importance which all levels of government have placed on the archaeological resources of Kingston and to understand the foundation upon which recent work has been based.
Given its extraordinary history, involving over 300 years of Euro-Canadian occupation, ranging from military fortifications to all manner of industrial and commercial establishments to rural and urban settlements, it is not surprising that the city has had a learned society devoted to its history since 1893. The Kingston Historical Society opened a museum at the converted Munroe Redoubt Martello Tower in 1925, and since 1952 has published the annual journal Historic Kingston (Kingston Historical Society 2007). While this interest has occasionally extended into the realm of historic archaeology, this has only gained prominence over the last three decades.

The second volume of Historic Kingston, published in 1953, described exploratory excavations undertaken at Fort Frontenac in 1937-38 by Colonel W.G. Hagarty, DSO, Officer Administering the Royal Canadian Artillery (1934-39), and in 1952 by Brigadier-General (later Major-General) George Kitching CBE, DSO, CD, Commandant of the Canadian Army Staff College (1951-54) (Hagarty 1953; Kitching 1953; Beaudry and Gillies 2001; Grodzinski 1999). In addition to these articles, Hagarty also produced an unpublished report entitled “Fort Frontenac from the Days of LaSalle” (Hagarty n.d.). While these officers clearly appreciated the historical and archaeological significance of Fort Frontenac, it seems that their enthusiasm was not matched by training in archaeological methods. As a result, their work makes a rather modest contribution to the archaeological record (Stewart et al. 1988: 105; Bazely 2001: 25). Similarly scant records exist for 1968 excavations, authorized by Lt.-Col. P.T. Nation, curator of the Royal Military College museum, at the circa 1812 Fort Frederick Martello Tower (Berry 2003:28).

Professional archaeologists would finally turn their attention to the historic record of Kingston in 1972, when Don Harris, of the National Historic Parks and Sites Branch of Indian and Northern Affairs Canada, carried out salvage excavations at the Kingston Market Shoal Martello Tower (Figure 10) as part of a federal government project to clean up the disused structure (Harris 1976; Stewart et al. 1988: 106-108). Later, in 1979, Parks Canada would return to Kingston to carry out salvage excavations at Bellevue House National Historic Park—former home of Prime Minister John A. Macdonald—prior to the redevelopment of the coach house (Gerrard 1981; Stark 1982; Stewart et al. 1988: 108-110).

The archaeology of the historic core of Kingston, including Fort Frontenac as well as many later military, commercial, and residential sites, was really launched as a result of the Ontario Government’s redevelopment of a Kingston harbourfront property in 1980, and the momentum of archaeological investigation so begun has essentially continued up to the present. The Kingston Harbourfront site (BbGc-7), investigated
in 1980, features four major periods of occupation, including a British military era, a commercial/industrial era, a residential era, and a railway era (Brown and Wright 1980; Stewart 1982a, b; Stewart et al. 1988: 110-114). Subsequent 1982 test excavations at the Fort Frontenac site (BbGc-8) revealed significant intact archaeological deposits (Stewart 1983), and the Cataraqui Archaeological Research Foundation (CARF) was incorporated in 1983 to sponsor further investigation of the site (Stewart et al. 1988: 114-115). Over the next two years, excavations (Figure 11) revealed sections of the 1675 log palisade, the 1680 bastion, the 1680 west curtain wall, the 1686 north curtain wall, and several interior structures (Stewart 1985). During this project, private development of an adjacent property within the precincts of Fort Frontenac threatened archaeological deposits there, so CARF was permitted to conduct a cursory salvage project in 1984. While development pressures did not allow for more than rudimentary sampling and documentation of the complex archaeological deposits at the Frontenac Village site (BbGc-11), the project served to raise public and local governmental awareness of the constant threats to their vast and significant archaeological resources (Stewart 1987; Stewart et al. 1988: 6, 120-123).

In 1985, CARF was contracted to carry out an archaeological assessment of the Bajus Brewery site (BbGc-12), a property comprising an extant limestone industrial complex dating from the late eighteenth century. While exploratory excavations documented structural remains, recommendations for further work could not be pursued due to the inadequate heritage legislation of the time (Adams 1986b; Stewart et al. 1988: 125-127).

In August of 1987, excavations for a utility trench within the Fort Frontenac precincts unearthed human remains which Cataraqui Archaeological Research Foundation staff subsequently investigated and attributed to a late seventeenth century cemetery affiliated with the fort (Stewart et al. 1988: 127-129). Later that fall, CARF took on the task of preparing the first archaeological master plan for the City of Kingston, a project which would carry on until 1990 (Stewart et al. 1988; 1989; Stewart and Bazely 1990; Bazely 1990). In the course of this project, 35 properties were assessed within the city, the majority of which pertained to the historic Euro-Canadian occupation. These investigations, which are detailed in the Stage II report of the first Kingston archaeological master plan study, yielded further information on two previously registered archaeological sites, four new significant archaeological sites, fourteen properties for which further assessment was recommended prior to any proposed land development, and fifteen properties for which no further archaeological concern was recommended (Stewart et al. 1989:41).

Since the 1990s, with the implementation of Kingston’s initial archaeological master plan and compliance with archaeological assessment regulations of the provincial Planning Act and Environmental Assessment Act, a considerable amount of historic archaeology has been carried out throughout the city and environs in advance of land development projects (e.g., Bazely 1991; Daechsel 2001, 2002).

Also, over the last decade, a growing amount of attention has focussed on the precincts of Fort Henry and the Fort Frederick Martello Tower and former Royal Naval Dockyard on Point Frederick, now occupied by the Royal Military College (Figure 12). A substantial amount of this work was recently featured in a special 2003 issue of the journal Ontario Archaeology under the guest editorship of Susan Bazely (Bazely
Aside from the extraordinary contributions to knowledge that this work has produced, since 1996 the Cataraqui Archaeological Research Foundation has also been offering hands-on public archaeology camps to “educate and enhance public awareness of cultural heritage in the local and regional community” (Bazely 2003b: 38). These programs have not only proven to be very popular, but they have shed considerable light on the archaeology of the Kingston Penitentiary, Naval Cottages site (BbGc-43) and the Fort Henry Garrison Hospital site (BbGc-28) (Bazely 2001; 2003b).

More specifically, in 2001, Parks Canada and the Province of Ontario initiated a $15 million programme of structural stabilization at Fort Henry, which led to significant archaeological investigations. Following five years of excavation, archaeologists now have a better understanding of the complex construction of the fort, which was both innovative and unique. Not only was Fort Henry constructed without forward-thrusting bastions and advanced works typical of other fortifications built in Upper Canada, the Fort was constructed deep into the bedrock of Point Henry (Last 2003:64-76). This complex design, which presented a number of challenges during construction and use, specifically water infiltration of its casemates compounded by the harsh Canadian climate (Garcia 2003:54-63), introduced the “principles of stealth and invisibility” which only became the standard means of defence in the 1870s (Last 2003:64-76). Recent excavations at Fort Henry by Parks Canada have revealed aspects of the early period of Kingston’s military history, shedding light on the original limits and architecture of the fort, as well as its builders and garrison. This work also led to a better understanding of the accuracy of historic military plans, which were influenced by a variety of physical and social factors (Cary 2003:4-22).

The work at Fort Frederick (BbGc-43) situated on Point Frederick, which is now the home of the Royal Military College of Canada (RMC), also yielded significant results. Together with the archival records, the archaeological investigations led to the identification of some of the earliest fortification structures as well as specific use areas within the site. Excavations confirmed periods of rise and decline of the Fort as is suggested in written accounts.

The work at the Naval Cottage sites (No. 15 and 16), both of which had been destroyed in the fire of 1868, involved the collection of structural information and the recovery of material culture revealing a domestic rather than military occupation, which is consistent with documentary accounts.

The recent interest in the Naval component of Kingston’s historic archaeology has not been limited to land-based sites. Since the inception of sport diving in the 1950s, the popularity of shipwrecks and other underwater archaeological resources has grown into a tourist industry in its own right. Concerns over the conservation of underwater cultural heritage resources led to the 1980 formation of the organization Preserve Our Wrecks Kingston, which is headquartered at the Marine Museum of the Great Lakes and affiliated with the provincial marine heritage organization Save Ontario Shipwrecks. Working with the local dive and heritage communities, Parks Canada has carried out inventories of underwater archaeological sites in the waters of Lake Ontario and the Rideau Canal (Moore 1995a,b; 2005a,b). Historical research and bathymetric surveys have also contributed to our understanding of the pre-canal structure of the Cataraqui River (Watson 2006; Sonnenburg 2006).
3 ARCHAEOLOGICAL SITE POTENTIAL MODEL

Introduction

Archaeological sites in the City of Kingston represent an important heritage resource for which only limited location data exist. While access to such distributional information is imperative to land-use planners and cultural heritage resource managers, the undertaking of a comprehensive archaeological survey of the city in order to compile a complete inventory is clearly not feasible. As an alternative, therefore, planners and managers must depend on a model which predicts how sites are likely to be distributed throughout the municipality. Such a model can take many forms depending on such factors as its desired function, the nature and availability of data used in its development, the geographic scope of the project, and the financial resources available. Ideally these constraints are balanced in order to produce a model of maximum validity and utility.

In the following sections, a model of archaeological site potential is developed for the City of Kingston. It begins with a brief review of the method and theory associated with site potential modelling. A strategy has been selected which employs a descriptive reconstruction of pre-contact landscapes in Kingston together with a reconstruction of pre-contact land-use patterns informed by both known site locations as well as archaeological and ethnographic analogues. This information is brought together with post-contact site location data to form a list of criteria which are used to define a zone of archaeological potential on GIS-based mapping of the city. The concluding section presents a series of recommendations for application of the model in a planning context.

Background and Theory

Archaeological site potential modelling can trace its origins to a variety of sources, including human geography, settlement archaeology, ecological archaeology, and paleoecology. The basic assumption is that pre-contact land use was constrained by ecological and socio-cultural parameters. If these parameters can be discovered, through archaeology and paleoecology, pre-contact land-use patterns can be reconstructed. The post-contact land-use pattern, of course, can be drawn from the archival record.

Two basic approaches to predictive modelling for pre-contact site potential can be described. The first is an empirical or inductive approach, sometimes referred to as correlative (Sebastian and Judge 1988) or empiric correlative modelling (Kohler and Parker 1986). This method employs known site locations, derived from either extant inventories or through sample surveys, as a guide for predicting additional site locations. The second is a theoretical or deductive approach which predicts site locations on the basis of expected behavioural patterns as identified from suitable ethnographic, historical, geographical, ecological, and archaeological analogues. While data requirements or availability tend to influence the particular orientation of the study, every modelling exercise will incorporate both inductive and deductive elements. Foremost is the need to employ any and all available data effectively and expeditiously.

It is important to note that, while heritage planners and resource managers generally prefer to work with specific inventories of resource locations, predictive models do not provide this degree of resolution. Instead they classify the environment into zones of archaeological potential. Three major factors limit the resolution of our images of the past and hence our ability to predict pre-contact site locations with precision.
First, our knowledge of the structure of the socio-political environment in the past is limited by both the inadequacies of the existing archaeological database and the inherent difficulties in interpreting extinct socio-political systems. With respect to the database, the coverage of archaeological survey in Ontario remains spotty at best. Comprehensive survey, using officially sanctioned methods, has only recently been implemented in the context of various pre-development approval processes and archaeological master plans. Areas that have been the object of such comprehensive surveys are relatively few. Although coverage in some other areas may be adequate, through the cumulative efforts of both professional and avocational archaeologists over time, there is currently no quantification of this work that would permit analysis of the province-wide quality of coverage. It is known, however, that vast tracts, including most of the City of Kingston, have never been systematically surveyed.

Second, our knowledge of the pre-contact natural environment is limited by both the inadequacies of the existing paleoenvironmental database and the inherent difficulties in interpreting extinct ecosystems. Just as reconstruction of past social environments minimally requires a basic understanding of the structure of pre-contact social networks, so does reconstruction of past natural environments require some minimal direct evidence of the structure of extinct biotic communities. Although evidence from early historic land surveys, pollen cores, floral and faunal remains, and other sources is slowly accumulating, it remains difficult to carry paleoenvironmental reconstruction past a fairly general level. As in archaeology, stochasticity, or randomness, imposes interpretive limits on the data since the dynamic character of biotic systems makes them increasingly difficult to reconstruct at larger scales. More importantly, it is clear that the distribution of natural resources on the landscape merely constrained rather than strictly determined pre-contact land use.

Third, from a modern perspective it is probably not reasonable to assume that decisions made in pre-contact cultural contexts necessarily followed the same lines of economic logic that we might employ today. These people possessed a world view that was both structurally and substantively different than our own. Therefore, our own concepts of rational behaviour may not completely apply to the pre-contact case. Moreover, there are certain classes of sites, for example rock art sites or burial grounds, that were situated primarily for ideological or aesthetic reasons and are therefore impossible to assess using economically based methods of spatial analysis.

In spite of these limitations, predictive modelling efforts to date have proven successful to the extent that they can permit site potential assessments at a level of probability that is useful in the context of heritage resource assessment and planning.

**Scale and Resolution**

The portrayal of land use patterns, in either a modern, early historic, or pre-contact context, must also address the limitations imposed by mapping scales. Specifically, one must consider the requirements of accuracy and resolution of the intended analysis. In southern Ontario, archaeological sites typically range between about 10 and 250 metres in diameter, although most are probably around 25 metres. It is therefore possible to place known sites on existing 1:50,000 topographic base maps, and in fact the Ontario Archaeological Sites Database (OASD) employed this format for many years. In recent years site locations have been increasingly determined through global positioning system (GPS) technology and the OASD is now maintained on a digital geographic information system (GIS) platform.

Whether working with analogue or digital maps for purposes of mapping archaeological sites, one must consider both the accuracy of the base map and the accuracy with which additional features can be added to it. For example, the accuracy ratings of Class A Standard 1:50,000 N.T.S. maps are as follows: horizontal—90% ± 25 m; vertical—90% ± 0.5 m of contour interval (Surveys and Mapping Branch 1976;
In other words, a feature mapped at this scale has a 90% chance of being within 25 metres (0.5 mm on the map) of its actual location on the ground. Displacement of archaeological sites, due to inaccuracies of the base map alone, could therefore range from 250% of the site diameter for the smallest sites to 10% for the largest. Additional displacement, stemming from difficulties in accurately relating the site to existing features on the map, can be expected to be equally, if not more, severe. Such distortion may be entirely acceptable in the context of evaluating broad categories of archaeological site potential. In contrast, it would clearly be unacceptable as the basis for locating the majority of sites in the field.

In addition to accuracy, one must consider the implications of generalization that pertain to various scales. Since maps are abstractions of reality, and given the constraints of accuracy noted above, maps at different scales exhibit different degrees of resolution. In other words, a feature visible on a 1:2,000 scale map may be too small to represent at 1:50,000. Resolution standards are arbitrary and subject to cartographic licence, however published guidelines are available. For example, N.T.S. 1:50,000 series maps employ the following minimum dimensions for topographic features: islands—15 m (width); eskers—500 m (length); lakes—60 m (width); marshes—150 m (width) (Surveys and Mapping Branch 1974). The ramifications of generalization apply primarily to the utility of various mapping scales as sources of physiographic data. For instance, at a scale of 1:50,000 one might have difficulty relating known sites to all parts of a drainage system since springs and smallest water courses might not be represented.

For purposes of this study, custom digital base mapping compiled at a scale of 1:2,000 and based on Ontario Base Map (OBM) standards was employed. This provided very high resolution of all topographic and hydrographic features. Scaling of the soils data to the 1:2,000 base will have resulted in some distortion, since the original soils mapping was compiled at a scale of 1:63,360. Any such distortion was deemed to be acceptable for purposes of this study, given that the original soils mapping depicts relatively gross generalizations.

**Modeling Criteria**

A useful analogy can be drawn between the criteria used to construct predictive models and the optical filters used in photography: each is used to clarify an image by screening out nonessential information. In predictive modelling, we seek to improve our image of past land-use patterns by focusing on places with a positive attractive value to humans and filtering out places with a neutral or negative value. Some filters are designed to admit a very narrow spectrum while others are less discriminating. Since the efficacy of each filter is in part determined by what is being viewed, none are truly all-purpose. The best image is often achieved by selectively combining several filters. Proper use, therefore, requires knowledge of both the characteristics of the filters and the proposed context of application.

In Ontario, most criteria for predicting pre-contact site potential modelling can be considered narrow-spectrum filters. The best broad-spectrum filter to date, and by far the most methodologically developed, is the one implemented in the "Ontario Hydro Distance to Water Model," also known as simply "The Hydro Model." The success of this model can be attributed to its focus on a criterion that is arguably the most fundamental human resource: water. Regardless of a group's subsistence economy, whether based on hunting herds of caribou or growing corn, it will require access to water. The universality of the need for this resource makes its consideration a logical point-of-departure for most predictive modelling exercises of the pre-contact past.

Having considered proximity to water there are a variety of narrow-spectrum filters that can be considered. Selection of additional criteria will depend on consideration of the context of use as well as a
cost-benefit analysis of their application. While the concatenation of various criteria will improve the filtering effect, there will always be residual sites that cannot be isolated by modelling. The objective, therefore, is to implement a logical series of criteria until one reaches a threshold of diminishing returns that is determined by the needs of the particular study.

**GIS Layers and Analysis**

Most archaeological potential models are now developed using a Geographic Information System (in this case, ArcGIS®) to summarize and map various data sets as separate, but complementary layers. Modelling criteria are then derived through analysis of these layers, and these criteria are applied to produce a final, composite layer, which is the map of archaeological site potential within the City of Kingston.

In this case, digital data for the initial base layer was provided by the City of Kingston and consisted of 1:2,000 scale mapping. Included on this layer were: hydrographic features, including watercourses, lakes, ponds, and wetlands; the road network; and current vegetation.

### 3.1 Pre-contact Aboriginal Archaeological Site Potential

**Research Design**

Pre-contact land-use interpretation and modelling has traditionally been conducted on an intuitive and implicit level. This has been possible since it usually involved fairly localized contexts: a single site or a small constellation of regional sites. In recent decades, attempts been made to make these intuitive concepts explicit and to design predictive models for broader geographic and temporal contexts. Although the work to date has been encouraging, the extant models must still be considered as prototypes requiring field assessment and on-going development. Two basic approaches can be identified in these modelling exercises: a qualitative approach, wherein the paleoenvironment of the study area is characterized in as much detail as possible as a basis for presenting a narrative description of hypothesized aboriginal land use; and a quantitative approach, which attempts to derive site potential probabilities from the statistical correlations between known sites and quantified environmental attributes. While the former approach may be primarily inductive or deductive in character, the reliance of the latter approach on known site locations results in a decidedly inductive character.

In southern Ontario, most modelling exercises have employed a qualitative approach which is predominantly deductive, although they have been informed by the reflection of pre-contact land use afforded by known site locations (e.g., MacDonald and Pihl 1994). Only in regions with robust inventories of registered archaeological sites have quantitative approaches been attempted, and these have been facilitated by the advent of GIS technology and digital environmental and archaeological data (e.g., ASI 1998).

In the case of the City of Kingston, the possibility of adopting a quantitative approach was denied by the extremely low inventory of known archaeological sites in the region. As a result, while GIS technology has been used to quantify and map environmental data, the modelling approach employed in this study was primarily deductive. This is not to say, however, that the known sites in the region did not inform the interpretive process, only that there were too few on which to extrapolate site potential throughout the study area.
The modelling process involved a deductive assessment of the paleoenvironmental constraints which may have affected pre-contact land use in the region. This assessment began with a review of the most fundamental determinants of the landscape, namely bedrock and Quaternary geology, and proceeded through considerations of soils, climate, flora, and fauna. Modelling criteria were established through the consideration of both paleoenvironmental and cultural data, and zones of archaeological potential were digitally mapped on the base mapping.

**Reconstructing Paleoenvironment**

Even before modelling criteria can be invoked, however, it must be recognized that the biotic landscape of southern Ontario has not been static during the span of human occupation. Since deglaciation, it has progressed through a sequence of stages in response to climatic warming. In addition to these broad paleoenvironmental trends, fluctuations in regional and local microenvironments have continued up to the present. Fluctuations in the water levels of the Great Lakes basins, for example, had profound effects upon early pre-contact settlement and subsistence patterns, alternately opening up and then covering vast land areas which, being at different stages of ecological development would have been the locale of alternative sets of resources (Lovis and MacDonald 1999; Monaghan and Lovis 2005). Therefore, when implementing site potential modelling criteria, it is necessary to reconstruct the pre-contact environment at time intervals and degrees of resolution appropriate to the study requirements.

The geological history and structure of the landscape, particularly with respect to the distribution of water, is perhaps the most fundamental aspect of site potential modelling since it not only influenced the distribution of sites in the past but also may have affected the survival or accessibility of those sites in the present. Related to geology is the distribution of soil types. Soil distribution affected the distribution of past floral communities and, in turn, faunal communities. Moreover, soils can be considered a resource which to some extent influenced the distribution of groups that practised horticulture (MacDonald and Pihl 1994).

Climate is another important determinant of the distribution of biotic communities. Ideally archaeologists would like to be able to resolve climatic changes in the past within the range of a century or even a few decades. Although such relatively fine-grained climatic change may have had few recognizable effects in terms of vegetative distributions, it may have caused significant changes in floral, faunal, and agricultural productivity. At present, however, the resolution of climatic change lies more in the range of centuries. In southern Ontario, paleoclimatic reconstruction is further complicated by the influences of the Great Lakes. Modern climatic data for Ontario are published, although detailed mapping of microclimatic variability, a potentially useful source of analogues for paleoclimatic reconstruction, is very limited (MacDonald and Pihl 1994).

The botanical features of the landscape are extremely difficult to retrodict in detail, while at the same time they may have most directly influenced settlement in the past. Various efforts have been directed at using early historical records, such as surveyor’s notes, to reconstruct the distribution of botanical communities immediately prior to the onset of land clearance and logging by European settlers (e.g., Francescut 1980a; Heidenreich 1971; 1973). Modelling of forest composition and dynamics in earlier periods has also been undertaken, largely through the compilation of fossil pollen profiles (e.g., McAndrews 1981). Yet in most cases the spatial and temporal resolution of these reconstructions is either coarser or more geographically restricted than archaeologists would hope for (MacDonald and Pihl 1994).

Zoological landscapes of the past may be the most difficult of all to reconstruct in detail given the constant flux of animal populations. Moreover, as Semken (1983:182) has noted, this difficulty is exacerbated by a general lack of interest in the Holocene among vertebrate paleontologists.
Archaeologists have therefore depended on the reconstruction of pre-contact habitats and modern analogues from wildlife ecology to retrospect the availability of faunal resources. Unfortunately this evidence remains circumstantial and zooarchaeologists have yet to supersede paleontologists with a paleoecological programme of their own. Ironically, archaeological sites offer one of the best paleofauna data sources, albeit in a culturally selected form (MacDonald and Pihl 1994; Sadler and Savage 2003).

In the sections which follow, key aspects of Kingston’s landscape and natural history are reviewed in order to provide a context for evaluating human land use through time and the associated archaeological site potential.

**Physiography and Geology**

In order to investigate regional landforms and how they may have influenced human land-use trends over time, Kingston has been subdivided into four physiographic regions (Table 1; Figure 13), which are described in the following discussion of regional geology.

<table>
<thead>
<tr>
<th>Physiographic Region</th>
<th>Principal Geological Components</th>
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<tbody>
<tr>
<td>Napanee Limestone Plain</td>
<td>glacio-lacustrine clay plain</td>
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<tr>
<td></td>
<td>limestone plain</td>
</tr>
<tr>
<td></td>
<td>sandy loam till</td>
</tr>
<tr>
<td></td>
<td>organic deposits: marsh, muck, peat</td>
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<tr>
<td>Leeds Knobs and Flats</td>
<td>glacio-lacustrine clay plain</td>
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<tr>
<td></td>
<td>limestone plain</td>
</tr>
<tr>
<td></td>
<td>Precambrian bedrock knobs</td>
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<tr>
<td></td>
<td>organic deposits: marsh, muck, peat</td>
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<tr>
<td>Sandy Hill Outwash</td>
<td>glacio-fluvial gravel</td>
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<td></td>
<td>sandy loam till</td>
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<td>glacio-lacustrine sandy loam</td>
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<td></td>
<td>organic deposits: marsh, muck, peat</td>
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<tr>
<td>Frontenac Axis</td>
<td>Precambrian bedrock</td>
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<tr>
<td></td>
<td>organic deposits: marsh, muck, peat</td>
</tr>
</tbody>
</table>

The City of Kingston is situated at an important physiographic interface between the sedimentary rock plains of southern Ontario and the Canadian Shield of northern Ontario. Although the majority of Kingston is underlain by Paleozoic bedrock of Middle Ordovician age, to the north and east is the Frontenac Axis, a ridge of Precambrian bedrock which is a physiographic manifestation of the geological connection between the Canadian Shield to the north and the Adirondack Mountains to the south. The sedimentary Paleozoic bedrock throughout the Great Lakes region lies on top of the much older Precambrian igneous and metamorphic basement, and as the sedimentary rocks thin out east of the Cataraqui River, knobs of Precambrian granites, gneisses, and various metamorphic rocks are exposed where the softer Paleozoic rocks have been weathered away. The areas between the knobs have been in-filled with glacio-lacustrine clay, and Chapman and Putnam (1984: 196) refer to this area as the “Leeds Knobs and Flats physiographic area. As one heads north from Joyceville along Highway 15, the predominance of Precambrian exposures is such that it can fairly be said that this northern tier of Kingston lies within the Frontenac Axis of the Canadian Shield (Chapman and Putnam 1984:1-3; Freeman 1979; Henderson 1966).

To the west of the Cataraqui River lies the extensive Napanee Limestone Plain, an area largely devoid of significant unconsolidated surficial deposits due in part to the erosional action of the Laurentide glacier (Chapman and Putnam 1984: 186-187; Leyland and Russell 1983, 1984). Within the
study area the most extensive Paleozoic facies is the Middle Ordovician Gull River Formation, comprising fine-grained limestone, siltstone, dolomitie limestone, and crystalline limestone (Leyland and Russell 1983, 1984). During the Wisconsian glaciation, the southwesterly (~248°) movement of the Laurentide ice sheet was recorded by striations in the bedrock surface, as it dragged granitic cobbles and boulders across the softer limestone (Shaw 1994b: 29). While this tremendous force would also have pushed and plucked at scarps in the sedimentary rock, gouging out significant valleys, hydraulic forces also seem to have scored and fluted the landscape, contributing to the parallel, northeast-southwest trending streams and lakes which occur in this area. Between the interwoven network of valleys, bedrock escarpments have been shaped into prominent noses oriented north-easterly into the former ice flow, and the bedrock extending down-flow from these escarpments has been subjected to large-scale fluting (Shaw 1994a: 26). While the valley networks have been identified as sub-glacial meltwater tunnel channels, the fluting of the intervening uplands has been interpreted as the product of a vast sub-glacial flood event (Shaw and Gilbert 1990; Shaw 1994a:26-28). This event may also account for the general lack of unconsolidated Quaternary sediments throughout the Kingston area (Dalrymple and Price 1994: 51).

Since the end of the Pleistocene, joints in the exposed or thinly mantled limestone have weathered through physical and chemical erosion to produce networks of broad fissures or “grykes” surrounding limestone polygons termed “clints.” This clint and gryke terrain is most apparent in areas where the bedrock is intermittently or completely exposed over broad areas, and streams flowing across such terrain may suddenly disappear underground, as several do in the study area. With or without the clint and gryke terrain, such areas of thinly covered or mostly exposed bedrock, known as alvars, support unique biotic communities, and several such areas occur throughout the Napanee Limestone Plain.

Aside from Holocene-aged deposits of alluvium and organics and recent fill, the Quaternary deposits in Kingston are all of Late Wisconsian age. Glacial till in the area tends to be silty to sandy, moderately stony, and less than one metre in depth. Notable deposits are mapped on the east side of former Kingston

![Figure 3-1: Physiography and Quaternary Geology of the City of Kingston](image-url)
Township and scattered throughout the southern part of former Pittsburgh Township, mostly south of Highway 401. Glacio-fluvial ice-contact and outwash deposits show a similar patchy distribution, with notable deposits in the vicinity of Glenburnie and especially in the area between Sand Hill and Pine Grove, referred to herein as the Sandy Hill Outwash region. Amongst the glacial deposits in this region are two eskers.

By far the most extensive Quaternary deposits in Kingston are deep-water glacio-lacustrine silts and clays laid down in glacial Lake Iroquois between about 12,500 B.P. and 11,400 B.P. (Anderson and Lewis 1985; Gilbert 1994: 47-48; Henderson 1966; Leyland and Russell 1983, 1984; Muller and Prest 1985). While most of these are on the order of one metre in depth, accumulations over 20 metres in depth have been noted in bedrock depressions such as the valley of Little Cataraqui Creek. These depressions also commonly contain Holocene-aged organic deposits of peat and muck (Leyland and Russell 1983).

Finally, it is worth noting that the City of Kingston lies only about 40 kilometres west of the former strand of the Champlain Sea, a marine incursion which inundated eastern Ontario and parts of neighbouring southern Quebec and northern New York State between roughly 12,000 and 10,000 years ago (Gadd 1987: Figure 5).

Hydrography

Following the drainage of Lake Iroquois and the onset of the low-level stage of early Lake Ontario around 11,400 B.P., the Kingston lakeshore began an evolutionary sequence that would see relatively little change in the configuration of the waterfront itself (Gilbert 1994: Figure 55), but which would see significant changes in the configuration of the Lake Ontario-St. Lawrence River interface. As with the interwoven network of regional drainages previously noted, the Kingston basin of Lake Ontario features several deeply eroded bedrock channels that have been attributed to scouring by sub-glacial fluvial discharge. To the west of Kingston such channels also underlie the North Channel, the Bay of Quinte, the lower Trent River valley, and to the east they underlie the various channels of the St. Lawrence River (Shaw 1994a: Figure 25).

Between roughly 11,400 B.P. and 8,000 B.P., the northern part of the Kingston Basin was isolated from the southern part which incorporated the outlet from Lake Ontario into the early St. Lawrence River. A large, shallow lake in the Kingston basin drained northerly through drainages east and west of Amherst Island into the North Channel. The relatively narrow but deep North Channel was at that time essentially a segment of a large river which included the Trent Valley, the Bay of Quinte, and ultimately the St. Lawrence River via the channel north of Wolfe Island. Between about 9,500 B.P. and 8,000 B.P. significant flows may have come through this system via the Kirkfield-Fenelon Falls spillway to the Trent River system due to increased inputs from the Upper Great Lakes and glacial Lake Agassiz. Sub-bottom profiling has provided evidence that a substantial floodplain developed between Kingston and Wolfe Island, serving as a local base level controlling water levels in the system (Gilbert 1994: 47-48). Gilbert (1994: 48) suggests that this floodplain, with extensive shallow shelves along the sides, likely resembled a much larger version of the riparian wetland which today flanks the Cataraqui River. After about 8,000 B.P. isostatic rebound had raised the St. Lawrence River to the point where the bedrock controlling sills in the Kingston area were back-flooded, thereby connecting the Kingston Basin with the main Ontario Basin. Transgression due to isostatic uplift continued until modern lake levels were achieved around 4,000 B.P. (Anderson and Lewis 1985:246-249; Gilbert 1994: 48).

Detailed evidence of lake-level fluctuations over the last four millennia has been gleaned from core samples of alternating peat and organic-rich clayey silts (gyttja) taken from the Cataraqui Lagoon north of Bells Island. Over 2.5 metres of sediment have accumulated in this reach since a lagoon first developed.
there due to the transgression of Lake Ontario around 4,000 B.P. Since there is a strong correlation between organic matter content of the sediments and water depth—attributed to peat deposition during shallow water phases, when a marsh environment prevailed, and gyttja deposition during deeper water phases, when an open-water lagoon environment prevailed—water levels over time can be estimated by radiocarbon dating the alternating peat and gyttja strata. This has revealed periods of marsh formation (i.e. lower water levels) from circa 4,000 B.P. to 3,200 B.P. and from circa 2,400 B.P. to 2,000 B.P. In spite of on-going sedimentation, the trend over the last two millennia has been a fairly consistent rise in water levels relative to the surface of the substrate and an overall rise of about 2 metres since 4,000 B.P. (Dalrymple and Price 1994: 50-53).

The foregoing suggests that the hydrographic system has remained relatively unchanged since deglaciation. With base levels primarily under bedrock control, only a modest amount of entrenchment would have been possible, even in areas of deeper glacio-lacustrine clay deposits. Similarly, lateral movement of watercourses has been heavily constrained within bedrock valleys. Nor were there substantial quantities of unconsolidated materials to be eroded and carried into the drainage systems (Vreeken 1994: 40). While some transport and deposition of the fine-grained glacio-lacustrine materials would be expected, it has been suggested that the lack of coarse-grained materials within the lower reaches of the Cataraqui River system may be a function of the many upstream lakes serving as settling basins (Dalrymple and Price 1994: 51), and a similar process was likely at work throughout the Kingston drainages. The result would have been a gradual in-filling of the bedrock valleys and basins, initially with glacio-lacustrine clay, but after the retreat of Lake Iroquois, with fine-grained alluvium. Under certain circumstances, conditions favoured the deposition of marl, a highly calcareous lacustrine sediment. The margins of these shallow watercourses would have developed riparian wetlands, and the organic deposits associated with these would likewise encroach on stretches of open water. Over time, smaller basins would have become filled and incorporated into the terrestrial landscape as peatlands (Vreeken 1994: 39-40). The current configuration of the hydrographic system throughout Kingston (Table 2) very much reflects the on-going evolution of such a landscape.

### Table 3: Principal Watersheds of the City of Kingston

<table>
<thead>
<tr>
<th>Drainage Basin</th>
<th>Major Watershed</th>
<th>Subordinate Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Ontario</td>
<td>Wilton Creek</td>
<td>Odessa Lake</td>
</tr>
<tr>
<td></td>
<td>Millhaven Creek</td>
<td>Glenvale Creek</td>
</tr>
<tr>
<td></td>
<td>Collins Creek</td>
<td>Collins Lake</td>
</tr>
<tr>
<td>Little Cataraqui Creek</td>
<td>Butternut Creek</td>
<td>Butternut Creek</td>
</tr>
<tr>
<td>Cataraqui River</td>
<td>Steventown Creek</td>
<td>Steventown Creek</td>
</tr>
<tr>
<td></td>
<td>Mosquito Creek</td>
<td>Mosquito Creek</td>
</tr>
<tr>
<td></td>
<td>Colonel By Lake*</td>
<td>Colonel By Lake*</td>
</tr>
<tr>
<td></td>
<td>River Styx*</td>
<td>River Styx*</td>
</tr>
<tr>
<td></td>
<td>Cranberry Lake*</td>
<td>Cranberry Lake*</td>
</tr>
<tr>
<td></td>
<td>Leo Lake*</td>
<td>Leo Lake*</td>
</tr>
<tr>
<td></td>
<td>Little Cranberry Lake*</td>
<td>Little Cranberry Lake*</td>
</tr>
<tr>
<td></td>
<td>Loughborough Lake (via Milburn Creek to Dog and Cranberry Lakes)</td>
<td>Loughborough Lake (via Milburn Creek to Dog and Cranberry Lakes)</td>
</tr>
<tr>
<td>Gananoque River</td>
<td>Mud Creek</td>
<td>Mud Creek</td>
</tr>
<tr>
<td></td>
<td>Brady Creek</td>
<td>Brady Creek</td>
</tr>
<tr>
<td>Lake Ontario</td>
<td>Abbey Dawn Creek</td>
<td>Abbey Dawn Creek</td>
</tr>
<tr>
<td></td>
<td>Moors Creek</td>
<td>Moors Creek</td>
</tr>
<tr>
<td></td>
<td>Grass Creek</td>
<td>Grass Creek</td>
</tr>
<tr>
<td></td>
<td>Firmans Creek</td>
<td>Firmans Creek</td>
</tr>
<tr>
<td></td>
<td>Leakey’s Creek</td>
<td>Leakey’s Creek</td>
</tr>
</tbody>
</table>

* - water body created or expanded by construction of Rideau Canal system
In addition to the natural changes which have affected the hydrographic system over time, there have also been man-made changes to regional water courses and water bodies, the most noteworthy being the construction of the Rideau Canal system (Francescut 1980b; Watson 2000). Opened in 1832, the Rideau Canal created several lakes along the Cataraqui River where falls and rapids were replaced by locks (Table 2). At Kingston Mills, the Cataraqui River originally fell about 6 metres over the Cataraqui Falls, a series of rocky waterfalls spanning a distance of about 183 metres. Upstream from Cataraqui Falls there was a shallow stretch known as Jack’s Rifts, a series of rapids 152 metres long and 0.5 metres deep now located within the current channel between Colonel By Lake and the River Styx. Farther upstream were Billydore’s Rifts, a series of small rapids dropping 1.2 metres over 1.6 kilometres and now located at the northeast end of the River Styx. These features disappeared when a 9 metre high dam and series of four locks was built at Kingston Mills, bypassing the Cataraqui Falls and flooding the land up to the northeast end of the River Styx. There were also rapids at Lower Brewer’s Mills, near Washburn, and at Upper Brewer’s Mills. These too disappeared following the construction of locks in these locations. Upstream from Brewer’s Mills the landscape was originally a large marsh contiguous with a much smaller Cranberry Lake in the north end of the basin. This landscape now lies within the shores of Cranberry Lake, Little Cranberry Lake, and Leo Lake thanks to raised water levels created by a dam, 30.5 metres long and 3.5 metres high, plus two locks, each with a lift of 2.7 metres, located at Brewer’s (Upper) Mills (Watson 2000).

Soils

A relatively modest array of soils has developed on the Quaternary deposits of Kingston. These have been mapped according to 12 soil associations together with two organic soils (peat and muck), marshland, rockland and rock outcrops, and urban land (see Table 3).

With respect to soil texture, the distribution (Figure 14) is strongly correlated with the geological origins of the parent materials (Figure 13), with widespread fine-grained materials primarily derived from glacio-lacustrine silts and clays and coarser materials derived from sandy glacial till and sandy to gravelly glacio-fluvial deposits. The largest group of soils (Gananoque, Landsdowne, and Napanee), comprising 43.2% of the study area, has developed on calcareous lacustrine clay. One soil series (Farmington), comprising 25.8% of the study area, has developed on thin deposits of calcareous loam overlying limestone bedrock. Rock land and rock outcrops comprise another 9.9% of the landscape. Three series (Bondhead, Guerin, and Lyons), comprising 6.9% of Kingston, have developed on deposits of calcareous loam and sandy loam till. The remaining soils, comprising 4.4% of the study area, have developed on a variety of lacustrine and till deposits. The balance of the study area is composed of peat, muck, and marsh (3.8%), and urban and other unclassified land (6.0%).

The majority of soils are well drained (51.3%), while 21.1% are imperfectly drained and 19.9% are poorly drained (Figure 15). Since texture is a key factor affecting soil moisture-holding capacity, Figure 16 illustrates the composite distribution of soil texture and drainage attributes.
Figure 3-2: Distribution of Soils by Texture Class

Figure 3-3: Distribution of Soils by Drainage Class
### Table 4: Soils of the City of Kingston

<table>
<thead>
<tr>
<th>Parent Materials</th>
<th>Soil Series</th>
<th>Percent of Soils</th>
<th>CSSC Taxon</th>
<th>Texture</th>
<th>Drainage</th>
<th>Agriculture Capability</th>
<th>Agriculture Limitation</th>
<th>CLI Ag. Class/Limit</th>
<th>Texture Drainage Class</th>
<th>Original order</th>
</tr>
</thead>
<tbody>
<tr>
<td>calcareous loam and sandy loam till</td>
<td>Bondhead loam</td>
<td>0.7%</td>
<td>BR.GBL</td>
<td>loam</td>
<td>well</td>
<td>4</td>
<td>stoniness</td>
<td>4P</td>
<td>loam/w</td>
<td>1</td>
</tr>
<tr>
<td>Bondhead - shallow phase</td>
<td>Bondhead loam</td>
<td>1.0%</td>
<td>BR.GBL</td>
<td>loam</td>
<td>well</td>
<td>5</td>
<td>stoniness</td>
<td>5P</td>
<td>loam/w</td>
<td>2</td>
</tr>
<tr>
<td>Bondhead - sandy phase</td>
<td>Bondhead loam</td>
<td>0.5%</td>
<td>BR.GBL</td>
<td>sand</td>
<td>well</td>
<td>4</td>
<td>stoniness</td>
<td>4P</td>
<td>loam/w</td>
<td>3</td>
</tr>
<tr>
<td>Guerin loam</td>
<td>Guerin loam</td>
<td>1.4%</td>
<td>GLBR.GBL</td>
<td>loam</td>
<td>imperfect</td>
<td>1</td>
<td>none</td>
<td>1</td>
<td>loam/i</td>
<td>4</td>
</tr>
<tr>
<td>Guerin - shallow phase</td>
<td>Guerin loam</td>
<td>2.0%</td>
<td>GLBR.GBL</td>
<td>loam</td>
<td>imperfect</td>
<td>4</td>
<td>inadequate depth</td>
<td>4R</td>
<td>loam/i</td>
<td>5</td>
</tr>
<tr>
<td>Lyons loam</td>
<td>Lyons loam</td>
<td>0.4%</td>
<td>O.HG</td>
<td>loam</td>
<td>poor</td>
<td>5</td>
<td>excess moisture</td>
<td>5W</td>
<td>loam/p</td>
<td>6</td>
</tr>
<tr>
<td>Lyons - shallow phase</td>
<td>Lyons loam</td>
<td>0.9%</td>
<td>O.HG</td>
<td>loam</td>
<td>poor</td>
<td>5</td>
<td>excess moisture</td>
<td>5W</td>
<td>loam/p</td>
<td>7</td>
</tr>
<tr>
<td>calcareous lacustrine clay</td>
<td>Gananoque clay</td>
<td>9.0%</td>
<td>O.GL</td>
<td>clay</td>
<td>well</td>
<td>3</td>
<td>topography</td>
<td>3T</td>
<td>clay/w</td>
<td>8</td>
</tr>
<tr>
<td>Gananoque - rocky phase</td>
<td>Gananoque clay</td>
<td>0.9%</td>
<td>O.GL</td>
<td>clay</td>
<td>well</td>
<td>5</td>
<td>inadequate depth</td>
<td>5R</td>
<td>clay/w</td>
<td>9</td>
</tr>
<tr>
<td>Gananoque - shallow phase</td>
<td>Gananoque clay</td>
<td>0.6%</td>
<td>O.GL</td>
<td>clay</td>
<td>well</td>
<td>4</td>
<td>inadequate depth</td>
<td>4R</td>
<td>clay/w</td>
<td>10</td>
</tr>
<tr>
<td>Gananoque-Napane complex</td>
<td>Gananoque clay</td>
<td>1.7%</td>
<td>O.GL/O.HG</td>
<td>clay</td>
<td>well/poor</td>
<td>3</td>
<td>topography</td>
<td>3T</td>
<td>clay/w</td>
<td>11</td>
</tr>
<tr>
<td>Lansdowne clay</td>
<td>Lansdowne clay</td>
<td>16.0%</td>
<td>GL.GL</td>
<td>clay</td>
<td>imperfect</td>
<td>2</td>
<td>structure/permeability</td>
<td>2D</td>
<td>clay/i</td>
<td>12</td>
</tr>
<tr>
<td>Lansdowne - rocky phase</td>
<td>Lansdowne clay</td>
<td>0.7%</td>
<td>GL.GL</td>
<td>clay</td>
<td>imperfect</td>
<td>5</td>
<td>inadequate depth</td>
<td>5R</td>
<td>clay/i</td>
<td>13</td>
</tr>
<tr>
<td>Lansdowne - shallow phase</td>
<td>Lansdowne clay</td>
<td>0.8%</td>
<td>GL.GL</td>
<td>clay</td>
<td>imperfect</td>
<td>4</td>
<td>inadequate depth</td>
<td>4R</td>
<td>clay/i</td>
<td>14</td>
</tr>
<tr>
<td>Napane clay</td>
<td>Napane clay</td>
<td>12.8%</td>
<td>O.HG</td>
<td>clay</td>
<td>poor</td>
<td>3</td>
<td>excess moisture</td>
<td>3W</td>
<td>clay/p</td>
<td>15</td>
</tr>
<tr>
<td>Napane - rocky phase</td>
<td>Napane clay</td>
<td>0.1%</td>
<td>O.HG</td>
<td>clay</td>
<td>poor</td>
<td>5</td>
<td>inadequate depth</td>
<td>5R</td>
<td>clay/p</td>
<td>16</td>
</tr>
<tr>
<td>Napane - shallow phase</td>
<td>Napane clay</td>
<td>0.4%</td>
<td>O.HG</td>
<td>clay</td>
<td>poor</td>
<td>4</td>
<td>inadequate depth</td>
<td>4R</td>
<td>clay/p</td>
<td>17</td>
</tr>
<tr>
<td>calcareous lacustrine silty clay loam</td>
<td>Seeleys Bay silt loam</td>
<td>0.6%</td>
<td>O.GBL</td>
<td>silt loam</td>
<td>well</td>
<td>2</td>
<td>topography</td>
<td>2T</td>
<td>loam/w</td>
<td>18</td>
</tr>
<tr>
<td>calcareous lacustrine fine sandy loam</td>
<td>Newburgh fine sandy loam</td>
<td>0.4%</td>
<td>BR.GBL</td>
<td>fine sandy loam</td>
<td>well</td>
<td>2</td>
<td>topography</td>
<td>2T</td>
<td>loam/w</td>
<td>19</td>
</tr>
<tr>
<td>Hinchinbrooke silt loam</td>
<td>Hinchinbrooke clay</td>
<td>0.4%</td>
<td>O.HG</td>
<td>silt loam</td>
<td>poor</td>
<td>2</td>
<td>excess moisture</td>
<td>2W</td>
<td>loam/p</td>
<td>20</td>
</tr>
<tr>
<td>Lindsay clay</td>
<td>Lindsay clay</td>
<td>0.2%</td>
<td>O.HG</td>
<td>clay</td>
<td>poor</td>
<td>2</td>
<td>excess moisture</td>
<td>2W</td>
<td>clay/p</td>
<td>21</td>
</tr>
<tr>
<td>Lindsay clay loam</td>
<td>Lindsay clay</td>
<td>0.9%</td>
<td>O.HG</td>
<td>clay loam</td>
<td>poor</td>
<td>2</td>
<td>excess moisture</td>
<td>2W</td>
<td>loam/p</td>
<td>22</td>
</tr>
<tr>
<td>clay over calcareous loam till</td>
<td>White Lake gravelly sandy loam</td>
<td>1.9%</td>
<td>LU.HFP</td>
<td>gravelly sandy loam</td>
<td>well</td>
<td>4</td>
<td>nutrient deficiencies</td>
<td>4F</td>
<td>loam/w</td>
<td>23</td>
</tr>
<tr>
<td>thin deposits over limestone bedrock</td>
<td>Farmington loam</td>
<td>25.8%</td>
<td>O.MB</td>
<td>loam</td>
<td>well</td>
<td>6</td>
<td>inadequate depth</td>
<td>6R</td>
<td>loam/w</td>
<td>24</td>
</tr>
<tr>
<td>organic materials</td>
<td>muck</td>
<td>2.8%</td>
<td>n/a</td>
<td>organic</td>
<td>poor</td>
<td>7</td>
<td>excess moisture</td>
<td>7W</td>
<td>organic/p</td>
<td>25</td>
</tr>
<tr>
<td>organic materials</td>
<td>peat</td>
<td>0.4%</td>
<td>n/a</td>
<td>organic</td>
<td>poor</td>
<td>7</td>
<td>excess moisture</td>
<td>7W</td>
<td>organic/p</td>
<td>26</td>
</tr>
<tr>
<td>n/a</td>
<td>marsh</td>
<td>0.7%</td>
<td>n/a</td>
<td>organic</td>
<td>poor</td>
<td>7</td>
<td>excess moisture</td>
<td>7W</td>
<td>organic/p</td>
<td>27</td>
</tr>
<tr>
<td>n/a</td>
<td>rockland</td>
<td>6.4%</td>
<td>n/a</td>
<td>n/a</td>
<td>well</td>
<td>7</td>
<td>inadequate depth</td>
<td>7R</td>
<td>rock/w</td>
<td>28</td>
</tr>
<tr>
<td>n/a</td>
<td>rock outcrop</td>
<td>3.5%</td>
<td>n/a</td>
<td>n/a</td>
<td>well</td>
<td>7</td>
<td>inadequate depth</td>
<td>7R</td>
<td>rock/w</td>
<td>29</td>
</tr>
<tr>
<td>n/a</td>
<td>unmapped</td>
<td>3.5%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>30</td>
</tr>
<tr>
<td>n/a</td>
<td>urban land (not classified)</td>
<td>2.4%</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>31</td>
</tr>
</tbody>
</table>

Figure 3-4: Distribution of Soils by Texture & Drainage Class

Figure 3-5: Distribution of Soils by Capability for Agriculture
Only one soil series, Guerin loam, representing 1.4% of the study area, is rated as Class 1 for agriculture by the Canada Land Inventory (Figure 17). Nevertheless, there are substantial quantities of Class 2 (18.5%) and Class 3 (23.5%) soils, bringing the total arable land in Kingston to nearly half of the total (43.4%). A nearly equivalent area (39.5%) is made up of Class 6 (25.8%) and Class 7 (13.7%) soils which have virtually no capacity for agriculture. Marginal soils, comprising Class 4 (6.9%) and Class 5 (4.0%) make up the remainder (10.9%) of the rated soils. Inadequate depth to bedrock is the predominant (37.8%) limiting factor for agricultural capability. Other limitations include: excess moisture (19.4%), poor structure or permeability (16.0%), adverse topography (11.7%), stoniness (2.2%), and nutrient deficiencies (1.9%).

The mineral soils of Kingston are dominated by those of the Luvisolic soil order, accounting for about 34.8% of the study area. The remainder includes Brunisols (25.8%), Gleysols (16.1%), and Podzols (1.9%).

Luvisols are well to imperfectly drained mineral soils that have developed on calcareous parent materials under the influence of the growth and decomposition of forest vegetation in sub-humid to humid, mild to very cold climates. Luvisols are characterized by eluvial Ae horizons and illuvial Bt horizons with silicate clay as the main accumulation product. The A and B horizons are slightly to moderately acidic and the C horizons are usually neutral to alkaline. The Luvisolic soils of the study area belong to the Gray Brown Luvisol and Gray Luvisol great groups. Gray Brown Luvisols have developed under deciduous or mixed forest vegetation where high biological activity has resulted in the rapid incorporation of forest litter (L, F, H horizons) to form dark humic Ah horizons. The parent materials are typically till, glacio-fluvial, or glacio-lacustrine deposits. Loamy textures predominate but clayey and sandy loams also occur. The morphological characteristics of the eluvial Ae horizon and textural Bt horizon are most strongly expressed on medium to fine textured soils. On coarser, sandy soils the properties of the profile tend to intergrade with those of Brunisolic or Podzolic soils. In eastern Canada, Gray Luvisols have developed under boreal or mixed forest vegetation in humid to perhumid areas, usually on calcareous medium to fine textured parent materials. Gray Luvisols typically exhibit greater forest litter (L, F, H) horizons and less well developed Ah horizons than Gray Brown Luvisols. Luvisolic soils usually develop on gently to moderately rolling lands, especially on adequately drained, middle and upper slopes (ACECSS 1987: 78-79).

Brunisols are a broad group of well to imperfectly drained mineral soils that have developed under vegetative regimes ranging from forest to alpine to tundra. They occur in varying climatic zones, from Mesic to Arctic and from semiarid to perhumid. Their distinguishing characteristic is a prominent brownish Bm horizon which has developed in situ and hence mostly lacks the illuviation that typifies Podzolic and Luvisolic soils. Since leaching and weathering are relatively poorly developed in Brunisolic soils, their chemical characteristics tend to reflect those of the parent material. In Kingston, soils of the Melanic Brunisol great group, formerly referred to as Brown Forest soils, are the only representatives of the Brunisolic order. Developed under deciduous or mixed forests, these soils exhibit a pronounced humic A horizon as a result of the degradation of forest litter by soil fauna. Parent materials are most frequently loamy to clayey, moderately to strongly calcareous, glacial till and lacustrine deposits. Topography is typically gently to moderately rolling. Fertility limitations of Melanic Brunisols are slight to moderate and productivity is often high. While structural limitations are generally not a problem, shallowness to bedrock is a significant limitation of Farmington loam, the only Melanic Brunisol in Kingston (Clayton et al. 1977:1:124-131; Gillespie et al. 1966).

The poorly drained mineral soils of Kingston are Orthic Humic Gleysols. Gleysolic soils are poorly drained mineral soils that are saturated with water and are under reducing conditions, due to lack of aeration, for some or all of the year. Vegetative regimes are hydrophytic and range from tundra to forest and meadow. By definition these soils include dull, greenish to bluish grey gleyed horizons, although
surface horizons may vary from organic O horizons to organic-mineral Ah and Ae horizons, with or without a B horizon. In the study area all Gleysolic soils belong to the Humic Gleysol great group. These have well-developed humic A horizons, over 8 cm in depth, overlying gleyed B or C horizons. Parent materials are typically alluvial, glacio-lacustrine, or resorted till deposits. Where Humic Gleysols are dominant, the topography is usually level to gently rolling. Where they are subordinate, they often occupy local depressions or kettles. Fertility limitations of Humic Gleysols are minor and productivity can be high for a variety of crops if drainage is artificially improved. Meadow grasses and sedges are commonly supported in the natural state (Clayton et al. 1977:1:136-140).

Organic soils contain more than 30% organic matter by weight and meet certain criteria of thickness within a defined control section. Unless artificially drained, they are water saturated or nearly saturated throughout the year, and as such are derived from the decomposition of hydrophytic vegetation. Organic soils are classified on the basis of degree of decomposition within the control section, which is divided into an upper tier (30-60 cm), middle tier (60 cm thick or to contact with water or sediment/bedrock), and lower tier (40 cm thick or to contact with water or sediment/bedrock). Fibric layers are composed of poorly decomposed fibres which are readily identifiable to botanical origin, and soils with predominant middle or middle and upper tier fibric layers are termed Fibrisols. Mesic layers are composed of organic matter in an intermediate stage of decomposition, and soils with predominant middle or middle and upper tier mesic layers are termed Mesisols. Fibrisols and Mesisols are commonly referred to as peat. Humic layers are composed of highly decomposed organic material, and soils with predominant middle or middle and upper tier humic layers are termed Humisols (formerly known as muck soils) (ACECSS 1987: 82-92; Clayton et al. 1977:1:142-143).

One soil series in Kingston, White Lake gravelly sandy loam, is classified as a Humo-Ferric Podzol. Soils of the Podzolic order are well to imperfectly drained mineral soils that have developed under the influence of forest or heath vegetation in mild to cold, humid to perhumid conditions. Weathering has produced amorphous complexes of soluble organic matter and mobile compounds of aluminum and iron, which have accumulated to form a discrete podzolic B horizon. This B horizon typically has an abrupt upper boundary and may form a cemented pan. The A and B horizons, and usually the C horizons, are characteristically acidic. In the study area, the Podzolic soils belong exclusively to the Humo-Ferric Podzol great group. These usually form on acidic, iron-rich, non-calcareous materials and are characterized by podzolic B horizons high in iron and aluminum colloids and low in organic matter. Humic A horizons are thin and eluvial Ae horizons are highly bleached. Parent materials are typically coarse, frequently stony, glacial till, outwash, or glacio-fluvial sand deposits. Loamy-textured parent materials are less common. Podzolic soil development usually occurs on gently to steeply rolling lands. The productivity of Podzolic soils is generally not great, owing to fertility limitations as well as local constraints, including stoniness, shallowness to bedrock, and imperfect drainage due to topography. Structural limitations are usually not a problem except where iron pans occur (Clayton et al. 1977:1:120-124).

Paleoclimatology

The climate of southern Ontario (including eastern Ontario) is described as having warm summers, mild winters and a long growing season with usually reliable rainfall. Precipitation is fairly evenly distributed throughout the year. Regional climatic variations are due primarily to elevation and topography, prevailing winds and proximity to the Great Lakes. Year to year variability is attributable to the nature and frequency of weather systems which cross the area (Brown et al. 1980:1-2).

The fossil pollen record available for eastern Ontario has provided an outline of the region's paleoclimate. After adjustments are made for the differential dispersion of pollen by various species, a diachronic
reconstruction of the prevailing climatic conditions can be undertaken on the basis of the preferred habitats of those species.

During the period of initial deglaciation (ca. 12,000 B.P.), a harsh climate characterized by cool and extremely dry conditions prevailed in the study area. Mean annual temperatures in the study region were probably less than -3° Celsius (McAndrews 1981). Some have attributed these low temperatures throughout the Great Lakes-St. Lawrence region to the inflow of large volumes of glacial meltwater or pro-glacial lake water (Lewis and Anderson 1989). In eastern Ontario, the presence of the Champlain Sea would likely have had a cooling effect on local climate.

In south-western Ontario, a trend towards warming temperatures has been interpreted for the period from around 10,500 to 10,000 B.P. as the glacial lake levels receded in the Huron basin. The period between c. 9,500 and 8,000 B.P., however, witnessed an apparent climatic reversal with winters becoming longer and more severe, and summers warmer and drier than previously. This trend has traditionally been seen as a result of the extremely low water levels in the Great Lakes basins, which reduced the moderating effects of the evolving Great Lakes, however, it has recently been suggested that this deterioration was also caused by a new influx of cold waters from Glacial Lakes Agassiz and Ojibway during the brief "Mattawa flood" (Lewis and Anderson 1989). These observations suggest that, in Kingston, the retreat of the Champlain Sea may have had a similar effect of reducing local climatic moderation, while an influx of cold waters into the Trent valley may have produced micro-climatic cooling in the vicinity of the ancestral St. Lawrence River.

From c. 8,000-6,500 B.P., the region's climate became more moderate, experiencing warmer mean annual temperatures and greater precipitation. At their maximum, during the Hypsithermal, temperatures probably exceeded present levels by 1° to 2° Celsius. It is unlikely, however, that this climatic amelioration was sufficient to affect the zonal vegetation (McAndrews 1981). Essentially modern mean annual temperatures (7° Celsius) and precipitation levels were reached by c. 6,000 B.P.

Climatic trends and fluctuations play a significant role in determining the character of the natural environment to which human populations must adapt. As the shift in climatic conditions which occurred following deglaciation was very gradual, the concomitant changes which were necessary to the subsistence modes of pre-contact populations were also gradual. While long-term climatic trends did not directly influence the subsistence practices of a population in the short term, there are many short-term climatic factors that had significant implications for local settlement-subistence practices, the most critical of which were temperature, precipitation, potential evapotranspiration, frost-free days, snowfall, and wind-speed and direction. Short-term climatic irregularities may have been most keenly felt during the last millennium of prehistory, as aboriginal groups became increasingly reliant upon agriculture to supplement their dietary requirements.

The number of frost-free days, which represents the effective length of the growing season for agriculture, would have been of importance to pre-contact horticulturists. The mean length of the frost-free period is about 135 - 145 days in the Kingston area (Brown et al. 1980:60), which is more than adequate for traditional aboriginal agriculture. Moreover, Kingston lies within the 2700 - 2900+ range for corn heat units (CHU), a measure of capacity for corn maturation based on maximum and minimum daily temperatures. Grain corn is typically grown in areas exhibiting >2500 CHU, while corn can be grown for silage in areas of only 2100 CHU (Brown et al. 1980: 37-38).

The mean annual precipitation in the Kingston area is about 86 cm, with monthly means fairly evenly distributed at about 7.5 cm. Factors influencing local precipitation in southern Ontario are slope, elevation, proximity to the large lakes, and the prevailing winds (Brown, et al. 1980: 39). The last two variables exert considerable influence on local precipitation patterns. For aboriginal horticulture the
amount of precipitation during the growing season was sufficient, especially given the good waterholding capabilities of most local soil types.

Climatic conditions have been far from constant over the last millennium. Of particular importance is a climatic period characterized by cooling and referred to as the "Little Ice Age" (Bryson and Murray 1977; Grove 2004). This episode, which is conventionally dated to between A.D. 1550 and 1880, may have reduced average daily temperatures in southern Ontario by about one-half degree Celsius. In addition, early fall temperatures may have been reduced by about 1.5 degrees Celsius (Bryson and Murray 1977).

Paleovegetation

While a comprehensive discussion of the pre-contact vegetation of the study area is beyond the scope of this study, it is possible to draw some general conclusions regarding the development of Kingston’s plant communities since the Pleistocene. In addition, as the nature of understorey and forest floor vegetation is often dependent on the same factors which determine forest cover, and on the forest cover itself, an understanding of these factors may be useful in the recognition of particular floral resources within the environment which may have been actively sought out by past populations. The identification of these potential resources, and the determination of their general spatial and temporal variation within the study area, will further assist in reconstructing the subsistence strategies of the region's pre-contact occupants, and the diachronic changes these practices may have undergone.

The late Pleistocene and Holocene terrestrial environments of the Ottawa Valley-Lake Ontario region have been described by Anderson (1987) based on pollen stratigraphy obtained from sample sites located throughout this area. Sites in the environs of Kingston include the Bay of Quinte (Anderson and Lewis 1985), Harrowsmith Bog (Figure 18) (Terasmae 1969), and the Waterton Bog (Anderson 1987). Another sample site, situated to the west of Kingston at Parrott’s Bay (Figure 19), has been reported by McCarthy (1986). Shortly after deglaciation, the uplands bordering the Champlain Sea were colonized by herb-shrub tundra with scattered woodlands of spruce (\textit{Picea} sp.), poplar (\textit{Populus} sp.), juniper (\textit{Juniperus} sp.), and shrub birch (\textit{Betula} sp.) and alder (\textit{Alnus} sp.). Over time, spruce and poplar woodlands developed in the southern uplands, while woodlands dominated by poplar developed in the Ottawa Valley and southern Laurentians. Spruce-dominated forest eventually migrated northward to replace the poplar woodland by around 11,000 B.P. in the area to the south of the Champlain Sea. By the time the Champlain Sea had withdrawn around 10,000 B.P., spruce forests were dominant from Lake Ontario to the southern Laurentians (Anderson 1987: 33-34).
White pine, oak, and birch all produce large quantities of pollen and may be over-represented in this spectrum. Currently this relatively large (~241 hectares) peatland supports 12 biotic communities ranging from bog and lowland forests to upland forests and meadows. Upland forests are dominated by sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), and shagbark hickory (*Carya ovata*), while the swamp forests are dominated by American elm (*Ulmus americana*), eastern white cedar (*Thuja occidentalis*), and black spruce (*Picea mariana*), with no significant amount of pine (*Pinus* spp.) (Hainault 1969). Aside from these apparent over-representations, the relative frequencies of the remaining taxa do seem to illustrate regional trends through time consistent with other localities.

See previous footnote regarding possible over-representation of *Pinus*, *Quercus*, and *Betula*. 
Spruce dominance lasted nearly a millennium, until birch (*Betula* sp.) and pine (*Pinus* sp.) migrated northward into the region. Birch led the colonization of upland locations in the Ottawa Valley, but by about 9,400 B.P. jack pine (*Pinus banksiana*) was widespread throughout the Ottawa Valley-Lake Ontario region. After ca. 9,000 B.P. jack pine was replaced by white pine (*Pinus strobus*), and by the time the Kingston basin became connected with the main body of Lake Ontario around 8,000 B.P., the main pine populations had begun shifting northward into the southern Laurentians. This migration, which was in response to continuing climatic warming and pressure from invading taxa, especially hemlock (*Tsuga canadensis*) as well as maple (*Acer* sp.), and birch, dramatically changed the regional vegetation between about 8,000 B.P. and the peak of the Hypsithermal climatic optimum at around 6,000 B.P. Hemlock dominated the regional forests until about 4,800 B.P., when it declined dramatically throughout the northeast, likely due to the spread of a pathogen. As a result, beech (*Fagus grandifolia*) and maple established co-dominance in association with white pine, and white (*Betula papyrifera*) and yellow birch (*Betula lutea*). Shade-intolerant taxa including elm (*Ulmus* sp.), ash (*Fraxinus* sp.), hickory (*Carya* sp.), and basswood (*Tilia americana*) also gained importance in the regional forests at this time. Hemlock began to rebound by around 3,500 B.P., and since then has tended to share dominance with maple, beech, and white pine (Anderson 1987:39).

Over the past 200 years, the forest cover throughout much of Kingston has been reduced to the point that it scarcely resembles its original state. A number of sources are available to permit the reconstruction of local vegetation immediately prior to Euro-Canadian settlement in the early nineteenth century. These include historical descriptions, early surveyors’ notes and maps, phytosociological reconstruction based on soils, and extrapolation from extant forest stands in, and adjacent to, the study area. The use of historical survey data involves the reconstruction of vegetation based on the observations of early land surveyors. These surveyors routinely recorded information about trees located along their survey lines. These data are found in the surveyors’ notebooks, diaries, and maps, compiled when the original land surveys were carried out in the early nineteenth century. The quantity and quality of information regarding vegetation in these notebooks, however, is quite variable (Gentilcore and Donkin 1973). The procedure for transcribing vegetational data from the notebooks to topographic maps has been outlined by Heidenreich (1973). The earliest land surveys of Kingston proceeded as follows: Kingston Township by Aitken in 1794; Pittsburgh Township by Sherwood in 1807; and the City of Kingston by Wilmot in 1817, Chewett in 1821, Elmore in 1831, and Wells in 1846 (Gentilcore and Donkin 1973).

Forest composition information from the notes of early surveyors has been used to relate general forest types to physiographic areas by C. Keddy (1994) within the Eastern Ontario Model Forest area which encompasses a vast portion of eastern Ontario to the northeast of Kingston (Table 4). These notes indicate that the pre-settlement upland forests of eastern Ontario were dominated by maple (likely sugar maple (*Acer saccharum*)) and beech, with frequent associates of elm, hemlock, spruce, pine, and basswood. White cedar appears to be the predominant species in lowland and wetland forests, while elm, tamarack, alder, and ash are also common.

The trends in forest distribution observed by the early surveyors are consistent with the Canada Land Inventory (CLI) Capability for Forestry maps for this area (CLI 1971) and the Forest Site Regions of Ontario (Burger 1993). The study area currently falls within the Great Lakes-St. Lawrence Forest Region (Rowe 1972), and more specifically within forest Site Region 6E (Burger 1993). The characteristic tree species for this Site Region are indicated in Table 5. Under normal moisture and temperature conditions, the dominant species for this Forest Site Region are typically hard maple, beech, hemlock, white pine, basswood, and white ash (*Fraxinus americana*), with pioneering species including white birch, red oak (*Quercus rubra*), and black cherry (*Prunus serotina*). Wetter sites tend to be dominated by hemlock, yellow birch, black ash (*Fraxinus nigra*), white elm (*Ulmus americana*), and eastern white cedar (*Thuja occidentalis*), with pioneering species of white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*). In addition to these species, sites that are both colder and wetter may contain tamarack (=larch, *Larix laricina*) (Burger 1993).
Table 5: Pre-settlement Forest Trends of Eastern Ontario Compiled from Early Surveyors’ Notes

<table>
<thead>
<tr>
<th>Physiographic Region (Keddy 1994)</th>
<th>Physiographic Region Analogue (this report)</th>
<th>Common *Tree Taxa and Associations (in Order of Abundance)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upland Forests</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Till and (Precambrian) Rock</td>
<td>Frontenac Axis</td>
<td>hemlock-pine, maple-pine, beech-maple, hemlock, maplepine, basswood, maple-elm, maple-hemlock, maple</td>
</tr>
<tr>
<td>Limestone Plain</td>
<td>Napanee Limestone Plain</td>
<td>maple-beech, beech-maple, maple-elm, basswood-maple, hemlock-maple, beech-hemlock, maple-basswood</td>
</tr>
<tr>
<td>Clay Plain</td>
<td>Leeds Knobs and Flats</td>
<td>maple-elm, red spruce, pine-maple, basswood-maple, pine-spruce</td>
</tr>
<tr>
<td><strong>Lowland/Wetland Forests</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Till and (Precambrian) Rock</td>
<td>Frontenac Axis</td>
<td>white cedar (30%), alder (30%), tamarack (20%), ash (15%), spruce (10%)</td>
</tr>
<tr>
<td>Limestone Plain</td>
<td>Napanee Limestone Plain</td>
<td>white cedar (75%), tamarack (42%), alder (17%), willow (8%), black ash (8%), ash (1%)</td>
</tr>
<tr>
<td>Clay Plain</td>
<td>Leeds Knobs and Flats</td>
<td>elm (60%), white oak (40%), white cedar (40%), ash (40%), spruce (20%)</td>
</tr>
</tbody>
</table>

* - for upland forests, associations are the first and second species listed in surveyors’ notes with a frequency > 5% co-occurrence

** - percent of surveyed lots on which species occurs (Based on Keddy 1994)

Table 6: Characteristic Tree Species & Site Relationships in Forest Site Region 6E Lake Simcoe

<table>
<thead>
<tr>
<th>Soil Moisture</th>
<th>Hotter</th>
<th>Normal</th>
<th>Colder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drier</td>
<td>Fresh</td>
<td>Wetter</td>
<td>Drier</td>
</tr>
<tr>
<td>Climax Species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r, w, b Oak</td>
<td>h Maple</td>
<td>r, si Maple</td>
<td>w Pine</td>
</tr>
<tr>
<td>h, r Maple</td>
<td>Beech</td>
<td>w, r Ash</td>
<td>Beech</td>
</tr>
<tr>
<td>w, r Oak</td>
<td>r Oak</td>
<td>e Hemlock</td>
<td>b Ash</td>
</tr>
<tr>
<td>bk Hickory</td>
<td>w Ash</td>
<td>w Pine</td>
<td>w Elm</td>
</tr>
<tr>
<td>Butternut</td>
<td>Basswood</td>
<td>w Cedar</td>
<td>w Ash</td>
</tr>
<tr>
<td>Pioneer Species</td>
<td>r, w Pine</td>
<td>b Cherry</td>
<td>r Pine</td>
</tr>
<tr>
<td>w Birch</td>
<td>ro Elm</td>
<td>t, l Aspen</td>
<td>r Oak</td>
</tr>
<tr>
<td>t, l Aspen</td>
<td>ba Fir</td>
<td>b Cherry</td>
<td></td>
</tr>
</tbody>
</table>

**Bold** = High proportion of site region

*Normal = Moderate Proportion of site region

*Italic* = Low Proportion of site region

Abbreviations: b=black, ba=balsam, bn=bitternut, e=eastern, ew=eastern white, h=hard, l=large tooth, r=red, ro=rock, si=silver, t=trembling, w=white, y=yellow (based on Burger 1993)

The Canada Land Inventory classifies soils in their natural state on the basis of capability for the growth of commercial forests. Productivity is evaluated with respect to the best tree taxa adapted to the site and is expressed in terms of gross merchantable cubic foot volume (to a minimum diameter of four inches) per
Acre per year. Class 1 soils, having no important limitations to commercial forest growth, can be expected to produce more than 111 cu.ft./ac./yr. At the other end of the spectrum, Class 7 soils, having severe limitations which preclude commercial forest growth, can be expected to produce less than 10 cu.ft./ac.yr. Classes 2 through 6 are demarcated at 20 cu.ft./ac./yr. intervals between these extremes. In Kingston the distribution is generally mapped as complex, but certain overall themes can be identified and correlated with substrate (Quaternary geology and soils) mapping (Table 6). The generally thin Farmington soils of the Napanee Limestone plain generally exhibit moderately severe to severe limitations (Classes 4 & 5) to commercial forest growth, although there are also significant areas with only slight to moderate limitations (Classes 2 and 3). The deeper clay soils of the Napanee Limestone Plain, primarily situated to the south and east, rank somewhat higher, with Class 3 (moderate limitations) predominant, although there are still significant areas with moderately severe to severe limitations (Classes 4 and 5). The south-western portion of the Leeds Knobs and Flats region predominantly exhibits moderately severe limitation (Class 4), however the eastern portion of this region exhibits some of the best land in Kingston with respect to forestry capability, with well over half of the land exhibiting only slight to moderate limitations (Classes 2 and 3). In contrast, the Frontenac Axis region exhibits moderately severe to severe limitations (Classes 4 and 5) throughout.

<table>
<thead>
<tr>
<th>Physiographic Region</th>
<th>Class</th>
<th>% of Area</th>
<th>Limitation</th>
<th>Indicator Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Napanee Limestone Plain - till and limestone plain</td>
<td>4</td>
<td>40-50</td>
<td>R</td>
<td>rP, hM</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>30-40</td>
<td>R</td>
<td>rP, hM</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>20-30</td>
<td>D,W,R</td>
<td>wS, rM/ rP,hM</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>&lt;20</td>
<td>D</td>
<td>rP, hM</td>
</tr>
<tr>
<td>Napanee Limestone Plain - clay plain</td>
<td>3</td>
<td>60-70</td>
<td>D,X</td>
<td>wS, rM</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>20-30</td>
<td>D,X,R</td>
<td>wS, rM/ rP,hM</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>&lt;20</td>
<td>R</td>
<td>rP, rO</td>
</tr>
<tr>
<td>Leeds Knobs &amp; Flats - clay &amp; limestone plain</td>
<td>4</td>
<td>90</td>
<td>D,W,R</td>
<td>wS, rM/ rP,hM</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>D</td>
<td>rP, hM</td>
</tr>
<tr>
<td>Leeds Knobs &amp; Flats - clay plain &amp; Precambrian knobs</td>
<td>2</td>
<td>60</td>
<td>D</td>
<td>rP, hM</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>40-60</td>
<td>D,W,M</td>
<td>wS, rM/ rP,hM</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>&lt;20</td>
<td>D,W</td>
<td>wS, rM</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>&lt;20</td>
<td>Y</td>
<td>rP, hM</td>
</tr>
<tr>
<td>Frontenac Axis</td>
<td>5</td>
<td>80</td>
<td>X,Y</td>
<td>wS, rM/ rP,hM</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>20</td>
<td>D,W</td>
<td>wS, rM</td>
</tr>
</tbody>
</table>

**Abbreviations**

**Limitations:** D=physical restriction to rooting by dense or consolidated layers other than bedrock, R=restriction to rooting zone by bedrock, W=soil moisture excess, M=soil moisture deficiency, X=complex of soil moisture excess and deficiency too closely associated to map, Y=intimate pattern of shallowness and compaction or other restricting layers

**Indicator Species:** hM=hard maple, rM=red maple, rO=red oak, wP=white pine, rP=red pine, wS=white spruce

With the preceding analytical background in mind, we can now critically examine the pre-settlement forest distributions for the City of Kingston as mapped from the early land surveyors’ notes by Francescut (1980a). When the forestry data are overlaid on a map of the Quaternary geology, the robust correlation between the historic vegetation and the substrate is striking (Figure 20), and this can assist the characterization of forest evolution in Kingston since the end of the Pleistocene.

At the regional scale, the thicker clay loams of the south-eastern Napanee Limestone Plain and central-eastern Leeds Knobs and Flats physiographic regions would have provided the best growing conditions for forests in Kingston, although at the local scale there would have been considerable variability due to site-specific drainage conditions, topography, and bedrock depth. During the intervals when spruce (ca.
10,000 to 11,000 B.P.) and pine and birch (ca. 10,000 to 8,000 B.P.) were dominant, these regions would likely have been wooded with closed-canopy boreal forest. From around 8,000 to 5,000 B.P. hemlock would have replaced pine as the dominant taxon, although it would have been in competition with a wider variety of deciduous taxa. After the hemlock decline of ca. 4,800 B.P., maple and beech would have assumed primacy as co-dominant taxa. The pre-settlement dominance of maple and beech in these physiographic areas likely reflects the long-time establishment of climax northern hardwood forest under predominantly favourable growing conditions, with localized inclusions of pine, hemlock, and elm under more challenging growing conditions. Examples of such inclusions, which were actually noted by the early surveyors, include: pine on the rocky outcrops south of Stevenstown Creek; elm in the small wetland pockets south of Pine Hill; pine and hemlock on the rocky knobs east of Pine Hill; hemlock to the south of the Downey Wetland; and pine and hemlock in the poorly drained soils and rocky ridges of the Mud Creek watershed east of Atkinson and on the droughty soils of the Sand Hill Outwash region (Figure 20).

The north-western portion of the Napanee Limestone plain and south-western and north-western portions of the Leeds Knobs and Flats also exhibit localized variability in growing conditions, although overall the constraints tend to be more severe due largely to the shallowness of the soils over the limestone bedrock. While maple and beech were also co-dominant in these areas, the prevalence of basswood suggests that this and likely other subordinate taxa were able to compete more successfully throughout these more marginal lands.

The area mapped as cedar/pine/juniper/spruce on the western border of Kingston corresponds with the Odessa East alvar (NHIC 2007a), an area where soils were too thin to support the climax northern hardwood forest, and there were undoubtedly patches of similar landscape throughout the Napanee Limestone Plain that were too localized to map at this scale. Another such area with modern remnants is

![Figure 3-8: Historic Vegetation Superimposed on Quaternary Geology](image-url)
the Howe’s Road alvar (Figure 21), an open alvar grassland surrounded by glades of eastern white cedar (Brownell and Riley 2000; NHIC 2007b). Prior to the establishment of northern hardwood forest in the Kingston area, such marginal areas would likely have been meadows within the boreal forest.

Valley lands within the Napanee Limestone Plain would have graded from the adjacent upland forest through a topographical sequence of edaphic conditions ending with open water emergent plant communities. While some wetlands, such as those associated with the large organic deposits at the mouth of Little Cataraqui Creek and south of Collins Lake, were large enough to be reflected in the mapped pre-settlement vegetation (Figure 20), many others were scattered throughout the region but are not resolved at this scale.

The woodlands surrounding these riparian, palustrine, and lacustrine wetlands would have included various mixtures of conifers, such as eastern white cedar, hemlock, tamarack, white spruce, and balsam fir, and deciduous species, such as elm, black ash, yellow birch, and red and silver maple. Current examples of such landscapes include the Odessa Lake Swamp (NHIC 2007c) and Millhaven Creek Wetland (NHIC 2007d). While in-filling of wetland basins due to sedimentation appears to have been rather slow (Dalrymple and Price 1994: 51; Vreeken 1994: 40), the hydroseral development of wetland basins due to processes such as peat accumulation (Bunting and Warner 1998) has undoubtedly reduced the overall wetland area over the span of the Holocene and transformed open-water wetlands and marshes into fens, bogs, and swamps. Wetland reductions may also have occurred during the Hypsithermal as a result of summer rainfall deficits (Vreeken 1994: 40). Also, as noted in section 1.2 above, the extensive floodplain and riparian wetland that once existed along the southern shore of Kingston was inundated by
the rising waters of Lake Ontario around 8,000 B.P. In part this loss was offset by the development of the Cataraqui River marshes due to the transgression of Lake Ontario after about 4,000 B.P.

The Precambrian uplands of the Frontenac Axis were historically populated by stands of pine and hemlock intermixed with birch, which were able to successfully out-compete the dominant hardwoods in this marginal landscape characterized by extensive areas of thin soils, exposed bedrock, and severely rolling terrain. Both capability for agriculture and capability for forestry mapping underscore the severe challenges to plant growth in this region. The exceptions are primarily bedrock basins where wetlands have developed. Pine and hemlock also achieved dominance within the limestone upland of Tuttles Hill and on the Mount Chesney ridge (Figure 20).

Plant and Animal Subsistence Resources

A wide variety of wild plant resources was available to aboriginal populations residing in the Kingston area. Of particular importance to this study were plant species that appear to have been integral to Native subsistence. Nut-bearing trees were abundant in the study area, and could have provided an important and storable source of protein and fat. High in calories and rich in oil, nuts may have provided an important diet supplement. However, certain nuts required a considerable expenditure of energy for collection and processing, and nut masts are not consistent from one year to another. Common nut-bearing trees found in the study area include butternut (Juglans cinerea), hickory (Carya sp.), oak and beech. In fact, Nick Gromoff has identified a number of multi-component sites along the Bay of Quinte and the North Channel that he believes may have been situated, at least in part, to exploit Shagbark Hickory (Personal Communication 2007). The floodplains of major watercourses and associated wetlands also would have offered a wide variety of resources, including foods such as roots, tubers, greens, as well as fibres and building materials, such as bark and cedar poles.

Fleshy fruits were an important resource in aboriginal subsistence systems, as they are high in energy and are a good source of Vitamin C, an antiscorbutic. Elderberry (Sambucus canadensis), serviceberry (Amelanchier sp.), hawthorn (Crataegus sp.), cherry (Prunus sp.), plum (Prunus nigra), currant (Ribes sp.), strawberry (Fragaris sp.), viburnum (Viburnum sp.), and bramble (Rubus sp.) all flourished within the study area, the majority favouring disturbed or forest-edge habitats. The remains of these species are commonly recovered from archaeological sites where conditions have favoured their preservation.

As with vegetation, a comprehensive discussion of fauna within the study area is not relevant to this study, however, local fauna did provide an extensive resource base for pre-contact populations and are worthy of consideration. Different forest zones can be considered as micro-environments to which certain animal species may be principally adapted, although clearly, faunal habitats are of a clinal rather than a discrete nature. Generally, biotic diversity tends to be greatest where topography, drainage, and soils are most variable, resulting in a broader range of habitats per unit area. In contrast, areas with uniform topography, adequate drainage, and suitable soils tend to produce closed canopy climax forest with an impoverished under-storey that is less attractive to many animals.

In Kingston, it is expected that the greatest habitat diversity would be found in the lower reaches of the major drainages such as Collins Creek, Little Cataraqui Creek, and the Cataraqui River. These areas contained ecotones between the uplands of the Napanee Limestone Plain, the moist lowlands, the riparian wetlands, the watercourses, the estuarine wetlands at the lakeshore, and the lakeshore itself. Similar environmental interfaces at a reduced scale would have characterized several of the smaller watersheds that flow directly into Lake Ontario, such as Abbey Dawn Creek, Grass Creek, and Firman’s Creek. The next most biotically productive landscapes were likely the middle reaches of the major drainages noted above. The linearity of these limestone valleys and the sinuosity of many of the streams would have tended to maximize the ecotones between the upland plains, the lowlands, the riparian wetlands, and the
watercourses thereby increasing habitat and biotic productivity. Similar levels of biotic productivity would be expected in the middle to upper reaches of the Leeds Knobs and Flats drainages, including Steventown Creek, Mud Creek, Abbey Dawn Creek, Grass Creek, and Firman’s Creek. In contrast to the structure of the Napanee Limestone Plain drainages, these watersheds are not constrained by limestone valleys, thus they tend to form extensive, low-gradient, dendritic systems winding around the knobs of Precambrian bedrock and generally arising in extensive headwater wetland complexes such as the Downey Wetland (NHIC 2007e) and Steventown Creek Marsh (NHIC 2007f). While the bedrock knobs would have exhibited relatively low biotic productivity, they would have introduced topographic variability into the otherwise fairly monotonous clay and limestone plains. The historically recorded pine and hemlock stands east of Pine Hill (Figure 20) likely exemplify the sort of biotic variability that such rocky knobs and ridges contributed to this region.

The upper reaches of the Napanee Limestone Plain watersheds, where they spread out across the upland, would have been much less productive. While the inconsistency of the soil depth and quality, as well as agents of forest opening such as windthrow, would have introduced some variability in the vegetation cover, including patches of alvar, overall these uplands would have comprised relatively monotonous northern hardwood forests dominated by maple, beech, and basswood. Areas with more impoverished soils would have featured even more depauperate forests of pine and hemlock, such as on Tuttle’s Hill, the Mount Chesney ridge, and the Frontenac Axis. The latter area would have been particularly low in productivity due to the amount of exposed bedrock therein, although the rugged terrain would have introduced a greater overall variety of taxa, ranging from wetland plants in the poorly drained bedrock basins to xeric taxa on the knobs of Precambrian shield.

For the vast majority of the pre-contact period, ungulates represent the most significant game species in Kingston. White-tailed deer (Odocoileus virginianus) would have been attracted to wetland margins for spring and summer forage, to stands of mast-producing trees such as oak during the fall, and to conifer groves for winter browse and shelter. The sheltered valleys and conifer groves, open uplands, and alvars of the Napanee Limestone Plain likely provided the most important deer habitat. Such habitat would also have attracted herds of wapiti (Cervus elaphus), snowshoe hare (Lepus americanus) and eastern cottontail (Sylvilagus floridanus). Riparian wetlands, especially swamps, would have provided suitable habitat for moose (Alces alces) as well as beaver (Castor canadensis) and muskrat (Ondatra zibethica), which would also have occupied stream- and riverbanks. Wetland margins, stream valleys, and river floodplains, especially those with access to mast-producing beech forest, would also attract raccoon (Procyon lotor). Black bear (Ursus americanus), although a wide-ranging omnivore, would also be attracted to areas of highest biotic diversity and productivity.

Lake Ontario and the major rivers and streams would have provided an important fishery to aboriginal peoples. Resident populations of such species as brook trout (Salvelinus fontinalis) in the cold in-land streams and freshwater drum (Aplodinotus grunniens), brown bullhead (Ictalurus nebulosus), smallmouth bass (Micropterus dolomieui), pike (Esox lucius) and muskellunge (Esox masquinongy) in the weedy river shallows, would have been available through much of the year. More important, however, may have been seasonal spawning runs of species such as Atlantic Salmon (Salmo salar), Lake Sturgeon (Acipenser fulvescens), walleye (Stizostedion vitreum), American eel (Anguilla rostrata), and sucker (Catostomus sp.). These would have attracted aboriginal groups to the lower reaches of rivers and large streams to intercept the fish as they moved upstream.
Constructing the Pre-contact Potential Model

Soils and Physiography Layers

A digital soils layer was acquired from the National Soils Database (NSDB) compiled by the Canadian Soil Information System (CanSIS), an agency of Agriculture and Agri-Food Canada. This layer is essentially a digital version of the soils mapping contained in the Ontario Soil Survey Report for Frontenac County (Gillespie et al. 1966).

The soil survey for Frontenac had mapped some 283 discrete soil series polygons at 1:63,360 scale (Gillespie et al. 1966), providing relatively high resolution of soil variability across the region. At the same time, however, this complex array of mapped soils made it difficult to interpret gross regional trends. Accordingly, the soil series were re-grouped in order to provide mapped summaries of relevant attributes, including soil texture, drainage, and agricultural capability. This was accomplished by adding new texture, drainage, and capability fields to the attribute database from the digital soils map, and then using the GIS to produce maps based on these attribute sets. The soil texture layer discriminated between: exposed rock, gravely sandy loam, fine sandy loam, sand, silt loam, loam, clay loam, clay, and organic. The soil drainage layer discriminated between: well drained, imperfectly drained, and poorly drained. The soil capability for agriculture layer discriminated between: Class 1, having no significant limitations for agriculture; Class 2, having moderate limitations for agriculture; Class 3, having moderately severe limitations to agriculture; Class 4, having severe limitations to agriculture; Class 5, having very severe limitations to agriculture; Class 6, being only capable of producing perennial forage crops; and Class 7, having no capability for arable culture or permanent pasture.

The objective in aggregating the soils data this way was to facilitate its use as proxy measures for physiographic attributes for which there was no digital mapping, such as surficial geology and landforms, as well as biotic attributes, such as preferred growing conditions for various tree species. The soil texture layer reveals that the vast majority of Kingston’s soils are clays together with significant areas of loam. Gravels and sands are primarily of ice-contact glacio-fluvial origin, occurring primarily in areas of ice-contact outwash adjacent to the Frontenac Axis. Major organic soil deposits are associated with the valleys of Millhaven Creek, Glenvale Creek, Collins Creek, Little Cataraqui Creek, Joyceville Marsh, the Downey Wetland, and the Sand Hill outwash deposit.

The soil drainage layer indicates that nearly one-fifth of Kingston is poorly drained (19.9%), primarily in the valley lands of the Napanee Limestone Plain and level to depressional areas of the Leeds Knobs and Flats. One particularly large and well-defined area of poor drainage occupies approximately 3,392 hectares in the central-eastern part of Pittsburgh Township. Known as the Central Pittsburgh Drain, this artificially drained area has been established as a “petition drain” under the Ontario Drains Act, and is municipally controlled and maintained. The well-drained areas include: most of the uplands of the Napanee Limestone Plain, the southern portion of the Leeks Knobs and Flats, the gravels of the Sand Hill Outwash, and the Precambrian uplands of the Frontenac Axis.

The soil capability for agriculture layer reveals that Class 1 soils are extremely rare in the City of Kingston. Nevertheless, there are substantial areas of arable Class 2 and 3 soils throughout the Leeds Knobs and Flats, specifically on the well to imperfectly drained clays which occur between the bedrock knobs, as well as on similar soils which characterize the valley lands of the Napanee Limestone Plain. The thin soils which mantle the bedrock uplands of the Napanee Limestone Plain and Leeds Knobs and Flats are generally rated Class 4, 5, or 6. Class 7 soils are associated with the steep terrain and exposed bedrock of the Frontenac Axis and the organic lowland soils.
Steep terrain was also identified by means of a digital elevation model provided by the City of Kingston, in particular slopes greater than 10 degrees which are considered to exhibit low archaeological potential (Ministry of Culture 2004: 24).

Pre-contact Aboriginal Site Potential Layer

Throughout much of pre-contact history (see Section 2.1), the inhabitants of the City of Kingston were hunter-gatherers who practised an annual subsistence round to exploit a broad range of natural resources for food and raw materials for such needs as shelter construction and tool fabrication. Assuming that access to natural resources influenced and constrained the movement and settlement of aboriginal peoples, our goal was to understand what these resources were, how they may have been distributed, how their use and distribution may have changed over time, and how the landscape itself may have constrained movement and access to resources as well as settlement location. Given the requirements of this study, and our limited ability to precisely resolve details of past environments, we began by considering the relative merits of the physiographic areas, as it could be demonstrated that these represented certain constellations of environmental attributes. We proceeded chronologically in this investigation, since certain aspects of Kingston had changed dramatically through the period of human occupation.

Hunter-gatherer bands have likely occupied the Kingston area beginning as early as 10,000 to 11,000 years ago, as suggested by the discovery of Paleo-Indian artifacts in the Rideau Lakes area (Watson 1999:35). During this interval, Paleo-Indian hunters in the Kingston area would have been living within a few tens of kilometres of the shores of the Champlain Sea. At this time, the open boreal woodlands likely offered a rather limited selection of floral resources; hence subsistence would have been primarily oriented towards hunting and fishing. Accordingly, Paleo-Indians would have most likely been drawn to well-drained locations with access to both interior upland hunting grounds and lakeshore hunting and fishing areas. Since Lake Ontario was at its low water stage at this time, major lakeshore camps in the Kingston area may now be submerged, and the current landscape may not have been a major occupation area. The St. Lawrence valley and the mouths of major watersheds would seem to hold the greatest promise for encountering Paleo-Indian campsites.

By Early Archaic times (ca. 10,000 - 8,000 B.P.), hunter-gatherer bands likely established warm-weather base camps where resources such as spawning fish could support populations of 50 or more people. The lower reaches and mouths of the major watersheds, especially around complex shorelines, would have been the best localities to sustain such population aggregations. Complex shorelines may possess various features, including: (1) points of land with good visibility up and down river; (2) bays which may have beaches for canoe access as well as good fish habitat; (3) stream or river mouths which may have been both nodal points in the canoe transportation network as well as areas where nutrients flowed into the river thereby attracting fish and other game; and especially (4) combinations of these features.

During the late fall, winter, and early spring, Early Archaic bands may have dispersed into interior—probably nuclear family—hunting territories, much as Aboriginal people of the boreal forest have done until recent generations. Wetlands margins may have been especially attractive at this time of year. Like complex shorelines, interior wetlands are areas of increased biotic productivity and microenvironmental diversity. Settlement directly within the lowlands and wetlands would have been hindered in spring and fall by the poor drainage and in later spring and summer by biting insects, so camps would tend to be situated around the wetland margins, especially on uplands overlooking the lowlands. Winter occupations may have been more focussed within the limestone valleys, encouraged by the protection they offered from winter storms and by access to conifer grove deer yards, where ungulates congregate to avoid heavy snows and have access to abundant browse. Swamps would have also provided fuel, building materials, roots and tubers, and small game.
As the inland drainage system matured through the Early and Middle Archaic (ca. 8,000 - 4,500 B.P.)
periods, and adaptive patterns shifted in response to the establishment of northern mixed deciduous forest
and its associated fauna, the interior valleys and adjacent uplands may have increased in importance,
particularly where camps could be situated on river and stream terraces with well-drained soils. These
corridors would have provided access to the rich riparian habitat of the Napanee Limestone Plain
watercourses as well as adjacent upland stands of mast-producing forest, which would have been sought
out for both the nuts they provided and the game they attracted, including deer, raccoons, squirrels, and
passenger pigeons. The watersheds of the Leeds Knobs and Flats may also have been attractive, although
they may have been somewhat more difficult to navigate.

Lake Ontario was also evolving through this period, gradually rising to modern levels. In Early Archaic
times, the lake was still much lower and the Trent River/North Channel/St. Lawrence River watercourse
occupied the current Lake Ontario waterfront, including an extensive floodplain and riparian wetlands.
This would have placed Kingston at a node along one of the largest waterways in eastern North America.
Early Archaic camps may have been situated along this watercourse on what is now the lakeshore.
Around the end of the Early Archaic period the waters of Lake Ontario had risen to the point where this
river was replaced with essentially the current lakeshore, although water levels have continued to
gradually rise, flooding the mouths of the tributary creeks and rivers and creating the estuarine marshes
after around 4,000 B.P. during the Late Archaic period. These developments may have increased the
attraction to regional hunter-gatherer populations to the Kingston area.

To summarize, the proximity of major waterways is considered to have always been a significant factor
influencing land-use patterns in the City of Kingston. Transformations of the Lake Ontario shoreline
notwithstanding, the fundamental layout of the major drainage systems in Kingston has remained the
same since the late Pleistocene, and the waterways have likely acted as travel and settlement corridors
ever since. The middle reaches of the inland drainage systems may have comprised late fall and winter
microband hunting and fishing territories analogous to those recorded historically throughout the Great
Lakes-St. Lawrence region. Throughout these waterways, stream confluences may have been routinely
used as stop-over spots, leaving traces in the archaeological record. While wintertime land use would not
have been constrained by access to well-drained campsites or the limits of navigable waterways, such
routes would have still provided familiar, vegetation-free corridors for travel. In light of these
considerations, four criteria were added to the pre-contact archaeological potential layer. First, all river
and major stream segments—defined as those represented by two lines (i.e., banks) on the hydrographic
layer—were buffered at 250 metres. For the Lake Ontario shore, the buffer actually extended to the
border of the region, in order to capture underwater archaeological sites known to exist offshore. Second,
valleyland edges of the Napanee Limestone Plain were buffered by 200 metres. Third, all subordinate
streams—defined as those watercourses represented by a single line on the hydrographic layer—were
buffered by 200 metres, but only where the buffers crossed well- or imperfectly drained soils. Fourth, all
wetlands greater than 0.5 hectares in extent were buffered within 250 metres where the buffers crossed
well- or imperfectly drained soils. The major exception to the wetland buffering was the area of the
Central Pittsburgh Drain. Windshield survey of this area confirmed that, prior to artificial draining, this
would have been a vast morass that would have been both difficult to navigate through and unappealing
for settlement. Accordingly, the entire area was excluded from the zone of pre-contact Aboriginal
archaeological potential. Using the digital elevation model, areas of slope exceeding 10 degrees were
similarly excluded from this potential zone.

By about 7,500 B.P. the biotic landscape of Kingston was essentially similar to that which existed
immediately prior to European settlement, and by about the beginning of the Late Archaic period (ca.
4,000 B.P.), the Lake Ontario shore had assumed its essentially modern form. While the environment
continued to fluctuate and evolve up to the historic period as a result of natural processes such as forest
fire, down-cutting of waterways, organic in-filling of wetlands, animal population cycles, and others,
these generally cannot be resolved with currently available paleoenvironmental data. Nor is it necessary to do so given the scope and analytical scale of this study. The lifestyle of Late Archaic (ca. 4,500 - 3,000 B.P.) and Woodland (ca. 3,000 - 400 B.P.) period hunter-gatherers seems to have been relatively unchanged from that practised by their Middle Archaic ancestors. Major base camps were likely situated in riverine venues where abundant local resources could sustain the band. Smaller seasonal camps, representing the temporary occupation of small family groups or specialized hunting or collecting parties, were likely distributed throughout the interior in areas of higher biotic diversity and productivity.

In light of the general continuity in environmental and cultural practices after about 4,500 B.P., it is suggested that the land-use patterns described above for the Early and Middle Archaic periods, and based on ethnohistoric analogues, continued with only local variation through to the Iroquoian period. Thereafter the area seems to have been used for hunting and fishing for large communities (which were outside of the City’s boundaries) given the absence to date of the discovery of any significant agricultural Iroquoian villages within the City. Such villages appear to have been clustered on lands to the south and northeast of the City (see Figure 22). While there does not appear to have been a serious impediment to horticultural pursuit within City lands, at least in the southwest sector of the City, even better soils and/or socio-political concerns may have influenced community choices for their village locations.

Figures 1-4, Appendix D, illustrate the pre-contact potential layer for the City.
Figure 3-10: Iroquoian site clusters in the Lower St. Lawrence Valley
3.2 Historic Archaeological Site Potential Layer

The GIS layer of historical features is based largely on primary source documents. To standardize this process, approximately eighteen main map sets were chosen, which range in date from the early French regime to 1878. It is recognized that these maps did not always illustrate historic features that may be of interest, therefore, it can in no way be considered definitive. Also, the mapped locations are dependent upon cartographic procedures employed during the eighteenth and nineteenth centuries. Due to less sophisticated equipment and surveyors’ errors contained within these plans, all mapped locations should therefore be considered to be approximate.

With regard to the settlement centres, their boundaries have been plotted based on the above maps. Within the city of Kingston itself, the historic core district boundaries conform to the political boundary of the city at the time of its incorporation in 1846. It is recognized that some of the more massive features associated with many historic archaeological sites are likely to have survived as deeply buried deposits in areas that have been developed. This is reflected in the earliest occupied cores where historic archaeological potential overrides the integrity layer (see Section 3.5). The boundaries of other settlements, as plotted, serve to indicate those areas where most of the building activity was concentrated at the time the source maps were produced. In general, individual public buildings and homes have not been mapped within these centres. On the whole, however, the settlement centre overlay is indicative of those areas that exhibit potential for the presence of meeting halls, school houses, blacksmith shops, stores, grain warehouses, hotels, taverns, and other commercial service buildings.

All schools, places of worship and commercial buildings, such as inns, that occur outside of the major settlement centres have been mapped individually, if their locations were shown on the Illustrated Historical Atlas maps. These features represent the earliest structures of social and economic significance in the region and should be considered heritage features demonstrating significant archaeological potential. All features were mapped as points buffered by a radius of 100 metres to capture ancillary features.

All mill locations, manufacturers, lime kilns, quarries and mines were mapped based on the nineteenth century surveys and the Illustrated Historical Atlas maps. All features were mapped as points buffered by a radius of 100 metres to capture ancillary features.

All designated features, situated outside of settlement centres or archaeologically sensitive areas (see Section 3.4) have also been plotted and buffered by a radius of 100 metres. They are not subject to exclusion through the integrity layer (see Section 3.5).

Transportation routes such as early settlement roads, established by the 1870s (buffered by zones of 200 metres either side), and early railways (buffered by zones of 50 metres either side) have been mapped to draw attention to potential heritage features adjacent to their rights-of-way.

Cemeteries and family burial grounds have been included in the historic theme layer due to their particularly sensitive nature and the fact that these sites may become invisible in the modern landscape. Information concerning pioneer cemeteries was obtained from microfilm records deposited at the Archives of Ontario by the Kingston [Region VIII] Branch of the Ontario Genealogical Society, and in some instances from Land Registry records. Their locations were plotted based on an examination of the Historical Atlas of 1878, OGS transcriptions and 1:50 000 topographic mapping. These locations were not field verified. The active municipal and private cemeteries that were in the City GIS layer have also been plotted.
Isolated rural homesteads were also incorporated within this layer. While nineteenth century maps do not necessarily provide comprehensive locational data for rural homesteads, it is anticipated that those represented on the Illustrated Historical Atlas and Township histories will represent the majority of these resources. Each of these isolated rural homesteads/farmsteads will need to be evaluated in association with the Ministry of Tourism and Culture to determine their worthiness for systematic archaeological investigation given their quantity and ubiquity. Eighty-six percent (86%) of all currently mapped historic buildings (n=1149) are situated within the early transportation and water buffers, clear evidence of the efficacy of the historic model.

Appendices B and C present the historical feature data for each of the former townships and Figures 5-8, Appendix D, illustrate the locations of historical features while Figures 9-12 illustrate the contact potential layer for the City.

### 3.3 Archaeological Site Layer

Two sources of information were consulted in order to compile an inventory of archaeological resources within and in the immediate vicinity of the study area: site records for registered archaeological sites housed at the Ministry of Tourism and Culture and the City of Kingston and published and unpublished documentary sources.

In the Province of Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD), maintained by the Programs and Services Branch, Ministry of Tourism and Culture, Toronto. The database is the official, central repository of all site information for the province collected under the Ontario Heritage Act. An associated GIS has been developed by the Ministry. This database is organized by Borden Block, which is a unit defined as 10 minutes latitude by 10 degrees longitude, or approximately 13 kilometres east to west, and approximately 18.5 north to south. Each Borden Block is given a unique geographic placement within Canada and is referenced by a four-letter designator. Sites within a block are numbered sequentially as they are found. Portions of the City of Kingston study area fall within Borden Blocks BaGd, BbGb, BbGc, and BbGd.

There are 88 documented archaeological sites within and immediately adjacent to the City boundaries of which 81 were mapped and entered into the project GIS as a discrete layer. Of these, 80 are registered by the provincial site database (as of December, 2007) and eight are not (e.g., Shoal Tower, Dry Dock Museum). Of the 88 sites, only 16 date to the pre-contact period. For site potential modelling purposes, each registered site plotted as a point was buffered by 100 metres. It should be noted that archaeological sites found since 2007 may not have been entered into the provincial database by the Ministry of Tourism and Culture and may not be reflected in this study. In that the model is inductive in nature and is not constructed on the basis of the location attributes of known sites, this will have no impact on the potential model.

<table>
<thead>
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<th>Borden No.</th>
<th>Site Name</th>
<th>Cultural Affiliation; Site Type</th>
<th>Researcher</th>
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</thead>
<tbody>
<tr>
<td>---</td>
<td>Point Fredrick Ship Wreck</td>
<td>Euro-Canadian; Ship Wreck</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>Kingston Mills</td>
<td>Euro-Canadian; Blockhouse, saw and grist mills</td>
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<tr>
<td>---</td>
<td>Bellevue House</td>
<td>Euro-Canadian; Coach house</td>
<td></td>
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<tr>
<td>---</td>
<td>Belle Island South</td>
<td>Euro-Canadian; Trade post/mission</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>St. Lawrence Dry Dock Museum</td>
<td>Euro-Canadian; Ship wreck</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>Murney Tower</td>
<td>Euro-Canadian; Military tower</td>
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</tbody>
</table>
### Table 8: Archaeological Sites within the City of Kingston (2007)

<table>
<thead>
<tr>
<th>Borden No.</th>
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<th>Cultural Affiliation; Site Type</th>
<th>Researcher</th>
</tr>
</thead>
<tbody>
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<td>Shoal Tower</td>
<td>Euro-Canadian; Military tower</td>
<td></td>
</tr>
<tr>
<td>BaGd-5</td>
<td>Comet</td>
<td>Euro-Canadian; Ship Wreck</td>
<td>MMGL 1989, 1995-96</td>
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<td>BbGb-9</td>
<td>Topliss</td>
<td>St.-Lawrence Iroquois; Campsite</td>
<td>CARF 1988</td>
</tr>
<tr>
<td>BbGc-2</td>
<td>Kingston Outer Station</td>
<td>Undetermined Pre-Contact; Iroquoian</td>
<td>Pendergast, J. 1957</td>
</tr>
<tr>
<td>BbGc-6</td>
<td>Belle Island</td>
<td>Middle Woodland / Point Peninsula / Sandbanks; Campsite</td>
<td>Daechsel, H.J., 1987</td>
</tr>
<tr>
<td>BbGc-7</td>
<td>Kingston Harbour Front</td>
<td>Euro-Canadian; House, railway</td>
<td>Wright, P.J. 1980</td>
</tr>
<tr>
<td>BbGc-8</td>
<td>Fort Frontenac</td>
<td>19th-20th C. Euro-Canadian; Military house</td>
<td>CARF 1982, 1996</td>
</tr>
<tr>
<td>BbGc-11</td>
<td>Frontenac Village</td>
<td>Historic; Domestic, military</td>
<td>CARF 1984</td>
</tr>
<tr>
<td>BbGc-12</td>
<td>Bajus Brewery</td>
<td>Late Euro-Canadian; British military, brewery</td>
<td>CARF 1984</td>
</tr>
<tr>
<td>BbGc-13</td>
<td>Cartwright House</td>
<td>Euro-Canadian; Homestead</td>
<td>HQI 1993</td>
</tr>
<tr>
<td>BbGc-14</td>
<td>Lines House</td>
<td>Late Euro-Canadian; Urban homestead</td>
<td>CARF 1987</td>
</tr>
<tr>
<td>BbGc-19</td>
<td>Rideaucrest Development</td>
<td>Euro-Canadian/Loyalist; Rural domestic</td>
<td>CARF 1989</td>
</tr>
<tr>
<td>BbGc-20</td>
<td>Anglin</td>
<td>Euro-Canadian; Hospital, industrial, military, residence, wharf</td>
<td>CARF 1989, 2005</td>
</tr>
<tr>
<td>BbGc-21</td>
<td>Millard and Lumb</td>
<td>Mid-late 19th C. Euro-Canadian; Industrial, military</td>
<td>CARF 1990</td>
</tr>
<tr>
<td>BbGc-22</td>
<td>---</td>
<td>Early Woodland; Isolated Find</td>
<td>Dibb, G.C. 1992</td>
</tr>
<tr>
<td>BbGc-23</td>
<td>---</td>
<td>Euro-Canadian; Isolated Find</td>
<td>Dibb, G.C. 1992</td>
</tr>
<tr>
<td>BbGc-24</td>
<td>---</td>
<td>Euro-Canadian; Isolated Find</td>
<td>Dibb, G.C. 1992</td>
</tr>
<tr>
<td>BbGc-25</td>
<td>---</td>
<td>Euro-Canadian; Isolated Find</td>
<td>Dibb, G.C. 1992</td>
</tr>
<tr>
<td>BbGc-26</td>
<td>---</td>
<td>Euro-Canadian; Isolated Find</td>
<td>Dibb, G.C. 1992</td>
</tr>
<tr>
<td>BbGc-27</td>
<td>---</td>
<td>Euro-Canadian; Scatter</td>
<td>Dibb, G.C. 1992-94</td>
</tr>
<tr>
<td>BbGc-28</td>
<td>Fort Henry</td>
<td>Euro-Canadian; Fort</td>
<td>HQI 1994</td>
</tr>
<tr>
<td>BbGc-29</td>
<td>Glengarry</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-30</td>
<td>Chicago</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-31</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-32</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-33</td>
<td>Abbie L. Andrews</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-34</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-35</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-36</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-37</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-38</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-39</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-40</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-41</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-42</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Smith, M.D. 1994</td>
</tr>
<tr>
<td>BbGc-43</td>
<td>Royal Military College of Canada</td>
<td>Euro-Canadian; Military School</td>
<td></td>
</tr>
<tr>
<td>BbGc-69</td>
<td>Fort Henry Ordnance Wharf</td>
<td>Euro-Canadian; Ship Wreck</td>
<td></td>
</tr>
<tr>
<td>BbGc-70</td>
<td>Cedar Island / Cathcart Tower</td>
<td>Euro-Canadian; Military Tower</td>
<td>Jackson, L. 1993</td>
</tr>
<tr>
<td>BbGc-71</td>
<td>Cedar Island Northwest Bay</td>
<td>Early Woodland; Isolated Find</td>
<td>Jackson, L. 1993</td>
</tr>
<tr>
<td>BbGc-72</td>
<td>Cedar Island South Overlook</td>
<td>Euro-Canadian; Dump</td>
<td>Jackson, L. 1993</td>
</tr>
<tr>
<td>BbGc-75</td>
<td>Music</td>
<td>Euro-Canadian; Stone structure</td>
<td>HQI 1999</td>
</tr>
</tbody>
</table>
Table 8: Archaeological Sites within the City of Kingston (2007)

<table>
<thead>
<tr>
<th>Borden No.</th>
<th>Site Name</th>
<th>Cultural Affiliation; Site Type</th>
<th>Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>BbGc-76*</td>
<td>Sheppard</td>
<td>Euro-Canadian; Stone structure</td>
<td>YNAS 1999</td>
</tr>
<tr>
<td>BbGc-77*</td>
<td>---</td>
<td>Euro-Canadian; Isolated Find</td>
<td>YNAS1999</td>
</tr>
<tr>
<td>BbGc-78</td>
<td>Kingston Coal Gasification Pit</td>
<td>Euro-Canadian; Gas works/plant</td>
<td></td>
</tr>
<tr>
<td>BbGc-79*</td>
<td>---</td>
<td>Euro-Canadian; Refuse</td>
<td>YNAS 1999</td>
</tr>
<tr>
<td>BbGc-80*</td>
<td>---</td>
<td>Euro-Canadian; Refuse</td>
<td>YNAS 1999</td>
</tr>
<tr>
<td>BbGc-81*</td>
<td>---</td>
<td>Euro-Canadian; Refuse</td>
<td>YNAS 1999</td>
</tr>
<tr>
<td>BbGc-82*</td>
<td>---</td>
<td>Euro-Canadian; Refuse</td>
<td>YNAS 1999</td>
</tr>
<tr>
<td>BbGc-83</td>
<td>Bothwick</td>
<td>Euro-Canadian; Scatter</td>
<td></td>
</tr>
<tr>
<td>BbGc-84</td>
<td>Allen Point</td>
<td>Undetermined Pre-Contact; Findspot</td>
<td></td>
</tr>
<tr>
<td>BbGc-85</td>
<td>Strachan Saw Mill</td>
<td>Euro-Canadian; Saw Mill</td>
<td>HQI 2006</td>
</tr>
<tr>
<td>BbGc-86</td>
<td>McRossie Mill</td>
<td>Euro-Canadian; Saw Mill</td>
<td>HQI 2006</td>
</tr>
<tr>
<td>BbGc-88</td>
<td>Market Square</td>
<td>Euro-Canadian; Market, city hall</td>
<td></td>
</tr>
<tr>
<td>BbGc-89</td>
<td>McBurney Park</td>
<td>Euro-Canadian; Cemetery</td>
<td>CARF 2005</td>
</tr>
<tr>
<td>BbGc-90</td>
<td>McKane</td>
<td>Euro-Canadian; Homestead</td>
<td>Adam’s Heritage 2005</td>
</tr>
<tr>
<td>BbGc-93</td>
<td>Carson</td>
<td>Euro-Canadian; Homestead</td>
<td>HQI 2006</td>
</tr>
<tr>
<td>BbGc-91</td>
<td>Richard Cartwright House</td>
<td>Euro-Canadian; Urban homestead</td>
<td>CARF 2006</td>
</tr>
<tr>
<td>BbGd-1</td>
<td>Collin’s Creek</td>
<td>Middle-Late Woodland; Undetermined</td>
<td>CARF 1987</td>
</tr>
<tr>
<td>BbGd-5</td>
<td>Horsey Bay</td>
<td>Sandbanks, Woodland; Campsite</td>
<td>CARF 1987</td>
</tr>
<tr>
<td>BbGd-7</td>
<td>St. Helen’s</td>
<td>19th C. historic Canadian; Rural domestic habitation</td>
<td>CARF 1981, 1991</td>
</tr>
<tr>
<td>BbGd-8</td>
<td>---</td>
<td>Canadian (1852-present); Urban, domestic</td>
<td>CARF 1988</td>
</tr>
<tr>
<td>BbGd-9</td>
<td>Moodie Farmstead</td>
<td>Euro-Canadian; Homestead</td>
<td>CARF 1988</td>
</tr>
<tr>
<td>BbGd-10</td>
<td>Arbor Ridge</td>
<td>Middle Iroquoian, Woodland; Village</td>
<td>Adams, N. 1991</td>
</tr>
<tr>
<td>BbGd-12</td>
<td>Trillium Ridge</td>
<td>Euro-Canadian; Dump</td>
<td>CARF 1991</td>
</tr>
<tr>
<td>BbGd-13</td>
<td>Collins Bay Burial</td>
<td>Late Archaic; Burial</td>
<td>Ritchie, W? 1947?; CARF 1982</td>
</tr>
<tr>
<td>BbGd-14</td>
<td>Purdy Mill</td>
<td>Euro-Canadian; Grist and saw mill</td>
<td>CARF 1992; Wright, P.J. 1993</td>
</tr>
<tr>
<td>BbGd-17</td>
<td>Warden’s Residence</td>
<td>Euro-Canadian; Residence</td>
<td>CARF 1997</td>
</tr>
<tr>
<td>BbGd-18</td>
<td>Morton’s Wharf</td>
<td>Euro-Canadian</td>
<td></td>
</tr>
<tr>
<td>BbGd-21*</td>
<td>Chestnut</td>
<td>Euro-Canadian; Occupation</td>
<td></td>
</tr>
<tr>
<td>BbGd-22</td>
<td>Westbrook Creek 1</td>
<td>Late Archaic, Onondaga; Lithic scatter</td>
<td>HQI 2005</td>
</tr>
<tr>
<td>BbGd-23</td>
<td>Westbrook Creek 2</td>
<td>Archaic; Isolated Find</td>
<td>HQI 2005</td>
</tr>
<tr>
<td>BbGd-24</td>
<td>Westbrook Creek 3</td>
<td>Late Archaic; Scatter</td>
<td>HQI 2005</td>
</tr>
</tbody>
</table>

CARF = Cataraqui Archaeological Research Foundation  
HQI = Heritage Quest Inc.  
*site location to be confirmed by Ministry of Tourism and Culture
Table 9: Registered Archaeological Sites Immediately South of the Study Area

<table>
<thead>
<tr>
<th>Borden No.</th>
<th>Site Name</th>
<th>Cultural Affiliation; Site Type</th>
<th>Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>KPH Wreck</td>
<td>Euro-Canadian; Ship wreck</td>
<td></td>
</tr>
<tr>
<td>BbGc-1</td>
<td>Brophy Point</td>
<td>Undetermined; Campsite</td>
<td>Pendergast, J. 1968</td>
</tr>
<tr>
<td>BbGc-4</td>
<td>Treasure Island</td>
<td>Undetermined; Campsite</td>
<td>Pendergast, J. 1961</td>
</tr>
<tr>
<td>BbGc-5</td>
<td>Milton Island</td>
<td>Undetermined Pre-Contact; Lithic Scatter</td>
<td>Wright, J.V. 1978</td>
</tr>
<tr>
<td>BbGc-45</td>
<td>Deadman Bay 1</td>
<td>Euro-Canadian; Ship Wreck</td>
<td>FHM 1937; Moore, J. 1996</td>
</tr>
<tr>
<td>BbGc-46</td>
<td>Deadman Bay 2</td>
<td>Euro-Canadian; Ship Wreck</td>
<td>Moore, J. 1996</td>
</tr>
<tr>
<td>BbGd-3</td>
<td>Munson</td>
<td>Late historic; Ship wreck</td>
<td>Ibbotson, P.T. 1984; Moore, J. 1995</td>
</tr>
<tr>
<td>BbGd-6</td>
<td>HMS St. Lawrence</td>
<td>Euro-Canadian; Ship wreck</td>
<td></td>
</tr>
<tr>
<td>BbGd-19</td>
<td>---</td>
<td>Euro-Canadian; Ship wreck</td>
<td>Kohl, C. 1990</td>
</tr>
</tbody>
</table>

Figures 13-14, Appendix D, illustrate the archaeological site layer for the City.

3.4 DEFINING ARCHAEOLOGICALLY SENSITIVE AREAS

In recognition of the demonstrated unique and heightened archaeological sensitivity of the historic core (see Appendix A), which is defined as the area bounded by North, Bagot and West Streets and the water’s edge, and which encompasses the Kingston Market Square Heritage Conservation District and the eastern sector of the Sydenham Ward Heritage Conservation District, the Barriefield Heritage Conservation District (see Appendix B – Settlement Centres – Barriefield), various settlement centre cores (Appendices B and C) as well as two very significant archaeological sites for which boundaries have been documented and deposits have survived (i.e., Kingston Outer Station, Belle Island – Section 2.2), they have been designated as Archaeologically Sensitive Areas (ASAs). It is also acknowledged that other particularly significant archaeological sites, including ones of national and international prominence, are captured within the historic core (e.g., Market Square, Fort Frontenac).

In these cases, where there is potential for very significant archaeological resources, it is known on the basis of numerous case studies both in Kingston and elsewhere (e.g., Fort Frontenac – Stewart 1983, 1985; CARF 2006a, b, c; Market Square – CARF 2004; Upper Canada’s First Parliament Buildings - Dieterman and Williamson 2001), that twentieth century development does not erase all significant archaeological deposits related to earlier periods of settlement. Rather, it means that the archaeology of such areas is more complex. In the case of the historic core, for example, removal of industry from the core and waterfront, the demolition of some of the commercial and institutional buildings, and the infilling of rear yards and courtyards, often in fairly passive ways (i.e., the creation of parking lots) have left a fragmented, but often well-preserved archaeological record. The archaeological remains may range from built features that have survived one or more redevelopment events by virtue of the massive scale at which they were constructed (in terms of the areas they covered, or the depths to which they extended) to comparatively small scale domestic deposits that have been sealed by later grade alterations, such as the filling that often takes place in areas given over to parking lots or recreational spaces (see Figure 23).
The precise identification of areas of archaeological potential within the urban core requires a cautious approach, ideally one undertaken on a property-by-property approach, whereby detailed reconstructions of the development history of a given parcel leads to a clear understanding of the types of activities that took place there and the likelihood that any significant archaeological deposits have survived. Definition of the historic core, the Barriefield HCD, and other settlement centres as Archaeologically Sensitive Areas will permit such an approach as applications for the redevelopment of specific properties are submitted to the City.

The legislative support for the concept of the ASA is provided by the 2005 changes to the *Ontario Heritage Act*, whereby it became illegal for any person or agency to alter an archaeological site without a license. “Alteration” of an archaeological site is deemed to include any form of unsanctioned disturbance or destruction of an archaeological resource brought about by any means (i.e., either archaeological excavation, site looting, or development). An individual or a director of a corporation found in violation of the Act or the regulations is liable to a fine of up to $50,000 or imprisonment for up to one year or both. A corporation found in violation of the Act or the regulations is liable to a fine of up to $250,000.

This provision, in effect, offers automatic protection to all archaeological sites and the designation of an ASA for lands that exhibit significant potential on the basis of the available data will permit the City to exercise due diligence and best practice in all planning contexts to ensure that any adverse impacts to potential archaeological resources are suitably mitigated.

Figure 15, Appendix D, illustrates the location of archaeologically sensitive areas within the City.

### 3.5 Integrity Layer

An integrity layer was compiled based on a review of present land uses within the City. The objective of this task was to distinguish between those lands upon which modern development activities have likely destroyed any archaeological resources, and those lands, such as parking lots, schoolyards, parks and golf courses, which potentially remain wholly or primarily undisturbed.

This layer was compiled using the built-up layer from the National Topographic Data Base together with high-resolution ortho-imagery provided by the City.

Areas deemed to have no remaining archaeological integrity were subsequently excluded from the zone of archaeological potential. The only exceptions to this were the ASAs (Section 3.4) and all registered archaeological sites designated heritage features.
Alterations to the evaluation of integrity may result from a detailed Stage 1 report which demonstrates clearly that a study area has been severely disturbed thereby negating archaeological potential.

### 3.6 Composite Archaeological Potential Layer

The final GIS layer, which is the map of the composite zone of archaeological potential within the City of Kingston was compiled by merging the zones of pre-contact archaeological potential and zones of historic archaeological potential, as defined through application of the various modelling criteria (Table 10). All areas lacking landscape integrity were then excluded from this layer. The resultant potential mapping presents an approximation of the overall distribution of archaeological resources in the City of Kingston. On the basis of this mapping, it may be suggested that 31,015.06 hectares or 65.5% of the area within the City of Kingston Municipal boundary, exhibits potential for the presence of hitherto undocumented archaeological sites. For purposes of comparison, it was determined that the Ministry of Tourism and Culture’s generic proximity to water model (Ministry of Culture 1997) captures about 88% of the city.

<table>
<thead>
<tr>
<th>Environmental or Cultural Feature</th>
<th>Buffer Distance (metres)</th>
<th>Buffer Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-contact Aboriginal Site Potential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lakes</td>
<td>250</td>
<td>none</td>
</tr>
<tr>
<td>two-line rivers</td>
<td>250</td>
<td>none</td>
</tr>
<tr>
<td>wetlands</td>
<td>200</td>
<td>&gt;0.5 ha.; well and imperfectly drained soils only</td>
</tr>
<tr>
<td>valley lands (top of bank)</td>
<td>200</td>
<td>none</td>
</tr>
<tr>
<td>single-line watercourses</td>
<td>200</td>
<td>well and imperfectly drained soils only</td>
</tr>
<tr>
<td>Central Pittsburgh Drain</td>
<td>0</td>
<td>removed from potential zone</td>
</tr>
<tr>
<td>slopes ≥ 10 degrees</td>
<td>0</td>
<td>removed from potential zone</td>
</tr>
<tr>
<td>pre-contact ASAs</td>
<td>polygon as mapped</td>
<td>removed from potential zone</td>
</tr>
<tr>
<td><strong>Historic Euro-Canadian Site Potential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historic ASAs - historic settlement centres (including historic core and Barriefield HCD)</td>
<td>polygon as mapped</td>
<td>no buffer, override integrity</td>
</tr>
<tr>
<td>designated sites</td>
<td>100</td>
<td>override integrity</td>
</tr>
<tr>
<td>Potential inundated sites</td>
<td>100 from Lake Ontario and Cataraca River</td>
<td>from existing shore</td>
</tr>
<tr>
<td>domestic sites</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>breweries and distilleries</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>hotels/taverns</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>historic schools and churches</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>historic mills, forges, extraction industries</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>early settlement roads</td>
<td>200</td>
<td>both sides</td>
</tr>
<tr>
<td>early railways</td>
<td>50</td>
<td>both sides</td>
</tr>
<tr>
<td>train stations</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>cemeteries</td>
<td>100 around polygon (closed or abandoned cemeteries only)</td>
<td>none</td>
</tr>
<tr>
<td>military batteries</td>
<td>100</td>
<td>none</td>
</tr>
<tr>
<td>battlefields</td>
<td>Polygon as mapped</td>
<td></td>
</tr>
<tr>
<td><strong>General Criterion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all registered archaeological sites</td>
<td>100</td>
<td>override integrity</td>
</tr>
</tbody>
</table>

Figures 16-19, Appendix D, illustrate the composite potential layer for the City.
3.7 **MODEL EVALUATION AND IMPLEMENTATION**

*Model Evaluation*

The deductive modelling exercise undertaken above presents a first approximation of the overall distribution of archaeological resources in the City of Kingston. The purpose of this exercise has been to provide land-use planners and heritage resource managers with a theoretically supported estimate of the scope of a resource for which there is extremely limited substantive data available. Given the hypothetical nature of such a model, however, potential users must be fully aware of its limitations in order to employ it appropriately.

The unknown but undoubtedly complex distribution of sites in Kingston can be described in terms of a geographical continuum of density, or potential for discovery, ranging from none to very high. In this study, the continuum has been subdivided into two classes: areas that demonstrate archaeological potential and areas that do not demonstrate potential. Through a deductive modelling procedure, involving interpretation of the changing pre-contact landscape and the expected land-use patterns of its pre-contact and historic human occupants, Kingston has been tentatively partitioned into zones representing these categories. Since the principal orientation of the model revolves around access to water for travel and subsistence, it is anticipated that certain site classes, sacred sites for example, may not conform to the mapped zonation. Residual sites of this kind, and sites in localized zones of potential that could not be resolved at this mapping scale, can be expected to occur throughout the City of Kingston.

The validity and utility of archaeological site potential models can be assessed in terms of predictive capacity or gain. Predictive gain has been explicitly defined as follows (Kvamme 1988:329):

\[
Gain = 1 - \left( \frac{\text{percentage of total area covered by model}}{\text{percentage of total sites within model area}} \right)
\]

where the total sites variable would represent all known and unknown archaeological sites within the City of Kingston. Of course since the total number of sites is never known, the evaluation of gain cannot be based on a random sample of sites. One way of dealing with this problem is to undertake a random sample of the study area in the hope that this will constitute a suitable proxy for a random sample of sites (e.g., Wilson and Horne 1995). In most cases, where there is reason to believe that site distributions may be non-random, the confidence of this approach can often be improved by stratifying the sample into hypothetical density classes. For example, the site potential model for Kingston has suggested that sites may be non-randomly distributed and has defined two zones to predict the nature of the distribution. A stratified random sample of the city would therefore draw separately from both of these zones.

An alternative approach for evaluating gain is to employ relatively large samples or data acquired through some sort of preliminary investigation (cf. Altschul and Nagle 1988:265-268; Kvamme 1988:403-404; Rose and Altschul 1988:205). Systematic archaeological survey, undertaken in the City of Kingston in the context of the pre-development approvals process, will provide just this sort of information, and once the site sample has grown to a reasonable size, the gain statistic can eventually be evaluated. This is one reason why the standard recommendation to be applied at the adoption of this plan is that, where any part of a development application falls into the zone of archaeological potential, the entire application should be subject to assessment. This will continue to afford the opportunity of examining lands beyond the archaeological potential zone, thereby improving the site sample and avoiding the self-fulfilling prophesy of only finding sites where one looks for them.
Model Implementation

Land-use planners and heritage resource managers, seeking to make use of this model of archaeological site potential in the City of Kingston are reminded that:

- neither this nor any model can specifically predict where a site or sites will be found;
- neither this nor any model can specifically predict where a site or sites will not be found;
- some sites will occur in areas where the model predicts they are not likely to occur;
- this and any such models must remain open to revision in light of new data.

With these limits in mind, the following recommendations are offered for the practical application of this model:

Recommendation 1
All lands that fall partially or wholly within the zone of archaeological potential should be subjected to comprehensive field assessment by licensed archaeological personnel prior to certain land development situations.

Recommendation 2
In order to ensure the long term viability of the Kingston Archaeological Master Plan, it is recommended that the potential model and planning protocols be subject to comprehensive review on a five year basis in co-ordination with the five year review of the City’s Official Plan as required by the Planning Act. Such a review should consider any changes in Ministry of Tourism and Culture criteria for site significance, any data gaps in the site inventory, changes required to the archaeological potential modelling, and all procedures and protocols related to the implementation of the Plan. Any review regarding site significance should involve a synthesis of archaeological knowledge resulting from the implementation of this plan to define what kind of sites require excavation to further our knowledge of the pre-contact and post-contact past of the City.

Such reviews should be conducted by a licensed archaeologist, and any proposed modifications should be mutually acceptable to the City of Kingston Planning and Development Department and the Ministry of Tourism and Culture.

4 USING THE POTENTIAL MODEL

The archaeological potential and Archaeologically Sensitive Area (ASA) mapping will be used in determining requirements for archaeological assessments in the development review process. The process of implementation, maintenance and review of the archaeological potential model, and the associated issues, are fully discussed in the companion volume to this document, entitled, Planning for the Conservation of Archaeological Resources in the City of Kingston. The recommendations presented in the Planning report may be found in the Executive Summary of this report.

Upon reviewing the City of Kingston’s archaeological potential mapping, City staff will determine if any portion of an application falls within a zone of archaeological potential. Should any portion of the property have archaeological potential, the proponent will be required to undertake a Stage 1 and/or a Stage 1-2 Archaeological Assessment of the entire subject property, not simply the portion(s) that falls
within the zone of archaeological potential. The Ministry of Tourism and Culture must approve any deviation from this approach.

If the development history of the property is in question, or it is uncertain whether archaeological deposits might have survived, a Stage 1-2 archaeological assessment (background research and field review) will be undertaken, to ascertain whether there remains any potential for the survival of deposits on the property. It must be recognized that some features associated with many historic archaeological sites are likely to have survived, as deeply buried deposits, in areas that have been developed and even re-developed. Research must be undertaken to determine whether the subject property was entirely disturbed during previous development, or just the footprint(s) of former or existing buildings. Only where land has been completely disturbed to a depth of ten or more feet should it be concluded that there is no potential for survival and therefore no requirement to carry out an assessment.

Once the archaeological assessment, consisting of background research and a field survey (Stage 1-2), has been completed, the archaeological consultant will submit a report to the Cultural Programs Branch of the Ministry of Tourism and Culture. Ministry staff will review the report to determine if the assessment has met current licensing and technical standards. If this is not the case, the Ministry will require the consultant to carry out additional fieldwork and/or provide more extensive documentation.

If the assessment did not result in the documentation of any significant archaeological resources, the Ministry of Tourism and Culture will provide a copy of the letter to the City’s Planning and Development Department noting that all provincial concerns with respect to archaeological resource conservation and archaeological licensing have been met. Upon receipt of this notification of Ministry of Tourism and Culture approval, and supporting documentation from the archaeological consultant, the City may then clear the planning application of any further archaeological concern. At that time, all consultant archaeologists are required to file a copy of the report with the Planning and Development Department, City of Kingston.

If the assessment does result in the documentation of one or more significant archaeological resources, the proponent shall carry out a Stage 3 and/or Stage 4 archaeological assessment of the entire development property and mitigate, through preservation or resource removal and documentation, adverse impacts to any significant archaeological resources found. No demolition, grading or other soil disturbances shall take place on the subject property prior to the City and the Ministry of Tourism and Culture confirming that all archaeological resource concerns have met licensing and resource conservation requirements.

Upon receipt of notification that all Ministry of Tourism and Culture archaeological conservation and licensing concerns have been addressed, and receipt of the necessary supporting documentation from the archaeological consultant, the City will clear the planning application of further archaeological concern.

No Stage 4 archaeological investigations on Aboriginal sites should be undertaken within the City of Kingston without first filing a First Nations consultation report with the Planning and Development Department. Such a report should contain a description of the engagement with the appropriate Aboriginal community(s) and copies of any documentation arising from the process. The report must include a rationale for identifying which communities were engaged, a description of the engagement procedures were, dates of when the engagement occurred, documentations of the strategies undertaken to incorporate the input of the Aboriginal community(s) in to the fieldwork (e.g., monitoring) and a description of the process for reporting results to the community(s).
4.1 GLOSSARY OF TERMS

alluvium
sediment deposited by rivers and streams

alvar
a biological environment based on a limestone plain with thin or no soil and, as a result, sparse vegetation

antiscorbutic
a food rich in vitamin C that prevents scurvy

archaeological site
any location which shows evidence of the prior presence or influence of human beings. Individual archaeological sites (that collectively form the archaeological resource-base) are distributed in a variety of locational settings across the landscape, being locations or places that are associated with past human activities, endeavours, or events. These sites may occur on or below the modern land surface, or may be submerged under water. The physical forms that these archaeological sites may take include: surface scatters of artifacts; subsurface strata which are of human origin, or incorporate

archaeology
the science and/or methods concerned with the recovery, description, analysis and explanation of the physical remains of past human cultures. In North America, some archaeologists view their task as the cultural anthropology of the past while others restrict themselves to the culture history or the chronicling of events of a particular area. Archaeology may deal with either pre-contact history or history -- that period since the introduction of written records.

artifact
any object manufactured, used, moved or otherwise modified by human beings, including all waste materials and by-products of these processes. Occasionally, the term is used in the more restricted sense of a completed object as opposed to the associated detritus.

artifact assemblage
all artifacts of one culture or time period found within the context of an archaeological site

biotic landscape
the living component of the landscape

biotic systems
networks of relations between the living elements of an ecosystem

Borden Designation
the standard archaeological site designation system in Canada. The label consists of four letters (alternating upper and lower case) followed by a number, e.g. EaKv-1. The alphabetic prefix refers a block of 10 minutes by 10 minutes within a grid system which covers all of Canada south of 62 N latitude. The numerical suffix indicates that this is the first site within this block to be designated.

botanical communities
communities of plants

burial
1. the covering-over of an object with earth.
2. the ceremonial entombment of a dead body beneath the ground or in a chamber.
3. the feature thus created consisting of the individual(s) and the context. bundle
burial. the (re-)burial of bundled-up disarticulated, defleshed remains. extended burial. placement of the individual with arms at the sides and legs extended. flexed burial. placement of the individuals with arms and legs bent up against the body. intrusive burial. the excavation of a grave into a burial pit or mound constructed at an earlier period. Two individuals may thus appear to be in association although they are not contemporaneous. multiple burial. collective internment; the placement of two or more bodies within the same grave. platform burial. see scaffold burial. primary burial. placement of the dead in a grave with the flesh at least partially intact such that after further decomposition, the bones remain articulated. scaffold burial. placement of the dead on a scaffold above the ground where it may be defleshed by scavengers. The remains may be interred at a later date. seated burial. entombment of the deceased in a sitting position. secondary burial. the final interment of an individual subsequent to an earlier burial in which the flesh decomposed. Secondary burials are therefore not articulated (or frequently improperly articulated) and some bones may have been lost. supine burial. placement of the dead on the back with face and palms upward.

cert
a fine-grained stone similar to flint, used by pre-contact peoples for the manufacture of tools; differences in chert properties (colour, texture, mineral composition) are often indicative of the specific bedrock source.

cinal
pertaining to gradual change
deitage
debris produced during the manufacture of flaked stone tools

deductive modelling
in archaeology, the analysis of environmental indicators and known cultural land-use patterns to predict areas of archaeological potential within a given area (see also inductive modelling)
degaciation
the melting and withdrawal of glacial ice
dendric
pertaining to a branching pattern
diachronic
relating to or involving the study or development of something through time
drumlin
a teardrop-shaped hill of glacial debris of uncertain origin
ecosystem
a localized group of interdependent organisms together with the environment that they inhabit and depend on
eotone
a zone of transition between two different ecosystems
edaphic
pertaining to the effect of soil characteristics, especially chemical or physical properties, on plants and animals
esk
a sinuous ridge of sand or gravel deposited by a stream flowing under a glacier
estuarine
pertaining to an estuary, the wide lower course of a river where lake or ocean waters mix
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethnographic analogy</td>
<td>the study of lifeways among existing human cultures as a basis for understanding similar lifeways in the archaeological past</td>
</tr>
<tr>
<td>evapotranspiration</td>
<td>the return of moisture to the air through both evaporation from the soil and transpiration by plants</td>
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<tr>
<td>excavation</td>
<td>digging up and removing artifacts and features from an archaeological site in order to analyze and predict past human behaviour.</td>
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<tr>
<td>facies</td>
<td>a distinct kind of sediment or sedimentary rock for an area which reflects a certain depositional environment</td>
</tr>
<tr>
<td>feature</td>
<td>something distinctive encountered on the ground surface or during the course of excavations which is not artifactual in the usual sense. Its significance may lie not in the object or objects which constitute the feature, but rather in the relationship of the objects to each other. Thus while a cobble, fleck of ash or fragment of burned bone would mean little if found in isolation, a concentration of bone and ash surrounded by a circle of cobbles would suggest a cooking area, and this patterning would constitute the feature. Other examples of features could include post moulds, storage pits, a garbage dump, a cache of tools, a flint knapping area, a collapsed dwelling or a burial.</td>
</tr>
<tr>
<td>findspot</td>
<td>the location in which an artifact is found.</td>
</tr>
<tr>
<td>geographical information system (GIS)</td>
<td>computer-based techniques for managing and analyzing spatial data, especially in a digitally mapped format</td>
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<tr>
<td>glacial lake</td>
<td>a lake in contact with a glacier</td>
</tr>
<tr>
<td>glacio-fluvial</td>
<td>pertaining to rivers flowing on, under, or in contact with glaciers</td>
</tr>
<tr>
<td>glacio-lacustrine</td>
<td>pertaining to glacial lakes (q.v.)</td>
</tr>
<tr>
<td>gyttja</td>
<td>a fine-grained, nutrient-rich organic mud deposited in lakes and ponds</td>
</tr>
<tr>
<td>Holocene epoch</td>
<td>the last 10,000 years of geological time</td>
</tr>
<tr>
<td>hydrographic features</td>
<td>various types of water features on the landscape, including lakes, ponds, rivers, streams, and wetlands</td>
</tr>
<tr>
<td>hydroseral development</td>
<td>pertaining to the succession of wetlands from open water to closed peatlands</td>
</tr>
<tr>
<td>Hypsithermal</td>
<td>period from about 9,000 to 5,000 years ago when the climate was warmer than present - also known as the Holocene Climatic Optimum</td>
</tr>
<tr>
<td>inductive modelling</td>
<td>in archaeology, the extrapolation of archaeological potential on the basis of known site locations (see also deductive modelling)</td>
</tr>
<tr>
<td>isostatic uplift or</td>
<td>the upward movement of the earth’s crust following release from a weight such</td>
</tr>
</tbody>
</table>
rebound as a continental glacier

isolated find the recovery, usually from the surface, of a single artifact with no other artifacts in association.

lacustrine pertaining to lakes

Laurentide glacier the continental ice sheet that covered most of Canada during the Wisconsinan glaciation (q.v.)

lithics stone tools manufactured by the selective removal of flakes, or by grinding, to achieve a desired form.

macroband the largest unit of a hunter-gatherer community, comprising two or more microbands

marl a naturally occurring fine crumbly mixture of clay and limestone, often containing shell fragments and sometimes other minerals

mast the fruit of nut-bearing trees

microband the smallest unit of a hunter-gatherer community above the level of the individual nuclear family

microclimate dealing with localized climatic regimes

microenvironments localized ecosystems

midden a heap or stratum of refuse generally located near a habitation site.

mitigation measures that reduce the deleterious effects of project construction, operation and maintenance on archaeological resource values. Actions designed to prevent or avoid adverse impacts are also regarded as mitigation.

outwash sediment deposited from glacial meltwater

paleoclimatic dealing with climatic regimes in the past

paleoecology the study of past environments and the relationships between various life forms

paleoenvironment a natural environment of the past

paleofauna animal communities of the past

Paleozoic era the period of geological time from about 542 to 241 million years ago

palustrine pertaining to wetlands

physiography the study and description of the landscape

phytosociological pertaining to the study of the characteristics, classification, relationships, and
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>distribution of plant communities</td>
<td></td>
</tr>
<tr>
<td>Pleistocene epoch</td>
<td>the geological period from about 2 million years ago to 10,000 years ago</td>
</tr>
<tr>
<td>pollen profile</td>
<td>a chart illustrating the frequency distribution of fossil (ancient) pollen from various depths of a sediment sample</td>
</tr>
<tr>
<td>Precambrian</td>
<td>the earliest geological period from about 4.5 billion to 542 million years ago</td>
</tr>
<tr>
<td>predictive modelling</td>
<td>in the archaeological context, the analysis of past environmental conditions and human settlement and subsistence patterns in order to develop an informed understanding of land-use trends that can be used to predict the likelihood of encountering archaeological sites in a given area</td>
</tr>
<tr>
<td>projectile point</td>
<td>an arrow- or spearhead</td>
</tr>
<tr>
<td>Quaternary period</td>
<td>the last 2 million years of geological time</td>
</tr>
<tr>
<td>riparian</td>
<td>situated or taking place along or near the bank of a river</td>
</tr>
<tr>
<td>salvage archaeology</td>
<td>archaeology conducted primarily because a site or area is in imminent danger of destruction by natural forces or by construction or development. The British equivalent to this term -- rescue archaeology -- is self-explanatory. Also referred to as mitigation.</td>
</tr>
<tr>
<td>socio-political systems</td>
<td>the complex web of social and political institutions, including kinship groups, peer networks, trade relations, social hierarchies, etc., that organize and manage human societies</td>
</tr>
<tr>
<td>stochasticity</td>
<td>behaviour that is the result of random contingencies</td>
</tr>
<tr>
<td>stratigraphy</td>
<td>the study of the sequence of soil accumulation and deposition. The basic premise underlying this interpretive approach to archaeological sites is that if one deposit overlies another, it must have accumulated later in time than the lower, which could not have been inserted beneath a layer already there. Study of the stratification, or ordering of soil layers, and of the different artifacts recovered from the various layers is a method of estimating the dates (relative to one another) of various events that occurred on an archaeological site.</td>
</tr>
<tr>
<td>substrate</td>
<td>an underlying sedimentary layer</td>
</tr>
<tr>
<td>surficial geology</td>
<td>the study of unconsolidated sediments across the landscape</td>
</tr>
<tr>
<td>survey</td>
<td>1. the investigation of an area to locate archaeological sites and to acquire a preliminary understanding of its prehistory. This latter aim is most commonly achieved by means of surface collecting and the excavation of test pits. 2. to systematically map and grid an archaeological site. Surveying instruments such as the total station, transit and the theodolite are generally used.</td>
</tr>
<tr>
<td>taxon (plural, taxa)</td>
<td>a group to which organisms are assigned according to the principles of taxonomy, including species, genus, family, order, class, and phylum</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<td>-----------------------</td>
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</tr>
<tr>
<td>test excavation</td>
<td>Subsurface excavations in areas which are either defined as sites based on surface artifacts or thought to contain buried deposits based on the landform.</td>
</tr>
<tr>
<td>test pit</td>
<td>a unit excavated to determine the presence or absence of an archaeological site, or the nature of the deposits.</td>
</tr>
<tr>
<td>topographic features</td>
<td>various types of landforms that produce relief in the landscape</td>
</tr>
<tr>
<td>transgression</td>
<td>in geological terms, the expansion of a water body beyond its earlier limits</td>
</tr>
<tr>
<td>understorey</td>
<td>the area of a forest which grows in the shade of the forest canopy</td>
</tr>
<tr>
<td>vertebrate palaeontology</td>
<td>the study of past, often extinct, animals with backbones</td>
</tr>
<tr>
<td>Wisconsinan glaciation</td>
<td>the most recent glacial period, from about 110,000 to 10,000 years ago, within the Pleistocene epoch (q.v.)</td>
</tr>
<tr>
<td>zooarchaeology</td>
<td>the study of animals remains from archaeological sites</td>
</tr>
<tr>
<td>zoological landscape</td>
<td>communities of animals</td>
</tr>
</tbody>
</table>
APPENDIX A

Historical Overview

Historic Core
City of Kingston, Ontario
INTRODUCTION

This document is not intended to be an exhaustive history of the historic core of Kingston, although the main focus of the text is historical in nature. Rather, it serves to identify the extant or formerly present historical features within the core that provide the rationale for the area’s inclusion as an Archaeologically Sensitive Area.

Between October 1987 and 1990, the Cataraqui Archaeological Research Foundation (CARF) conducted the Kingston Archaeological Master Plan Study (KAMPS). The KAMPS was a joint venture between the old City of Kingston and the Ontario Ministry of Culture and Communications under the terms of a Community Facilities Improvement Program grant. This project focused on the area now known as ‘City Centre’. The two main goals of the study were to develop an accurate and complete inventory of the archaeological resources located within the city, focusing on the historic core of the city, and to develop responsible planning strategies for the management of those resources.

The study was comprised of four phases including background research, which included the review of historical and archaeological documentation, the development of field strategies and preliminary public consultation. It formed the base from which a detailed inventory of archaeological sites found within the historic city core could be prepared. The second phase consisted of the field evaluation of known sites and areas of potential. In the third stage, management strategies adopted by other municipalities in Canada, the US and Europe, at that time, were examined. In consultation with municipal government, the development community and the general public, the consultants developed policies concerning the responsible management of the City’s archaeological resources. Interim reports were prepared for each of the three first stages, which were then compiled together with an analysis of the study and its implementation to form the final Phase 4 report of the KAMPS.

The work and results of the KAMPS study have been used in this master plan to form the rationale for the inclusion of the Archaeologically Sensitive Area (ASA) encompassing the historic core of the former City of Kingston.

The background research of the KAMPS study (CARF 1987-88) was intended to create a historical framework through the identification of stages of development, within which to examine and understand the past and modern urban landscape, to identify areas or specific properties of historical significance, and to provide a means of assessing the significance or historical value of a property. Although little original archival research was conducted, the historical research conducted for the study consisted of an extensive review of secondary sources.

This document, which is informed by the KAMPS study and other sources, focuses on the early history of the historic core, the original town site of the City of Kingston which is bounded by Bagot, West, and North Streets, and which forms the historic core ASA in the current master plan.

FRENCH PERIOD

A major source for this time period was Preston and Lamontagne’s Royal Fort Frontenac (1958). They had concluded that the French were the first Europeans to recognize the strategic importance of Kingston, which served as a base from which westward exploration and territorial expansion was launched.

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4 Richard Preston and Leopold Lamontagne, Royal Fort Frontenac (Toronto, The Champlain Society 1958)
Cataraqui was chosen by Louis de Buade de Frontenac, the late seventeenth century Governor of New France, as a site for a fort for a number of strategic reasons. By the early seventeenth century, the French had allied themselves with the Huron-Algonquin tribes, which brought them into conflict with the Iroquois and their allies, including, later on, the English. This animosity was increased by the fur trade as it became more lucrative and the French and the English vied for territory and furs from the Aboriginal people. Following French Intendant Talon’s decision to build a series of forts along the north shore of Lake Ontario to keep the trade away from the English to the south, Frontenac chose Cataraqui and entrusted the mission to the Recollets.

The St. Lawrence-Lake Ontario route was already a well-established route into the interior and it was known that the Aboriginal hunters normally passed this site at Cataraqui on the way to their hunting grounds. The site was also a strategic place from which to monitor the Iroquois, who were rumoured to be stealing furs from the Ottawas at the entrance of Lake Ontario and relaying them to the English and Dutch to the south.

Fort Frontenac, in the form of a number of wooden structures surrounded by a rough wooden palisade, was constructed in 1673. Two years later, the seigneurial rights to the fort were granted to Robert Cavelier, Sieur de La Salle, on the conditions that 1) he maintain a garrison in the fort as strong as that of Ville-Marie (Montreal); 2) that he attract Indian and French settlers; and 3) that he build a church and maintain two Recollet friars.

When La Salle arrived at Cataraqui with soldiers, sailors, masons, carpenters, a blacksmith, an armourer and other tradesmen, he had the old wooden fort demolished and a second log palisade with four masonry bastions erected. Fifteen foot wide ditches were dug around the fort with a moat across the peninsula. Inside the new fort, he established a hundred foot long square-log house, a blacksmith shop, a guardhouse, officers’ quarters, a well and a cow-house. Three small vessels and a bark, named the Frontenac, were then constructed.

By 1677, the population in and around the fort was estimated at around 200, including missionaries, traders, workers, settler families and Aboriginal peoples. The Iroquois had built a chapel and a house for the Recollets missionaries by the lake near the fort, and over forty cottages were located between the mission house and the fort. Crops of corn and peas were abundant and a barn built near the fort held poultry and cattle. Recent research on Lake Ontario Park has also revealed the presence of French Fortifications in this area. As La Salle was mostly absent from the fort on his quest for the western passage to China, Sieur de La Forest was appointed commandant of Fort Frontenac and he was granted the seigneury of Belle Island.

By 1680, sections of La Salle’s fortification were being replaced with substantial limestone construction, and transformation of the fort from wood to masonry was completed by 1688.

The trading pattern established between the Iroquois and Cataraqui and Montreal following the peace confirmed by Frontenac in 1673 was short-lived as trade with the English and Dutch proved to be more lucrative. In their quest for more furs, they became increasingly aggressive, attacking and plundering French forts and French Aboriginal allies. War with the Iroquois was declared and, following two raids and an attack of scurvy which killed 93 soldiers, the commandant of Fort Frontenac was ordered, in 1689, to withdraw his garrison and destroy the fort.

Later that same year, scouts reported back to Count Frontenac that, while the buildings had been destroyed, the walls of the fort were still in good condition and there was no trace of occupation by either the English or the Iroquois. Under Frontenac’s guidance, the fort was re-established, with the intention to
use it as a base to launch an offensive against the Iroquois, which was imperative in order to keep their alliance with the Huron-Algonquin tribes.

In the summer of 1697, French troops attacked the Onondaga and Oneida in their own country. During the same period a twelve foot high building was erected at Cataraqui along a curtain wall which contained a chapel, officers’ quarters, bakehouse and magazines filled with provisions for 18 months. In 1698, peace was again sought between the English and French colonies and two years later, peace was achieved with the Iroquois. What followed was a half century of uneasy peace.

After Frontenac’s death in November 1698, M. de Callieres succeeded him as Governor of New France. One of his first objectives was to strengthen Fort Frontenac. Trade with the First Nations was forbidden at the fort, which was occupied by a garrison of two officers, a chaplain, a sergeant, and fifteen men led by Captain de Louvigny, so as not to interfere with the fragile peace negotiations.

The return of peace allowed the French empire to re-establish its former distant boundaries, the Jesuits to re-establish missions among the Onondagas and the Senecas, and the fur trade to continue under the direction of the Compagnie Générale du Canada and, at Fort Frontenac, the King’s agent. This time of peace between the French and English colonies, however, was short-lived as war resumed between France and England. As Acadia, Hudson Bay and Newfoundland were lost to the English and the French military strength was stretched thin over their distant settlements, only a small garrison was maintained at Fort Frontenac to guard a magazine on the supply route to the interior. The French, however, did retain a share of the fur trade.

While the Treaty of Aix-la-Chapelle restored peace in Europe, it brought little respite to the rivalry between the two colonies in America. A series of forts were constructed by both sides, and Fort Frontenac once again became a major supply depot, as well as an important shipyard, naval and military base. Improvements to the fort included entrenchments, redoubts, and soldiers quarters. Schooners were built on site and the fort soon became the arsenal for the French fleet on Lake Ontario.

By the time Fort Frontenac was attacked by Colonel Bradstreet in August of 1758, the area was populated by 110 men, women and children, 60 cannons, 16 mortars, nine vessels, military and naval stores, provisions, and trade goods. The French were allowed to leave for Montreal. After razing the fort, the English proceeded to Oswego, and one by one, the other French posts fell (Figure 1).
THE LOYALIST SETTLEMENT AT CATARAQUI

This part of the city’s history is the most familiar, and is often wrongly described as the beginning of settlement at Kingston. Preston’s collection of documents in *Kingston Before the War of 1812*\(^5\) provided the KAMPS study with invaluable information on the early years of British settlement.

During the American War of Independence, the British surveyed the area for the purpose of establishing a military and naval post. In 1778, Fort Haldimand was constructed on Carleton Island, located at the junction of the lake and the river. Supplies being sent to the interior posts were forwarded via Carleton Island. As such, merchants, several of whom became Kingston’s leading businessmen, were attracted to this military post. Fort Haldimand also served as base for raids against the Americans, for reconnaissance, and as a refuge for Loyalists, including Molly Brant, sister of Chief Joseph Brant, and several of her children.

The number of Loyalist refugees at British military posts and refugee camps increased as the war progressed, but as the preliminary peace treaty was signed in 1782 and there were negotiations for the relocation of the refugees, the future ownership of Carleton Island was questionable. In 1783, Surveyor General Samuel Holland arrived at Cataraqui to conduct a survey of the fort and entrenchments that had been left by the French in order to ascertain the suitability of the area for settlement. Following his positive report, Haldimand ordered the establishment of a military post at Cataraqui to be commanded by Major John Ross. Due to its location in a hostile wilderness, and in close proximity to another rebellious and recently victorious colony, a permanent military and naval force in the new settlement of Kingston was necessary. The British military undertook the care and supervision of the Loyalist refugees and oversaw the survey of lands and the preparation of mills and barracks.

The town survey was completed by Lieutenant John Frederick Holland in 1784 (Figure 2). His plan indicates that a town was already forming near the barracks. The first residents of the future town of Kingston included Robert Hamilton, a merchant from Carleton Island, John Howell, a sutler who sold provisions to the military, Peter Clark, a merchant from Montreal, Lieutenant John Howard and Oliver Church. By 1784, two merchants had warehouses and wharves near the fort. Holland’s plan also showed the houses of five inhabitants and three King’s houses.

Sir John Johnson, son of the late William Johnson – former Superintendent of Indian Affairs in the Mohawk Valley and step-son of Molly Brant – was appointed Superintendent General of the refugee Loyalists. The Brants and Sir John were granted lands in the original town survey. Land was also granted to Reverend John Stuart, a missionary to the Mohawks, who requested the chaplaincy of the garrison.

The Cataraqui settlement initially consisted of five townships, running from Cataraqui to the Bay of Quinte. Although military units and associated companies usually settled together with most lots assigned or drawn for on an impartial basis, preferential treatment was sometimes given to officers and other people of importance. Land was also set aside for the military, the church and public purposes such as a market and government buildings. The most notable of these parcels was the institutional “gore” on the west side of the downtown in which the City Hall, Market Square and Anglican Church, as well as the former Customs House and Post Office, are located.

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Appendix A - Figure 2: Plan of Old Frontenac and town plot of Kingston, 1784 (John Frederick Holland).

Archives of Ontario, C 295-1-75-0-2

Appendix A - Figure 3: Kingston, Ontario, 1796. Watercolour by Elizabeth Simcoe.

Archives of Ontario, F 47-11-1-0-241
By 1785, 206 settlers had drawn town lots, and approximately 50 frame and log houses had been built. By 1786, the town had built a school. A Church of England, which was to remain the only place of worship in Kingston for approximately two decades, was not built until 1792 (Horsey 1937). The Catholic church was here by 1812. The frame building stood back from the market and its burial grounds were located in what is now St. Paul’s churchyard. The watercolour shown in Figure 3 illustrates what Kingston looked like in 1796.

New settlers generally moved out into the townships due to the availability of free land and the town’s population was mostly made up of merchants, officers and their families and servants. Kingston’s first stone house, which was standing prior to 1792 on Town Lot 3, is thought to have been owned by the merchant Peter Smith. The house was demolished in 1929.

EARLY COMMERCE

Due to its strategic location near the mouth of the St. Lawrence River, Kingston became a hub of transshipping both within Upper Canada and the United States and therefore quickly emerged ahead of other towns in Upper Canada in terms of early commerce. Wharves and storehouses were built by merchants, many of whom were direct representatives of the larger Montreal firms that could get and give credit and had contacts with overseas markets. While the French had built their wharves in the sheltered inner harbour behind the fort, the English traders built close to the shoreline facing east and southeast at the entrance of the Cataraqui River. This location was exposed to strong winds from the lake and there were dangerous shoals just off shore. While Kingston could boast of being the largest commercial metropolis in Upper Canada for the first 50 years, it could not maintain this status as increasingly large ships could not safely navigate its waters.

In the early years, the largest portion of exports continued to be furs. Other imported products included tobacco, tea, paper, sealing wax, flour, trade goods, rum, powder and shot, blankets, cloth, cheese and sugar. One of the first items produced by the settlers that found a market overseas was potash, followed by wheat, flour and salt pork.

The merchant class was in a relative position of power and influence given their indispensable link in the economic and communication structure of the colony. Some of the more notable businessmen were appointed to government positions, and the class as a whole took an interest in political and civic matters. Before the War of 1812, the most successful merchant in Kingston was perhaps Richard Cartwright, who began operations on Carleton Island and was an associate of the Montreal firm of Todd and McGill. Other prominent merchants included Joseph Forsyth, Robert Macaulay, Thomas Markland, Peter Smith, John Kirby, Hugh Fraser, Hugh Johnson and the Herkimer family from the Mohawk Valley. Lawrence Herkimer, who supported the British, settled in Cataraqui on the site of the present Prince George Hotel. At that time, the basement of the hotel was actually the ground floor, as the ground level was much lower that the streets today. The shoreline was also much closer to the buildings on Ontario Street and boats could unload their goods right across from the hotel.

The presence of the garrison and the naval base also enabled local trade and development. The construction of saw and grist mills began prior to the arrival of the Loyalists and were for many years operated free of charge. The Kingston Mills site was located approximately four miles north of the town on the Cataraqui River. The first road in Kingston led to the mill and a roadmaster was appointed to maintain it. This road became a main thoroughfare as it continued east to Montreal.

The naval base and dockyard was located on Point Frederick and by 1800, it contained a transport store, a naval store, a deputy commissary and storekeeper’s house, a work shed and sail loft (Figure 4). This
establishment, which was also a centre of trans-shipment and of ship-building, became the headquarters for the navy on Lake Ontario. Private ships built and launched from Kingston include the 87 ton Lady Dorchester (1789) and the Simcoe (1794).

According to a report prepared by Dana Johnson for the Canadian Inventory of Historic Buildings (Johnson and Taylor 1976-77), only a handful of major buildings from this era appear to have survived. These are a fragment of the Kingston Brewery located at 308 Wellington Street (1794-95), the Roman Catholic Bishop’s House located near the intersection of Bagot and Johnson (1813), the frame house located at 232 King Street East (built c. 1812), the Rocheleau storehouse located at 70-72 Princess Street (1808) and the pre-1796 Stuart Cottage at 57-59 Gore (OGS, Buildings of Architectural and Historic Significance. Vol. 6: 117) (see also Sydenham Heritage Conservation District Study for building details).

PERIOD OF GROWTH (1812-1838)

The War of 1812 had a profound impact on the Town of Kingston. Defence became a priority and military activity and spending jump started the local economy. As the population increased, so did the built-up area of the town as more houses were constructed. Additional wharves and buildings were built to accommodate this new commercial prosperity. This growth led to the need for stronger local government, which ultimately led to the incorporation of the town in 1838.

When the United States declared war against Britain on June 12, 1812, Kingston’s defenses were in desperate need of an overhaul. Old and run down, the barracks and public buildings provided no protection for the town or the dockyard, the ships were in need of repair and there were fewer than 100
men in the garrison. Instead of moving the marine establishment to York, as had been considered by the Governor General, large efforts were undertaken to make the town defensible. Changes in the town included the clearing of forest around the town and on Point Henry, the construction of five strategically placed blockhouses, intersected by cedar picketing to surround the town, the construction of garrisoned batteries on Mississauga and Murney Points, the rebuilding and enlargement of the old barracks and stores to front on Place d’Armes, the construction of a military compound in the area presently bounded by Barrack, Wellington and Ontario Streets, which was sub-divided into zones for the different military departments, the founding of Artillery Park at the head of Barrack Street which contained its own parade ground, gunsheds, forges, stables, barracks and a residence for the commanding officer, the construction of a battery supported by a blockhouse and barracks on Point Frederick to protect the naval yard (ship builders at the naval yard played an important role in maintaining Britain’s naval supremacy on the lakes and keeping the lines of communication and transportation open), and the construction of a twin-towered fortress on Point Henry, which also had an ordnance wharf and an enclosed compound containing the workshops and stores of the Ordnance and Royal Engineers (Figure 5).

Appendix A - Figure 5: In the Kingston Archaeological Master Plan Study Stage I Report compiled by the Cataraqui Archaeological Research Foundation (1987-88:33) entitled ‘Plan of the town of Kingston showing the military reservations, October, 1815’. Originally from Preston: 280a.
By the end of the war, over 2000 troops were stationed in Kingston. With military disbursements amounting to over 1000 pounds per day and the circulation of money by soldiers and workers, builders and merchants prospered during the war. Within five years, the town’s population had nearly doubled to 2,250 with a concomitant enhancement of the built-up area of town.

Canada’s first defence master plan was drawn up by Lt. Col. John Harvey in 1818. In his “Memorandum on the Defence of the Canadas” he outlined the urgent need to abandon the St. Lawrence for a safer, interior route for the transport of men and provisions between Kingston and Montreal with both terminals heavily fortified. Construction of the Rideau Canal was begun in 1826 as was the construction of the Kingston fortification. The canal was completed in 1832 and while it was never called upon for military use, it enhanced Kingston’s trade, opened up the Rideau Corridor (now a UNESCO World Heritage site) to settlement and production and facilitated transport between Kingston, Montreal and Ottawa (Figure 6). It was also used to transport the rebels from the Battle of the Windmill.

Kingston’s merchants were involved in launching the first steam ship on Lake Ontario in 1816 and as improvements were made and steamers were increasingly used, more merchants and shipping companies established themselves in the town. The naval dockyards closed down in 1834 but were re-opened as a result of the Rebellion of 1837. Gun boats were built there until after the Fenian Raids.

According to Dana Johnson in the Canadian Inventory of Historic Buildings (1976-77), the city’s architectural history between the War of 1812 and the incorporation of the town can be characterized by three major facets including the physical growth of the town, a transition from wood to stone as the main building material, and the arrival of architects with professional training. A more recent urban design analysis of the downtown core (Kingston Downtown and Harbour Area Architectural Guidelines Study, Baird Sampson Neuert Architects, 2007) contains an architectural character statement that addresses this issue in greater detail. Text within that report prepared by cultural geographers Carl Bray and Brian Osborne reveals a breakdown of five periods in local history in which development activity had a significant effect on the city’s physical form, and an appended discussion paper, prepared by architectural historian Jennifer McKendry, provides a more detailed analysis of the trends Johnson identifies.

The transition in building materials to limestone was made possible by the wealth that was accumulated from the trans-shipment of goods through Kingston and the influx of skilled masons who worked for the British Ordnance Department on the fortifications and the Rideau Canal. Some of the influential architects during those years included William Cloverdale (Kingston Penitentiary), Archibald Fraser (Stone Frigate, St. Andrew’s Presbyterian Church, Colborne Presbyterian Church) and Thomas Rogers (Knaresborough Cottage and other residences, Kingston General Hospital, first Cataraqui Bridge).

**Kingston as Capital (1838-1844)**

The Incorporation Act of 1838 divided the town into four wards, each of which would elect representatives to the town council, and defined the new boundaries between the town and the township. The town prospered and the population exploded. By 1842, there were over 6000 inhabitants in the Town of Kingston. Wheat prices in Britain increased trade through Kingston. The deepening of the St. Lawrence allowed steamers to tow barges loaded with wheat, oats, flour, pork and potash to Montreal, and return via the Rideau Canal with general merchandise and more immigrants.

Manufactures and factories increased and work continued on fortifications which in turn pumped a great deal of money into the local economy. Despite this boom in population, most of the actual settlement remained largely within the old boundaries of the town and the previously subdivided areas of Charlesville, Picardville and Williamsville. An exception, however, was the construction of large villas...
along the waterfront west of the town. The selection of Kingston as capital also had an impact on surrounding communities such as Portsmouth, whose quarries profited from the building boom, and Hatter’s Bay, whose harbour accommodated the rapid expansion of the forwarding business in Kingston, especially after the disastrous fire on Kingston’s waterfront in 1840.

Numerous new structures were constructed at this time, including Kingston’s City Hall, and residences to accommodate the civil servants. As demand for land increased within the old limits of the city, civilians started to encroach on Ordnance Lands. For example, in 1842, City Council wanted to extend streets through the Engineer’s Yard Reserve down to the Bay, an area bounded by present day Wellington, Barrack and Ontario Streets.

During the period between 1838 and 1860, upper class families, such as merchants and professionals, moved from the original city core to settle in more spacious country villas or townhouses. Construction of rural homes west of the town really boomed in the 40s and 50s.

**CHANGING ECONOMY (1845-1859)**

Kingston’s standing as the leading port in Upper Canada ended during the middle of the nineteenth century. While Kingston was still experiencing a steady increase of port activity during this time, it was drastically surpassed by the increase in activity in both the Toronto and Hamilton ports. During the 1850s, the local economy fluctuated back and forth between prosperity and decline, ending on a low at the end of the decade. It was also a time during which fill was added thereby altering the shoreline.

A number of factors led to a decline in prosperity. First, the move of the capital to Montreal in 1844 led to a population decline by the removal of officials and their families. The real estate market was in decline and social and economic depression set in. Second, Kingston’s harbour was becoming increasingly disadvantageous. More and more goods were being transported down the Erie Canal in the United States, navigation of larger vessels between the shoals in the harbour was becoming increasingly dangerous and the railroad immediately proved to be more efficient in the transport of passengers, mail and perishables. Additionally, as vessels became larger and more specialized, the need for storage and trans-shipping at Kingston was diminished.

As a way to counteract this economic decline, Kingston expanded its road network into the rural hinterland. These roads helped open up the interior lands for settlement and economic development. Once completed, the new roads, together with railroads, would compliment port functions. These roads allowed Kingston to deal with its economic slump by expanding and diversifying its economic base.

This decade also saw a decline in official British interest in Kingston as they were making plans to pull out and turn all military affairs over to the United Canadas. Most of the town’s expansion at this time was concentrated in Lot 24 and the area known as Stuartville, located immediately west of the original town survey. This area, also known as the Liberties, was developed by Archdeacon George Okill Stuart as a place in which working people of modest means could build their own houses. It had a diverse population of tradespeople of many nationalities, although the housing stock tended to be substandard and the area was considered to be a slum.
1860s AND BEYOND

The last decades of the nineteenth century saw relatively slower expansion. Loss of the regional shipping trade, as the Province expanded westwards and the area’s resource base was depleted, meant that downtown Kingston needed a new economic focus. Over the next decades, there were many experiments with new land uses. Most notably, the expansion of the railway after the 1850s brought tracks along the harbour and reinforced the segregation of land uses between the commercial core and the industrial edge, with Ontario Street as the boundary. Even prior to the British military pulling out in 1871, the military presence on the waterfront diminished with the arrival of the railway: even Market Battery Park was removed for the K&P railway station and yard. Large locomotive works dominated the south end while storage and expanded wharves took up the remainder. The expansion of Kingston’s role as a trans-shipment hub led to construction of several large grain elevators that competed in height with the tallest public buildings. The presence of heavy industry and commercial storage fed by rail lines reinforced Ontario Street’s character as a place of hotels and ticket offices catering to travellers, and of modest stores and restaurants catering to workers. At the turn of the century, this area saw an industrial boom focusing on elements of the “old economy”, in this case the locomotive works, several factories, and greatly expanded shipyards. Added to this were elements of emerging economies, such as the municipal gas works. The new industries attracted a larger unskilled work-force. Consequently, affordable housing and rental units were in high demand. Working class districts, like Charlesville, were filled in. The Goad’s Insurance Plan of 1892 shows all the privately owned land within the original town plot to have fairly dense building coverage.

The period between the First and Second World Wars saw minimal change in the study area. The slow decline of the “old economy” industries was not offset by any significant influx of new industries or commercial enterprises. The modest boost given by the post-WWI economy was followed by the international chill caused by the Great Depression. As was the case in most other Canadian communities, the Second World War marked the turning point in revitalizing the downtown. Following the war, Kingston echoed national trends in expanding its boundaries into new suburbs, shifting from manufacturing to a service economy, and experimenting with radical renewal schemes for the waterfront and much of the downtown.

The harbinger of major change was the introduction of the automobile. As motor vehicles replaced horse drawn transport, new repair garages, showrooms, and filling stations began to appear. These space-intensive uses first began to alter the block interiors, replacing stables and storage sheds with surface parking and truck access. Then, the desire for prominence on the street dictated the removal of buildings on street corners and their replacement with service stations. Demolition of many older structures, both humble (as in old factories and worker’s housing) and grand (as in some key institutional and commercial structures) was a hallmark of this period.
APPENDIX B

Historical Overview

Kingston East
City of Kingston, Ontario
INTRODUCTION

This document is not intended to be an exhaustive history of Kingston East (former Pittsburgh Township), although the main focus of the text is historical in nature. Rather, it serves to identify the extant or formerly present historical features that might yield associated archaeological deposits and that were mapped for the GIS layer of historical features. That layer is described in more detail in Section 3.2 of this report. For a detailed consideration of the early period of Kingston’s development and the history of the historic core, City of Kingston, see Appendix A.

To standardize the documentation process, eighteen main map sets were chosen with which to work, which range in date from the early French regime to 1878. The boundaries of the settlement centres were plotted based on the above maps and serve to indicate those areas where most of the building activity was concentrated at the time the source maps were produced. Individual public buildings and homes were not mapped within these centres, although the settlement centre overlay is indicative of those areas that exhibit potential for the presence of meeting halls, school houses, blacksmith shops, stores, grain warehouses, hotels, taverns, and other commercial service buildings. All schools, places of worship and commercial buildings, such as inns, that occur outside of the major settlement centres have also been mapped individually, if their locations were shown on the Illustrated Historical Atlas maps.

All mill locations, manufacturers, lime kilns, quarries and mines were also mapped based on the nineteenth century surveys and the Illustrated Historical Atlas maps as well as all transportation routes such as early settlement roads or railways, established by the 1870s. Isolated rural homesteads and cemeteries were also mapped.

HISTORY OF PITTSBURGH TOWNSHIP

This township was named in honour of William Pitt (1759-1806), who was the prime minister of Great Britain under George III between 1783-1801, and again from 1804-1806 (Rayburn 1997:272). Although the southwest portion of the township was partially surveyed by Alexander Aitken in June 1787, the first ‘legal’ settlers did not take up their land holdings until 1789 (Armstrong 1985:146). Aitken abandoned his survey of Pittsburgh, mainly based upon his perception that the township contained poor quality land from about the third concession northward (Preston 1959:130). Some areas contained rocky outcroppings and wet, swampy terrain, and Aitken concluded that “I would be putting Government to a useless expense to Survey lands that never will be settled” (Tulchinsky 1976:66).

In 1789, the Reverend John Stuart reported that Pittsburgh “does not contain more than ten families” (Preston 1959:148). Nevertheless, period maps show that the southerly part of Pittsburgh along the St. Lawrence and Cataraqui Rivers was well settled by the early nineteenth century (Part of Kingston Township, 1830a) (Figure 2). Several substantial private homes and warehouses were constructed along the river fronts during the first two decades of the nineteenth century. By 1805, it was noted that a “tolerably good road” had been constructed along the river which extended between Kingston to Elizabethtown and Cornwall (Boulton 1805:35).

Indeed, the first transportation routes to be established across the Kingston region followed early Aboriginal trails, both along the lakeshore and adjacent to various creeks and rivers. Local roads were

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6 The land in the northern part of the former Pittsburgh Township is Precambrian shield, with patches of good soil located within the valleys (see Section 3.1, this volume).
initially cleared by the grantees of adjacent land as part of their settlement duties, although the many creeks and swampy areas posed a challenge to the gridded road system, and nineteenth-century maps detail the many jags and detours necessary to avoid bad crossing points.

After Simcoe established York as the capital of Upper Canada, he commissioned the Queen’s Rangers to build the Dundas Highway running west to Ancaster and London and east toward Kingston. This important transportation corridor was intended to provide an overland military route between Lake Ontario, Lake St. Clair and Lake Huron. The road was intended to serve a dual purpose – to support settlement in Upper Canada and as a deterrent to expansionist American interests.

The DeRottenburg map\(^7\) of 1850 showed that the road network within Pittsburgh Township remained largely undeveloped, with the main transportation routes being the Front, Middle and Perth Roads (Figure 1). One possible reason for this lack of road development was undoubtedly the proximity of navigable water which provided farmers with an easy access to markets. These routes included the Cataraqui River, the Rideau Canal, the St. Lawrence River and Lake Ontario.

The same was true after the mid-1850s when the construction of railway lines created junction communities adjacent to stops along the route. At first, these crossroads and junction settlement centres existed largely to provide goods and services to travelers along long distance journeys or to aid in the shipment of goods across the province. But, as resident families settled near the crossroads and created other institutions and amenities of village life, population growth, diversified industries and a consolidation of a strong agricultural base allowed villages to flourish beyond their initially transient economies.

Pittsburgh was originally a much larger township, but it was divided in 1845. The severed northerly portion formed a new township called Storrington (Smith 1851 vol. 2 p. 288). At this same period, land in the vicinity of Kingston Mills which originally comprised part of Kingston Township was transferred to Pittsburgh although the lot and concession numbers reflected the original designations assigned to them in Kingston (Figure 2).

One of the large islands in the St. Lawrence River, named Howe Island, originally formed part of the “Island County of Ontario.” It was transferred to Frontenac County in 1798 and joined to Pittsburgh Township. It was separated from Pittsburgh in 1871 and became an independent municipal entity, known as the Township of Howe Island (Patterson 1989:21).

\(^7\) Whereas discrepancies are often encountered when the road systems appearing on later maps are juxtaposed, the DeRottenburg map is a reliable source of information for the period due to the fact that it was prepared for military intelligence and planning with the most up-to-date information.
Appendix B: 4 of 34

The southwestern corner of the township was selected for use as a strategic, defensible military site and sheltered naval depot by Haldimand in 1783 (Patterson 1989:5). A naval dockyard was constructed at Point Frederick in 1789, and by 1812 Haldimand Cove (Navy Bay) was the base for the marine force on Lake Ontario. A ferry service was established by Richard Cartwright which connected Point Frederick

Appendix B - Figure 1: DeRottenburg map (1850) showing the principal roads within Pittsburgh Township.

Appendix B - Figure 2: Part of the study area showing Kingston and Pittsburgh Townships (1830). Note the large Kingston Mills Reserve and Military Reserve in Pittsburgh.
with Kingston during this same period. The ferry service was superseded by a first bridge in 1827, which was replaced in 1845.

Fortifications were built at Point Henry in 1812, in order to defend Kingston and the naval base. The present redoubt was built in 1836, which replaced the original Fort Henry. This fort was garrisoned until 1891, but never saw any military action. It did, however, offer assurances of protection to the City and to the Rideau Canal in the event of hostilities with the United States.

Due to the pressures imposed upon the Upper Canadian government to locate new lands which could be granted to settlers and the children of Loyalists, orders were issued to Reuben Sherwood in February 1807 to complete the survey of Pittsburgh. Accordingly, Sherwood hired a team of men composed of Anglo-Americans and French Canadians to serve as axe-men and chain-bearers. The survey of the township commenced in early March and did not conclude until September of 1807. The men—called “us poor dogs” by Sherwood – initially worked in deep snow, and an Indian was hired to repair and make some snowshoes for the crew. This was followed by heavy rains during the summer. The men were especially bothered by black flies and mosquitoes during late May and June, and one of Sherwood’s men journeyed to Kingston in order to purchase some protective gauze for the crew. Despite the fact that Sherwood lost some of his team who “declared they would rather lose their wages than work in such a condition,” the survey was finally completed (Sherwood 1807).

An early, printed geographical account of Upper Canada described Pittsburgh as a township which “consists of land of different descriptions, some good, some but indifferent. Its greatest advantage arises from being near to Kingston, where the inhabitants find a market for their superfluous produce” (Boulton 1805:34). An eyewitness who wrote a statistical account of Canada West observed that Pittsburgh contained “a great deal of rocky land” (Smith 1851:288).

One of the main hindrances to settlement within Pittsburgh Township during the early nineteenth century was the lack of properly maintained roads. By the mid-nineteenth century, the principal highways in the township were the Front, Middle, Perth and Point Roads. The Front Road, which skirted the St. Lawrence River, was constructed over hilly terrain and parts were said to be impassable after a rain. The Middle Road was constructed over level ground and was easier to maintain, while the Perth Road was described as being in “generally a wretched state.” During the 1850s, a number of joint stock road companies were formed. These companies collected tolls which were applied towards the maintenance of roads. They remained in existence until 1874 when the Pittsburgh Council assumed control over all of the township roads. The performance of statute labour by all able bodied men aged between 16 and 60 years of age kept other township roads and bridges in varying degrees of repair. During the third quarter of the nineteenth century, the Pittsburgh Council also passed a number of municipal by-laws for the opening up and improvement of Concession and sideline roads which were then not maintained, as well as for the straightening of other roads. This facilitated settlement, travel, and the shipment of goods to market within the township (Patterson 1989:161-165).

Following the close of the War of 1812-1814, the population of the township increased due to immigration from Scotland and Ireland, although the total number of inhabitants in Pittsburgh is estimated to have numbered not more than 800 during the 1820s (Patterson 1989:2). During the 1830s, “increased emigration from the British Isles caused the population to double” (ibid). By the 1840s, the most prosperous and heavily populated portion of Pittsburgh Township was centred near Barriefield, in an area bounded by Point Road, Front Road and Middle Road (ibid). An examination of the decennial census returns from 1861 and 1871 showed that the township retained this primary mixture of Scotch
Presbyterian and Irish Catholic families. Other township settlers during the mid-nineteenth century, included English, Americans, Quebecois and Germans.\footnote{One example of a German family within the study area was the family of Ernest Ludwig, a Lutheran immigrant from Prussia \textit{(Pittsburgh Census 1871, division e-2 p. 60)}.}

The principal crops and farm products in the township in 1849-1850, included wheat, oats, peas, potatoes, wool and butter \textit{(Smith 1851:288)}. The agricultural census returns from 1861 and 1871, revealed that many farmers within the southerly part of the township were engaged in mixed agriculture. Crops included spring wheat, barley, rye, oats, peas, potatoes, carrots, mangel wurzel, hay, hops, apples, pears and/or plums, flax seed, and grass or clover seed. Livestock included horses, colts/fillies, milch cows, other “horned cattle,” sheep and pigs. Several farmers within the study area kept bee hives. Additional farm products included honey, barrels of cured beef, mutton and pork, butter, wool, and flannel and fulled cloth. Today, much of the agricultural activity within the township is concentrated around dairy and beef production. During the nineteenth century, many of the residents in the more northerly portions of the township were engaged in lumbering.

In 1846, the population of the township was estimated at just 2,132. This small number of settlers may be attributed to the fact that part of the land within the township was considered unfit for cultivation. It was noted, for example, that the high ground in the vicinity of the Rideau Canal principally contained “granite rocks,” while the low ground was “generally flooded.” At that time, Pittsburgh contained three sawmills \textit{(Smith 1846:147)}. By 1852, the population of the township had increased to 3,258, and it reached its greatest peak during the nineteenth century before 1861 \textit{(Tulchinsky 1976:77)}. By 1980, the population had reached 9,649 \textit{(Carter 1984 vol. 2 p. 934)}.

During the mid-nineteenth century, a number of small businesses and industries were located within the study area. The decennial census showed the following businesses located within the township: cheese factories, lime kilns, limestone and sandstone quarries, saw and grist mills, potash works, blacksmith shops, carpenters, harness makers, coopers, wagon makers, and boat works \textit{(Pittsburgh Census 1871, division e-2, schedule 6)}.

\textbf{Settlement Centres}

There were some small communities established within Pittsburgh Township during the nineteenth century. Many were located along the Cataraqui River or along the Rideau Canal such as Brewers Mills, Birmingham, Kingston Mills and Barriefield. These villages owed their existence primarily to the mills, the military and naval presence, and the construction of the Rideau Canal between 1827 and 1831. Pitts Ferry was located in the southeastern part of the township near the St. Lawrence River, and it became important as a shipping centre and for providing fuel for steamers. Other communities were located further inland and owed their existence to the railroad. They included Ballantyne Station and Willetsholme.

\textit{Ballantyne/Ballantyne’s Station}

This place was a post office village situated on the Grand Trunk Railway about eight miles from Kingston. The post office was established here on December 1, 1872, with John Hysop appointed as the first postmaster. This office was closed on July 1, 1913, under the tenure of John C. Hyslop \textit{(www.archivianet)}. In 1873, this community contained a telegraph office and three churches. The population was estimated to number 180 residents at that time \textit{(Crossby 1873:26)}.  

\footnote{One example of a German family within the study area was the family of Ernest Ludwig, a Lutheran immigrant from Prussia \textit{(Pittsburgh Census 1871, division e-2 p. 60)}.}
Barriefield (aka Barryfield)

The village of Barriefield is situated about one and one-half miles from Kingston on the east bank of the Cataraqui River on Cataraqui Bay (Figure 3). It was bounded by the Military Reserve to the south and Government (Ordnance) lands to the north and east. Fort Henry was built to the southeast of Barriefield during the War of 1812. The growth of the village was therefore restricted on all sides.

The village was named after Commodore Robert Barrie, who was commander of the Kingston dockyard between 1818 and 1835. Many of the men employed at the Royal Navy Dockyard at Point Frederick resided at Barriefield (Scott 1997:21). The village was “irregularly built on a rising ground, having a blue limestone foundation.” The community contained twenty buildings in 1830 and around fifty by mid-century. Among the early businesses was a store kept by Charles Aykroyd in 1823-1824 (Patterson 1989:73). The village contained two stores, three taverns, two blacksmiths and one shoemaker in 1846. At that time, the village population was estimated to number three-hundred inhabitants (Smith 1846:9). Later businesses in the village included coopers, wagon-makers and commercial fishermen (Patterson 1989:197).

One of the early taverns in Barriefield, called the Pittsburgh Inn, was built at the northwest corner of Main and James Streets. It was operated by James Medley in the early 1840s, and is still standing today (Patterson 1989:9).

A landmark structure within the village is St. Mark’s (Anglican) Church (Figure 4a). This stone, Gothic Revival building, which was designed by architect Alfred Varnell Brunel, was built in 1843-1844. The land for the church was partly donated by naval paymaster John Bennett Marks from his farm lot, while an additional parcel of land was purchased by the congregation. The money to erect the church was raised through donations from the British Admiralty and local settlers. The hilltop site for this church was contested by the government, who wished to obtain this spot for the use of a proposed redoubt (Figure 4b). The stone was obtained from a quarry very close to the church site (Patterson 1989:16-17; Patterson 1993; Scott 1997:21).

Across the road from St. Mark’s church is the site of the Rectory. This is one of the oldest and most historic homes in Pittsburgh Township. The core of the structure is the log cabin possibly built as early as the 1790s. This building was enlarged to two storeys by John Marks in 1824 (Figure 5). This house was purchased by the church, and was used as a rectory between 1913 and 1977 (Patterson 1993; Scott 1997:21).

By 1873, the village contained two saw mills (Crossby 1873:27). A post office was not opened in Barriefield until July 1, 1876 when John Ryan was appointed as the first postmaster. A subsequent postmaster, William James Norris (1932-1937) was dismissed from office due to “political partisanship.” This office was closed on December 1, 1959 during the tenure of Mrs. Daisy Irene Gray (www.archivianet).
A map of the village, published in 1878, showed that the community was laid out on either side of the main road between Kingston and Brewer's Mills, now Highway 2 (Figure 6). The village contained five streets which had been established according to a regular survey grid, which were named Wellington, Regent, James, George and Drummond. The south side of Barriefield was also bounded by a macadamized road, which directly abutted against James Street. This would have therefore formed a double width street measuring approximately 132 feet.

The 1878 map also showed that there were over fifty structures within the village at that time, including a sawmill operated by Warren & Co. Property between the sawmill and the riverbank was owned by Martin Strachan who was Reeve of Pittsburgh Township at that time.

During the 1930s, relief camps were set up at Barriefield and unemployed men found employment here on the Vimy Barracks which housed the Royal Canadian School of Signals.

In 1971, Barriefield contained a population of approximately 250. The village also contained the Kingston Military Hospital and Corps School of the RCEME of the Canadian Army.

Barriefield is now designated as a Heritage Conservation District under the *Ontario Heritage Act*. It is one of two such Districts in Kingston and is unique as a complete village in Ontario to be conserved under the Ontario Heritage Act. The impetus for its conservation came in the early 1970s, when threats such as the effects of through traffic on Highway 15 – the main street – combined with newly installed municipal services, indicated that development pressures were likely to increase. The Pittsburgh Township Local Architectural Conservation Advisory Committee (LACAC), with the support of Township Council, commissioned a Heritage Conservation District Study, completed in 1978 by Carl Bray, with the assistance of LACAC members and staff of the Provincial Ministry of Culture and
Recreation. The Township then prepared a Heritage Conservation District Plan, with the Study included as an appendix. The Plan was adopted by the Township as By-law 37-79 and approved by the Ministry of Culture on January 15, 1980.

The Plan and Study continued to inform Township planning and development decisions over the following decade, but the shortcomings of these documents were revealed in some of the new development permitted during this period. Improved Ministry of Culture guidelines for HCDs, as well as greater experience in conservation planning, encouraged the Township to review the 1979 Plan and update it to address then current and anticipated planning and development issues. Accordingly, the Township commissioned a study, led by heritage consultants Unterman McPhail Cuming Associates, to provide a more detailed assessment of the cultural heritage resources of the village and to make recommendations for improvements to the planning policies of the 1979 District Plan. This study was completed and adopted by the Township in 1992. Its clarifications of definitions and suggested modifications to the Plan’s policies have served as the basis for subsequent development review by the Township and, since municipal amalgamation, the City of Kingston.

Since the Plan’s approval by the Province and successful defence at the Ontario Municipal Board in 1981, changes in the village have largely followed the conservation and development policies and guidelines the Plan contains including ones directed at the conservation of archaeological resources. Highway 15 has been re-routed around the village, and most properties have been sensitively rehabilitated or in-filled. In this way, the goals and objectives of the original Study have, to a large extent, been fully realized.
Appendix B - Figure 5: John Marks house (1824).

Appendix B - Figure 6: Plan of Barriefield (1878).
Joyceville

This post office village was situated approximately twelve miles from Kingston. The post office was opened here on February 6, 1852, with James Birmingham appointed as the first postmaster. The name of the office was changed to Joyceville on March 1, 1891. It remains open to the present time, under postmaster Sharleen Harvey (www.archivianet). By 1873, the population had grown to about sixty inhabitants (Crossby 1873:36).

Upper Brewers Mills (Brewer’s Mills Post Office)

This post office village was situated on the east side of the Rideau Canal near Dog Lake, about seventeen miles from Kingston on Highway 15. The community was founded in 1802, when John Brewer built a brewery, saw mill and grist mill at this location (Rayburn 1997:42).

The post office was opened here on February 6, 1852, with Robert Anglin appointed as the first postmaster. The post office closed in 1854, but was re-opened on October 1, 1855. It remained in operation until June 24, 1970 when it officially closed. The last postmaster was Mrs. Florence Jeffries (Rayburn 1997:42; www.archivianet).

In 1865, the village contained a flour and grist mill operated by J. Foster, a sawmill run by Middlebrook, Whiting and Wood, and F. McReevor and Sons blacksmith shop. A hotel was operated by Barnard McCarrey. A store was kept by Robert Anglin Jr.

By 1873, the population numbered approximately one-hundred and fifty inhabitants. The village then contained a telegraph office, saw mill, grist mill and carding mill (Crossby 1873:42).

Lower Brewer’s Mills (Washburn)

This community (Figure 7) contained a saw mill, grist mill, woolen mill and elevator which were all built by James Foster after 1860. A post office was opened here in 1872, at which time the name of the village was changed to Washburn (Patterson 1989:197).

Cunningham’s Corners (Code’s Corners)

This community is located on Highway 15 just north of Highway 401, about 11 km northeast of Kingston. It was named in the late 1940s or early 1950s after storekeeper Orville Code. It is said that the name was given accidentally by the provincial department of highways “when it misinterpreted the storefront sign ‘Code’s Corner.”

Appendix B - Figure 7: Lower Brewers Mills (Washburn) in 1829.
This community was never elevated to the status of a post office village.

**Kingston Mills**

One of the chief reasons for the historical importance of this spot is that the first English (government-built) grist mill in Ontario was constructed here by Robert Clark under orders from Haldimand in 1783-1784 (Preston 1959:28-29).

The mill site was located at what was known as “Cataraqui Falls,” and this early complex of industrial buildings was known as the “Cataraqui Mills” (Tatley 1977:1) (Figure 8). The name for this site was soon changed the “King’s Mills,” although it appears to have been called “Kingston Mills” by about 1791 (Rayburn 1997:182). The mill was situated on the main road between Upper and Lower Canada, which became locally known as the Kingston Mills Road. The site was selected since it contained a fall of water between forty and fifty feet (Preston 1959:xliii). The mills were of sufficient importance that the Simcoes visited them on July 18, 1792, but on July 21st “we were prevented by rain from going to the mills on the Cataraqui” (Robertson 1911:120). Early maps of Pittsburgh showed that this area was retained as a large “Mill Reserve” by the Upper Canadian government.

The saw and grist mills were damaged by waste water during the winter of 1792. However, repairs were undertaken and the structures were “in tolerable repair” when they were inspected by Peter Russell in July of the same year (Preston 1959:191). The mill dam was swept away in 1794, but repaired shortly thereafter. The mills appear to have fallen into disuse by 1800, and the original gristmill was destroyed by fire in 1805. The lease for the mills was granted to David Brass. Brass was a former Lieutenant in Butler’s Rangers, who had originally settled at Niagara where he built the first mill in that district. Brass also served as the roadmaster in charge of the road to the Kingston Mills (Preston 1959:31). The sawmill was busy during the War of 1812-1814, but it was destroyed by fire in 1818. It was rebuilt in 1819, and remained operational until about 1842. The gristmill was rebuilt after it was burned, although there is no record of it after 1826 (Tatley 1977:1-3).

Water had been diverted away from the mills due to the construction of the canal, and it was noted by an eyewitness that “the mills are at present useless, but very little water being allowed to pass by the small sluice at the east end of the river dam. The old bridge is torn away, and the present road over the dam is narrow and dangerous.” In 1830, the mill was leased to a Mr. George Carter. He “appears to be a very decent man; but I ascertained that he had been joining in the spoliation of the woods on the reserve.-He stated however that Colonel By had given permission to him & many others to do so”

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Appendix B - Figure 8: Early view of Kingston Mills painted by Thomas Burrowes in 1828.
Due to the fact that the mill was located some distance upriver from Kingston, settlement around the mill was slow until the 1830s. During the late 1820s and early 1830s, much of the settlement comprised those individuals who were connected with the milling operations or who were employed on the Rideau Canal works (Figure 9).

The community was mentioned in passing by W.H. Smith, who noted that it was “a spot the scenery of which is very picturesque” (Smith 1846:94).

In 1847, the mill reserve was leased to Colonel Angus Cameron, who rebuilt the saw-mill and erected housing for his labourers. The mill was sublet to an American firm called Wood-Bond & Co. The mill was abandoned in 1861 when timber supplies began to dwindle. Also, competition from other mills closer to Kingston contributed to the closure of the sawmill in that year (Tatley 1977:3).

In 1863, the mill site was leased by Dr. Edward Smith formerly of Smith’s Falls. He demolished the sawmill, and constructed a new stone gristmill. This structure was leased to John Rourk in 1878, who abandoned it sometime during the 1880s. It was then leased by Clark Hamilton from 1889 until 1904. The mill site was then leased by the Kingston Street Railway Company in 1904, with plans to convert the mill into a hydro-electric generating station. The mill was severely damaged during a spring freshet in 1905, after which it stood unoccupied and it later “crumbled away into oblivion” (Tatley 1977:4). A hydro generating station was constructed at the mill site by the Ganonoque Electric Light and Water Supply Company in 1913-14 (Tatley 1977:7).

There was no actual settlement at Kingston Mills during the first quarter of the nineteenth century, with the exception of those men who were associated with the mill. With the construction of the Rideau Canal in 1827, a large number of workers were attracted to Kingston Mills. Kingston Mills became the terminus of the canal following the construction of four stone locks. It is estimated that over 300 workers settled at Kingston Mills between 1827 and 1831, the majority of whom were Irish (Tatley 1977:5-6). It was noted by an eyewitness “I am sorry to observe that the present settlers at the village are of the lowest description of Irish and French Canadians—it would be advisable to pause before granting leases to any of them” (Hotham 1830).

A map produced during this period, and preserved in the correspondence files from the Hamilton Brothers sawmill, showed that an extensive community had grown up around the mills and canal locks. Structures included fifteen log houses for the canal labourers, a cookhouse, store, school, two taverns and a “proposed” Roman Catholic chapel. A flag stone quarry was located slightly to the southeast of this community, near the intersection of the old and new roads to Point Henry.
In the 1890s, a smaller community known as Cunningham’s or Code’s Corners flourished about one mile east of Kingston Mills (Tatley 1977:6).

**Pitts’ Ferry Post Office (Pitts’ Ferry)**

This post office village was situated about nine miles from Gananoque. The post office was opened on part Lot 27, Concession 3 on March 1, 1856. Daniel Root appointed as the first postmaster. This office remained operational until it was closed on June 30, 1913. The last postmaster was Joseph Lane (www.archivianet; Patterson 1989:201).

By 1873, the population of the village had grown to number about sixty inhabitants (Crossby 1873:251).

**Willetsholme**

This post office village was located approximately fourteen miles from Gananoque. The post office was opened on November 1, 1864 with Willet Ferris appointed as the first postmaster. The office was closed on March 31, 1913 during the management of the last postmaster, Joseph Smyth (www.archivianet).

The name of the community was clearly derived from the given name of the postmaster, Willet, plus “holme” which is derived from an Old Norse word “holmr.” The Scandinavian word originally meant a small island (usually in a river or lake), but it could also signify low, flat land or the bottoms near a river or stream.

By 1873, the population of the community had grown to about 100 inhabitants (Crossby 1873:359).

**Early Economic Activity, Industry and Agriculture**

**Railway Era**

The study area was traversed during the mid-nineteenth century by the Grand Trunk Railway, which entered Pittsburgh at Kingston Mills. The right-of-way for the tracks ran in a slight northeasterly direction, from the Kingston Mills Reserve and Lot 1, Concession 3, through to Lots 34 to 38 in Concession 5. It passed through the communities of Kingston Mills, Ballantyne Station and Willetsholme. The railway was chartered in 1853, partly in order to provide easier access for Canadian goods such as wheat and lumber to the American markets and to Europe from eastern ports. Much of the construction work between Toronto and Montreal was undertaken in 1854-1855. The Toronto-Montreal line was operational by 1856, and the railway was extended to Sarnia by 1859.

**Rideau Canal**

The Rideau Canal was constructed under the supervision of Lieutenant-Colonel John By during the period between 1826 and 1832. This canal was a British post-War of 1812 response to the perceived threat posed to Britain and Upper Canada due to the proximity of the United States along the St. Lawrence River. The Rideau was constructed in order to ensure a safe transportation route for men and supplies away from the St. Lawrence River. Some of the lands along the Cataraqui River, measuring over 5,200 acres, were flooded and rendered useless following the construction of this waterway, as were some of the old mill sites. Some compensation was paid to the owners of these flooded lands. There were three lock stations in Pittsburgh Township: the first which contained four locks, a dam and a protective blockhouse was located at Kingston Mills; the second, with one lock and a defensible lockmasters’ house, was at Lower Brewers;
the third, with two locks and a defensible lockmasters’ house, was at Upper Brewers (Passfield 1982:164-171; Patterson 1989:34-38, 52).

**Potential Historic Archaeological Remains**

**Blacksmiths**

There were at least ten blacksmiths within Pittsburgh Township during the nineteenth century, and at least two were located within Barriefield. The names of the known blacksmiths included:

- Thomas Esford, blacksmith in the village of Barriefield (Patterson 1989:197)
- Lot 18, Concession 1, operated by James Bryant in the 1870s (Patterson 1989:197)
- Lot 16, Concession 2, operated by William Major in the 1870s (Patterson 1989:197)
- Lot 24, Concession 2, operated by Robert Bennett in 1891 (Patterson 1989:201)
- Lot 3, Concession 4, operated by William Ahern in 1891 (Patterson 1989:201)
- Lot 12, Concession 4, operated at Pine Hill by George Peck in 1891 (Patterson 1989:201)
- East half of Lot 18, Concession 5, operated by Robert McIlgorm. McIlgorm purchased this land in 1856 (Patterson 1989:198, 288)
- Lot 36, Concession 5, operated at Willetsholme by Noble Darling from at least 1891 into the early 20th century (Patterson 1989:201, 207) (Figure 10)
- Lot 19, Concession 6, operated at Joyceville by Michael and Patrick Joyce in 1891 (Patterson 1989:201)
- West half of Lot 30, Concession 6, operated by Robert Johnston between 1889 and 1912. He employed five men at various times, and two volumes of his business ledgers have survived (Patterson 1989:201, 204, 206).

Appendix B - Figure 10: Noble Darling’s blacksmith shop.
Brickyards

No references were found to any brickyards or brick manufacturers within Pittsburgh Township prior to 1900. The Perfect Tile and Brick Company however, was operated near Lower Brewers Mills during the early 1900s (Patterson 1989:197).

Bridges

One of the first bridges built which linked Pittsburgh Township to Kingston was the Cataraqui Bridge, constructed in 1829. This wooden structure was built on wooden piers set about six feet above the water, and measured thirty feet wide with an overall length of 1,600 feet. Piers constructed out of loose stones extended into the river from either shore, and a drawbridge on the Kingston side of the bridge permitted the free passage of ships along the Cataraqui River. Tolls were collected at the bridge which was locally known as the “Penny Bridge.” The bridge at this point was replaced by the LaSalle Causeway which was constructed in 1912 (Patterson 1989:42, 169).

Another early wooden bridge was located at Kingston Mills, which was later replaced by a wooden swing bridge following the construction of the Rideau Canal (Figure 11). There was also a railway bridge in this community, built with cut stone piers during the third quarter of the nineteenth century.

A third bridge over the Cataraqui River which linked Pittsburgh and Storrington Townships was built just north of Brewers Mills at Lot 25, Concession 8. It was depicted on the Meacham’s Atlas map of 1878.

The township also contained a number of smaller bridges, such as one near the mouth of Mosquito Creek (Lot 23, Concession 7), Gibraltar Lake (Lot 4, Concession 4), Lot 2, Concession 3, and two on the Front Road at Lot 7, Concession 1 and Lot 21, Concession 2. These bridges were depicted on the Meacham’s Atlas map of 1878.

Cemeteries

There are at least six historical cemeteries located within Pittsburgh Township. They are:

Barriefield Cemetery
It is not known when this cemetery was established and how long it remained in use. There is a notation on T.E. Vidal’s “Plan of Kingston and its vicinity” dated 1816, which reads “Burying Ground.” This cemetery was depicted on the Military Reserve at the north end or head of Navy Harbour, on the west side, at the junction of the Point Road and the road leading to the Cataraqui Bridge (Patterson 1989:26) (Figure 12).
Milton Cemetery (situated on part Lots 3 and 4, Concession 1)

Land for this cemetery was donated by Thomas Milton in 1820, and the first burial is believed to have taken place in 1823. The oldest extant marker commemorates Alexander McIntyre who died in December 1824 (Figure 13). This land was divided into sections reserved for the Anglicans, Presbyterians and other denominations. The ground was consecrated in 1842. The cemetery was enlarged in 1878, and it was administered by a board of trustees. The last burial took place in 1935, and this cemetery is believed to contain approximately 165 burials. It was abandoned around 1937. This cemetery has been transcribed and published by the OGS (Patterson 1989:117; Ronnow 1987:39). Milton Cemetery is now designated under Part IV of the Ontario Heritage Act.

Pine Grove (Methodist) Cemetery (situated on Lot 33, Concession 8)

This burial ground was established on Brewers Mills Road around 1850, beside the frame church which was built in 1874 and destroyed by fire in 1926 (Figure 14). The cemetery contains approximately 225 burials and is still active. This cemetery has been transcribed and published by the OGS (Patterson 1989:117; Ronnow 1987:39).
Sandhill (Presbyterian) Cemetery (situated on part Lots 22 and 23, Concession 6)

This cemetery was originally located beside a frame church which was constructed in 1861 and burned in 1910 (Figure 15). It was replaced by the present concrete block structure in 1911. The cemetery dates from about 1864, and contains over 400 burials. It remains an active cemetery, and it has been transcribed and published by the OGS (Patterson 1989:112-114, 117; Ronnow 1987:39).

St. Barnaby’s (Roman Catholic) Cemetery (situated on part of Lot 25, Concession 8)

This cemetery was connected to St. Barnaby’s church, which was originally a log structure built about 1842. The present stone church was erected in 1873. The cemetery is believed to date from approximately 1846, and contains over 600 burials. It is still an active cemetery, and has been transcribed and published by the OGS (Patterson 1989:108, 117; Ronnow 1987:39).

St. James’ Birmingham (Anglican) Cemetery (situated on part of Lot 16, Concession 5)

This cemetery was connected to the original St. James Birmingham Mission church, which stood from about 1836 to 1910 (Figure 16). This frame structure was later replaced by a brick edifice. The cemetery was used between ca. 1853 and 1927. It contained approximately 50 burials. This cemetery has been transcribed and published by the OGS (Patterson 1989:106, 117; Ronnow 1987:39).

Cheese Factories

Pittsburgh Township contained at least fifteen cheese factories, which is a higher number on average than what was normally found in other Ontario townships during the nineteenth century. They included:

Agnew’s Cheese Factory
This cheese factory was located on the west half of Lot 23, Concession 6. It was operated by Edward Agnew between ca. 1895 and 1910. The actual name of the factory is not known (Patterson 1989:310).

Morningstar
This cheese factory was located on the east half of Lot 12, Concession 1. It was operated by the McLean family between ca. 1870 and 1910 (Patterson 1989:310).
Ellerslie
This cheese factory was located on part of Lots 34 and 38, Concession 3. It was operated by the Cowan family between ca. 1870 and 1890, and then by Edward Jackson from about 1890 to 1925 (Patterson 1989:310).

Pine Grove
This cheese factory was located on the east half of Lot 30, Concession 8 on Brewers Mills Road. It was operated by the Dillon and Maitland families between ca. 1872 and 1890 (Patterson 1989:310).

Brewers Mills
This cheese factory was located on Brewers Mills Road on part of Lot 26, Concession 8. It was operated by several different proprietors between ca. 1890 and 1935 (Patterson 1989:310).

Joyceville
This short-lived cheese factory was located on the west half of Lot 18, Concession 6. It was operated by Murphy, Franklin and McBroom between ca. 1875 and 1885 (Patterson 1989:310).

Atkinson/Central
This cheese factory was located in a frame building on part of Lot 30, Concession 6. It was operated by J. Stanton between ca. 1890 and 1935. The first factory exploded in 1919 killing two employees, but was rebuilt (Patterson 1989:190-191, 310) (Figure 17).

Pine Hill
This cheese factory was located on part of Lot 13, Concession 4. It remained in business between ca. 1900 and 1947 (Patterson 1989:310).

Willetsholme/Woodburn
The first cheese factory was located on part of Lot 31, Concession 5. It was operated by several different proprietors. The first factory remained in business between ca. 1890 and 1917 when it was destroyed by fire. The second factory was built across the road on part Lot 32, Concession 4. It stood between 1917 and 1925 when it was also burned. It was rebuilt again and remained in business until about 1958 (Patterson 1989:193, 310).

Rose Hill
This cheese factory was located on Middle Road on part of Lot 11, Concession 3. It was operated by the Barnes and Lane families between ca. 1880 and 1935. It relocated to the south side of the road at a later date on part of Lot 11, Concession 2 (Patterson 1989:310).

Keenan & Sons
This cheese factory was located on part of Lot 41, Concession 4, in Kingston Township. It was operated by Keenan & Sons and later by a Co-operative between ca. 1910 and 1955 (Patterson 1989:310).

Granite Hill
This cheese factory was located on part of Lot
24, Concession 2. It was operated by E.A. Reed between ca. 1910 and 1945 (Patterson 1989:188-189, 310).

Byrne’s Corner
This cheese factory was located on the north half of Lot D, East of the Cataraqui River. It was operated by Alfred Brown between ca. 1875 and 1895 (Patterson 1989:310).

Churches

An early hostelry was James Birmingham’s Inn, which was built sometime during the 1830s on the site of the Joyceville Institution on the Perth Road (Highway 15). Church services for the Anglican congregation were held here in 1842, before the construction of St. Mark’s was commenced at Barriefield (Patterson 1993:2).

St. Mark’s (Anglican) Church, Barriefield
This stone church was built on land donated by John Marks in early 1843. The cornerstone was laid in July of that year, and building progressed rapidly. The structure was consecrated and opened for divine services in July 1844. The church was renovated in 1897. It remains a conspicuous landmark in Barriefield today (Patterson 1989:106; Patterson 1993).

Pine Grove (Methodist) (situated on Lot 33, Concession 8)
The original frame church was built in 1874 and destroyed by fire in 1926. A cemetery was located next to the church which contained approximately 225 burials and is still active (Patterson 1989:117; Ronnow 1987:39).

Sandhill (Presbyterian) (situated on part of Lots 22-23, Concession 6)
The original frame church was constructed in 1861 and burned in 1910. It was replaced by the present concrete block structure in 1911. A cemetery, which dates from about 1864, was located next to the church. It contains over 400 burials and remains in active use (Patterson 1989:112-114, 117; Ronnow 1987:39). The driveways located on the church property, which are estimated to have been constructed in the 1840s, are designated under Part IV of the Ontario Heritage Act.

St. Barnaby’s (Roman Catholic) (situated on part of Lot 25, Concession 8)
The original church was a log structure built about 1842, but replaced by the present stone church in 1873. A cemetery is located beside the church which is believed to date from approximately 1846. It contains over 600 burials and remains an active cemetery (Patterson 1989:108, 117; Ronnow 1987:39).

St. James’ Birmingham (Anglican) (situated on part of Lot 16, Concession 5)
The original frame mission church stood from about 1836 to 1910. It was later replaced by the present brick edifice. A cemetery located beside the church was used between ca. 1853 and 1927. It contained approximately 50 burials (Patterson 1989:106, 117; Ronnow 1987:39).

Hotels, Taverns and Inns

There were at least forty hotels, taverns and inns located within Pittsburgh Township during the nineteenth century, nine of which were situated in the village of Barriefield and three or four in Kingston Mills. The earliest appears to have been the tavern built by Joseph Franklin sometime before 1817.

Those which were licensed within Barriefield included:
The Richmond Hotel
This two storey stone structure is located at 217 Main Street. It was originally constructed by a shipwright named John Hendry around 1820. It was advertised for rent in 1824, and licensed by John Martin during the 1820s. Today this building is called “Willowmere” (Patterson 1989:70, 72-73).

The Pittsburgh Inn (Dominion House)
The Pittsburgh Inn is a two storey stone structure located at 236 James Street. It was built about 1840, and taken over by William Reid in 1860. It was subsequently operated by William Hutton between ca. 1867 and 1900 (Patterson 1989:216-217).

The Coat of Arms was rented out and licensed by William Beggs between ca. 1850-53. This tavern measured 48 x 24 feet and contained three bedrooms. A barn associated with the tavern measured 56 x 24 feet (Patterson 1989:214).

Other Barriefield taverns included:

Crown and Shamrock
This tavern was operated by Thomas Patrick between 1851 and 1853 (Patterson 1989:212).

George Morton’s Inn (ca. 1829)
This one and one-half storey stone structure is located at 246-248 James at the corner of George Street. It operated as a tavern until at least 1847 (Patterson 1989:73, 213).

The Pittsburgh House
This tavern was a one and one-half storey stone structure located at 210 Main Street (Patterson 1989:217).

Ferguson’s Tavern
This tavern is known to have been in business as early as 1838 (Patterson 1989:73).

Strachan’s Tavern
This tavern is known to have been in business as early as 1830 (Patterson 1989:73).

Mrs. Petrie’s Tavern
This tavern is known to have been in business in Barriefield as early as 1831. The business may have originally been located on Point Frederick in 1826 (Patterson 1989:73).

There were at least thirty-one licensed taverns which operated in Pittsburgh Township during the remainder of the nineteenth century. Some of them remained in business until around the time of the First World War. They included:

John Urquhart
This tavern was licensed for business in 1853 (Patterson 1989:212-213).

Michael Lawless’s tavern
This last mentioned tavern measured 20 by 40 feet and contained four bedrooms. A nearby barn measured 30 by 20 feet. It was rented by Lawless, and it was licensed for business as early as January 1850 (Patterson 1989:212, 214).
George Moore
This tavern was located on the Front Road, on part of Lot 10, Concession 1. The structure measured 21 by 34 feet and contained five bedrooms. A barn stood on the property which measured 15 by 30 feet. This tavern was licensed for business between 1850 and 1862 (Patterson 1989:214-215).

Goff’s
There were two inns operated by the Goff family. One was located on part of Lot 24, Concession 3, and the other on part of Lot 22, Concession 2 (Patterson 1989:73).

James Miller (Goff’s, Geraldi’s)
This tavern was located on part of Lot 24, Concession 2. The structure measured 33 by 24 feet and contained three bedrooms. A barn stood on the property which measured 30 by 18 feet. This tavern was licensed for business as early as January 1850 (Patterson 1989:214).

Wallace Fairman
This tavern was located as early as 1835, on the Front Road on part of Lot 30, Concession 1. The structure measured 52 by 52 feet and contained eight bedrooms. A barn stood on the property which measured 36 by 45 feet. This tavern continued to be licensed for business as late as January 1850 (Patterson 1989:73, 214).

William Major
This tavern was located on the Middle Road on part of Lot 16, Concession 2. The structure measured 24 by 30 feet and contained two bedrooms. A barn stood on the property which measured 36 by 18 feet. This tavern was licensed for business between 1850 and 1857 (Patterson 1989:214).

Joseph Franklin’s Tavern (McNiece’s Hotel)
This tavern may have been the first one built in Pittsburgh Township sometime during the first quarter of the nineteenth century. It was referred to by Charles Fothergill in February 1817, “kept by one Franklin, a Yankee.” It was located on the Montreal Road on part of Lot 11, Concession 3. It was operated by the Franklin and McNiece families until the 1840s, when it was sold to the Hay family. Vintage photographs showed that this structure was a two storey frame building with a symmetrical five-bay façade (Figure 18). It contained eight rooms with a central hall and kitchen wing, four fireplaces and two stoves. Two large brick chimneys stood at each gable end of the house (Patterson 1989:68, 70).

Charles Franklin’s Tavern
This tavern was located on part of Lot 8, Concession 3 in 1857 (Patterson 1989:214).

James Blake
This tavern was located at Abbey Dawn and Middle Road, on part of Lot 7, Concession 2. The structure measured 24 by 18 feet and contained two bedrooms. A barn stood on the property which measured 24 by 20 feet. This tavern was licensed for business as early as January 1850. It may have been licensed to James Redfearn in 1859 (Patterson 1989:214).

Thomas Blake
It is unclear whether or not Blake was licensed to operate a tavern on the Middle
Road on part of Lot 8, Concession 2. He applied for a tavern license at this location in 1863 (Patterson 1989:216).

**Pecord’s Tavern**  
By 1830, this structure was located on the Middle Road on the east half of Lot 7, Concession 3 (Patterson 1989:70).

**James English**  
This one and one-half storey stone structure was built around 1830, by James English on John F. Scott Road on part of Lot 5, Concession 3. It was operated as a tavern as early as the 1840s (Patterson 1989:70-71).

**Ed O’Reilly**  
This tavern was situated at Kingston Mills during the early 1830s (Patterson 1989:73).

**Henry Franklin**  
This tavern was situated at Kingston Mills during the early 1830s (Patterson 1989:73).

**Michael Mahoney**  
This tavern was situated at Kingston Mills during the early 1830s (Patterson 1989:73).

**Geraldi’s (Blessing’s Railway Inn, Bridge Inn)**  
This tavern was located at Kingston Mills at the junction of the Montreal and Station Roads, on part of Lot 40, Concession 4, Kingston Township. It was originally constructed during the early 1830s by Louis Geraldi. The proprietorship was taken over by William Blessing in 1859, and it was then operated by Henry Wilson in 1863. It was named the Bridge Inn during the tenure of Charles Harrison, and closed in 1880 (Patterson 1989:214, 216-217).

**Peter Cunningham**  
This tavern was located on part of Lot 41, Concession 4, in Kingston Township, on the corner of the Perth/Philipsville and Montreal Roads. It was opened in 1856. A tollgate was located at this corner, which soon acquired the name “Cunningham’s Corners.” The original tavern was destroyed by fire, and replaced by the Berryman Hotel which was later known as Coyle’s Hotel (Patterson 1989:214, 216).

**Edward Cunningham**  
This tavern was located opposite (north-east) of Peter Cunningham’s Tavern, and was licensed in 1861. This structure was later converted to a private residence, and stood until it was destroyed by fire in 1970 (Patterson 1989:216).

**Canning’s Tavern**  
This tavern stood opposite the two Cunningham taverns on part of Lot 41, Concession 4 in Kingston Township. It was later operated as Dean’s Store (Patterson 1989:216).

**Martin Murdoch**  
This tavern was located on part of Lot 1, Concession 3, and it was licensed for business in 1860 (Patterson 1989:214).
John Burns
This tavern was located on part of Lot 11, Concession 4, at the junction of Woodburn and Perth Roads, and is known to have been licensed for business in 1853. This structure was built of flattened logs, and measured 32 by 22 feet (Patterson 1989:213).

Henry Rees
This tavern was located on Woodburn Road on part of Lot 29, Concession 4. This tavern was licensed for business in 1861 (Patterson 1989:216).

James Birmingham
This early tavern was located on the Perth Road (Highway 15) on part of Lot 16, Concession 5. It was built sometime during the 1830s on the site of the Joyceville Institution. Church services for the Anglican congregation were held here in 1842, before the construction of St. Mark’s was commenced at Barriefield. The structure measured 45 by 45 feet and it contained eight bedrooms. It is said to have been stuccoed on the exterior, and walnut paneled on the interior. A barn was located on this property which measured 50 by 18 feet. It was licensed for business by James Birmingham, who rented the premises, as early as January 1850. The building temporarily housed the post office and school, and was used for social functions such as dances. It burned in 1876 (Patterson 1989:2, 214).

Joyceville Hotel
This tavern was in operation at the southwest corner of Highway 15 and the Swamp Road between 1865 and 1917. Two of the long-time proprietors were named Samuel Smith and John Murphy. It was destroyed by fire (Patterson 1989:216).

Patrick McNeil
This tavern was located near Joyceville on the east half of Lot 19, Concession 5, at the southeast corner of Perth Road and the Sixth Concession Road. This tavern was licensed for business in 1860 (Patterson 1989:214, 216).

Patrick Glenn (McCarey’s)
This tavern was located on Brewers Mill Road on part of Lot 29, Concession 8, and is known to have been licensed for business in 1853. It was taken over by Bernard McCarey in 1859 (Patterson 1989:213-214).

Willet’s Tavern
This tavern was located at Brewers Mills as early as November 1829 (Patterson 1989:73).

Patrick Murray
This tavern was located on the Perth Road on part of Lot 28, Concession 9, and is known to have been licensed for business in 1853 (Patterson 1989:213).

James McMullen
This tavern was located on the Perth Road on part of Lot 38, Concession 11. The structure measured 36 by 36 feet and contained seven bedrooms. A barn was located on the property which measured 36 by 26 feet. It was licensed for business as early as January 1850 (Patterson 1989:214).
Early Houses

There are a number of extant nineteenth century heritage houses within Pittsburgh Township. Among them the most significant include:

**John Marks House, 229 Main Street, Barriefield**

Portions of this house were constructed as a log cabin by John Grant during the late eighteenth century, or very early in the nineteenth century. The property was acquired by John Bennet Marks (1777-1872), who served in the Royal Navy before his arrival in Kingston in 1812. Marks was a business man, civil servant and farmer, justice of the peace, and Member of the Legislative Assembly between 1836 and 1840. He enlarged the older structure on this site around 1824, which has remained a two storey, symmetrical, four bay frame dwelling since that time. It was used as a rectory by St. Mark’s (Anglican) Church for over sixty years between 1910 and the 1970s (Patterson 1989:64).

**Barriefield House, 202 Main Street, Barriefield**

This two and one-half storey stone structure was built by a cabinet-maker named William Baker in 1816. It was occupied by various military officers during the nineteenth century, and was taken over for use as a rectory by St. Mark’s (Anglican) Church between 1875 and 1910. It has been owned by the Department of National Defence since 1910, and is used as the residence for the Commandant, Canadian Land Forces Command and Staff College (Patterson 1989:74).

**Cluny House**

This one and one-half storey stone structure on Highway 2 was built about 1820 on part of Lot C Adjoining the Military Reserve, by Lieutenant-Colonel Donald MacPherson. It is a symmetrical structure with four rooms on each floor, with four fireplaces and a basement kitchen. It was the home of the Milton family for over fifty years (Patterson 1989:74, 226). The Cluny house was designated under Part IV of the Ontario Heritage Act in 1982.

**Sopwell Hall (Glen Lawrence)**

This two-storey, asymmetrical, stone structure was built about 1817 on part of Lot 2, Concession 1, by James McKenzie. It received its present name in 1852 when the property was purchased by Major Henry Sadleir (Patterson 1989:76). Sopwell Hall was designated under Part IV of the Ontario Heritage Act in 1982.

**Glen Logie**

This one and one-half storey, symmetrical, five bay structure was built about 1820 on part of Lot 1, Concession 1, by Edward Laws. The house acquired its present name when it was purchased by Lieutenant-Colonel Logie in 1832 (Patterson 1989:77). This house was designated under Part IV of the Ontario Heritage Act in 1984.

**Cataraqui Grange**

This symmetrical, two storey stone house on Highway 15 (part of Lot C, East of the Cataraqui River) was built during the 1820s by George Baxter. This structure contains a five bay front elevation with a central entrance and covered porch. Baxter was head of the Midland District Grammar School and brother-in-law to William Lyon McKenzie. This house is among the finest examples of Georgian style structure in the township (Patterson 1989:78). The Cataraqui Grange was designated under Part IV of the Ontario Heritage Act in 1982.
**Allerdean Hall**
This symmetrical, two storey stone structure on Highway 2 was built by James Ramsey around 1850, on part of Lot D, Adjoining the Military Reserve. This structure contains an unadorned three bay façade, with a central entrance way (Patterson 1989:78).

**McCallum House**
This symmetrical, one and one-half storey stone structure on Highway 15 was built by John McCallum around 1850 on part of Lot 7 East of the Cataraqui River. McCallum was a farmer who was born in Ireland, and settled in Kingston during the early 1820s. This house contains large, twelve-over-twelve windows and a particularly fine transom and sidelights around the central front entrance. This structure is clearly depicted on the Meacham’s Atlas map of Pittsburgh (1878). This house has recently been restored (Patterson 1989:92).

**Riverview House**
This long, asymmetrical, one storey house was built on Highway 2 on part Lot A, Adjoining the Military Reserve, by William Ferguson (Figure 19). Ferguson was treasurer for the Midland District during the late 1840s, and served as sheriff of Frontenac County and a Member of Parliament representing Frontenac in 1863. The house was photographed late in the nineteenth century. It has since been demolished (Patterson 1989:97).

**Hawthorn Cottage**
This symmetrical, one and one-half storey stone house was built on Highway 15 on part of Lot 10, East of the Cataraqui River, by John Ruttan in 1866. This structure contains a particularly fine example of a transom and sidelights surrounding the central entrance, surmounted by a Palladian-style window in the upper storey gable (Patterson 1989:100).

**Robert Anglin House**
This two-storey frame house was constructed at the intersection of Highway 15 and Brewers Mills Road. This structure served a number of purposes, including that of a local post office, store and telegraph office. The house was probably built during the second quarter of the nineteenth century (Patterson 1989:222).

**Rickey House**
This asymmetrical, two storey frame house at 404 Regent Street in Barriefield was built by Alexander Rickey in the 1880s (Patterson 1989:227).

**Alexander Grant House**
This symmetrical, one and one-half storey frame house was built on the Middle Road on the west half of Lot 10, Concession 2, by Alexander Grant. The central doorway contains an unadorned transom and sidelights (Patterson 1989:227).
Jack House
This symmetrical, two and one-half storey stone house was built on the east half of Lot 27, Concession 3, around 1867. Period photographs showed that the house contained an especially elaborate, two storey Gothic style verandah (Patterson 1989:242).

Mitchell House
This symmetrical, one and one-half storey brick house was built at 221 Main Street in Barriefield by William Mitchell during the 1830s. Mitchell was master armourer at the Naval Dockyard (Patterson 1989:245).

Graham Anglin House
This symmetrical, one and one-half storey frame house was probably built during the early 1870s on Brewers Mill Road. The central entrance way contains an unadorned transom and sidelights, but the structure is noted for a twenty-pane window on the main floor (Patterson 1989:248).

Medley House
This fine example of a one and one-half storey, Georgian style, stone dwelling was built at 230 James Street, Barriefield, by tailor James Medley in 1857. The central entrance contains a fine transom and sidelights, balanced by a small Palladian style window in the upper storey gable. The side gables are topped by red brick chimneys (Patterson 1989:249).

Cowan House
This house was built on Highway 2 on the west half of Lot 33, Concession 3, by William Cowan around 1850. The house is a symmetrical, two-storey structure with a rear wing and massive chimneys along the side walls. A covered porch with brick pillars was constructed somewhat later (Patterson 1989:268). Cowan House was designated under Part IV of the Ontario Heritage Act in 1982.

Lime Kilns
An early lime kiln existed at Upper Brewers Mills as early as 1830 (Patterson 1989:34).
An Andrew Waldie Lime Kiln is mentioned in an 1870s directory, but no lot or concession is provided.

Military Reserve Lime Kiln
This lime kiln was operated by John Crawford in the early 1870s (Patterson 1989:197).

Brown’s Kiln
This kiln was operated by Alfred Brown in the early 1870s on part of Lot 32, Concession 3. It had a capacity of twenty-four tons of stone (Patterson 1989:197).

Potasheries
Byrnes’s Potashery
This short-lived enterprise was operated in the early 1870s by Edward Byrne on the north half of Lot D, east side of the Cataraqui River (Patterson 1989:198).
Ship Building

Boat building may have become a minor industry in Pittsburgh as a result of the proximity of the naval yards and the craftsmen employed there. During the 1850s and for decades thereafter, small crafts built at Barriefield were renowned for their quality and sold throughout Ontario. Some of the boat builders in Pittsburgh included:

**Barriefield Boat Company**
This firm was active as early as the 1840s, which also operated a ferry service (Patterson 1989:93).

**Frank Blake**
This individual was active in boat building during the period 1908-1935 (Patterson 1989:93).

**Bowman’s Boat Building Shop**
This firm was in business between 1866 and 1903 (Patterson 1989:93).

**Knapp’s Boat Building Shop**
James and William Knapp’s shop was undoubtedly the most important boat building establishment in Pittsburgh, located on Green Bay near Barriefield (Figure 20). This firm was in business between 1832 and 1929. In 1871, their establishment built twelve and repaired twenty boats (Patterson 1989:93, 197).

**LaChappelles Boat Building Shop**
This firm was active during a short period of time between 1855 and 1866 (Patterson 1989:93).

**O’Gorman’s Boat Building Shop**
This firm was active during the period between 1851 and 1866 (Patterson 1989:93).

**Rickey’s Boat Building Shop**
This firm was active during the period between 1890 and 1923 (Patterson 1989:93).

**Sharman’s Boat Building Shop**
This shop built three boats in 1871. Their firm remained in business between 1862 and 1913 (Patterson 1989:93, 197).

**Tisdale’s Boat Building Shop**
This was the second largest shop in Pittsburgh, capable of building eight and repairing ten boats per year (Patterson 1989:197).
Stone / Sand Quarries

Rudd’s Quarry
This limestone quarry was operated by Y.G. Rudd during the 1870s at the southwest corner of Lot 7, Concession 1. This quarry was clearly depicted on the Meacham’s Atlas map of 1878, on a twenty acre lot owned by T.R. Rudd (Meacham 1878:48; Patterson 1989:198).

Rudd’s Sand Quarry
This quarry was also operated by Y.G. Rudd during the 1870s at the southwest corner of Lot 21, Concession 2 (Meacham 1878:49; Patterson 1989:198).

Jackson’s Quarry
This limestone quarry was operated by Frederick Jackson during the 1870s on part of Lot 18, Concession 3. This quarry was not depicted on the Meacham’s Atlas map (Patterson 1989:198).

Mills

Several mills were located in the villages which grew up along the Cataraqui River, at the Upper Brewers Mills and at Kingston Mills. The earliest of these was the Cataraqui Mills, established at Kingston Mills in 1783, which was also the first mill built in what was to become Upper Canada. Both of these early milling complexes were depicted in water colour sketches painted during the early nineteenth century. These early structures were rebuilt on several occasions during the nineteenth century. The Kingston Mills was destroyed in a flood in 1905 (Figure 21), while the mills at Lower Brewers continued to operate until 1943 (Patterson 1989:197).

Strachan saw-mill
This business was located on the west side of Barriefield on Green Bay, and was depicted on maps during the mid-nineteenth century. The mill was later managed by McRossie and Company (1867), and then by Warren and Company (1873). The mill was depicted in an engraving published in Picturesque Canada in
1882, and photographed around the same time. It was such an important business that it was granted tax exemption by the City Council during the late 1870s. It produced lath and shingles into the early 20th century (Patterson 1989:61, 197, 200-201).

*Kirkwood’s Mill*  
This steam-powered mill was operated by Alexander Kirkwood on part of Lot 35, Concession 5, during the early 1870s (Patterson 1989:198).

*MacLean’s Sawmill*  
This steam-powered mill was operated much later during the 1930s on the Front Road by the MacLean family, on part of Lot 13, Concession 1 (Patterson 1989:205).

*Miscellaneous Structures and Sites*  

*Gordon’s shoe shop*  
This business was operated by John Gordon during the early 1870s on part of Lot 29, Concession 5 (Patterson 1989:198).

*Pittsburgh Township Hall*  
This fine, one storey stone structure was designed by architect William Newlands in 1886. This structure still stands today, serving as the Barriefield Library. Conspicuously absent from Newlands’ original design today are the enclosed vestibule and bell tower (Patterson 1989:225).

*Weavers*  
There were no less than four weavers, all located in the east end of Pittsburgh Township during the early 1870s. They were Samuel Kane (Lot 36 Concession 3), John Abrams (Lot 37 Concession 5), Patrick Mangan (Lot 31 Concession 7) and William Murphy on Lot 34 Concession 7 (Patterson 1989:198).

*Post Offices*  

*Atkinson Post Office*  
This office was opened on November 1, 1891, with James Atkinson appointed as the first postmaster. The office closed in January 1913 (www.archivianet; Patterson 1989:201).

*Cushendall Post Office*  
This office was opened on January 1, 1886, with Samuel McKane appointed as the first postmaster. The office closed in June 1915 (www.archivianet; Patterson 1989:201).

*Dufferin Post Office*  
This office was opened on the Middle Road on July 1, 1887, with Samuel Donaldson appointed as the first postmaster. This office was closed on December 31, 1912 (www.archivianet; Patterson 1989:201).
Eric Post Office
This was opened on the Front Road on the east half of Lot 5, Concession 1, on November 1, 1887, with John A. Wilmot appointed as the first postmaster. This office was closed in June 1913 (www.archivianet; Patterson 1989:201).

Fort Henry
This office was established on May 1, 1947, with Mrs. Dorothy Nickle Batty appointed as the first postmaster. The name of this office was changed to the Kingston-Fort Henry post office on July 2, 1960. It was closed on January 31, 1964, with George A. Dineley serving as the last postmaster (www.archivianet).

Howe Island
This office was established on October 1, 1863, with Robert Urguhart appointed as the first postmaster. The office closed on September 30, 1915, with Joseph Beaubien as the last postmaster (www.archivianet). This office has been included within the history of Pittsburgh Township, since Howe Island formed part of Pittsburgh until 1871.

Washburn
This office was opened on May 1, 1874, at Lower Brewer’s, with John McGillivray appointed as the first postmaster. He was succeeded by Miss Anne McGillivray. The office was closed on May 13, 1922 (www.archivianet).

Whitmount
This office was opened on May 1, 1908, with Mrs. Mary Ann Whitney appointed as the first postmaster. This office did not remain open for very long, and closed on November 30, 1913 under the tenure of the second postmaster, Daniel McLean (www.archivianet).

Railways and Railway Stations

There were three railway stations established in Pittsburgh Township during the nineteenth century, and all were connected to the Grand Trunk Railway. They were:

Kingston Mills Station
This station was located on Flag Quarry Road, although the name was later changed to Station Road. This station is said to have been primarily used for loading agricultural products and silica sand from the Hughes Quarry (Patterson 1989:201).

Ballantyne Station (part of Lot 20, Concession 4)
This station was established on the Ballantyne farm in 1872. This station was originally the main station in the township, and was used as a stop for passengers, and contained a post office and telegraph (Patterson 1989:201).

Findlay Station (part of Lot 35, Concession 5)
This station was originally used to load agricultural products and freight. A post office was established here around 1865. This later became the main flag station for Pittsburgh, and remained open until 1931 (Patterson 1989:201).
Recreational Sites

The Golden Slipper
This large frame dance hall was opened on Highway 2 near the Fingerboard in July 1926 under the name of the “Red Moon.” The following year it was re-opened under new management as the “Grand Gardens” and the hall was enlarged and other amenities were added such as a parking lot and service station. This successful enterprise continued to operate until 1931, when the business was leased by James Wood who changed the name to the “Golden Slipper.” The “Slipper” burned in 1949, but was rebuilt in 1950 and reopened as the “Golden Slipper Motel” (Figure 22). It burned again in 1962 and was not rebuilt (Patterson 1989:220-221).

Schools

There were approximately fifteen historic schools and school sections within Pittsburgh Township during the nineteenth century.

One of the early schools established in Pittsburgh Township was located on or near Point Frederick, where church services were held in 1835 (Patterson 1989:2).

Barriefield
The first school on Barriefield Common stood between 1819 and 1849, which was replaced by a new frame structure at the southwest corner of James and Main Street in 1850. This structure was replaced with a new school in 1953, and the old building was used as St. Mark’s Church Hall until it was demolished (Patterson 1989:119, 308).

Point Road
This stone school was built in 1855, on part of Lot 9, East of the Cataraqui River, near Gore Road and Point Road (Figure 23). It was replaced by a frame structure on part of Lot C (ECR) in 1876, which was demolished in 1965 (Patterson 1989:84, 122, 308).

Woodside
This school was built before 1860, on part of Lot E, Adjoining the Military Reserve, near the intersection of Front Road and Rogers sideroad. This building was moved to part of Lot 1, Concession 1. It was replaced by a new brick structure and demolished around 1961 (Patterson 1989:124, 308).
Sunny Plains
The first school in this section was known as McLean’s School, and stood on the west half of Lot 13, Concession 1, north of Front Road. It was replaced by a second school on the same site in 1854, and a third, brick school was erected in 1884. This school was closed and sold in 1965 (Patterson 1989:126-127, 308).

Pitts Ferry
This school was built before 1860 on the east half of Lot 32, Concession 3. It was replaced by a new frame school on the same site in 1885. This school was closed in 1965 (Patterson 1989:127, 308).

Fingerboard
The first school was built near Middle Road on part of Lot 24, Concession 2, in 1850. It was replaced by a second brick school in 1876, and a third in 1900. The school was closed in 1965 (Patterson 1989:128, 308).

Dufferin
The first school in this section is said to have been built on the east half of Lot 9, Concession 3, as early as 1856. Vintage photographs show that it was a substantially built stone structure. This school remained open until 1965 (Patterson 1989:130-131, 308).

Joyceville
The first school was built on part of Lot 19, Concession 5, before 1860, and replaced with a stone building in 1875. A new brick school was constructed here in 1958 (Patterson 1989:132, 309).

Pine Hill
The first school in this section was a log building, erected on part of Lot 11, Concession 4, in 1854. It was replaced by a brick school in 1886, which was enlarged during the mid-1930s. It closed in 1966 (Patterson 1989:134, 309).

Atkinson
This school section appears to have once contained at least two schools. The first was built on part of Lot 37, Concession 7, which was in existence between 1849 and ca. 1871. A second school was built on part of Lot 24, Concession 6, which stood between 1854 and 1860. Both were replaced by a new school built on part of Lot 31, Concession 7, in 1871. It was replaced by a frame structure in 1889, which was closed in 1965 (Patterson 1989:135, 309).

Woodburn
A stone school building was constructed on the west half of Lot 31, Concession 5, in 1865, and replaced with a new school which was built in 1954. The old building stood until as recently as 1987 (Patterson 1989:136, 309). The school was designated under Part IV of the Ontario Heritage Act in 1984.

Brewers Mills
A school was built on Brewers Mills Road on part of Lot 28, Concession 8, in 1850. This was replaced by a new frame school on part Lot 30 in 1878 (Patterson 1989:137, 309).

Leo Lake
This section contained a school which was built in 1850 on part of Lot 34, Concession 10. It was replaced by a new structure in 1874, which was closed in 1966 and converted into a private residence (Patterson 1989:139, 309).
Garrett
This school was built before 1860 on part of Lot 30, Concession 6. It was rebuilt as a small, frame structure in 1877. It was closed in 1938, reopened again in 1954 and permanently closed in 1965 (Patterson 1989:140, 309).

McCaugherty (Ballantyne)
This school section was established after 1860, and contained a frame school on part of Lot 26, Concession 4, which was built before 1878. This building was destroyed by fire in 1936, and rebuilt in the following year. It was subsequently enlarged but closed in 1966 (Patterson 1989:143-144, 309).

Tollgates
There were three road companies which built and maintained sections of road within Pittsburgh Township during the second half of the nineteenth century. These companies all operated toll gates which collected money from persons using the road and which was then expended upon the maintenance of the road.

Kingston, Pittsburgh and Gananoque Road Company
This company was chartered in 1855, and collected road tolls until 1874. At that time, the township purchased the roads and was thereafter responsible for their maintenance toll free. Tollgates were established at the Barriefield Bridge, the Fingerboard, Franklin’s Tavern (Lot 8, Concession 3) and at Lot 38, Concession 3, on the Pittsburgh Townline Road (Patterson 1989:162).

Kingston, Phillipsville Road Company
This company was chartered in 1855, and collected road tolls until 1874, when it was also bought out by the township. Five tollgates were established at Cunningham’s Corners, the Woodburn Road junction and at Brewer’s Mills (Patterson 1989:162).

Kingston and Kingston Mills Joint Stock Road Company
This company was chartered and permitted to set up one tollgate on the road between the Kingston Mills Bridge and Cunningham’s Corners around 1859. This company abandoned the road and ceased to collect tolls around 1898 (Patterson 1989:162).
APPENDIX C

Historical Overview

Kingston West
City of Kingston, Ontario
INTRODUCTION

This document is not intended to be an exhaustive history of Kingston West (former Kingston Township), although the main focus of the text is historical in nature. Rather, it serves to identify the extant or formerly present historical features that might yield associated archaeological deposits and that were mapped for the GIS layer of historical features. That layer is described in more detail in Section 3.2 of this report. For a detailed consideration of the early period of Kingston’s development and the history of the historic core, City of Kingston, please see Appendix A.

To standardize the documentation process, eighteen main map sets were chosen with which to work, which range in date from the early French regime to 1878. The boundaries of the settlement centres were plotted based on the above maps and serve to indicate those areas where most of the building activity was concentrated at the time the source maps were produced. Individual public buildings and homes were not mapped within these centres, although the settlement centre overlay is indicative of those areas that exhibit potential for the presence of meeting halls, school houses, blacksmith shops, stores, grain warehouses, hotels, taverns, and other commercial service buildings. All schools, places of worship and commercial buildings, such as inns, that occur outside of the major settlement centres have also been mapped individually, if their locations were shown on the Illustrated Historical Atlas maps.

All mill locations, manufacturers, lime kilns, quarries and mines were also mapped based on the nineteenth century surveys and the Illustrated Historical Atlas maps as well as all transportation routes such as early settlement roads or railways, established by the 1870s. Isolated rural homesteads and cemeteries were also mapped.

HISTORY OF KINGSTON TOWNSHIP

The European settlement of Kingston Township began with the 1673 construction of a fortification/trading post named Fort Frontenac in honour of Louis de Buade, comte de Frontenac et de Palluau, who was then the governor of New France (Indian Treaties, vol. 1 pp. 12-14). This fort was briefly abandoned but it was thereafter in continual usage until it was captured by the British during an expedition lead by Lieutenant-Colonel John Bradstreet in July 1758. For the ensuing 25 years, the land around the old French fort sat unoccupied with the possible exception of periodic visits by traders or native hunting parties.

In September and October 1783, Captain William Redford Crawford, formerly of the King’s Royal Regiment of New York, persuaded the Mississauga to sell their land to the British. The purchase was negotiated at Carleton Island through an aged chief named Mynass, in exchange for “some cash” and a promise that he and his family were “to be Cloathed during his life.” Following the conclusion of this treaty, Haldimand permitted this tract of land to be opened up for Loyalist settlement (Cruikshank 1934:21; Preston 1959:xlvi, 32, 38, 45-46; Curnoe 1996:74). This township was originally named “Kings Town” in honour of King George III (1759-1820), but later contracted to “Kingston” (Rayburn 1997:181-182).

Kingston Township was partially surveyed as early as 1783 by John Collins. He noted the excellent quality of the soil, which he considered suitable for the cultivation of various crops including wheat, oats, Indian corn, hemp, timothy and clover. He noted that the woods consisted of maple, bass, hickory, ash, elm, pine and white oak. Kingston was also situated upon a good, natural harbour, and the township contained several potential sites for mills (Preston 1959:40).
Systematic settlement of the township commenced in 1783 or 1784, but the population grew slowly. By 1817, the township only contained about 600 inhabitants (Smith 1851:287). The first land grants were made to Loyalists and disbanded troops following the end of the American Revolutionary War, and the first patents were issued in 1796. Several of the earliest grants were sold cheaply, either by absentee landowners, or because “many of these people…got into the books of the merchants” and the lands were “sold to liquidate debts” (Smith 1851:287). Within the first quarter century of settlement, the value of land in Kingston Township rose from a few shillings per acre to as much as thirteen shillings and four pence (£0.13.4)-, and if the land contained a house and barn it could command as much as two pounds and five shillings (£2.5.0) per acre (Smith 1851:287).

In 1805, D’Arcy Boulton noted that the land in Kingston Township closest to the town was “not very rich” but that it became very good within a few miles and “farmers there are rapidly succeeding” (Boulton 1805:36). The soil was described as a loam on a clay sub-soil with a limestone base. The timber was a mixture of beech, maple, oak, elm and pine (Smith 1851:287-288).

One of the hindrances to early development of the township was a lack of proper roads. In 1817, Robert Gourlay noted that the roads in Kingston and Pittsburgh were “very indifferent” but that “if properly undertaken, might at a little expense be made good, as stone is at hand.” Roads were neglected since the goods could reach market, or people could travel, by water or sleighing, depending upon the time of the year.

The first transportation routes to be established across the Kingston area followed early aboriginal trails, both along the lakeshore and adjacent to various creeks and rivers. Local roads were initially cleared by the grantees of adjacent land as part of their settlement duties, although the many creeks and swampy areas posed a challenge to the gridded road system, and nineteenth century maps detail the many jags and detours necessary to avoid bad crossing points.

After Simcoe established York as the capital of Upper Canada, he commissioned the Queen’s Rangers to build the Dundas Highway running west to Ancaster and London and east toward Kingston. This important transportation corridor was intended to provide an overland military route between Lake Ontario, Lake St. Clair and Lake Huron. The road was intended to serve a dual purpose – to support settlement in Upper Canada and as a deterrent to expansionist American interests.

The DeRottenburg map9 of 1850 showed that the road network within Kingston Township was well established (Figure 1), unlike in neighbouring Pittsburgh, whose roads remained largely undeveloped. One possible reason for this lack of road development in Pittsburgh was undoubtedly the proximity of navigable water which provided farmers with an easy access to markets.

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9 Whereas discrepancies are often encountered when the road systems appearing on later maps are juxtaposed, the DeRottenburg map is a reliable source of information for the period due to the fact that it was prepared for military intelligence and planning with the most up-to-date information.
The same was true after the mid-1850s when the construction of railway lines created junction communities adjacent to stops along the route. At first these crossroads and junction settlement centres existed largely to provide goods and services to travelers along long distance journeys or to aid in the shipment of goods across the province. But, as resident families settled near the crossroads and created other institutions and amenities of village life, population growth, diversified industries and a
consolidation of a strong agricultural base allowed villages to flourish beyond their initially transient economies.

In 1845, land in the vicinity of Kingston Mills, which originally comprised part of Kingston Township, was transferred to Pittsburgh although the lot and concession numbers reflected the original designations assigned to them in Kingston (Figure 2).

During the 1850s, a number of joint stock road companies were formed. These companies collected tolls which were applied towards the maintenance of roads, and some of them remained in existence until the fourth quarter of the nineteenth century. Otherwise, the performance of statute labour by all able-bodied men aged between 16 and 60 years of age kept other township roads and bridges in varying degrees of repair.

The principal crops and farm products in the township in 1849-50, included wheat, oats, peas, potatoes, maple sugar, wool and butter (Smith 1851:287). The agricultural census returns from 1861 and 1871, revealed that many farmers within the southerly part of the township were engaged in mixed agriculture. Crops included spring wheat, barley, rye, oats, peas, potatoes, carrots, mangel wurzel, hay, hops, apples, pears and/or plums, flax seed, and grass or clover seed. Livestock included horses, colts/fillies, milch cows, other “horned cattle,” sheep and pigs. Several farmers within the study area kept bee hives for honey. Additional farm products included barrels of cured beef, mutton and pork, butter, wool, and flannel and full cloth. Today, much of the agricultural activity within the township is concentrated around dairy and beef production. During the nineteenth century, many of the residents in the more northerly portions of the township were engaged in lumbering.

In 1846, the population of the township was estimated at 6,289, which included parts of the outskirts of the Town of Kingston. The estimated population in 1850 was 4,523 (Smith 1851:287).

In 1846, Kingston Township contained two gristmills and three sawmills. By 1850, the latter had increased to twelve (Smith 1846:94; Smith 1851:287).

**Settlement Centres**

**Cataraqui**

This post office village was located on part Lots 15 and 16, Concessions 2 and 3, Kingston Township. The village was located where the Western Road crossed the Little Cataraqui River. Alternate names for the community were “Sandhill” or “Sandville” and “Waterloo.” The first name was given on account of the sandy soil in the vicinity. The second name, Waterloo, was given to commemorate the British victory over Napoleon in 1815. This was the name assigned to the post office when it opened in 1851. The name was changed to Cataraqui in 1868, in order to avoid confusion with the post office in Waterloo County.

The village was laid out into building lots around 1822. In 1846, the village contained a Methodist Church and a Quaker Meeting House. The principal businesses included three physicians and surgeons, a carding machine and fulling mill, cloth factory, ashery, tannery, store, three taverns, three wagon makers, a saddler, two blacksmiths, two shoemakers, one tailor and one baker. The population was approximately 200 (Smith 1846:205-206).
By 1851, “Waterloo” was described as “a neat little village” with a population that had increased to 250 (Smith 1851:275). The trades and professions now included a sleighmaker and mason / builder (MacKay 1851:464).

The population was approximately 300 in 1873 (Crossby 1873:80; Scott 1997:44; Rayburn 1997:61). By the late 1870s, other businesses had been established here such as James H. Berry’s fanning mill factory, F.J.H. Fast’s confectionary, and John E. Norris’ saddle and harness making operation.

The village contains Christ Church and cemetery, where Canada’s first Prime Minister, Sir John A. Macdonald, is buried, as well as a United Church cemetery where many of the early township settlers are interred (Scott 1997:44), to name only two.

Charlesville

This village was bounded by Patrick Street, Ragland Road, Montreal Road and Lower James Street, on part Lot 25, Concession 1. This settlement area remained in existence as a distinct community from approximately 1840 until 1850, when it was amalgamated within the city. The “tannery” site located south of John Street, also known as the “Markland-Ordnance Land,” was surveyed for subdivision in 1858. It was to have contained a new road called “Markland Street.” It contains several heritage houses which are designated under Part IV of the Ontario Heritage Act, notably a row of three stone cottages at 141-145 James Street, which probably date from the mid-nineteenth century (OGS 1973:144-145). The House of Providence stood to the north of the village.

Collins Bay

This post office village was located on part Lots 1 to 3, Concessions 1 and 2, Kingston Township. The village site was originally named “Collinsby” in honour of John Collins, the deputy surveyor who laid out the lands in the township and who was also a land owner on the bay. The post office was opened in 1854. The village of Collinsby was laid out into building lots by Sir Henry Smith, an MP for Frontenac, during the 1860s.

During the first half of the nineteenth century, the family of Loyalist Daniel McGuin engaged in a milling enterprise along Collins Creek. They constructed a carding mill, grist and saw mills, and a distillery was later added to the complex. The distillery operation was later closed down and the building converted into a machine shop.

In 1873, Collins Bay contained a hotel, store, Methodist church, school, grist mill and telegraph office. The telegraph was operated by Samuel G. Sutherland. Ship-building was once an important industry at this place. At one time the village contained three churches (Methodist, Wesleyan Methodist and Anglican). Collins Bay was a station on the Grand Trunk Railroad. The population was approximately 130 (Crossby 1873:91; Scott 1997:55; Rayburn 1997:77).
Elginburg

This post office village was located on part Lots 16 and 17, Concessions 5 and 6, and part Lot 18, Concession 5, Kingston Township. An alternate name for the community was “Scott’s Corners.” This first name was given in honour of an innkeeper in the village during the early 1800s. The name was changed in 1853 to honour James Bruce (1811-1863), 8th Earl of Elgin, who was Governor General of the province of Canada between 1847 and 1854. This village once contained a sawmill, store, blacksmith, two wagon and carriage makers, a paint shop, and a shoemaker. It also contained a Methodist and a Primitive Methodist Church. The population was approximately 150 in 1873 (Crossby 1873:110; Rayburn 1997:109).

Glenburnie

This post office village was located on part Lots 24 to 26, Concessions 5 and 6, Kingston Township. The original name for the village was “Shannon’s Corners” in honour of innkeeper Robert Shannon. It was renamed after a place near Newburgh, Fifeshire, Scotland in 1861.

Another early name for this village may have been “Cole Hill” since a log school by that name was constructed here around 1835. This building was replaced by a stone structure in 1845, and then by a brick school in 1878. A separate school was built on the Patrick Black farm.

The stone school was used by the local Presbyterians for church services until they built a brick church. This later structure was closed in 1925, at which time it was converted into a United Farmers’ Society Hall. A stone Methodist church was built here in 1856. Glenburnie once contained a cheese factory.

The population was approximately 300 in 1873 (Crossby 1873:126; Rayburn 1997:135).

Glen Vale

This post office village was located on part Lots 1 and 2, Concessions 5 and 6, Kingston Township. An alternate name for the community was “Ballynahinch.” The population was approximately 150 in 1873 (Crossby 1873:126-127).

Johnsville

This part of the City of Kingston on the east side of the Montreal Road on Farm Lot “A” was subdivided into building lots during the first quarter of the nineteenth century.

Kingston

For a discussion of the history of the historic core, see Appendix A.
Kingston Mills

One of the chief reasons for the historical importance of this spot is that the first English (government-built) grist mill in Ontario was constructed here by Robert Clark under orders from Haldimand in 1783-84 (Preston 1959:28-29).

The mill site was located at what was known as “Cataraqui Falls,” and this early complex of industrial buildings was known as the “Cataraqui Mills” (Tatley 1977:1) (Figure 3). The name for this site was soon changed to the “King’s Mills,” although it appears to have been called “Kingston Mills” by about 1791 (Rayburn 1997:182). The mill was situated on the main road between Upper and Lower Canada, which became locally known as the Kingston Mills Road. The site was selected since it contained a fall of water between forty and fifty feet (Preston 1959:xliii). The mills were of sufficient importance that the Simcoes visited them on July 18, 1792, but on July 21st “we were prevented by rain from going to the mills on the Cataraqui” (Robertson 1911:120). Early maps of Kingston and Pittsburgh Townships showed that this area was retained as a large “Mill Reserve” by the Upper Canadian government.

The saw and grist mills were damaged by waste water during the winter of 1792. However, repairs were undertaken and the structures were “in tolerable repair” when they were inspected by Peter Russell in July of the same year (Preston 1959:191). The mill dam was swept away in 1794, but repaired shortly thereafter. The mills appear to have fallen into disuse by 1800, and the original gristmill was destroyed by fire in 1805. The lease for the mills was granted to David Brass. Brass was a former Lieutenant in Butler’s Rangers, who had originally settled at Niagara where he built the first mill in that district. Brass also served as the roadmaster in charge of the road to the Kingston Mills (Preston 1959:31). The sawmill was busy during the War of 1812-14, but it was destroyed by fire in 1818. It was rebuilt in 1819, and remained operational until about 1842. The gristmill was rebuilt after it was burned, although there is no record of it after 1826 (Tatley 1977:1-3).

Water had been diverted away from the mills due to the construction of the canal, and it was noted by an eyewitness that “the mills are at present useless, but very little water being allowed to pass by the small sluice at the east end of the river dam. The old bridge is torn away, and the present road over the dam is narrow and dangerous.” In 1830, the mill was leased to a Mr. George Carter. He “appears to be a very decent man; but I ascertained that he had been joining in the spoliation of the woods on the reserve.-He stated however that Colonel By had given permission to him & many others to do so” (Hotham 1830).

Due to the fact that the mill was located some distance upriver from Kingston, settlement around the mill was slow until the 1830s. During the late 1820s and early 1830s, much of the settlement comprised those individuals who were connected with the milling operations or who were employed on the Rideau Canal works (Figure 4).
The community was mentioned in passing by W.H. Smith, who noted that it was “a spot the scenery of which is very picturesque” (Smith 1846:94).

In 1847, the mill reserve was leased to Colonel Angus Cameron, who rebuilt the saw-mill and erected housing for his labourers. The mill was sublet to an American firm called Wood-Bond & Co. The mill was abandoned in 1861 when timber supplies began to dwindle. Also, competition from other mills closer to Kingston contributed to the closure of the saw-mill in that year (Tatley 1977:3).

In 1863, the mill site was leased by Dr. Edward Smith formerly of Smith’s Falls. He demolished the saw-mill, and constructed a new stone grist-mill. This structure was leased to John Rourk in 1878, who abandoned it sometime during the 1880s. It was then leased by Clark Hamilton from 1889 until 1904. The mill site was then leased by the Kingston Street Railway Company in 1904, with plans to convert the mill into a hydro-electric generating station. The mill was severely damaged during a spring freshet in 1905, after which it stood unoccupied and it later “crumbled away into oblivion” (Tatley 1977:4). A hydro generating station was constructed at the mill site by the Ganonoque Electric Light and Water Supply Company in 1913-14 (Tatley 1977:7).

There was no actual settlement at Kingston Mills during the first quarter of the nineteenth century, with the exception of those men who were associated with the mill. With the construction of the Rideau Canal in 1827, a large number of workers were attracted to Kingston Mills. Kingston Mills became the terminus of the canal following the construction of four stone locks. It is estimated that over 300 workers settled at Kingston Mills between 1827 and 1831, the majority of whom were Irish (Tatley 1977:5-6). It was noted by an eyewitness “I am sorry to observe that the present settlers at the village are of the lowest description of Irish and French Canadians—it would be advisable to pause before granting leases to any of them” (Hotham 1830).

A map produced during this period, and preserved in the correspondence files from the Hamilton Brothers sawmill, showed that an extensive community had grown up around the mills and canal locks. Structures included fifteen log houses for the canal labourers, a cookhouse, store, school, two taverns and a “proposed” Roman Catholic chapel. A flag stone quarry was located slightly to the southeast of this community, near the intersection of the old and new roads to Point Henry.
In the 1890s, a smaller community known as Cunningham’s flourished about one mile east of Kingston Mills (Tatley 1977:6).

**Picardville**

This village is contained between present day Division Street, Raglan Road, and York Street, on part Lot 25 Concession 1. As the name implies, it was originally a French settlement, started in 1798 when the exiled Comte Joseph de Puisaye, settled some Royalists and French Canadians here. The village remained as a distinct entity until about 1875, when it became part of the City of Kingston. It is said to have been named “after a distinguished and masterful-looking individual called Picard who was dubbed ‘the Count’ by his English neighbours.” The village remained as a distinct entity until about 1875, when it became part of the City of Kingston (Roy 1952:67).

**Portsmouth**

Portsmouth was an incorporated village situated on Portsmouth Bay, on part Lots 18 to 21, Concession 1, Kingston Township. It was named in 1855, possibly after the port city in Hampshire, England. It contained a tannery, brewery, flouring mill, several stores, three hotels, a brush factory, one public school on Baiden Street built in 1857, one separate school built in 1859, a town hall, a Methodist and an Anglican Church (St. John’s), telegraph office and two “marine railways.” The telegraph was operated by a boot and shoemaker named Samuel Lowe during the 1870s. It also contained the Provincial Penitentiary and Rockwood Lunatic Asylum. The population numbered approximately 1,702 in 1873. It was an incorporated village between 1859 and 1951, when it was amalgamated with the City of Kingston. The oldest surviving house within the village stands at 9 Kennedy Street. This structure was built by James Gardiner sometime between 1819 and 1822, and is now designated under Part IV of the *Ontario Heritage Act* (Crossby 1873:258; McKendry 2005:33; Rayburn 1997:279).

**Sandhill**

See Cataraqui.

**Scott’s Corners**

See Elginburg.

**Shannon’s Corners**

See Glenburnie.

**Sharpton**

This post office village was located on part Lot 12, Concessions 5 and 6, Kingston Township. The population was approximately 150 in 1873 (Crossby 1873:311).
Slab City

See Westbrook.

Stuartville

This village was laid out on part of Farm Lot 24 by the Rev. George O’Kill Stuart in the early 1840s and surveyed by William Kilborn in 1841. It was bounded by present day Barrie Avenue, University Avenue, Union Street and Johnson Street. It contained “poorly constructed wooden houses,” and was inhabited mainly by poor Irish Catholics. By 1861, this village contained 147 families with a total population of 692 inhabitants. It was described as an “overgrown and populous suburb.” It remained a distinct settlement centre into the 1860s, but was eventually annexed by the City of Kingston.

Waterloo

See Cataraqui.

Westbrook / Westbrooke

This post office village was located on part Lot 3, Concession 3, Kingston Township. An alternate name for the community was “Slab City” due to the fact that the local sawmill produced fine slabs, or the first cuts from saw logs, for building purposes. There is some confusion regarding the origins of present name. It may have been called Westbrook due to its location on the west branch of Collins Creek. Another theory has been put forth that when the post office was opened in 1860, a local farmer and brewer named William Marshall suggested that it be named “Westbrooke” in honour of Lord William Westbrooke. It was named “West Brook” but eventually contracted to “Westbrook” in 1950. The population was approximately 100 in 1873. In 1878, it contained two churches (Methodist and Methodist Episcopal), two blacksmiths, sawmill, churn factory, store and one hotel operated by E.B. Benjamin (Crossby 1873:354; Scott 1997:242; Rayburn 1997:367).

Westville (Williamsville)

This village was developed on either side of Princess Street between Regent and Victoria Streets. It extended as far as North Bartlett Street to the north, and to Durham Street in the south. It formed a distinct settlement area as early as 1840, and remained an independent village until about 1871.

By 1851, this place was described as “a cluster of houses, a nucleus of what was intended to be a village.” During the mid-1840s, the residents were divided as to what name was to be selected. “Rival sponsors had resorted to the expedient of getting labels printed with the names Williamsville and Westville inscribed on them in large capitals, these were affixed to the houses, and denoted very decidedly and conspicuously to which party each house belonged, at the same time giving a rather party coloured appearance to the settlement.”

Part of Williamsville was surveyed in December 1852 by A.B. Perry on the west half of Lot 22, Concession 1, Kingston Township, on Smith Bartlett’s farm lot. The village appears to have extended into part of Lot 23 Concession 1. This village was incorporated within the boundaries of the City of Kingston (Smith 1851:275-276; Frontenac Land Registry Office Registered Plan of Subdivision C17; Winearls 1991:710, #B1186).
Early Economic Activity, Industry and Agriculture

Railway Era
The study area was traversed during the mid-nineteenth century by the Grand Trunk Railway, chartered in 1853, partly in order to provide easier access for Canadian goods such as wheat and lumber to the American markets and to Europe from eastern ports. Much of the construction work between Toronto and Montreal was undertaken in 1854-55. The Toronto-Montreal line was operational by 1856, and the railway was extended to Sarnia by 1859. It entered Kingston Township just along the lakeshore just west of Collin’s Bay. The right-of-way for the tracks ran in a slight north-easterly direction, somewhat south of the village of Cataraqui, until it swung south into the City of Kingston. The line of track continued northeast towards Kingston Mills along the west side of the Cataraqui River, where it crossed the Rideau Canal into Pittsburgh Township. The other railway which provided freight and passenger service to the City of Kingston was the Kingston and Pembroke or “K & P” Railway. This was humorously thought to have been an abbreviation for the “Kick and Push” Railway. It was constructed between 1872 and 1877, and entered the northern portion of the township from Portland, headed south-easterly and by-passed all of the township villages until it reached the depot in the City of Kingston.

Rideau Canal
The Rideau Canal was constructed under the supervision of Lieutenant-Colonel John By during the period between 1826 and 1832. This canal was a British post-War of 1812 response to the perceived threat posed to Britain and Upper Canada due to the proximity of the United States along the St. Lawrence River. The Rideau was constructed in order to ensure a safe transportation route for men and supplies away from the St. Lawrence River. Some of the lands along the Cataraqui River, measuring over 5,200 acres, were flooded and rendered useless following the construction of this waterway, as were some of the old mill sites. Some compensation was paid to the owners of these flooded lands.

Potential Historic Archaeological Remains
Blacksmiths
There were several blacksmiths within Kingston Township and its villages during the nineteenth century. The locations for the known blacksmiths included:

- Lot 34, Concession 6
- Lot 11, Concession 7
- John Schemerhorne, blacksmith in Elginburg during the 1870s
- Hamilton Bearance, blacksmith in Glenburnie during the 1870s
- Wesley Kennedy, blacksmith and wagon-maker in Glenvale during the 1870s
- Hugh McCaugherty, blacksmith in Portsmouth during the 1870s
- M. McDonald, blacksmith in Westbrooke during the 1870s
- Johnston Spooner, blacksmith and wagon-maker in Westbrooke during the 1870s

There were a number of carriage and wagon makers within the township during the 1870s, who may have also operated a smithy in association with their main business. These included:

- David Shannon, carriage builder at Glenburnie
- William Stewart, carriage maker at Glenvale
- Hogan and Asselstine, carriage builders at Portsmouth
- W. Jackson and Son, carriage and wagon makers at Elginburg
- William Lawson and John Pope, carriage and wagon makers at Elginburg. Their business was named “Pope and Lawson’s Carriage Factory.”
- Nathaniel Leonard, wagon maker at Westbrooke

**Brickyards**
There were two known brickyards and brick manufacturers within Kingston Township prior to 1900. They were:

- Johnson Day: His manufactory was located near the village of Cataraqui on part Lot 15, Concession 3. Day was a native of Upper Canada, born in the province around 1811.
- James Ross: His brickyard was located on part Lot 23, Concession 2. Ross was a native of England who settled in Kingston Township around 1872.

**Bridges**
There were two main bridges which linked Kingston to Barriefield in neighbouring Pittsburgh Township. The first was the Cataraqui Bridge, constructed in 1829 (Figure 5). This wooden structure was built on wooden piers set about six feet above the water, and measured thirty feet wide with an overall length of 1,600 feet. Piers constructed out of loose stones extended into the river from both shores, and a drawbridge on the Kingston side of the bridge permitted the free passage of ships along the Cataraqui River. Tolls were collected at the bridge which was locally known as the “Penny Bridge.” The bridge at this point was replaced by the LaSalle Causeway which was constructed in 1912 (Patterson 1989:42, 169).

Another early wooden bridge was located at Kingston Mills, situated on part Lot 37, Concession 4, in the township. It was later replaced by a wooden swing bridge following the construction of the Rideau Canal. There was also a railway bridge in this community, built with cut stone piers during the third quarter of the nineteenth century.

**Cemeteries**
Later cemeteries established during the 20th century, such as Glenhaven Memorial Gardens, have not been included on this list but have been included as polygons on the GIS mapping. Also, it is known that there was a cemetery at the Frontenac County jail behind the court house (Registry Records, Lot 25). It was officially closed in 1972. The other historical, nineteenth century cemeteries include:

**Bethel Congregational Church (Union Cemetery)**
In 1827, Congregationalists purchased property in the present location of the Bethel Congregational Church of Kingston, located at 314 Johnson St, to serve as a cemetery for all non-conformist denominations. The cemetery was in use until 1875, and in 1878, the Second Congregationalist Church, also known as Bethel Church, was constructed on the site of the Union Cemetery. Construction at the Church in 2002 led to the discovery of human remains (Bazely 2005).
Beth Israel
This cemetery is located on present-day Sydenham Road between Princess Street and Highway 401. This cemetery has been in continually used by the Jewish community since the nineteenth century.

“Broken Stones”
Twelve broken stones were found at 127 King Street West in 1978. They were said to have been laid down as flagstones in a garden walk sometime during the 1930s. Their origin is unknown, although they may have been from the Catholic cemetery once located at McBurney Park. Some of the burials were recorded in St. Mary’s Church Register. The names were predominately of Irish origin, and the burials commemorated date from between 1848 and 1885.

Buck Family Cemetery
The cemetery is located on Sunnyside Road, part Lot 15, Concession 4, overlooking a creek valley belonging to the Conservation Authority. This burial ground contained at least four tombstones, two for the Buck family and two for the Fairbanks family. The dates on the stones range from 1867 to 1908.

Cataraqui United Church Cemetery
This cemetery is located on part Lot 15, Concession 3, about 300 yards north of the intersection of Kingston Road and the road to Loughborough. This lot contained a rough, frame Methodist Meeting House built on land once owned by John Ferris. The church was replaced by a stone structure in 1824, which was succeeded by the present brick church built in 1881. The first burials are thought to have taken place here during the 1790s, although it was certainly used from 1802 onwards. Three of the oldest stones found here commemorate the burials of Nicholas Herchmer (1809), Jacob Powley (1814) and Jerusha Dawson (1820).

Cataraqui Community Cemetery
This cemetery is located on part Lot 16, Concession 3, at the corner of Highway 2 and Sydenham Road. The cemetery office is located at 927 Purdy Mills Road. The Cataraqui Cemetery Company was established in 1850, and sixty-five acres of land was sold by the widow Mary Atkinson to the Cemetery Company in 1853. The first burials date from that time. The cemetery was originally established as a non-denominational burial ground. The grounds were laid out by Frederic J.M. Cornell of Rochester, New York, in 1853 (McKendry 1995:77).

Christ Church (Anglican)
This cemetery was located on part Lot 16, Concession 3, outside the village of Cataraqui. It contains the gravesite of Prime Minister Sir John A. Macdonald, which is designated as a National Historic Site.

Church Acre (North Portion)
This plot is located “306 feet along the fence” from the nearest corner of the older Church Acre situated just to the south, also on part Lot 16, Concession 3. This land was acquired for burial purposes in 1901.

Church Acre (South Portion)
This cemetery is adjacent to, or surrounded by, the Cataraqui Cemetery but is a distinct entity from this other cemetery. The land was sold by Mary Atkinson to the church in 1853. Christ Church (Anglican), located within this plot, was formally opened in October 1870. The “Church Acre” is situated south and east of the Church itself, and is approximately 300 yards from the intersection of Sydenham Road and Princess Street (Highway 2). This plot has been used for burials since the second half of the nineteenth century.
Graham Irwin Cemetery
This cemetery is located on Elginburg Road between Elginburg Village and Highway 38. This burial ground contains the graves for two children, Roderick Welstead (died 1856), and Norman Welstead (died 1862).

McBurney Park (aka “Skeleton Park.”)
This park, located at the intersection of Balaclava and Ordnance Streets, was formerly used as a cemetery by the Catholics, Anglicans and Presbyterians. It was referred to as the “Upper Burial Ground.” It is possible that the cemetery was established as early as 1816 as the Garrison Burying Ground, and it was formally recognized by the government in 1819 (Bazely 2005). The cemetery was closed in 1864, and supposedly all remains were removed in 1892. It appears, however, that only those graves were removed whose relatives requested the removal. Remaining tombstones were laid down and the area covered with grass. The formal northern and western limits of the cemetery have been defined by archaeological work (Bazely 2005).

McConnel Family Cemetery
This cemetery is located on part Lot 30, Concession 4, “a half mile in” from McAdoo’s Lane, which runs between Division Street and Montreal Street. The neglected plot measures about 15 square feet and is bordered by some “stunted evergreen trees.” It contained at least five burials. Two burials were for William and Jane (McConnell) Talbot, who died in 1876 and 1900 respectively. The other known interments included James McConnell (1849), Francis McConnell (1863) and Margaret McConnell (1880).

McGuin Family Cemetery
This family burial ground, located on one-quarter acre of land adjoining the Methodist (United) Church cemetery at Catarqui, was purchased by Anthony McGuin in 1826. It is still owned by the McGuin family, although it “blends into the larger cemetery and appears at one with it.”

Kingston General Hospital Grounds
It is estimated that 1,400 to 1,600 immigrants died of typhus in Kingston during the 1847 epidemic. They were originally buried in a marshy area on the north side of Kingston General Hospital, but were reinterred at St. Mary’s Cemetery in 1966. Not all remains were moved, however, as periodic construction and maintenance work has led to discovery of disturbed human remains. The site was commemorated by a monument in 1894, and more recently by a plaque placed by the Irish community (Bazely 2005).

Patterson Family Cemetery
This cemetery is thought to have been located on Sunnyside Road on either part Lot 20 or 21, in Concession 4, Kingston Township.

Quaker (Friends) Burial Ground
A small Quaker cemetery was located within what are now sections “P” and “Q” of the Cataraqui Cemetery. The Quaker interments which took place here pre-date the establishment of the Cataraqui Cemetery in 1850.

Wellborn Family Cemetery
This family burial ground is located on part of Broken Front Concession, Lot 9, on Park Crescent “off Crerar Boulevard” in the field between Centre 70 and Bath Road. The hill slopes down to the Lake from the cemetery. The Wellborn family farmed in Kingston Township as early as the 1820s. The plot contains three tombstones, and at least four burials: John Glazeby/Glazery (1840), Mary Wellborn (1847), Anne Wellborn (1854) and Marmeduke Wellborn (1863).
Welstead Family Cemetery
This appears to be the same burial plot as the Graham Irwin Cemetery.

St. Paul’s Anglican Church
This cemetery is located at the corner of Queen and Montreal Streets in Kingston. The present church was constructed between 1845 and 1847, and was dedicated to the memory of the Reverend Robert D. Cartwright. The surrounding cemetery, which is also known as the Lower Burial Ground, was part of the burial ground for the original St. George’s Church, used between 1792 and 1845. Burials continued to be made in the family plots here until 1863; in the following year, a city by-law forbade interments within the city limits.

St. Mary’s (RC) Church Cemetery
This cemetery is located on part Lot 24, Concession 2. The land for this burial ground was bought by the church from Patrick Connor Murdock in 1852, and the first burials are said to date from 1856.

St. Joseph’s (RC) Burial Ground
This cemetery was located adjacent to St. Joseph’s church which was constructed in 1808. Burials were made here until about 1848, after which time several of the graves were removed to the Upper Burial Ground or City Cemetery, now known as McBurney Park. Construction on a senior citizen’s home at the St. Joseph’s site was stopped during the 1960s, due to the fact that “some bones were still there.”

St. Mary’s (RC) Churchyard
It is possible that there may have been people buried in the churchyard around the St. Mary’s structure although no record of such burials have been found. Burials have been found, however, in the basement of St. Mary’s.

St. Francis/Fort Frontenac Burial Ground
A burial ground associated with Fort Frontenac was in existence during the French Regime, and was in use between November 1747 and March 1752. A register of burials within the parish of St. Francis at Fort Frontenac is preserved at the Notre Dame Church archives in Montreal, which recorded at least ten interments. These consisted of five native children between two and nine years of age, one adult native aged 20 years, one French child aged 3 years and two French adults aged 23 and 40 years. One Aboriginal child of unspecified age was buried here in March 1, 1749 (Preston 1958: 236-243). As late as August 1758, a “Parade State” of the garrison at Fort Frontenac noted that Gunner Biard and Jean Gentil dit JoliCoeur of Bonne were “dead” (Preston 1958: 259-260). Presumably other men of the garrison and their families were also interred in the vicinity of the Fort during the late seventeenth and early eighteenth centuries.

Cheese Factories
There were two known pre-1900 cheese factories in Kingston Township, which is in sharp contrast to Pittsburgh Township which contained at least 15 cheese factories during the same period. The factories in Kingston included:

- Lot 29, Concession 5: this factory was operated by Robert Vair during the 1870s
- Lot 17, Concession 6: this factory may have been operated by Joseph Healey during the 1870s
Churches

There were at least seven churches within Kingston Township, not including those found in the villages and City of Kingston proper. The township churches included:

- Lot 5, Concession 1: This lot contained a “Parsonage” as depicted on the 1878 Illustrated Atlas.
- Lot 4, Concession 3 (Westbrooke)
- Lot 15, Concession 3 (Cataraqui)
- Lot 16, Concession 3 (Cataraqui): This is Christ Church (Anglican), largely used in connection with the Cataraqui Cemetery. It was designed by architect John Power in 1863, and enlarged in 1877 (McKendry 1995:77).
- Lot 1, Concession 5 (Glenvale)
- Lot 2, Concession 5 (Glenvale)
- Lot 6, Concession 6
- Lot 27, Concession 6 (Glenburnie: This was a Methodist congregation.
- St. James Church (Stuartville): This was a structure designed by William Coverdale and built in 1844 (McKendry 1995:71).

There was also a Methodist Church (built in 1855), an Anglican Church (built in 1849-50) and a Roman Catholic Church (built in 1892) in the village of Portsmouth. St. John’s Anglican Church in this village was possibly designed by William Coverdale, and built in 1849-50. Transepts and chancel, designed by John Power, were added in 1863 (McKendry 1995:75).

Hotels, Taverns and Inns

There were at least nine hotels, taverns and inns located within Kingston Township during the latter half of the nineteenth century, in addition to those which were situated in the villages and at least six within the City of Kingston proper. They included:

- George Marsh’s Hotel, a tavern which was operated by Marsh at Collin’s Bay during the 1870s.
- J. Gorie’s Hotel, located on part Lot 9, Concession 2.
- The “Westbrooke Hotel,” located on part Lot 6 Concession 3. The proprietor in 1878 was named Eben B. Benjamin, who settled in the township in 1869.
- The “Five Mile House,” located on part Lot 8, Concession 3.
- Hotel, located on part Lot 16, Concession 3.
- Joseph Langwith’s Hotel, situated on part Lot 7, Concession 5.
- Unnamed hotel, located on part Lot 17, Concession 5.
- R. Shannon’s Hotel, situated on part Lot 25, Concession 5.
- The “Union Centre House,” located on part Lot 17, Concession 6. This hostelry was operated near Elginburg by John Ray, who settled in the township around 1872.
- A. English’s Hotel, located on part Lot 35, Concession 6.

Taverns and hotels located within the City of Kingston included:

- Daley’s Tavern
- The “Lambton House” Tavern
- The “St. Lawrence Hotel”
- The “Exchange Hotel”
- The “National Hotel”
- The “Palace Hotel,” operated by Mrs. Susan Purdy during the late 1870s.

**Early Houses**

The *Illustrated Historical Atlas* of 1878 and other nineteenth century maps showed that the township was well populated during the nineteenth century, and that nearly every farm lot contained at least one house. Subdivisions began to develop in Kingston on Park Lots 1 and 2 during the 1840s, and several buildings constructed here during the 1840s and 1850s are still extant.

There are a large number of stone houses and commercial buildings of historical and architectural significance which have survived from the nineteenth century within Kingston Township, as well as in the villages and the City of Kingston. Some of these buildings, such as the Rochleau House on Princess Street which is designated under Part IV of the *Ontario Heritage Act*, pre-date the War of 1812. Many notable structures were designed by the architect William Coverdale. Many of these structures have been studied, catalogued and published by other historians. In order not to unnecessarily reduplicate the scope and contents of these works, it is recommended that the publications by Margaret Angus (1966), OGS (1971-1975) and Jennifer McKendry (1995) should be consulted.

Some of the earliest and more noteworthy structures in Kingston are located in the historic core and include: the Bajus Brewery (ca. 1800 with subsequent enlargements), Mason house (Barrack Street, ca. 1820), Macpherson house (Rideau Street, pre-1820), Charles Place (ca. 1820), the “Stone Frigate” (ca. 1820), Gildersleeve house (1825), St. George’s Cathedral (1825), Plymouth Square (1831-32), Cartwright house (1832-33), Kingston General Hospital (ca. 1835), Summerhill (1836-38), St. Helens (1837-38), Bellevue house (1838-40), Rockwood Villa (1841) and Kingston City Hall (1843-44).

**Lime Kilns**

There is evidence that the French had a lime burning operation at Fort Frontenac during the 1740s-50s. While the exact location is unknown, “a little in front [of the Fort]… is an excavation from which stone is taken for making lime” (Preston 1958:250).

The 1851 census for Kingston lists four lime burners within the limits of the City. There are no lime kilns listed in the 1861 and 1871 censuses.

Two to three lime kilns were located in Portsmouth, on Grange, Logan and Richard Streets. These were located in close proximity to a limestone quarry that was operated on Grange Street. The kilns were operated during the 1830s-40s by the McLeod family of Scotland, and by Richard Logan (McKendry 2005:33, 71).

Some early lime kilns were operated by Andrew Waldie, a Scottish émigré who settled in Kingston during the early 1870s.

**Ship Building**

It is known that shipbuilding was carried out at Kingston to some extent during the French regime. Ship building had been suggested by Talon to King Louis XIV as early as October 1670, in order to secure dominance on Lake Ontario. In November 1673, Frontenac had “sent up carpenters” to the fort in order to
construct a ship, by which “we will be masters of all the lake” (Preston 1958:102, 112). There are references to a bark at Fort Frontenac in the fall of 1683, which was built by LaSalle, and preparations were discussed for the construction of another bark in order to “trade with the Iroquois at Niagara.” This second ship was built in 1684, and both were valued at 2,000 livres. One of the ships was named La Generale. In a letter of November 1685, Denonville referred to the importance of fitting out the three barks at the Fort which were “very neglected.” In November 1686, he wrote “our three barks at Cataracoüy are now in the water. In caulking them it was found necessary to do a refit” (Preston 1958:131, 133, 152-153, 160).

Shipbuilding under the French continued during the eighteenth century, and accounts survive for the cost of goods and materials used during the construction of two barks in 1725-1726, and again in 1749. In 1747, two barks or bateaux named the St. Charles and St. Francis had been constructed and plied the waters of the lake between Kingston and Fort Niagara. By 1756, the armed French fleet on Lake Ontario consisted of vessels named the Marquise de Vaudreuil, the Huron, an un-named schooner and a bateau. Ship building continued at Fort Frontenac until at least 1755-56, when a ship’s carpenter was dispatched there from Montreal to construct a schooner for the protection of French bateaux from English sloops (Preston 1958:219-223, 235, 244-246, 248, 254-255).

At the fall of Fort Frontenac to the British in 1758, it was noted that the fort and shipping were destroyed except for a brig and schooner “which we keep to carry plunder to Oswego.” The total number of French vessels at Fort Frontenac was given at nine, including one which contained sixteen gun carriages (Preston 1958:262, 268).

Around 1788, Kingston was selected by the British government to be the principal military and naval station on Lake Ontario. The harbour at Kingston was, however, deemed to be open to the lake and without adequate anchorage. Haldimand Cove (or Navy Bay), located between Point Frederick and Point Henry, was therefore selected as the site for the dockyard and storehouses. The dockyard was established here in the summer of 1789, and the naval base by 1794. A naval hospital was established around 1804 and enlarged in 1815 (Angus 1966:107).

In the 1780s, when private vessels were permitted to navigate on Lake Ontario, some of the merchants at Kingston such as Richard Cartwright constructed their own cargo ships. Perhaps the first such ship to be built at Kingston, possibly at Point Frederick, was the Lady Dorchester in 1788-89. This was followed in 1794 by the [Governor] Simcoe (Preston 1959:lxxiii).

On July 2, 1792, Mrs. Simcoe noted in her Diary that she accompanied her husband to see the shipyard. There they observed two gunboats “lately built on a very bad construction. Coll. Simcoe calls them the ‘Bear’ and the ‘Buffalo’ as they are so unscientifically built” (Robertson 1911:112).

In 1801-1802, Silas Pearson applied for a grant of land along the waterfront at Mississauga Point, between Lots 27 and 29. Pearson had been appointed master builder of the Kingston dockyard in 1798. Gother Mann determined that this location was “the only commodious situation for Building and Repairing Vessels” and therefore recommended a lease be issued for this land instead of an absolute grant (Pearson 1959:216).

It is known that itinerant boat builders were employed in the Kingston area during the early British period. For example, a document exists from 1808, in which Francois Lecompte of Montreal was contracted by Joseph Forsyth to build boats at Kingston for three months. It is also known that a Loyalist named John Dennis (1757-1832), who resided in New Brunswick after the American Revolutionary War, came to Kingston where he worked at the dockyards. He later removed to York in 1796, and settled near Weston. Dennis was renowned for his shipbuilding skills, and among his works was the government yacht Toronto (Preston 1959: 59; Firth 1962:88).
One of the important early structures associated with ship-building and the naval dockyards at Kingston is the “Stone Frigate,” located on Point Frederick. The Kingston Gazette advertised for tenders for a “stone store house” in December 1816, which was to have measured 200 feet long by 80 feet wide with a “tinned” roof. Construction began in 1820 on this building, which was just forty feet in width, using stone quarried on the spot. It was used to store naval equipment, and after the dockyard closed in 1837, it was used for housing the men of the naval detachment. It became part of the Royal Military College in 1876, and has been used as a cadet dormitory (Angus 1966:110).

By 1851, the census of Canada West indicated the importance of shipyards and shipbuilding in the Frontenac County-Kingston area. This document showed that there were four “boat builders” and eleven shipwrights in Frontenac, and six ship builders and eighteen shipwrights at Kingston. Some of the associated trades included three boiler makers, sixteen “boatmen,” four pilots, six rope makers, and five sail makers and one chandler in Kingston (1851 census pp. 507-508, 519-521). A Directory published during the mid-nineteenth century named George Thurston as a “master builder” on Ontario Street, and Calvin and Cook on Garden Island. A ship owner of note included the Hon. J. Hamilton. B.D. Jenkins was a ship’s Chandler and sail maker (MacKay 1851:128).

By the mid-nineteenth century, one of the important centers for shipbuilding in Kingston was at the foot of Gore Street, which later became the Kingston Shipyards and the government drydock. Period maps showed several wharves on the west side of the harbour from the King’s Wharf (Garrison Wharf) near Barrack Street to the “Boat Yard” at the foot of Simcoe Street. There were also wharves and a pier at Portsmouth harbour, and a few small wharves near the brewery on the lakeshore south of King Street just to the east of Portsmouth (Meacham 1878:56, 89; Law 1973:132).

Ship-building was not isolated to greater Kingston, but was carried out in other areas as well. For example, during the nineteenth century we find records regarding ship building on Garden Island, where the barque Garden Island was built by the Calvin Company and launched in May 1877, and in neighbouring Pittsburgh Township (McKendry 1998: 63; Patterson 1989:202-203).

There are collections of private and company papers which are illustrative of the importance of shipbuilding in Kingston during the nineteenth century. A few of these include the Calvin Company papers (1836-1923) and in the Gaskin papers (1884-1905) held at the Queen’s University Archives (MacDermaid 1986: 38, 93).

During the mid-nineteenth century, there are numerous references to ship builders and carpenters in and around the Kingston area. Among those who resided in Portsmouth were William Graham (1812-95), an Englishman who settled in the 1840s, John White, Thomas Nicholson, Edward Berry, Robert Abbey, John Craig, Richard Howard, John Marks, John Wishart, Thomas Dissett, and the firm of MacPherson and Crane. On Wolfe Island we find the name of Michael Scrimes, who resided there during the 1860s. The British Whig newspaper referred to the “village side” of Portsmouth at Hatter’s Bay as being “tenanted chiefly by shipwrights.” Many of the Portsmouth ship carpenters settled on King Street (now Mowatt Avenue) and Kennedy Street (McKendry 1998:40, 42; McKendry 2005:10-11, 33, 68-69, 71; British Whig, April 5, 1848).

The “Long Pier” at Portsmouth was constructed by William Dickson and Company in 1840, which served as a protection against the Lake for the smaller village wharves and ship building and repair facilities. By 1841, the Kingston Marine Railway had been established in Portsmouth on the waterfront. It was used to help haul the larger ships for repair.

By 1861, this number had increased somewhat. Kingston had one boiler maker, five boatmen, one pilot, one rope maker, one chandler, and twenty-one shipwrights; Frontenac had eleven boiler makers, one
boatman, three sail makers, eight chandlers, and forty-five shipwrights (**1861 census** pp. 560-561, 569, 571-572).

In 1871, Kingston had six sail makers, one chandler, fifty-six ship builders, and three steam engine builders; Frontenac had two sail makers and thirty-eight ship builders. The census also indicated that there were nine steam ships owned in Frontenac, twenty-three sea-going vessels and nine barges. There were ten steam ships owned in Kingston, seven sea-going vessels and ten barges (**1871 census** vol. 2 p. 283; vol. 3, p.7).

With the increased use of railways in Ontario during the third and fourth quarters of the nineteenth century, the use of ships for transporting goods and passengers declined. The last of the neglected Portsmouth shipyard buildings, for instance, were demolished in 1976 (McKendry 2005:12).

**Stone Quarries**

There is evidence of stone quarrying within Kingston Township, and notably in and around Portsmouth Village. Stone quarries were established by McLeod, Logan and Barclay at Hatter’s Bay during the 1830s in order to supply building materials for the penitentiary. Other known quarry sites include present day Garrigan Park, the Queen’s campus and the area between King and Grange Streets.

**Mills**

As early as 1846, there were two grist mills and three sawmills located within Kingston Township (Smith 1846:94). By 1878, this number had decreased to just three mills. These included:

- Mill, located at Collins Bay on part Lot 1, Concession 1. This mill was operated by David I. Rankin during the 1870s.
- Sawmill, located on part Lot 10 Concession 4.
- Flour/grist mill, located on part Lot 13, Concession 4. This mill was operated by Robert T. McDonell and Mires Simmons during the 1870s.

**Miscellaneous Structures and Sites**

**Rideau Canal Locks**
These were built during the late 1820s, on part Lot 37, Concession 4, near Kingston Mills.

**Rockwood Asylum**
This is situated on part Lot 18 in the Broken Front Concession (Block 60) in the village of Portsmouth. This “humane and useful” institution was established in 1856-57 on the grounds of the “Rockwood Villa” estate which was the summer home of John S. and Sarah Cartwright. The original Rockwood Asylum was used between 1859 and 1870, with additional structures added to the complex in 1882, 1893 and 1902.

**Penitentiary**
This structure is located in the village of Portsmouth on part Lots 19 and 20 in the Broken Front and 1st Concession. It was described as “an immense massive pile of stone buildings, surrounded by a very lofty, strong stone wall, flanked with towers.” The land for the penitentiary was purchased in 1832, and construction began in the following year. The first prisoners were admitted in 1835. Since there was no other penitentiary in Canada at the time it contained inmates from both Upper and Lower Canada.
“Crystal Palace”
This structure was depicted on the 1878 Illustrated Historical Atlas, in the north end of the village of Portsmouth on part Lot 20 Concession 1.

Post Offices

There were at least six post offices located in the villages in Kingston Township. They included:

- Collins Bay Post Office, part Lot 1, Broken Front Concession.
- Westbrooke Post Office, part Lot 3, Concession 3.
- Glenburnie Post Office, part Lot 27, Concession 5.
- Sharpton Post Office, part Lot 11, Concession 6 or part Lot 10, Concession 5.

Railways and Railway Stations

There were two railways which crossed the township during the late nineteenth century. The Grand Trunk line entered the township in Concession 1 at Collin’s Bay. It ran through the village of Collins Bay, and passed slightly south of the village of Cataraqui before it reached the depot in the north end of the City of Kingston. From this point, the line followed the west side of the Cataraqui River before it crossed the Rideau Canal into Pittsburgh Township at Kingston Mills. The other railway was the Kingston and Pembroke Railway. It was constructed between 1872 and 1877, and entered Concession 7 in the township from neighbouring Portland Township. It by-passed all of the villages in the township before it reached the Kingston Depot.

Recreational Sites

Orange Hall
This structure was located on part Lot 32 Concession 5.

Good Templar’s Hall
In the 1870s, this structure was located in the village of Collin’s Bay on part Lot 2 in the Broken Front Concession.

Boyle’s Mineral Spring
This spring was located within the City of Kingston at the corner of King and Arthur Streets. The water was analyzed, and was found to contain chlorides of sodium, calcium, magnesium and sulphate of soda (Smith 1846:92).

Portsmouth Bath and Mineral Springs
Two mineral springs were first discovered when wells to obtain water for a distillery were drilled into the bedrock a short distance from the Penitentiary at Portsmouth around 1843. They became known as the “Upper” and “Lower Wells.” The water from these wells was analyzed by a Professor Williamson at Queen’s College, who determined their chemical composition and specific gravity. The springs were “much frequented by health and pleasure seekers,” and a saloon and bath house were built for the accommodation of the visitors (Smith 1846:92-93).
Schools

There were approximately eighteen historic schools and school sections within Kingston Township during the nineteenth century. They included:

- Part Lot 5 Concession
- Part Lot 5 Concession 2
- Part Lot 11 Concession 2
- Part Lot 21 Concession 2
- Part Lot 6 Concession 3 (Westbrooke)
- Part Lot 7 Concession 3
- Part Lot 15 Concession 3
- Part Lot 11 Concession 4
- Part Lot 14 Concession 4 (school lot)
- Part Lot 34 Concession 4
- Part Lot 1 Concession 5 (Glenvale)
- Part Lot 11 Concession 6 (Sharpton)
- Part Lot 15 Concession 6 (Elginburg)
- Part Lot 29 Concession 6
- Part Lot 6 Concession 7
- Part Lot 10 Concession 7 (near Loughborough Lake)
- Part Lot 14 Concession 7
- School adjacent to lot 5 on the west side of the Cataraqui River

Tollgates

There were eight tollgates established within Kingston Township during the second half of the nineteenth century, which collected money on behalf of private road companies, which maintained sections of road within the township. Many of the road companies were “joint stock companies” which were permitted to operate under various pieces of legislation passed during the 1840s. Unfortunately, the ledgers and annual reports for the majority of all toll road companies within the province have not survived, making detailed research on them almost impossible. It is possible to discover the names of the toll-keepers and company officials through an examination of the decennial census returns and newspaper advertisements. The location for the known gates which remained operational within the township during the 1870s included:

- Part Lot 17, Concession 2, south-east of the village of Cataraqui and east of the Little Cataraqui Creek.
- Part Lot 18, Concession 2, south-west corner of the lot.
- Part Lot 4, Concession 3
- Part Lot 15, Concession 3, north-east corner of the lot.
- Part Lot 24, Concession 3.
- Part Lot 14, Concession 4
- Part Lot 33, Concession 6.
- Tollgate situated directly north of the City of Kingston, on land owned by William Elliott.
APPENDIX E

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