Report on the 2004 Investigations at the Emmerson Springs Village (AkGx-5), Town of Halton Hills, Ontario Under Licence P081-002 and P081-004

Submitted to the Ministry of Culture and to the Ontario Heritage Foundation

by

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Introduction

This report outlines the results of eleven weeks of fieldwork undertaken at Emmerson Springs Village (AkGx-5) in the summer of 2004. Fourteen undergraduate students from the University of Toronto (St. George campus) and nine staff participated in ANT311 in May and June 2004. Eleven undergraduate students from Laurentian University and three staff participated in fieldwork in July and August 2004. Additional contributions were made by Dena Doroszenko of the Ontario Heritage Foundation, a student employed by the Ontario Heritage Foundation, and volunteers.

This work comprises a follow up to work begun in 2002 and continued in 2003. The main areas on which we focussed our work in 2004 were

- to finally determine the location of longhouse walls suggested by excavations in 2002 and 2003;
- to determine the nature of the hillslope midden north of midden units N275E175 and N279E175 excavated in 2003;
- to attempt to determine the extent of hillslope midden deposits through testpitting; and
- to re-examine the question of site size through test pitting by students familiar with artefact identification.

We set aside a search for the palisade for logistical reasons. We aimed to collect further information that could help place the site chronologically and determine its relation to the Wallace site (AkGx-1).

The goals of the field school included both pedagogical and research objectives. Among the former were teaching of basic field skills: hand excavation using both trowels and shovels, use of mapping equipment, and recording methods. In addition, I wished to emphasize the link between fieldwork and research - that our methods and location of excavation relate to research interests - and that plans and methods evolve based on the results of ongoing fieldwork. Students in the ANT311 course were challenged to contribute to an ongoing discussion about how the excavation should proceed in light of a series of research questions of varying complexity.

Student projects entailed examination of the resources present in the Emmerson Springs vicinity. These were also conducted at Hart House Farm so as to avoid contamination of the archaeological site. The student projects included:

1) Determination of the density of chert in the till;
2) Determination of the types of igneous rocks locally present that would have been available for use in production of groundstone tools and as pottery temper;
3) Reproduction of Iroquoian pipes using local clays;
4) Organization of ‘School Day’ when students from Limehouse Public School were invited to visit the site and Public Archaeology Day, when friends and parents were invited to visit the site.

During the fall of 2004 and winter of 2005 two students at Laurentian University assisted in cataloguing of material from the excavations. In addition, another student systematically examined light fractions for Eastern White Cedar, a second student worked on point counts of different minerals in thin-sections of pottery and a third student began a study of the chemistry of cherts represented in the collection using Fourier Transform Infrared Spectroscopy. All of these studies are on-going. Students at

University of Toronto at Mississauga continue to work on identifying plant remains from the site.

This report follows the guidelines set out by the Ministry of Culture. Some of the sections included below are repetitions of the background provided in the 2002 and 2003 reports (Hawkins 2002, 2006). The analysis sections include materials recovered in both 2003 and in 2004 and with the exclusion of the faunal analysis section, these sections are repetitions of the analysis sections in the 2003 report.

Location and Environment

Site location

The Emmerson Springs Village (AkGx-5) is located on the Scotsdale Farm, a property William and Violet Bennett bequeathed to the Ontario Heritage Foundation. The village lies on Lot 9, Concession 9, Esquesing Township, Halton County, Ontario (Figure 1). It is most easily accessed via the Bennett Heritage Trail, which leads northeast from 8th line. The site is found on a promontory overlooking Owl Creek, a tributary of the Credit River.

Figure 1. The location of the Scotsdale Farm and Emmerson Springs Village. Modified from Fox (1984).

In the following sections I consider the environmental context of the site in terms of the suitability of the region for practice of agriculture, the available natural resources including water, flora, fauna, lithic and clay resources. Finally, I outline the climatic conditions during the period of occupation.

Geology and lithic resources

The Scotsdale Farm is underlain by Middle Silurian Amabel Formation limestone (Fox 1984; Ontario Geological Survey 1991). Underlying this is Queenston shale (Chapman and Putnam 1984; Ontario Geological Survey 1991), an important source of clay for modern brickmakers and a source used by at least one art pottery manufacturer

(Guillet and Joyce 1987). Fox (1984) recovered non-cultural fossiliferous chert pebbles, beige to cream in colour in till and outwash deposits. He suggests that Amabel formation limestones are the likely source of these cherts. A student project carried out in 2004 (Jollife, Lee and Landry 2004) demonstrated that the density of chert in the sediment is very low, and that in addition to beige and cream coloured chert, dark brown translucent and orange chert pebbles are present. All of the chert recovered through this project was very small and the density of chert was very low, suggesting that local lithic resources would not have been sufficient for procurement of material for chipped stone tool manufacture.

In addition to bedrock formations other lithic resources available in the vicinity include those in secondary context: glacial and fluvially redeposited rocks. We have not systematically surveyed the area to determine the location and nature of rocks in secondary context, but we did note their presence both in the soil on-site and in the creek-bed west of the site. Both of these locations are likely sources of the metamorphic and igneous rocks such as granite, schist, and amphibolite. Student project conducted in 2004 examined the availability of chlorite schist and amphibolite, two raw materials used for ground stone tools. Students were not successful in locating either material in the creek bed or in the stone fences that line the local fields (and which would represent the material present in the till). However, they sampled a small area and non-systematically, so the results of this survey must only be that these materials are not locally common.

While archaeologists commonly focus on the source of chert for chipped stone manufacture, it is important to remember that stone was used in a variety of ways. We recovered fire-cracked rock, hammerstones, grinding stones, groundstone tools, a stone effigy, and a fragment of a groundstone pipe. Characterization of the mineral additions made to clay (temper) suggests that potters used minerals derived from stone rather than unconsolidated sediment (Hawkins 2002). Therefore, a future survey of locally available stone would contribute to understanding past landscape use.

Although local sources of chert for chipped stone manufacture apparently exist (Fox 1984), the occupants of Emmerson Springs did not use them to any significant extent. As described in the 2002 report (Hawkins 2002), the chipped lithic assemblage is overwhelmingly dominated by Onondaga chert. According to Fox, the closest source of Onondaga chert would have been at least 100 km south of the site. Outcrops of other chert types (Lockport or Ancaster) lie closer to the site (Eley and Bitter 1989: 104), but only minor amounts of non-Onondaga cherts occur in the archaeological assemblage.

Geomorphology

A number of features of the local geography are relevant to understanding habitation of Emmerson Springs.

Water is seasonally available from Owl Creek, a tributary of the Silver Creek, which is itself a tributary of the Credit River. Owl Creek is fed, in part, by a spring that flows from the hill slope west of the site. On the west side of Emmerson Springs one finds a 'spillway' (Poulton and Associates 1994: 3), a former drainage channel formed by glacial meltwater during the Pleistocene (Chapman and Putnam 1984: 15). As is typical of such features (Chapman and Putnam 1984), a cedar swamp is present at the base of the slope. Poulton describes a second spillway on the east side of Emmerson Springs. This meets the western one on the southwest of the site. He describes these lowlands as "active

year-round drainages with associated bogs, still pools and cedar stands." We noted that by mid-summer a tributary of Owl Creek north of the site was dry.

As described above, the spillway is a likely source of lithic raw materials other than chert. Cedar swamps provide winter yarding habitats for white-tailed deer.

The site itself is found on a terraced plateau. This topography, described below, likely structured the settlement pattern: the hill slope separating two terraces was an unlikely location for longhouses. Glacial till (Wentworth Till) overlies limestone bedrock on these terraces. Till may have served as a source for both clays and lithic resources, however excavation has shown that the location of clay is unpredictable and the C horizon in the occupation area varies in texture from sandy loam through clay.

Considered on a different scale, the Niagara Escarpment is a major geomorphological feature in the region. The significance of the Niagara Escarpment in the past requires consideration of a number of factors. It is a highly visible feature of the landscape, is difficult to traverse in places and may be considered either a pathway or a barrier or both. Further, it may be considered in terms of resources: shales outcrop, the Credit River and tributaries flow at the base of the escarpment in the study region, and swamps may have provided habitats for white-tailed deer. Crawford (no date) cites it as an example of an 'edge' where floral diversity and productivity may be high. Numerous Iroquoian sites have been documented associated with the Niagara Escarpment south of Emmerson Springs (Finlayson 1998).

Soils

Consideration of the soils of Emmerson Springs includes the bedrock geology, the nature of the quaternary deposits, classification of the soils that have developed in this area and differences between the published soil classification and our field observations. Emmerson Springs lies atop the Niagara Escarpment on Amabel formation limestones, dolostones, siltstones and sandstones (Freeman 1979). In some areas near the site, sediments are very thin and bedrock is exposed. Much of the fire-cracked rock we recovered is sandstone and dolostone and is likely to have been procured locally. The Amabel formation is underlain by soft Queenston shales, limestones, dolostones and siltstones (Freeman 1979). These are exposed in the face of the Niagara Escarpment east of the site.

The Quaternary deposits on which the Emmerson Springs soils were formed are the Halton tills, which are described as a ‘red to brown gritty silt to clayey silt till’ (Karrow, et al. 1990). Our observations of the sediment underlying the plough zone include patches that fit the above description, however sediment texture ranges from gravely through clayey, with some areas having a high sand content.

According to Gillespie (1971) three soil series occur in the Emmerson Springs vicinity: Farmington loam (a brunisolic soil), Lockport clay (a luvisol) and Dumfries loam (a luvisol). Based on the soil map for Halton county, the site itself lies on a Farmington loam (Gillespie, et al. 1971)(see Figure 2). This soil has three horizons

1. Ah horizon, characterized as ‘Very dark grayish brown (10YR3/2) loam; medium granular structure; friable consistency, slightly stony; pH 7.0’colour, a loam texture, medium to granular texture- soil type from the map

2. Bm horizon, characterized as ‘Yellow brown (10YR5/4) loam; medium subangular blocky; firm consistency; moderately stony; pH 7.4.’ The depth of the Bm horizon ranges from 6 to 11 inches.

3. R, characterized as ‘Dolomite bedrock’ (Gillespie, et al. 1971).

The designation of the soil as Farmington loam did not fit well with our field observations. Specifically, the horizon underlying the plough zone varies in colour from 5YR 3/4 through 10YR 4/3, and varies in texture from sandy loam to clay loam. More importantly, however, although we dug to well below 30 cm (11 inches) both on site and off-site, we did not encounter the dolostone bedrock. A test pit at the base of the slope northwest of the slope showed a layer of alluvial silt over dolostone bedrock at approximately 30 cm below surface. Some of the sediment deposition in this area is likely a recent event given that we discovered a chert flake in this location.

Figure 2. A section of the soil map of Halton County showing the location of different soil types in comparison with the location of Emmerson Springs. From Gillespie et al. (1971).

The Soils of Halton County show an outcrop of Dumfries loam near the site location. This is a stony luvisol developed on till. The soil horizons typical of a Dumfries loam are:

1. Ah, characterized as ‘very dark grey (10YR 3/1) loam; fine crumb and granular structure; friable; very stony; pH 7.0’

2.Ae1, characterized as ‘dark yellowish brown (10YR4/6) granular and small weak subangular blocky; friable; stony; pH 7.0’

3. Ae2, characterized as ‘brown (10YR5/3) loam; weak medium subangular blocky; friable; stony pH 7.0’

4. Bt, characterized as ‘Reddish brown (7.5YR 5/5) loam; medium subangular blocky; friable; stony; pH 7.4’

5. Ck, characterized as ‘Yellowish brown (10YR 5/4) stony loam till; calcareous; pH 7.8’

This designation more closely resembles our field observations, in that the underlying parent material is till, not bedrock. However, A. Davis and A. Stewart who visited the site in August of 2004 examined a test unit at the north end of the field (off-site). They observed that the top horizon is an Ap horizon, and that it is likely that the B horizon is not present having been obliterated by ploughing and erosion. Based on these observations, they suggest that the soil might better be designated a retool.

Finally, the Niagara Escarpment marks a significant boundary in the geology and soils in southern Ontario. Soils at the base of the Escarpment are clayey, while those at the top of the Escarpment are sandier. Despite this, we observed large patches of red clay in sediment at the base of our excavations. Davis and Stewart suggest that these are derived from the underlying Queenston shales and were redeposited by glaciers.

Climate

Emmerson Springs, Wallace and a number of the sites that Finlayson (1998) discusses from the Crawford Lake region fall within the Huron Slopes climatic region. Modern climatic data on the Huron Slopes is shown in Table 1. Mean temperatures are lower than southern regions, and precipitation is slightly higher.

Table 1. Climatic data for the Huron Slopes. From (Gillespie, et al. 1971).

Mean annual temperature (C)	6
Length of growing season (days)	200
Length of frost-free period (days)	140
Mean minimum temperature – April (C)	1
Mean minimum temperature - October (C)	3
Mean annual precipitation (mm)	812
Mean annual heat units for corn	2700
Mean precipitation (May - Sept) (mm)	381

There has been considerable research on climatic conditions in the Crawford Lake region during the last 1000 years. This has focussed on understanding changes in vegetation in the area: pollen studies show an increase in oak and pine pollen and a decrease in oak and maple (Finlayson 1998: 58). Two causes are cited, possibly both contributed: the Little Ice Age may have resulted in changes in forest composition with extension of the southern boundary of pine during cooler periods. Clearing of forest for agriculture and subsequent growth of secondary forests may also contribute to changes in pollen profiles.

Finlayson (1998: 58-65) outlines debate on this issue. At this time, it is clear that agricultural practices certainly contributed to the nature of flora and fauna in the Crawford Lake region and further north into this study region in the sixteenth century. Global climate profiles clearly show cooling during this period (Eichenlaub 1979): the extent to which southern Ontario was affected remains unclear. For the purposes of this study, which is not concerned with long-term regional trends, the agents causing change in flora are not considered important.

Flora and Fauna

Two biotic provinces are relevant to this study: the northern Canadian province and the southern Carolinian province. lists selected flora and fauna found in each

province. Crawford (no date) places Wallace in the transition zone between these two provinces. Given that he also argues that the transition between should be considered gradual rather than abrupt, we may also place Emmerson Springs in a transition zone. Crawford suggests that because the transition was gradual, other features of the local environment may be more relevant to understanding the attractiveness of this location. Specifically, he cites edges between microhabitats where he suggests, "productivity and diversity are high." For the Wallace site, these include: field-woodland and woodland-wetland boundaries, in addition to the Niagara Escarpment (Crawford no date: 32). All three boundaries would also have existed in the Emmerson Springs area. This research, and on-going analyses will address the extent to which the resources exploited at these two sites were similar and suggestive of similar decision-making by the former inhabitants of the two sites.

The vegetation at Emmerson Springs falls into two groups: field and woodland. The majority of the site falls in a ploughed field, which is mowed twice annually for hay. The lower half of the field has not been hayed in recent years and is has not been ploughed since the 1994 assessment. However, as described below, earlier ploughing of the site heavily disturbed archaeological deposits. Wooded areas include a cedar swamp at the base of the slope and a hardwood bushlot. Fox researched the vegetation present in the early 19th century. He reports two types of forests:

> ...a maple beech climax forest with secondary oak, pine, elm, white ash and basswood on the well-drained uplands to the north (Finlay, 1978). An oak dominant stand with secondary maple, pine, elm, basswood and cedar was noted to the south, while the poorly drained lowlands in the southwest contained a cedar swamp. (Fox 1984: 1)

Future investigations may include a detailed vegetation survey.

Figure 3. Forest near Owl Creek, west of Emmerson Springs and at a lower elevation. by O. John Hawkins.

Table 2. Flora and fauna found in the Carolinian and Canadian Biotic Zones. Compiled from Finlayson (1998: 66-67)

Species	Carolinian Biotic Zone	Canadian Biotic Zone
Oak (black, red, white)	y	
Hickory	y	
Maple (sugar, silver)	y	y
Beech	y	y
Walnut	y	
Butternut	y	
Elm	y	y
Basswood	y	y
Sycamore	y	
Cottonwood	y	
Yellow birch		y
Hemlock		y
White Pine		y
Opossum	y	
Racoon	y	
Striped skunk	y	
Grey fox	y	
Bobcat	y	
Grey squirrel	y	
Cottontail rabbit	y	
White-tailed deer	y	
Passenger pigeon	y	
Black bear	y	y
Weasel	y	y
Mink	y	y
Otter	y	y
Badger	y	y
Coyote	y	y
Wolf	y	y
Cougar	y	y
Woodchuck	y	y
Eastern chipmunk	y	y
Beaver	y	y
Muskrat	y	y
Elk	y	y
Fisher		y
Marten		y
Wolverine		y
Porcupine		y
Snowshoe hare		y
Moose		y

Previous Investigations

Prior to 2004, archaeologists undertook five investigations of the Emmerson Springs site.

1984 – Fox Survey

W. A. Fox (1984) and J. Fox discovered the site during a two-day survey of the Scotsdale Farm property in 1984. They collected artefacts from two field edge middens which they designated Midden 1 and Midden 2. The field was in pasture during the survey, making it impossible to determine the extent of the surface artefact distribution in the field. They dug no test pits. The artefacts they recovered are summarized in Table 3.

Table 3. Materials collected in the 1984 Fox and Fox survey.

Material	Midden 1	Midden 2	Unspecified location
Pottery	117	14	
Chipped Stone	25	5	2
Ground or rough stone	6		2
Bone artefacts	5		
Unmodified bone and shell	51	5	

Fox (1984: 4) indicates that the pottery is similar to that known from 16th century Iroquoian villages. Specifically, collar motifs are predominantly stamped or incised obliques, there is little decoration on the neck and the shoulders often display a single line of punctates. Fox also considers the chipped stone formed tools to be diagnostic of the sixteenth century. He specifically mentions fragments of un-notched triangular points. He also points out similarities with Huron lithic technology, evidenced in the use of bipolar reduction. He estimates that that the closest source of Onondaga chert is over 100 km distant, and notes that this raw material is overwhelmingly preferred and that there is no evidence of use of locally available cherts from the till. He also considers formed tools in groundstone to be typically Iroquoian and, based on the presence of groundstone tools broken in manufacture, suggests that these tools were produced on site.

Fox (1984: 6) recommended further investigation of Emmerson Springs, specifically in the form of detailed contour mapping and a controlled surface collection of the field area. He raised two main questions about the site (Fox 1984: 5). What was the ethnic identity of the inhabitants? Were they prehistoric Neutral, Huron or Petun? Secondly, he points out that both Emmerson Springs and Wallace are located in an agriculturally marginal zone, leading one to ask why people dependent on corn horticulture would have settled there.

1994 – Poulton and Associates Controlled Surface Collection and Survey

In 1994 the OHF contracted D.R. Poulton and Associates to follow up with Fox's recommendations and investigate the questions he posed. Poulton's investigation entailed a controlled surface collection of artefacts on the ploughed field and excavation of 36 30 cm diameter test pits and 29 50 cm^2 test units (Poulton and Associates 1994: 6-8). The purposes of the controlled surface collection were to delineate the site boundaries and collect a representative artefact sample. They dug test units in the two midden areas

pointed out by Fox, in two places in the ploughed field where the soil appeared darker than elsewhere, and at the southern extreme of the promontory in a location they believed likely to show slope middens. More test pits were excavated on the western side of the site on the slope above Owl Creek. One set of test pits lies near Fox's Midden 1, the other lies north of Fox's Midden 2 (Poulton and Associates 1994: 49). The material recovered during this fieldwork is summarized in Table 4.

Table 4. Material recovered during the D. R. Poulton and Associates 1994 investigations.

Material	Surface collection	Midden 1 test units	Midden 2 test units	Field test units 1	Field test units 2	Test pits
Pottery	233	8	84	28	6	147
Chipped Stone	1033	3	38	8	3	62
Ground or rough stone	11	2				2
Carbonized plant remains			1			1
Bone and shell	94	2		6	11	85

The main results of Poulton's work are the following determinations:

1. The approximate size of the site is 1.28 ha, and the total village area would have been smaller, perhaps 1 ha.

2. Poulton could not confirm that the area Fox designated 'Midden 1' actually represents a midden. Similarly, two areas with high potential to be middens - the promontory slope on the south and dark area in the northeast corner of the field - show no appreciable amounts of artefacts. However, materials were recovered from Fox's Midden 2 and the dark patch in the north central section of the field appears to indicate the location of a buried midden.

3. The larger artefact collection from the 1994 fieldwork is consistent with Fox's assessment of the site as late prehistoric or early proto-historic.

4. The cultural affiliation is likely to be Neutral. Poulton and Associates (1994: 30) base this assertion on "the quality and quantity of the chipped lithics, the comparative quality of the ceramics, and the presence of select other traits, especially serrated lithics and cord maleated pottery."

5. Lithic raw materials suggest contacts between the inhabitants of Emmerson Springs and people in the Niagara peninsula or Lake Erie (Onondaga and Haldimand); in the Blue Mountain or Simcoe county area (Collingwood); and in the Upper Trent River system or Simcoe county (Gull River). Additionally, chert recovered includes some unidentified materials possibly suggesting wider contacts.

6. The relationship with the nearby Wallace site remains indeterminate mainly because the material foci of the two studies were quite different. Excavators of the Wallace site concentrated on analysis of plant and animal remains, whereas Poulton and Associates concentrated their study on pottery and chipped stone.

Poulton and Associates recommend further investigation of the site to determine the boundaries to the north and east. Further, they argue that detailed artefact analysis and/or limited research oriented excavations could elucidate the relationship of this site to the Wallace site and provide insight on Iroquoian life on the Niagara escarpment.

1997 – Ontario Heritage Foundation excavations

Dena Doroszenko (2002) directed excavations at Emmerson Springs in 1997. A crew of up to five excavated 11 square metres in 3 units over the course of a week. The units were designated A, B and C. Excavators used shovels to remove sediment from the plough zone. This was screened through ¼ inch mesh. Features and post moulds were recorded in plan view, then sectioned and described in profile.

Unit A was 2 m by 2 m in size and the most northerly of the units dug during this season. Excavators recorded eight features in plan, and discarded two after sectioning. They designated the remainder as postmoulds ranging in depth from 7 to 30 cm and in diameter from 5 to 13 cm.

Excavators selected the Midden 3 area pointed out by Poulton for excavation of the 2 m x 2 m Unit B. Like Poulton and Associates, the OHF crew discovered strata underlying the plough zone and overlying the subsoil in this area. They also discovered a feature in the corner of the unit. It was trough-shaped in cross-section, with stratified ash and charcoal deposits.

To try to fully uncover this feature, the crew excavated Unit C, a 1 m by 1 m square adjacent to Unit B. Stratification was similar to that seen in Unit B and in Poulton's test units. Excavation of Unit C confirmed for the excavators that the unit lies in a midden. Table 5 summarises the material recovered by the OHF.

Table 5. Material recovered during the 1997 OHF excavations.

Material	All units
Pottery	172
Chipped stone - chert	255
Chipped stone - quartz	11
Ground and rough stone	6
Floral	3
Faunal	468

The main results of the 1997 OHF excavation are the confirmation of a buried midden and the discovery of features and postmoulds.

2002 – University of Toronto Field School

The 2002 University of Toronto field school undertook several types of investigation:

1. Test-pitting north of the edge of the area surveyed by Poulton to determine the extent of the site to the north;
2. Shovel excavations of one-meter squares in plough disturbed areas on both terraces, with sediment screened through ¼ inch mesh. Units were separated from one another by about ten meters to determine areas of potential further investigation;
3. Excavation of a one-meter unit at the edge of the field in the area designated Midden 1 by Fox;
4. Excavation of a 50 cm square on the slope near Midden 1;
5. Excavation of 11 contiguous units near N330E200 to try to locate a former longhouse;

6. Excavation of 27 contiguous one-meter square units near N280E200, again to try to locate a former longhouse;

7. Excavation of a small trench at the north end of the site aimed at determining if a palisade is present; and

8. Contour mapping of the field.

The totals of different classes of objects recovered in the 2002 season can be found in Table 6. While this represents a substantially larger amount than recovered in any of the previous seasons, this does not arise only from the larger area excavated. Students collected many tiny objects, both because of extreme care taken by neophyte excavators and because we employed a microrefuse study in the first stages of the project.

Table 6. Material recovered during the 2002 University of Toronto excavations.

Material	Number of objects*	Mass (g)
Pottery	4173	4606.0
Clay	22	17.3
Clay pipe	31	75.7
Chipped stone	2633	1348.9
Ground and rough stone	58	3408.5
Rock	37	3431.0
Floral	1482	419.0
Faunal (bone)	5355	2826.6
Shell	57	16.7
Teeth	68	61.3
Prehist. Metal	2	2.4
Glass	1	0.6
Metal	6	14.7
Total	13925	16228.7

* These represent minimum values because where many tiny objects were present, the pieces were weighed but not counted.

The main conclusions of the 2002 investigations are that:

1. Cultural remains occur north of the boundary of ploughing, but that they do not extend far north of this;

2. There are likely longhouses located on both terraces, and that the areas around N280 and N330 on the E200 line both warrant further investigation;

3. The midden at the west edge of the field on the N280 line is approximately one meter deep and undisturbed below the plough zone;

4. Although there are cultural remains as far north at N385, there is no evidence of a palisade in this area and the site are of occupation is likely to be much smaller than the artefact spread indicates;

5. There is a third midden at about N300E190, but it is completely plough disturbed;

6. The artefacts recovered are consistent with the assessment that the site is a small Neutral village, but that the assigned date of 1500-1550 needs to be re-examined, given the recovery of two copper objects; and

7. As at other early contact or late precontact sites, white-tailed deer dominate the faunal remains.

2003 – University of Toronto and University of Toronto at Mississauga Fieldschools

The 2003 University of Toronto fieldschools undertook several types of investigation:

1. Testpitting on the western edge of the site to determine the location and extent of Midden 2 deposits;
2. Testpitting around a trench on the east side of the field to determine whether it had any relation to the archaeological deposits;
3. Shovel excavation of 12 contiguous units in the N260 area to determine if a palisade is present in this location (sediment screened through ¼" inch mesh);
4. Shovel excavation of 38 contiguous or near contiguous one-meter square units near N280E200, to expand the longhouse area exposed in 2002 (sediment screened through ¼" mesh);
5. Trowel excavation of two one-meter square units at the edge of the field in the area near that designated Midden 2 by Fox (sediment sampled for flotation or screened through 1/8" mesh);
6. Excavation of 5 contiguous units in Midden 3; and
7. Contour mapping of the slope adjacent to the field.

The totals of different classes of objects recovered in the 2003 season can be found in Table 6. This represents a substantially larger amount than recovered in any of the previous seasons, for two reasons. First, in 2003 there were two fieldschools at Emmerson Springs, each with approximately 20 students. Secondly, we excavated two units in Midden 2 using and sampled extensively for flotation. Heavy fractions have been sorted and the totals below include objects found in them. These include objects that certainly would not have been recovered in normal screening.

Table 7. Material recovered during the 2003 University of Toronto excavations.

Material	Number of objects*	Mass (g)
Pottery	8484	9017
Clay pipe	40	119
Chipped stone	3392	1161
Ground and rough stone	85	9641
Rock	74	4282
Floral	12485	692
Faunal (bone)	16520	5358
Antler	10	172
Shell	79	11
Teeth	423	115
Metal (incl. iron)	11	31
Glass	2	1
Europ. Ceramics	1	4
Total	41606	30604

* These represent minimum values because where many tiny objects were present, the pieces were weighed but not counted.

The main conclusions of the 2003 investigations are that:

1. The area designated Midden 2 by Poulton too large, and midden deposits are found mainly on the upper slope;

2. The trench in the east part of the field does not have any relation to the archaeological deposits, most likely being an artefact of recent ploughing activity;

3. There is no evidence of a palisade in the N260 area;

4. The longhouse in the N280E200 area most likely runs approximately east-west and is about 6.25 m in width;

5.Midden 2 deposits are rich in artefactual and ecofactual material and those lying closest to the edge of the slope are essentially undisturbed by ploughing but have been disturbed by bioturbation and slopewash;

6. Midden 3, though completely disturbed by ploughing, is artifact rich. We could find no associated settlement pattern;

7. Recovery of several more pieces of copper-based metal suggests that the estimated date of 1500-1550 should be re-examined. However careful screening of midden deposits and picking of heavy fractions lead to discovery of no glass beads. Similarly no iron trade goods were recovered. Therefore, a date of 1550 to 1580 seems appropriate; and

8. As at other early contact or late precontact sites, white-tailed deer dominate the faunal remains.

Methodology

The specific methods used for investigation of different questions will be discussed in the results section of this report. However, the general methods are outlined here.

Grid mapping and contour mapping

In 2002 we re-established the grid that Poulton and Associates used, and set our units in using the same grid that Poulton used. We also produced a contour map of the entire field.

Although the datum stake Poulton placed at N200E200 survived from 1994 to 2002, in the winter of 2002-03 someone kicked it out. To make matters worse, we had removed the stakes from the field at the end of the 2002 season, to allow for haying of the field. We therefore had to try to reconstruct the location of the grid from a few stakes at the edge of the field and the locations of the units excavated in 2002. Unfortunately we were not successful in exactly relocating the datum stake, and as a result a number of units from 2003 are slightly offset from those excavated in 2002. We have carefully documented this and where necessary we have excavated 'baulks' that occurred because of the offset grid.

In 2003 we placed two permanent markers near the original datum so that we would not be faced with the same problem in future. One was placed at N190E190, the other at N190E210. Both markers consist of rebar set in concrete sunk nearly a meter deep. During the winter of 2003 someone moved these markers. The fence along the south end of the field had been cut, suggesting that this area had been adopted as a route for snowmobiles. The markers were pushed out of place, but we were still able to approximate the location of the N200E200 stake, and using other stakes left at the field edge we were able to re-establish the 2003 grid.

We continued collecting elevation points for the contour map, and as in 2003 we focussed on collection of points from the western slope. Every student spent one week learning mapping methods and although all students gained competency in operation of a transit, we collected elevation information for relatively few points compared with 2002.

Investigation of settlement plans

We excavated a number of one-meter square units on the lower terrace area where we discovered a number of post moulds and features in 2002 and 2003 (the area is nicknamed 'Denatopia'). We excavated these with shovels, and screened all sediment through ¼ inch mesh. Students excavated in an approximate chequerboard pattern, to avoid use of baulks and still enable recording of profiles. We recorded plan view drawings of each unit twice: students sketched the location of plough scars that were present in almost every unit in individual field books and drew the final plan view on the square record form. We assessed the colour of the soil using the Munsell soil colour chart in the shade on damp sediment samples. We assessed soil texture using a standard feel test (see Appendix 2). We recorded the colour and texture of the plough zone, subsoil, all potential features and posts and any significant variation in the subsoil that was not thought to relate to a cultural feature. We drew profiles for all four walls, unless a wall had already been recorded through excavation of a previous adjacent unit. Finally, we

measured the depth of excavation below a nearby datum stake. We photographed the plan view of each excavated unit before excavation of features or post moulds. Artefacts from the plough zone were bagged together, and labelled as coming from Layer I.

All stains that could be features and post moulds were numbered sequentially continuing from the 2003 list. After students had gained competency in excavation of one-meter squares, they moved on to excavation of features and posts. Students recorded the location of post moulds and features by triangulation. This was redundant because features and post moulds had already been recorded on square record forms, but was considered part of the learning process.

Students excavated features using trowels, and where possible, only the sediment in the feature was excavated so as to leave a negative basin reflecting the shape of the initial pit. We retained a 10 L sample from each feature for flotation. Each sediment sample was assigned a sequential sample number, again continuing the numbering from 2003. In most cases, features contained less than 10 L of fill, and all sediment was retained. In cases where features were greater than 10 L, the remaining fill was screened through ⅛ inch mesh. The features were drawn in profile and unless the stain was determined to be a surface stain, root burn or rodent burrow, the remaining half of the feature was excavated and retained for flotation.

We sectioned post moulds using shovels and screened the post mould sediment through ⅛ inch mesh. If the post moulds had depth and were determined to be 'real', students drew the profile and screened the remaining sediment.

We photographed a selection of features and post moulds in profile.

Sediment was floted using a flotation tank lent to the Emmerson Springs field school by Professor G. Crawford of University of Toronto at Mississauga. The heavy fraction was screened through 1mm mesh, while the light fraction was screened through 425 µm mesh.

Investigation of middens

Test pitting conducted in 2003 indicated that Midden 2 deposits occur on the slope north and west of the previously excavated Midden 2 units. We followed the same methodology adopted in 2003 for excavation of these largely undisturbed deposits. We excavated with trowels using a combination of natural layers and arbitrary levels. Natural layers were numbered using Roman numerals, starting with I. We excavated each of three natural layers in arbitrary 2 cm levels, assigning each level an Arabic numeral that followed the Roman numeral. For example, I-4 indicates the sediment from 6 to 8 cm below the top of Layer I. The first arbitrary level in every layer was numbered 1 (e.g., I-1, II-1, III-1)

We piece plotted diagnostic objects and large pieces, assigning a sequential number to each object. Each unit had its own set of numbers starting with 1. Piece plotting was employed mainly to provide students with exposure to this method. However, this information may be used in examination of mends that may inform on the degree of disturbance of these deposits.

We continued the sampling strategy for flotation adopted in 2003: we sampled 50% of the sediment for flotation. The samples were taken alternately from the north and south halves of the unit, switching at each new arbitrary level. Sediment that was not retained for flotation was screened through ⅛ inch mesh.

Investigation of the hillslope midden deposits

Fox's initial investigation of Emmerson Springs indicated the presence of two middens on the west edge of the site. Poulton was only able to relocate one of these, which he designated Midden 2. In 2002 we excavated a unit at N270E173.5, a unit between the locations where Poulton suggested Middens 1 and 2 lie. The deposits in this unit were clearly midden deposits, and surface collection did not show material further south. Therefore, we believe that this area is Fox's southern Midden 1. We wished to determine, therefore, if there were further midden deposits north of this (Fox's Midden 2). Although various people who walked around the edge of the site indicated that they had found the other midden, we did not have precise information about its location at the end of the 2002 season. To definitively locate it, a group of students placed test pits along the west edge of the site in 2003, north of the known midden location. Test pits were a shovel width in diameter and dug to subsoil. All sediment was screened through ¼ inch mesh and we recorded the depth of the pits. Preliminary examination of the slope below N275E175 and N279E175 suggested that midden deposits may be present further downslope, beyond the locations designated by Poulton, and outside the boundaries of our 2003 testing. In 2004 one student, K. Ivic, who had previously enrolled in the 2003 fieldschool, took on the project of determining the distribution of midden deposits on the slope. Various volunteers and student supervisors assisted her. Test pits were a shovel width on each side, and were dug until subsoil was encountered. The colour of the soil was estimated, the location of the test pits was recorded using tapes and GPS. Screeners passed sediment through ¼ inch mesh.

Figure 4. K. Ivic screening sediment from a test pit on the east slope.

Determination of northern site boundaries using test-pitting

In 2002 students began the fieldschool by attempting to determine the northern site boundaries through test pitting from the trench at approximately N370 toward the end of the field. This was largely unsuccessful because students were not experienced in artefact identification. In 2004 we addressed the question a second time, this time in the

last week of the Laurentian Anthropology fieldschool. Students started at the north end of the field and worked their way southward. They dug test-pits a shovel width in diameter and screened all sediment through ¼ inch mesh. Seven lines of test pits were aligned with the western fence and separated by 5 m. The test pits were placed 5 meters apart, and when a positive test pit was encountered, this was narrowed to 2.5 meters. Soil colour and test pit depth were recorded for all test pits.

Figure 5. Student digging a shovel test pit at the north end of the field.

Public archaeology

In addition to teaching students fundamentals of excavation, we also endeavoured to expose them to public archaeology and the archaeological community in Ontario. A number of speakers were kind enough to visit the field school in May, June and August to discuss some aspect of Ontario archaeology (See Acknowledgements). We held both a 'School Day' in June and two 'Public Archaeology Days', one in June and one in August.

Students from the Grade 6 classes from Limehouse Public School visited the site. The field school students discussed the purpose of the visit with the teacher at some length and designed a tour that included discussion of the local environment, an exercise in mapping, an exercise in cataloguing and excavation.

Public Archaeology Days provided students with the opportunity to invite their families and friends to participate in the excavation. In preparation, students developed a question and answer sheet about Iroquoian archaeology and set up a tour of our lab, the flotation machine and the site itself. At the site, they laid out a number of 50 cm by 50 cm units in the disturbed in-field midden.

Geophysical survey

On two occasions in the 2004 field season L. A. Pavlish visited the site and students undertook to survey a section of it using both a resistivity meter and a proton magnetometer.

The resistivity survey employed a Wenner array in which a series of four probes are inserted into the ground, a current is passed between the two outer probes and the change in voltage between the inner two probes is measured. The point measured is the centre of the four probes. Probe spacing in this array is equal. The depth of measurement is related to probe spacing. The process is labour intensive, because the probes must be removed and reinserted at each point.

The June survey employed probe spacing of 1 m, and an applied current of 20 mA (milliamps). Three lines running east to west were surveyed: N270 (E178.5 to E244.5), N275 (E174.5 to E201.5) and N280 (E173.5 to E239.5).

The August survey, conducted in somewhat dried conditions employed a probe spacing of 0.5 m and an applied current of 5 mA. Three lines running south to north were surveyed: E185, E190 and E195 all from N250.75 to N309.25.

Resistivity is calculated as follows: $r = 2\pi aR$, where a is the electrode spacing and R is resistance. Resistance is calculated as the measured change in voltage divided by the applied current, measured in amps.

Figure 6. Resistivity survey by ANTR3095 students

Resistivity measures difference in the ability of a current to pass through the ground. Examples of low resistance materials include midden deposits, moist deposits,

refilled trenches (if refilled with loose sediment). Examples of high resistance materials include stone, hardened sediments, brick or stone walls.

The magnetometer survey employed a proton magnetometer with a kerosene bottle. Measurements may be recorded with an automatic data-logger, but in this case, measurements were recorded manually. The depth of measurement is related to the location of the bottle with respect to the ground. In this case, it was placed on the ground. Students attempted to minimize the interference of vegetation by treading on the grass in the area to be surveyed. Cloth measuring tapes served to assist in determination of data points. Two students made the measurements: one held the bottle while the other carried the battery pack and instrument. A third student standing at some distance recorded the measurements. Both students removed all metal from their persons before commencing measurement. Vehicles, overhead lines, buried pipes, and other large metal items may interfere with measurements. In this case we were lucky to note that no such objects occur in the vicinity of Emmerson Springs. There is however, a certain amount of small metal objects such as nails, which may have effected specific measurements.

Figure 7. Magnetometer survey by ANTR3095 students

The June magnetometer survey entailed survey of four lines running west to east. Three lines starting at E200 and running to E248.5 ran along N269.5, N270 and N270.5. A fourth line along N280 ran between E195 and E243.5. We recorded measurements every 50 cm.

The August survey entailed examination of 6 lines running from south to north between N250 and N310. The lines examined are: E185, E190, E195, E200, E205 and E210. Measurements were recorded every 50 cm.

Measurements of magnetic susceptibility are given in nanoTeslas. The measurements given by the instrument do not need to be converted, but 57000 is systematically subtracted from each measurement to allow for easier comparison.

Magnetometer survey is useful for detecting anomalies arising from both differences in magnetic susceptibility and differences in thermoremnant magnetism. The differences in magnetic susceptibility may arise from the presence of middens and pits. Differences in thermoremnant magnetism may arise from previous burning in places such as hearths.

Figure 8. Satellite image of Emmerson Springs showing the areas trodden down for magnetometer survey.

Figure 9. Location of lines surveyed in geophysical survey.

Results of 2004 Archaeological Investigations

Topographic Mapping

The field in which Emmerson Springs lies is terraced and is surrounded on the south by steep slopes. Given possible relationships between topography and defence, useable areas for longhouse location and site formation processes, production of a topographic map was a priority of the 2002 field season. In 2003 and 2004, we concentrated on teaching mapping skills to students, rather than collecting more data points. Nevertheless, we were able to record a number of elevation measurements on the southwestern slope and determine the depth of the creek below the site.

The data were collected using a transits and stadia rods provided by the Geography Department at the University of Toronto at Mississauga. A number of different points were used as base stations, and new stations were established on the southwestern slope. After collection, students entered the data into a spreadsheet program. Using the program provided on the web site of the London Chapter of the Ontario Archaeological Society (http://www.ssc.uwo.ca/assoc/oas/misc/mapmath.html), I converted the compass data into Cartesian coordinates. Tracey Li and myself produced the new contour map shown in Figure 10. This incorporates data points collected in 2002, 2003 and 2004.

Grid Map

For both the grid map and the topographic map we used the datum established by Poulton in 1994 at the south end of the site and which is designated this N200E200 (Poulton and Associates 1994: 6). As described above, the datum stake had been displaced in the winter of 2002-03 and the 'permanent' datum stakes placed in 2003 were displaced in the winter of 2003-04. As in 2003 we reconstructed the grid using the approximate location of the datum stakes and the few stakes on the field edge. The location of previously excavated units was also useful in reconstructing the grid. As in 2002, we used the SW corner stake to designate one-meter squares. The grid map with excavated units from all three years is shown in Figure 11.

Settlement Pattern

Our investigation of the settlement pattern at Emmerson Springs evolved along several lines. This year our research questions included:

1. How do the features and posts discovered in 2002 and 2003 relate to a former longhouse location?
2. Is Midden 3 related to a longhouse?

Given the small number of students participating in each fieldschool (14 and 11) we abandoned the search for a palisade and concentrated work on the longhouse area on the lower terrace. We expanded the area around the trench at N300 to determine whether any evidence of posts or features could be found in this area.

Figure 10. Contour map of Emmerson Springs and the southwestern slope

Figure 11. Areas excavated in 2002, 2003, 2004 by fieldschool students.

Features and Settlement Pattern

As in 2003 we concentrated all of our investigation of the settlement pattern in one area: the southern block where we started excavations in 2002 and which students nick-named 'Denatopia' (Figure 12). Figure 13 shows the distribution of posts and features in the area excavated in 2002 to 2004. The main area uncovered what appears to be the end of a longhouse, including the end cabin. The width of the house is approximately 6.5 to 7 metres. The ash pits discovered in 2002 are likely hearth related. We have not discovered central hearths indicated by fire-reddened soil, and these have probably been truncated by ploughing. The numerous red stains are clearly different in texture than the surrounding sediment – they are clayey as opposed to sandy, and are most likely derived from the Queenston shale.

Figure 12. 'Denatopia' excavations by ANTR3095 students from Laurentian University in 2004

We discovered relatively few features in 2004 because, as in 2003, we concentrated our efforts in areas that could help clarify the location of the longhouse walls. Most features were not particularly artefact productive, and are likely small refilled pits. Table 8 shows the classes of material recovered from features in 2004 and Figure 14 shows an example of a feature and its excavation.

Figure 13. Distribution of posts and features on the lower terrace of the field, as uncovered in 2002, 2003, and 2004.

Table 8. Materials recovered in features discovered in 2004

Feature number	Type	Pottery	Chipped lithics	Ground & rough stone	Rock	Bone	Shell	Teeth	Floral	Slag	Total
175	T	14.6	1.7	104.2		1.9			5.2		127.6
176	S	7.4				1.2			3.1		11.7
178	S	8.6	0.1			0.7			1.3		10.7
186	T	5.0				3.6	0.1		2.3		11.0
188	T	115.8	2.7			24.5	0.0	0.6	4.1		147.7
192	A	37.4	6.0			28.3		0.3	2.7	1.0	75.7
194	T	0.2				0.0					0.2
195		10.6	0.6		20.2	3.1			7.4		41.9
196	T					0.3			0.3		0.6
197	T	1.1				0.1			1.0		2.2
200	S	0.4				0.3			1.3		2.0
204	T	3.5	5.7			2.4			1.2		12.8
205	T	5.8	0.3			7.0			0.6		13.7
214		3.0	0.2			1.1			0.3		4.6

Figure 14. Feature 205, sectioned for profiling.

We sectioned all posts to verify that they had depth. Students drew the profiles of all sectioned profiles. Original drawings and photographs are deposited with the OHF.

Figure 15. Sectioned post mould (PM500)

In addition to the house shown above, there are two other sets of post moulds that may be indicative of house walls. The first occurs in units along the N272 line (Figure 13), and this line is approximately parallel to the house immediately to the north. This line of posts could also represent at palisade: too little has been exposed at this time to be certain about what these represent.

The second line of posts comes from a unit excavated at the end of the ANTR3095 field course at N290E210. A clear double row of posts, all of them dark in colour with halos around them, is evident in this unit. Sectioning of the posts showed that all have depth.

Figure 16. N290E210 Square plan photograph showing line of post moulds running approximately east-west.

This row of posts could represent the northern wall of the main house, or they could represent the southern wall of a third house. Given the orientation of House 1, I think that the second possibility is more likely.

Figure 17. Conjectural house locations based on distribution of posts and features. See above for grid location.

Field edge midden

We excavated two one by one meter square units in the field edge midden Figure 18) using the methods described above. These were located on the slope and further north than the units excavated in the midden in previous years.

Figure 18. Lower terrace showing location of midden units excavated in 2004 (in black).

The two one meter square units excavated in Midden 2 are located at N285E159 and N287E159. The more northerly of these two, N287E159 was relatively shallow, having 5 natural layers each with a maximum of 8 cm or less. By contrast, unit N285E159 had only three natural artefact-bearing layers but these were thicker and richer. The average number of artefacts per cm in unit N287E159 is 18 compared with 43 for unit N285E159. Similarly, the average mass of artefacts per centimetre is much higher for unit N285E159 (168 g/cm) vs. unit N287E159 (17 g/cm). N285E259 is lower in elevation and appears to represent a small gully in which artefacts accumulated (Figure 19).

Table 9. Comparative thickness and richness of units excavated and E159 (Midden 2)

	N285E159 Thickness of layer	N	Mass (g)	N287E159 Thickness of layer	N	Mass (g)
Layer I	26 cm	1134	2541	8 cm	247	419
Layer II	28 cm	1587	5927	6 cm	72	105
Layer III	12 cm	366	2343	4 cm	37	44
Layer IV				4 cm	109	14
Layer V				2 cm	22	3
Total		3087 (3418)*	10811 (11,841)		487 (559)	585 (627)

*Totals of layers do not add to the total for the unit, shown in parentheses, because additional artefacts were collected in wall cleaning and floor scraping.

Figure 19. Excavation of N285E159 near completion of the excavation.

Layer I - very gravelly
Layer II - homogenous dark sediment
Layer III - mottled ash and charcoal
Layer IV - loose, dark sediment
Layer V - subsoil

Traced from a drawing
by E. Matwey
August 19, 2004

Layer I - very gravelly
Layer II - homogenous dark sediment
Layer III - mottled ash and charcoal
Layer IV - loose, dark sediment
Layer V - subsoil

Traced from a drawing
by E. Tourigny
August 19, 2004

Figure 20. North and East profiles of N285E159, traced by Tracey Li.

Layer I - very gravelly
Layer II - homogenous dark sediment
Layer III - mottled ash and charcoal
Layer IV - loose, dark sediment
Layer V - subsoil

Traced from a drawing
by E. Cheng
August 19, 2004

Layer I - very gravelly
Layer II - homogenous dark sediment
Layer III - mottled ash and charcoal
Layer IV - loose, dark sediment
Layer V - subsoil

Traced from a drawing
by M. McMillan
August 19, 2004

Figure 21. South and West profiles of N285E159, traced by Tracey Li.

Examination of the profiles shown above and the artefact counts and masses in Table 9 shows that Layer I in N285E159 is gravely and the artefact density is slightly lower than Layer II. Consideration of this layer during excavation led us to the conclusion that it is formed by slopewash. While the density of artefacts by count is slightly lower than that of layer II, the density of artefact by mass is much lower, suggesting that artefacts in the upper layer have been subject to greater fragmentation. The density of artefacts by mass is comparable between Layers II and III. Both of these layers appear to be *in situ* deposits, with the lower layer containing a larger amount of charcoal and ash.

Table 10 compares the classes of material recovered from each of these units. A substantial amount of pottery derives from N285E159, including 48 separately analyzed rims or fragmentary rims. One of these is a large castellated sherd with obliques on the interior and exterior rims (Figure 22).

Other artefacts of note that we recovered from these units include a complete plain pipe and three pieces of copper based metal. These are described in the following sections. The light fractions recovered from the flotation of samples from these units are rich, but are still under analysis. Some of the analysed faunal remains are discussed in the section later in this report.

Table 10. Classes of material recovered from excavated midden units (2004). Note that some counts are underestimates because numerous fragments of charcoal and unanalysable bone were not counted.

	N285E159		N287E159	
	Mass (g)	N	Mass (g)	N
Pottery	7070.2	835	338.3	121
Clay	0.1	1	0	0
Clay pipe	28.2	1	0	0
Chipped lithics	151.0	743	8.6	58
Ground and rough stone	17.1	4	0	0
Rock	0	0	20.2	19
Prehistoric metal	0.3	2	0.1	1
Bone	3626.5	1352	223.6	309
Antler	0.3	2	3.3	1
Teeth	86.7	61	0.2	6
Shell	1.2	10	0	0
Floral	832.3	407	33.3	44
Glass	0.2	1	0	0
Total	11814.1	3419	627.6	559

Figure 22. Large castellated rim sherd recovered from N285E159

This deposit is very rich and holds potential for providing important data about the exploitation of plants and animals by the inhabitants of Emmerson Springs. In addition, the recovery of metal objects and a substantial number of rim sherds suggests that the general area may be productive of analysable artefacts. Future excavations should include a program of flotation, and should be conducted conservatively.

Midden 3

Our final location of investigation in 2004 was the area designated Midden 3 by Poulton (1994), where we had excavated a particularly rich 1 m by 1 m square in 2002 and a trench in 2003 (Hawkins 2002, 2006). Our investigations in 2002 and 2003 indicate that the deposits in this area are completely plough-disturbed, as is the case elsewhere in the field. We selected continued investigation of Midden 3 for two reasons: first, we wished to determine if there is a longhouse associated, and second because we believed this would provide an interesting excavation experience for visitors on Public Archaeology Day.

Figure 23. Excavation of Midden 3 on Public Archaeology Day, August 2004. Note excavation of the plough zone by trowelling.

We discovered three postmoulds and three possible features in the nine units that we dug in the N298 and N300 lines. None of these suggested that a longhouse is present in the area. Rather the features appear to be shallow exterior features and posts. Table 11 shows the contents of these features by class, and shows that only one of these contained an appreciable number of artefacts. Figure 24 shows the location of these features, including the superposition of feature 201 over feature 202. Post 539 was devoid of artefacts, while posts 491 and 492 contained floral material and a small amount of pottery (491) or bone (492).

Table 11. Contents of materials recovered from Feature 201 to 203, in the Midden 3 area

Feature number	201		202		203	
	Mass (g)	N	Mass (g)	N	Mass (g)	N
Pottery					39.9	36
Chipped lithics					1.2	7
Ground and rough stone					7.4	2
Bone	0.3	1	0.2	3	1.7	21
Floral	1.7	0	0.5	5	4.3	0
Total	2	1	0.7	8	54.5	66

Figure 24. Units excavated in Midden 3 in 2002, 2003 and 2004, showing the location of post moulds and features.

As in the units excavated in the N299 trench in 2003, we found that the colour and texture of the plough zone sediment is comparable with that of the plough zone in the longhouse area. The thickness of the plough zone in this area is not considerably greater than in the longhouse area.

Figure 25 shows the mass of artefacts, excluding ground and rough stone, from all of the units excavated in Midden 3 to date. This illustrates two things. Firstly, there is some type of anomaly at N298E185.5: the mass of artefacts is much lower than elsewhere. Secondly, the highest density of artefacts lies in the north central part of this excavation. There are two possible explanations for the anomalously low artefact mass from N298E185.5. The first is that it indicates a problem in excavation: artefacts were not

identified in the field, they were placed in the incorrect bag or a bag of artefacts was lost. A second explanation is that this area coincides with a location previously excavated by D. Poulton or D. Doroszenko, both of whom excavated in the general area. Comparison of the maps indicates that it is unlikely this represents the location of Doroszenko's unit C, which lies at about N302E185. However, Poulton's unit 1D falls within the area excavated in Midden 3, and along the N298 line. Overlaying of maps shows Unit 1D to fall between N298 E186.5 and E187.5. It is possible that Features 201 and 202 represent the base of Unit 1D, however, I believe that it is more likely that the two maps are not perfectly matched, and that Unit 1D lies in N298E185.5. Table 12 shows the distribution of artefact classes from the different units. The mass of all artefact classes from N298E185.5 is low; therefore, it is unlikely that excavators were unable to recognize some artefacts. The possibility remains that artefacts were placed in an incorrect bag, despite heavy supervision on Public Archaeology Day.

Figure 25. Total mass of artefacts recovered from units in Midden 3, excluding ground and rough stone.

Table 12. Mass of artefact classes recovered from nine Midden 3 units excavated in 2004.

	N298 E184.5	N298 E185.5	N298 E186.5	N298 E187.5	N298 E188.5	N300 E184.5	N300 E185.5	N300 E186.5	N300 E187.5
Pottery	162.7	40.7	185.2	156.6	153.7	235.7	183.1	263.6	240.2
Clay pipe							0.8	8.7	8.2
Chipped lithics	42.0	1.2	107.1	36.7	40.8	40.9	40.5	37.2	32.6
Ground and rough stone	0.4	7.4		34.9		2109.6	2070.7	1047.6	1010.2
Bone	161.8	2.0	87.8	80.0	64.8	108.2	102.9	113.7	131.4
Antler							6.7		
Teeth	1.7				12.6	1.0	1.7	0.5	4.1
Shell	0.8				0.4		0.8		0.2
Floral	0.7	5.2		3.2	1.3	1.1	0.4	1.0	0.2
Total	370.1	56.5	380.1	311.4	273.6	2496.5	2407.6	1472.3	1427.1

The density of objects in this area is somewhat higher than in the longhouse area. While the 2003 excavations of units in the N299 trench resulted in recovery of about 300 pieces per unit, the 2004 excavations resulted in somewhat lower numbers (Table 13). Units in the N300 line, while having a higher mass than units in other lines, on average produced fewer than 200 objects. Objects of note recovered from Midden 3 in 2004 include 13 rim sherds, 9 fragmentary rims, 2 pipe bowl fragments, 3 pipe stem fragments, a projectile point, a scraper and 4 wedges.

Table 13. Number of items recovered from Midden 3 units in 2004, by class.

	N298 E184.5	N298 E185.5	N298 E186.5	N298 E187.5	N298 E188.5	N300 E184.5	N300 E185.5	N300 E186.5	N300 E187.5
Pottery	51	43	223	188	25	32	50	39	31
Clay pipe							1	2	2
Chipped lithics	108	7	86	63	56	78	80	82	55
Ground and rough stone	2	2		4		12	7	8	8
Bone	74	25	9	44	32	6	5	21	39
Antler							1		
Teeth	3				3	3	2	2	6
Shell	1				1		2		4
Floral	4	4		25	16	19	13	20	4
Total	243	81	318	324	133	150	161	174	149

Test Pits

We investigated the site by test pitting on two occasions for two reasons in 2004. In May and June, K. Ivic examined the west slope of the site to determine midden deposits on the slope. She focussed on one area, examining how far downslope deposits exist. In addition, Ivic dug one test pit on the east side of the site to determine the density of deposits on the lower terrace east of the longhouse.

Figure 26 shows the location of test pits dug on the western slope and the area determined to have artefact-bearing deposits. We were surprised to discover that these deposits extend all the way to the creek, but do not occur in a wide swath: some of the more southern test pits were barren of artefacts.

Ivic dug several test pits along the creek. The location of these pits is not shown on the map, but the UTM location determined by a GPS is given in Table 14. All test pits at the creek, with the exception of the one directly downslope from Midden 2, were devoid of artefacts.

The number of artefacts recovered from positive test pits ranges from 4 to 82. In general, examination of Figure 27 shows that the test pits with higher artefact counts lie further north than those with lower counts. Interestingly, while the test pit with the most artefacts (KI TP 9) lies at the top of the slope, other pits with relatively high counts are found at all elevations.

Table 15 shows the classes of materials recovered in test pits on the western slope. Two test pits contained only charcoal; the rest contained pottery in addition to charcoal.

Table 14. Location and contents of test pits dug on the western slope by K. Ivic.

TP KI	Location	UTM (GPS)	Elevation (m)	Depth (cm)	No. Artefacts
1	N260 E181	582554E 4838448N			18
2	Creek		348	25	0
3	Creek	582537E 4838400N	362	23	0
4	Creek	582516E 4838395N	358	20	0
5	Creek	582488E 4838428N	361	26	0
6	N268 E167	582559E 4838428N		29	0
7	N258 E167	582572E 4838425N		19	0
8	N255 E169	582572E 4838425N		29	4
9	N268 E170			40	82
10	N279 E150	582535E 483841N		35	29
11	N276 E163	582544E 4838430 N		54	46
12	N272 E153	582539E 4838424N		26	17
13	N267 E143	582539E 4838417N		37	13
14	N262 E132	582615E 4838275N		27	0
15	N265 E138	582529E 4838417N		19	0
16	N266 E134	582532E 4838416N			41
17	N264 E131	582508E 4838769N	473m	31	4
18	N263 E128	582510E 4838774N	473m	20	4
19	N264 E166	582520E 4838448N		22	0
20	N259 E157	582510E 4838430N	473m	20	0
21	N280 E229				16

Table 15. Class of materials recovered from positive test pits.

	Pottery	Clay pipe	Chipped lithics	Rough stone	Bone	Teeth	Floral	Recent	Total
KI TP01	5		1		12				18
KI TP08							4		4
KI TP09	20	1	8	1	43		9		82
KI TP10							29		29
KI TP11	12		7		19		7	1	46
KI TP12	5		4		4		4		17
KI TP13	5				3		5		13
KI TP16	9		3		1	1	27		41
KI TP17	2				1		1		4
KI TP18	1				2		1		4
KI TP21	3		3		8		2		16

Figure 26. The location of test pits dug on the western slope and determined locations of artefact bearing deposits.

Figure 27. Location of test pits dug by K. Ivic. Coloured squares are positive test pits; white ones are negative test pits.

The second set of test pits dug in the 2004 season lie at in the northeastern corner of the field. Laurentian University field school students dug 204 test pits in 7 lines starting from the north fenceline, aligned with the eastern field edge and proceeding south. As described above, test pits were separated by 5 m and were dug to subsoil, with all sediments being passed through ¼ inch mesh screen. Test pits are numbered sequentially on even numbers starting at 0 (e.g., 0,2,4, etc.). When a positive pit was encountered, the excavator moved back 2.5 meters and dug another pit. These pits were assigned odd numbers, in appropriate order (e.g., 2,3,4). The easternmost column of test pits was designated A, the next one B, etcetera.

Examination of Table 16 shows that some positive test pits occur outside of the expected range. With one exception the artefacts in these test pits probably are related to the site, and the presence simply indicates the distance from the site at which material may be deposited or re-deposited. The exception is test pit F28, which yielded a piece of glass. Figure 28 shows the likely extent of the site based on test pits dug in all three seasons.

Table 16. Contents of positive test pits dug by Laurentian fieldschool students

Test pit number	Pottery	Chipped lithics	Bone	Floral	Glass	Total
TP A53		1	1			2
TP A54	1		5			6
TP B45		1				1
TP B46	1					1
TP C0		1				1
TP C43		1		1		2
TP C44		1				1
TP C45			2			2
TP D45		1				1
TP D46		1				1
TP D47	1			1		2
TP D48				1		1
TP E06			1			1
TP E34		1				1
TP E48		1		2		3
TP E49	2					2
TP F28					1	1
TP F44		1				1
TP F51	1					1
TP F52	1					1
TP G47		1				1
TP G48		1				1
TP G49		1				1

Figure 28. The location of test pits dug by the Laurentian fieldschool students and the approximate boundary of the site.

The test pits on the northern edge of the site yielded relatively few artefacts compared with those dug on the western slope. A single test pit within the field dug on the eastern end of the N280 line contained 16 objects. When this is compared with the one or two artefacts recovered from the northern test pits, it is clear that eastern end of the N280 line is well within the site boundaries.

Geophysical survey

With the assistance, equipment and expertise of L.A. Pavlish we conducted a resistivity and magnetometer survey of Emmerson Springs on two occasions: in June and again in August.

Figure 29 shows the relative resistivity readings taken along the N270, N275 and N280 lines. These should be considered only as relative readings: areas of lower resistivity indicate places that have a higher moisture content, metal or that are less consolidated. Higher readings indicate the opposite. The figure shows that the west side of the site has lower readings: this is expected given the known midden deposits in this area. The readings in the excavation area are quite variable: this is also expected given that some units were open at the time the readings were taken. The resistivity drops somewhat as one continues east, then rises again. This may be related to natural variation in moisture content, or it may indicate the presence of soils with higher organic matter (a midden).

Figure 29. Resistivity readings along N270, N275 and N280.

Figure 30 shows the resistivity readings taken along the E185, E190 and E195 lines. As above, these are represented as relative readings. A table of the readings may be found in the appendices. The area of higher resistance near Midden 3 is probably related to compaction because the path used on the daily trip to the site falls slightly to the east of Midden 3. The areas of higher and lower resistance south of the main excavation area are certainly related to the open units and the relatively uncompacted backdirt piles. One area worthy of further investigation is the area at about N260, at about E190 to E195. This

area has a lower resistivity than that surrounding the main excavation area and may signify a region of higher moisture or organic matter.

Figure 30. Resistivity readings along E185, E190 and E195

Magnetometer readings were taken running west to east in two places in June, and from south to north in August (see Figure 32). In both cases, readings were taken every 50 cm. The August readings are shown in Figure 31. The large spikes most likely represent metal objects such as nails. More likely to be of interest are smaller anomalies on E200, E205 and E210 lines. Anomalies are likely to be off-set somewhat to the north at this latitude, therefore the spikes may represent a difference in the magnetic susceptibility or thermoremnant magnetism of sediment slightly to the south. In the case of the small anomalies to on the three lines mentioned, it is possible that these represent the location of former hearths (thermoremnant magnetic differences). A possible case of a difference in magnetic susceptibility is found in the eastern-most line, at the southern end of the line where it has a lower reading than elsewhere. This area is partially on the slope and may have a different thickness of sediment (thinner), decreasing the magnetic susceptibility. By contrast, on the same line there is an area of heightened readings west of the main excavation area. This may result from the midden deposits in this location.

Students selected to excavate a unit at N290E210 because of the small anomalous readings along the E210 line. They chose to dig at N290 because a possibly hearth-related anomaly is located slightly south of this area. Interesting, as discussed above, several possibly wall related posts were found in this unit.

Figure 33 is a contour map of the magnetometer readings taken along the N270 line. This area had not been excavated; therefore, anomalies are not related to digging activities. There are two points of note here, but neither have been explored through excavation. An area of higher readings is located at approximately E210. Unlike the spikes in the readings running north to south, this anomaly is found over all three lines. This could be natural variation in subsoil, or it could relate to the location of a former hearth. The other point of note is that the magnetic readings decrease on all three lines as one proceeds downslope and eastwards. This could relate to differences in elevation or

differences in subsoil. Given the size of the area of lower magnetic readings, it is unlikely that this indicates an archaeological feature.

Figure 31. Results of magnetometer survey carried out in August, 2005

Figure 32. Location of Magnetometer survey lines, 2004

Figure 33. Magnetometer along N270 between E200 and E248.5

Ceramic Analysis

Rim sherds and fragmentary rim sherds are the focus of this analysis. This summary includes analysis of rims recovered in 2003 and 2004.

Methodology

The 2002 report outlines paste and temper attributes of a large number of plain sherds, therefore this report will only summarize attributes of the upper rim. The rims were examined for decorative motif, decorative technique, shape and size. The system developed by D. G. Smith (1997) served as the basis of the attribute analysis. In addition, where possible we recorded the MacNeish type (1952). A manual of additional types compiled by M. Latta (1983) served in the identification of pots not represented in MacNeish (1952). A diameter chart aided our estimation of vessel mouth size. Digital electronic calipers served in measurement of lip thickness, collar height, collar base thickness and thickness below the base. The temper type was determined visually. Two students, E. Cheng and E. Matwey made the preliminary measurements, and I later verified these.

Results

The analysis presented below is based on 181 sherds. Out of a total of 185 sherds there are two sets of sherds with distinctive characteristics that allow them to be combined into one vessel. It is likely that there are other mends (real or analytical) in the collection, but the objects tend to be so small that determining this with certainly is impossible. In any case, the collection is relatively homogeneous typologically and although systematic combination of sherds into analytical pots would alter the percentages slightly, the general picture is likely to remain the same. Out of 181 analysed sherds, 103 are classified as rim sherds and 78 as fragmentary rim sherds. The entire collar (interior and exterior) and lip are present on rim sherds but not on fragmentary rim sherds.

The sherds that mend or clearly come from the same pot all derive from midden contexts. Sherds from N285E159 layer I-07 mend with sherds from layers II-14, II-16 and III-01. From the same unit we find another mend, but from a different pot. These come from layers I-14 and II-05.

Technological characteristics

Table 17 shows the distribution of rims and fragmentary rims by temper type. In almost all cases, a mineral temper served to modify the clay. The only exceptions are two sherds that are untempered, one of which had corded decoration and the other of which is very small. The mineral temper is mainly grit: large angular fragments from an igneous rock such as granite. There are a few examples of other types of temper: grit and mica together, and sand. The sherds tempered with grit and mica may be examples of use of a particularly micaceous igneous rock for temper (i.e., the mica originates from the same rock as feldspars and quartz fragments). Sand may have been added as temper, or a particularly sandy clay source may have been used in some cases. There are no examples of shell temper.

The sherds examined all appear to be manufactured by paddle and anvil: no evidence of coil-building is present. There are a few examples of pots that appear to be

made by a child: the form is irregular and the tempering inconsistent. However, there is considerable consistency on a general level in the manufacture of pottery. Petrographic analysis of minerals and grain size is underway to determine whether there are variations in the type, size and amount of temper added to vessels of different sizes.

Table 17. Breakdown of rims and fragmentary rims analysed by temper type.

Temper	Number
Grit	168
Sand	1
Grit and Mica	8
Grit and Sand	2
None	2

Size characteristics

Diameters of the pot mouths may be estimated using diameter charts, but when the sherds represent only a small proportion of the total diameter of the pot, this estimation is subject to large errors. Additionally, where pots are not perfectly circular, the estimation will be a misrepresentation of the mouth diameter. Nonetheless, we obtained estimates for 77 sherds (both rims sherds and fragmentary sherds). In most cases because of the small proportions of the vessels present, the estimation is rounded to the nearest 5 cm. Figure 34 shows the distribution of pot diameters. This histogram shows that there are few very small and a few very large mouthed pots, but the majority of pots have mouths that lie between 15 and 30 cm in diameter.

Figure 34. Histogram showing the estimated diameters of pots in the sample (n = 77)

The size of pots will be reflected in the size of the lips of vessels and the thickness of the walls. Figure 35 shows a histogram of the measured lip thickness of 154 sherds. The mean thickness is 5.8 mm with a standard deviation of 2.4 mm. The range is 2.3 – 19.9 mm. If we compare Figure 34 and Figure 35, it is evident that the spread of diameters is greater than the spread of lip thickness, with the exception of a few outliers.

This suggests that while there must be some relationship between lip thickness and diameter, it is loose: large pots may have relatively thin lips.

Figure 35. Histogram of lip thickness (mm) of 154 sherds

Figure 36 shows the thickness of vessel rims below the collar. This demonstrates that while there are a significant number of vessels with thin lips, the thickness below the rims is less skewed to the left than the distribution of lip thickness, as would be expected for a sample with many pots of medium mouth diameter, if the wall thickness were related to pot size.

Figure 36. Histogram of thickness below the collar (mm) of 90 sherds

Form characteristics

The sample includes both collared and collarless examples. Only complete rim sherds are considered in this classification. Although it may be possible to determine that some fragmentary sherds are collared, it is not possible to determine that they are collarless. The total number of collared rim sherds is 77, while the number of collarless ones is 26. This analysis did not further break down sherds by the degree of definition of the collar.

Collared sherds generally had fairly short collars, as evidenced by Figure 37. Only about half of the sample (N=91) had measurable collars. Of these, only a very small number fall into the high-collared category. These pots are clearly separable from the rest

of the sample. It is likely that there are a number of other high collared specimens in the sample, but these were broken above the collar base, making measurement of collar height impossible. The majority of measurable pots have collars falling between 6 and 20 mm. The mean collar height is 13.2 mm with a standard deviation of 8.0 mm.

Figure 37. Collar height (mm) of 91 measurable sherds

The mean thickness of the collar base is 9.2 with a standard deviation of 2.3 and a range of 5.6 to 16.8 mm. Collar base thickness is measurable on 82 sherds. The relative definition of collars can be assessed by comparing the values of the collar base thickness with that of the thickness of the pot just below the collar. Figure 38 shows a histogram of this difference and this indicates that in this sample collars are not particularly pronounced: the majority of cases lie under 2 mm.

Figure 38. The difference in the thickness of the collar and the thickness of the pot below the collar (mm)

We classified the form of the interior and exterior collar as concave, convex, straight or indeterminate. Table 18 shows the results of this classification. The largest group is that with convex exteriors and concave exteriors. Following this are pots with convex interiors and concave interiors. A chi-squared test of the distribution of pots with both exteriors and interiors observable shows that the distribution is significant. The groups that vary most from what would be expected are the convex-concave, concave-

convex, convex-convex and concave-concave. This simply suggests that the form of the exterior and interior are related, so far as the potter was concerned.

Table 18. Shape of the collar. Values in parentheses are percentages of the total number that could be assessed for both interior and exterior shape.

		Exterior				
		Concave	Convex	Straight	Indet.	Total
Interior	Concave	8 (6)	30 (22)	13 (10)	3	54
	Convex	20 (15)	12 (9)	10 (7)	2	44
	Straight	13 (10)	16 (12)	12 (9)	5	46
	Indet.	6	9	15	7	37
	Total	47	67	50	17	181

Lip forms can be broadly grouped into three categories: defined or flat, semi-defined and round. The majority of rim sherds had defined lips (N=118), followed by semi-defined (N=37) and finally round (N=14). Lip form was not observable on the remaining 12 sherds.

Design characteristics

Smith (1997) considers the attributes of design in terms of three variables: technique, tool and motif. Each is examined separately for different bands on the pot: interior rim, lip, collar, neck, shoulder, and body. The sherds in the sample from Emmerson Springs are fragmentary, thus usually only the interior rim, lip and collar are analysable.

We recognized four possible attribute states for tool: blunt stick, pointed stick, cord, and none. When the tool could not be discerned, the state was determined to be 'indeterminate'. The tools 'blunt stick' and 'pointed stick' grade into one another, and there is likely to be difference in the way that observers categorize impressions.

Table 19 shows the distribution of different tool types by location on the rim. Of note is the presence of two sherds decorated using cord. These are shown in Figure 39. One is decorated by impression of a cord wrapped stick, and the other by impression of cord or a corded paddle. Neither tool is common in pottery assemblages of the sixteenth century Neutral, and may represent imports, innovation or heirlooms. The table also shows that blunt sticks are more common than pointed sticks, and that most commonly the interiors, lips and necks are undecorated.

Table 19. Inferred tools used for producing the decoration on the upper rim.

	Interior	Lip	Collar	Neck	Shoulder
Blunt stick		18	96	4	
Pointed stick	1	6	45	1	1
Cord			2		
None	148	148	21	95	3
Total observed	149	172	164	100	4
Indeterminate	32	9	17	81	177

Figure 39. Cord impressed rim decoration. Left: cord impression; Right: cord-wrapped stick impression.

Attribute states inferred for the variable 'technique' include stamping, incising, and none. We did not attempt to distinguish between trailed and incised decoration, classifying all as 'incised'. Technique that could not be inferred was classified as indeterminate. Distinguishing between stamping and incising is not always clear-cut. When minor imperfections in the decorative element are repeated and are non-linear, this is generally an indication that the technique is stamping. Elements that vary in length, width, and are not of the same shape are more likely to be incised.

Table 20 shows that the most common method of decorating lips is stamping, while the most common method of decorating collars in incising. One might anticipate that decoration applied to a narrow band that could be pulled out of place might be better achieved through stamping than incising. Conversely, incising may be a more effective method of applying decoration to the upper rim of a vessel that could be deformed by application of pressure to the collar.

Table 20. Inferred techniques used for producing the decoration on the upper rim.

	Interior	Lip	Collar	Neck	Shoulder
Incising	1	6	118	5	
Stamping		19	25		1
None	148	147	21	95	3
Total observed	149	172	164	100	4
Indeterminate	32	9	17	81	177

The third major variable of decoration is the motif. These are also coded separately based on location. Table 21 through Table 27 show the different motifs found on different bands, classified into broad groups: plain, vertical or obliques lines, horizontal lines, lines of round impressions, crossed, and complicated motifs. These tables do not show the relationships between these motifs (i.e., that pots with collars with and oblique line motif frequently have plain necks).

Table 21. Frequency of a plain motif on the upper rim

	Smith code	Interior	Lip	Collar	Neck	Shoulder
Undecorated (N)	A	150	148	22	96	3
Percent of observable motifs		99	86	13	95	75

Table 21 shows that these pots are not highly elaborated in terms of decoration. The interior, lip, neck and shoulder bands are usually plain. Decoration is focussed on the collar.

Table 22. Frequency of oblique motifs on the upper rim.

	Smith code	Interior	Lip	Collar	Neck	Shoulder
Obliques	BAA		2	2		
	BAAA-02			4		
	BAAA-03				1	
	BAAA-05			1		
	BAAA-11		7	18		
	BAAB-01			3		
	BAAB-02			25		
	BAAB-03			3		
	BAAB-11	1	8	47		
	BAAC-02			4		
	BAAC-03		1			
	BAAC-11		1	11		
	BAAC-15			1		
	BAAF-11			3		
	BAAF-21			1		
Total		1	19	123	1	0
% of observable motifs		1	11	75	1	0

The collar, which is most often decorated, is usually decorated by a band of lines. Obliques tilted to the right are most frequent, followed by vertical lines, followed finally by obliques tilted to the left.

A small number of sherds have horizontal lines on the collar and/or neck. Frequently the total number of lines could not be determined because of the fragmentary nature of the sherds.

Table 23. Frequency of horizontal line motifs on the upper rim.

	Smith code	Interior	Lip	Collar	Neck	Shoulder
	BABA-01			1	1	
	BABA-02			3	1	
	BABA-03				2	
Total				4	4	
% of observable motifs				2	4	

Strings of circular (punctuates) are also found in small numbers. Although frequently pots with obliques on the collar also have a string of punctuates on the shoulder, we found only one example of this. This is most likely because of the very small number of shoulders represented.

Table 24. Frequency of strings of round element motifs on the upper rim.

	Smith code	Interior	Lip	Collar	Neck	Shoulder
	BCAD-01		3			
	BCAD-02			1		
	BCBD-11			1		1
	BCBD-21		1			
Total			4	2		1
% of observable motifs			2	1		25

Crossed motifs occur on the collar only, and these too are rare. This may be an indicator of cultural affiliation and chronology: that the site is more closely aligned with the other sites in the Spencer Bronte Creek area, than it is with sites in Huronia.

Table 25. Frequency of crossed line motifs on the upper rim.

	Smith code	Interior	Lip	Collar	Neck	Shoulder
	CAAB-11			1		
	CAAC-20			1		
	CABE-36			1		
Total				3		
% of observable motifs				2		

A small number of sherds possess motifs classified as 'horizontal difference', meaning that the motif includes regular changes within the band. These are likely to be high collared and some may relate to castellations. The significance of the presence of high-collared sherds is not at this time clear. Motifs classified as 'horizontal difference' are only found on the collar.

Table 26. Frequency of opposed triangular plat motifs on the upper rim.

	Smith code	Interior	Lip	Collar	Neck	Shoulder
Horizontal difference	DAA			2		
	DAAF-27			1		
	DDAB-01			1		
	DDAC-09			1		
	DDAC-11			1		
	DGAB-01			1		
	DGAC-17			1		
	DGAE-17			1		
Total				9		
% of observable motifs				5		

Table 27 shows the remaining motif codes, of which only three are represented, and the number of sherds for which motif was indeterminate in the different bands. Clearly the neck and shoulder are not well represented in this collection.

Table 27. Frequency of remaining motifs.

Smith code	Interior	Lip	Collar	Neck	Shoulder
EHBD-12		1			
FGAF-02			1		
FGED-03			1		
Indeterminate	30	9	16	80	177

Lennox and Fitzgerald (1990: 415) describe some general trends in Neutral ceramic decoration. Early Neutral pots may be decorated with horizontal motifs, some may be high collared (similar to Lalonde high-collared) and some may be decorated on the neck. After A.D. 1500 and lasting until A.D. 1650, pots are mainly plain on the neck, and with oblique line decoration circling the collar. Plain collars are also known, but are outnumbered by pots decorated by obliques. Small numbers of other types of decoration are also present.

Table 28 shows the comparative proportions of different motifs of the lip and collar for Emmerson Springs and Wallace. The main areas of difference are that the proportion of plain rims is slightly higher at Emmerson Springs, and the proportion of obliques is slightly lower. Crossed motifs were not observed in the Wallace assemblage. Apart from these differences, the two assemblages are remarkable similar. Given this, it is clear that in this case ceramics will not be useful in helping us to understand the chronological placement of the two sites with respect to one another.

Table 28. Motif types of rims from Emmerson Springs and Wallace.

	Emmerson Springs		Wallace	
Motif	N	%	N	%
Plain	13	8	2	2
Nicked lip, notched lip	9	6	5	5
Obliques, plain lip	102	65	69	73
Obliques, notched lip	10	6	4	4
Horizontal	4	3	3	3
Opposed obliques	4	3	4	4
Complicated motifs	9	6	5	5
Lines of punctates	2	1	2	2
Crossed motifs	3	2	0	0
Indeterminate	25		3	
Total	181	100	97	100

Typological classification

Although typological classification has shortcomings, particularly when types are poorly defined and may overlap, Table 29 presents a list of the sherds present by type to allow for comparison with other sites.

Table 29. Distribution of rim sherds and fragmentary rim sherds by type (Latta 1983; MacNeish 1952).

MacNeish Type	N	p
Collingwood collarless	1	0.01
Graham-Rogers Plain	3	0.03
High collared	9	0.08
Huron Incised	53	0.48
Huron/Lawson Incised	3	0.03
Innisfill Plain	4	0.04
Lalonde High Collared	2	0.02
Lawson Incised	14	0.13
Neutral nicked lip	3	0.03
Neutral punctate lip	2	0.02
Pound blank?	1	0.01
Pound Necked	1	0.01
Ripley Plain	3	0.03
Ripley Plain?	1	0.01
Seed Incised	1	0.01
Sidey Notched	7	0.06
Syracuse Notched	1	0.01
Warminster crossed	1	0.01
Total	110	
Indeterminate	70	
Indeterminate, corded	1	

Figure 40. Castellated pot with vertical incisions and a plain lip

Figure 41. Castellated pot with oblique incisions on the interior and exterior rims.

Figure 42. Two sherds from small pots. Left: Oblique incisions on the collar and punctates on the shoulder. Right: Two rows of punctates on the collar, and a convex strip for a castellation.

Figure 43. Two pots with plain collars and modified lips. Left: A collared pot with punctates on the lip. Right: A collarless pot with a notched lip.

Figure 44. Two high collared pots, the one on the left with a drilled hole in it.

Analysis of Smoking Pipes from the Emmerson Springs Village Site

by Aleksandra Pradzynski

The smoking pipe assemblage recovered during the 2002-2004 excavations consists of 77 ceramic pipe fragments and two stone specimens. For the purpose of the following report, I also include seven pipe pieces from one of the previous field seasons (Poulton and Associates 1994). The present discussion utilizes attribute and typological approaches outlined by Smith (1997) and Emerson (1967).

Methods & Results

I examined in detail a total of 94 pipe fragments. Before analysis, these were examined for mends and sorted into the following categories: complete pipes (N=1), bowl fragments (N=39), stem fragments (N=44), elbows (N=1) and fragmentary juvenile pipes (N=1) (See Table 30). Only small portion of this sample is analysable. We recovered multiple fragments from the same units, but only few successfully mend. An attempt to match pipe fragments between settlement units and middens did not bring positive results. Most mending fragments derive from the same unit and have the same catalogue number (N275E175 III-13-6 2 stem fragments; N279E175 II-14-9 2 stem (mouthpiece) fragments; N284E197 I-4, 2 stem (mouthpiece) fragments; N329E200 I-7, 2 bowl fragments, N331E198 I-11, 3 stem fragments). A single case of mends between proveniences comes from N275E175, where a bowl fragment from layer II-1 mends with one from II-6, a difference of about 12 cm.

Analysis of pipes and bowls included, if possible, measurement of bowl lip thickness, orifice diameter, mouth thickness of stem, bore hole diameter and description of decorative motif, decorative technique, tempering, bowl form and stem form. The pipe bowl decoration is classified as one of three types: plain, ring or decorated. The ring motif includes incised/trailed lines and/or a string of stamped punctates horizontally encircling the bowl. The third category incorporates design components that do not form the ring motif. All metrics and a selected set of variables for bowl and stem fragments are summarized and presented in Table 30 and Table 31.

In general, of the 17 analysable bowls, the most popular form is the coronet (N=6), followed by collared (N=4), conical (N=2), barrel (N=2), effigy (N=2) and vasiform (N=1) types. The sample also includes nine analysable pipe stems represented by two forms: tapering (N=7) and tapering with flared end (N=2).

An intact undecorated ceramic pipe was recovered from the field edge/hillslope midden (N285E159 II-5-1). The length, width and height of the pipe are 67 mm, 23 mm and 34 mm respectively. The conical bowl measures 18 mm in height, its round orifice is 16 mm in diameter and the thickness of smooth flat lip is 3 mm. The stem is circular in cross-section and has a tapering shape. Its thickness at the mouth is 2 mm and the diameter of bore hole measures 3 mm.

Figure 45. Complete plain pipe (N285E159 II-5-1)

A high proportion (p=0.76) of the analyzable pipe bowls are burnished. All unburnished specimens are coronet types. Decorated specimens dominate the sample (p=0.80). The exterior surface of pipe bowls is most frequently decorated with ring motifs (p=0.60). The remaining pipe bowls are evenly divided between plain (p=0.20) and those with a non-ring decorative motif (p=0.20). The form of the pipe bowl lip is generally flat and their surface is smooth. Lip thickness ranges between 2.0 and 8.0 mm with an average of 4.7 mm. The orifice diameters range from 1.6 to 5.0 mm with an average of 3.2 mm.

Table 30. Descriptive summary of identifiable pipe bowls from the Emmerson Springs Site.

ID #	Pipe Bowl Form	Provenience Type	Lip Thickness mm	Orifice Diameter cm	Decorative Motif	Decorative Technique
1014	Collared	Surface collection	6.0	4.0	Plain	None
0194	Human effigy	Surface collection	N/A	N/A	Decorated	Incised, stamped
0888	Coronet	Surface collection	6.1	N/A	Decorated	Incised, stamped
N280E174 II-70	Conical	Midden	5.0	N/A	Ring	Incised
N290E189 I-6	Collared	Settlement Area	4.0	N/A	Ring	Stamped
N331E199 II/F64-20	Vasiform	Settlement Area	N/A	N/A	Ring	Incised, stamped
Midden 1 0-1	Collared	Midden	8.0	4.0	Ring	Incised, stamped
Midden 1 0-2	Barrel?	Midden	3.5	3.0	Ring	Trailed
N285E159 II-5-1	Conical	Midden	3.0	1.6	Plain	None
N275E175 II-1-13	Coronet	Midden	4.0	N/A	Ring	Stamped
N275E175 II-1-45, N275E175 II-6-4	Coronet	Midden	4.0	3.1	Ring	Trailed
N277E191 I-1	Effigy	Settlement Area	7.0	N/A	Decorated	Incised/ trailed, stamped
N284E197 I-5	Barrel?	Settlement Area	6.0	2.0	Ring	Trailed
N299E189 I-5	Coronet	Midden	3.0	N/A	Ring	Trailed, stamped
N300E186.5 I-1	Collared	Midden	2.0	5.0	Decorated	Stamped
N300E187.5 I-11	Coronet	Midden	N/A	N/A	Decorated	Trailed
N279E197 I-5	Coronet	Settlement Area	4.5-7.5	3.0	Plain	None

Two pipe bowl forms dominate the collection: coronet and collared. The more numerous coronet bowls are represented by one plain and five decorated specimens. The single undecorated coronet pipe bowl fragment is also an example of a stone pipe. One coronet fragment is comprised of two pieces found in the same unit and its reconstructed side measures 31.0 mm (N275E175 II-1-45, N275E175 II-6-4).[1] The bowl is decorated with two trailed horizontal lines and a row of stamped punctates placed below them. A combination of horizontally trailed lines and stamped punctates is also present on another bowl (N299E189 I-5). In addition, the edge of the lip had been notched. One fragment is decorated with polygonal marks placed on both sides of one of the coronets (N300E187.5 I-11). Another coronet bowl is decorated with an ovate punctate and a rectangular mark (#0888). Finally, the last coronet fragment (N275E175 II-1-13) displays a row of punctates stamped on the upper bowl.

Figure 46. Pipe bowls including barrel and coronet forms

Three of the four collared examples are decorated. The first pipe has a single string of punctates stamped on a collar (N290E189 I-6). The ring motif on a well-developed collar of another pipe bowl (Midden 1 0-1) incorporates three rows of stamped punctates and a trailed horizontal. The last example is represented by the Collared Mortice with a row of stamped punctates just below the lip and large polygonal depressions positioned vertically on the exterior surface of a bowl (N300E186.5 I-1).

One of the two conical pipe bowls (N285E159 II-5-1) has been described above. The second specimen is decorated with at least three horizontally incised lines (N280E174 II-70). The entire extant exterior surface of a single vasiform type is decorated with incised lines on the upper and lower bowl parts and a single string of small punctates stamped where the exterior profile starts to expand. The barrel pipes (Midden 1 0-2, N284E197 I-5) display similar decorative motifs. Their entire exterior surfaces are decorated with horizontally trailed lines of even widths and depth.

The Emmerson Springs collection includes two effigy pipes. The more complete example is a human effigy pipe (#0194) found during the 1994 Archaeological Assessment of the site by D.R. Poulton & Associates. The decoration on the second effigy consists of a single protrusion encircled by two rings and four furrows placed on

[1] . These two pieces derive from the same midden unit, but from rather different positions: Layer II-1 is 12 cm above Layer II-6. This may indicate post-depositional movement through the stratigraphic profile, or that the objects were deposited at different times. The former possibility is a simpler explanation.

each side of the protrusion. It resembles specimens identified by some researchers as either the top knot (Doak 1993; Noble 1979) or 'a horn of power' associated with shamans (Mathews 1976: 18; 1980:300-02). However, due to fragmentary nature of the effigy it is not clear if this is a representation of a stylized hair or a supernatural feature.

Figure 47. Effigy pipe bowl fragment (N277E191 I-1).

There are also 22 pipe bowl fragments for which form could not be determined. Seven of them display evidence of having been decorated, while the rest appear to be plain. The most common motif is stamped punctate element of different shapes and depth sometimes combined with trailed/incised lines. One of the fragments has a deep mortice-like depression. Decoration of the exterior surface of three specimens consists of a single or double string of punctuates. The exterior surface of one bowl is decorated with three lines forming a triangle inside which two punctates were placed.

The second example of a stone specimen is represented by a piece of banded slate with a hole (12mm in diameter) drilled through it. This may be a possible fragment of either Middle Archaic to Early Woodland banner stone or Mississippian or Hopewellian platform pipe (R. MacDonald, personal communication). Unfortunately, due to its incomplete state, it is not possible to state with certainty whether it is a pipe or a bannerstone. It does not seem to fit within the repertoire of known Neutral pipe forms.

Figure 48. Groundstone possible pipe or bannerstone fragment

Table 31. Descriptive summary of analysable pipe stems from the Emmerson Springs Site.

Cat.#	Thickness at mouth (mm)	Bore hole diameter (mm)	Shape	Cross-section
0255(a)	2.2	4.0	Tapering	Circular
0255(b)	1.6	4.0	Tapering	Circular
N280E174 PP8	2.0	2.0	Tapering	Circular
N275E175 III-5-9	3.5	3.0	Tapering with flare	Circular
N276E196 I-9	1.8	4.0	Tapering	N/A
N279E175 II-14-9	4.0	4.0	Tapering	N/A
N283E196 I-8	4.5	N/A	Tapering with flare	N/A
N284E197 I-4	2.5	3.5	Tapering	Circular
N299E188 I-8	2.0	4.0	Tapering	Circular

The Emmerson Spring pipe collection includes nine analysable stems. Seven of these have a tapered form and the remaining two are flared. The mouth thickness of the pipe stems for all specimens ranges from 1.6 to 4.5 mm. The bore hole diameter can be measured for eight fragments and varies from 2.0 to 4.0 mm. One example bears evidence of being ground around the mouthpiece. The cross-section of all analysable stems is circular; however, there are also two stem fragments that could be squared in cross-section. A fragmentary stem that could not be fully analysed is decorated with incised lines.

Figure 49. Pipe stems

The only elbow was recovered from a test pit and is plain and highly burnished. A single juvenile pipe bowl fragment displays evidence of having been decorated with incised lines; however, due to its small size no other observations can be made.

The majority of fragments from all parts of the pipe are untempered. Fine sand was used as temper for 16 stem fragments, 11 bowls and one elbow. It is possible that this represents a different way of processing clay than is used for pots, which are mainly tempered with angular grit derived from igneous rocks.

Intra- and Intersite Comparisons

The purpose of analyzing the Emmerson Springs pipes is to present not only their quantitative and descriptive attributes but also any information derived from their spatial distribution. In general, pipes were found in all excavated localities. Almost half of the collection (49%) was recovered from the settlement area, 40% was excavated from midden areas, 9% was found during the surface collection and 2% came from test pits. Among three settlement areas, the 'Denatopia' produced the highest number of pipes. Since we excavated many more units in this area than elsewhere, it is not possible to determine whether the higher pipe frequency in this particular locality is relevant. It should also be emphasized that ploughing activities disturbed the site. Consequently, the artefacts from this area are particularly small and it was difficult to obtain good descriptive information from artefacts from them.

Three pipe fragments were associated with features. One stem fragment was found in Feature 38, which is an ash feature. The second stem was recovered from Feature 55. This ash pit produced also a fragment of a white-tailed deer tibia covered with possible red ochre. Both features are associated with the house interior in the southern area.

The only vasiform pipe bowl fragment was recovered from Feature 64 in the central area. The function of this large lensed pit cannot be fully determined because of the limited excavation in this area. However, a semi-subterranean sweatlodge or refuse pit may be a possible interpretation. In addition, six other pipe fragments were recovered from the plough zone overlying Feature 64.

Pipe fragments recovered from the midden were probably purposely discarded there. Since the midden deposits appear to be undisturbed, it is likely that any wear or breakage happened in antiquity. It is interesting to see that an intact pipe was found in the midden context. This may reflect processes inferred at the Draper site (von Gernet 1985) and outlined by Schiffer (1987), such as village abandonment or disposal of property belonging to deceased person.

In general, of the all analysable pipe bowls, 53% was recovered from the midden context, 29% from the settlement area and 18% was found during surface collection. Coronet forms appear to be more common in the midden, but there is no clear association of one form with one area.

For comparative purposes, I analysed the smoking pipe assemblage from the Wallace site. The collection is housed at the University of Toronto at Mississauga and was made available by Prof. G. Crawford and Prof. D. Smith. I employed the same set of quantitative and qualitative variables used for analysis of the Emmerson Springs pipes on the sample from Wallace. This sample includes 32 pipe bowls and 11 stems. The results of typological observations for both sites are presented in Table 32.

Table 32. Comparative frequencies of smoking pipe types from the Emmerson Spring and Wallace sites.

Type	Emmerson Springs	Wallace
Conical		
Plain	1	1
Ring	1	4
Barrel		
Ring	2?	1
Cylindrical		
Plain	-	4
Trumpet		
Plain	-	2
Ring	-	3
Decorated	-	3
Vasiform		
Ring	1	-
Coronet		
Plain	1	-
Ring	3	2
Decorated	2	1
Collared		
Plain	1	4
Ring	2	2
Decorated	1	2
Effigy	2	1
Calumet	-	1
Unknown	-	1
Total	17	32
Number of different forms	6	9
Richness (dl=(s-1)/LN(n)	1.8	2.3

In general, a broader assortment of pipe types is represented in the Wallace pipe assemblage than in the Emmerson Springs collection. When sample size is considered, the apparent difference in richness is reduced (Table 32). The trumpet and collared types make up the half of the collection. They are followed by conical (p=0.16), cylindrical (p=0.13) and coronet (p=0.09) types. The collection also includes single examples of barrel, human effigy, calumet and unidentified specimens. The evidence of burnishing is present on over half of the sample. As was the case with the Emmerson Springs pipes, a lack of burnishing correlates with the coronet type bowl form. Untempered specimens (p=0.80) dominate the sample, while a significant proportion of ceramic pipes was tempered with fine sand (p=0.17) and a very small proportion with mica (p=0.03). Plain pipe bowls make up a greater portion of the assemblage than at Emmerson Springs (p=0.40), but both samples are small. Ring motif decoration is present on nearly half (p=0.40) of analysable bowls and the remaining of pipes (p=0.20) are decorated with a combination of lines and punctates or punctates alone. The most common decorative motif is a single ring of stamped punctates of different shapes and sizes. A band of

incised/trailed horizontal lines sometimes combined with strings of stamped punctates is also a frequent decorative motif. Three quarters of the trumpet pipes have a low vertical collar at the edge, which in all instances is decorated. A high proportion of pipe bowls has flat smooth lips but a few cases of rounded lips are also present. An indication of lip surface polishing is evident on some examples. Lip thickness ranges from 1.7 to 10.3 mm with an average of 5.5 mm. The orifice diameters range from 1.0 to 3.0 mm with an average of 2.0 mm. Most of the eleven pipe stems with intact or nearly intact mouthpieces are circular in cross-section and their shape is tapered toward the end with a few cases where the mouthpiece has a flared form. One of the specimens is an effigy with an undecorated snake coiled around the stem.

Smoking Pipes - Conclusions

Despite its fragmentary nature, the Emmerson Springs pipe assemblage represents a wide range of smoking pipes, reflecting diversity in the knowledge, experience and identity of pipe makers. Questions that need to be addressed in further research remain.

Does the presence of a banded slate fragment suggest the existence of another component on the site? This seems unlikely, given that we have not discovered evidence of Late Archaic/Early Woodland projectile points; however, this does not exclude the possibility that the Late Woodland occupants of Emmerson Springs discovered, collected, and subsequently discarded an artefact dating to the Late Archaic or Early Woodland.

Previous investigators (Fox 1984; Poulton and Associates 1994) have implied that the Emmerson Springs site may be an early to mid-16th century Neutral village. The sample includes both early and late pipe forms; however, the frequency of later forms is higher than the frequency of earlier forms (Table 33). The presence of coronet and collared pipe types (i.e. Collared Mortice) corresponds with the chronological trends some researchers suggest for Fur Trade and Contact period sites (Lennox and Fitzgerald 1990; Noble 1992; Ramsden 1990). Pipe forms which appeared on Ontario sites during the Middleport substage (conical, barrel and vasiform) (Dodd, et al. 1990; Lennox and Fitzgerald 1990) were popular for a long time and continued to be used into the Contact Period (Noble 1992). At Emmerson Springs, these forms make up only a small part of the assemblage.

Table 33. Chronological trends in pipe bowl form

Cent.	Conical	Barrel	Trumpet	Vasiform	Short Barrel	Coronet	Collared	Effigy
15th	p	p	p	p				p
16th					p	p	p	p
17th					p	p	p	p
ES	12%	12%?	-	6%	12%?	35%	23%	12%
Wallace	15%	3%	25%	-	-	9%	25%	3%

The absence of trumpet form at Emmerson Springs evidently distinguishes this site from the Wallace site where trumpet pipes account for a quarter of the pipe bowls. On the one hand, this may imply a chronological sequence between two sites with the Emmerson Springs later than the Wallace (Table 33). The small proportion of coronet pipes at Wallace may tentatively support this hypothesis. An alternative hypothesis is that

the sites are contemporaneous, but that the pipe makers had different stylistic preferences (D. G. Smith 1997). Without other indicators of chronological placement, it is not possible to determine the reasons for variation in pipe form frequencies between Emmerson Springs and Wallace.

Lithic Analysis

The analysis presented here includes discussion of both chipped stone artefacts and groundstone/grinding stones. The chipped stone material includes formed tools, utilized flakes, and a large quantity of chipping detritus. The 2002 report presents details of the chipping detritus, therefore only a sample is presented below. The groundstone and grinding stones include fragments of formed tools, such as axes, but also includes tools such as hammerstones. We did not systematically collect firecracked rock at Emmerson Springs. This discussion includes materials recovered in 2003 and 2004.

Chipped Stone

Chipped stone comprised one of the most common artefact classes at Emmerson Springs. As described in the section on the site setting, the closest source of chert lies a significant distance from Emmerson Springs (as much as 100 km), therefore one can examine the chert sample for evidence of the nature of the *chaîne opératoire*: was chert reduced elsewhere and brought to Emmerson Springs mainly as tool rough-outs, or were chert nodules brought to the site?

Methodology

The analysis methods used for formed tools differ from those used for other chipped stone artefacts. The typology of points presented on the web site of the London Chapter of the OAS served as the basis of determining the point types. Scrapers were described in terms of the location of retouch and the angle of the scraper edge. The other common chipped stone artefact type is the wedge. These are measured and weighed.

Assessment of a sample of chipping detritus included classification by debitage category (Sullivan III and Rozen 1985), determination of fracture type (Cotterell and Kamminga 1987), recording the presence of cortex on flakes and determination of raw material.

Raw material

Separation of lithic raw material occurred at the cataloguing stage, thus it should be possible to determine the proportions of different raw materials in the collection through examination of the catalogue. However, unfortunately cataloguers did not record this information systematically. The vast majority of the chipped stone is Onondaga chert. As an example of the degree to which the sample is dominated by Onondaga, out of nearly 3400 pieces of chipped stone catalogued for the 2003 season, a mere 76 (2.2 %) are identified as non-Onondaga chert. This is most frequently white in colour and speckled, and may be Collingwood chert. However, at this time, a chert sourcing study is underway and we are only able to identify cherts as non-Onondaga.

Points

The 2003 and 2004 excavations resulted in recovery of ten point fragments (Figure 50), nine complete points (Figure 53) and one possible partially flaked point (Figure 52). Onondaga chert served as the raw material for all of these, with the exception of one point tip. This object is made from a whitish chert.

Point tip fragments (n=6) outnumber bases (n=2) and medial fragments (n=1). Although most fragments are quite small, all appear to be bifacially flaked. The single example of a nearly complete point is only flaked marginally on one face. In all cases the flaking is scalar and some instances of hinge fracturing were noted. Some point fragments are narrow and steep, and may be examples of drills rather than points, or may simply be resharpened. Both point bases are concave as is consistent with either the Daniel's Triangular or the Nanticoke Triangular points (London Chapter of the Ontario Archaeological Society 2001). Neither base is notched.

Figure 50. Point fragments recovered from Emmerson Springs in 2003 and 2004.

All point fragments appear to be snapped and one bears a flake scar originating from the snapped edge, suggesting breakage arising from impact (see Figure 51). If points were broken in use, rather than manufacture this would suggest processing of kills on-site. The present of point bases suggests re-tooling on site, assuming that handles were retained. No refits were discovered. Broken points derive from the longhouse area (n=4), the Midden 2 (n=4), and Midden 3 (n=1).

Figure 51. Point tip with impact fracture originating from snapped edge

Figure 52. Retouched triangular flake, possibly a point abandoned in manufacture or a child's point

The complete points may be classified as belonging to one of three basic forms: triangular points with a convex base, triangular points with a concave base, and triangular points with a barb.

The lengths of the points without barbs range from 25.0 to 30.1 mm, while widths range from 14.3 to 19.6 mm. In most cases, the dimensions of these points fit within those expected for both Daniels Triangular and Nanticoke Triangular points (London Chapter of the Ontario Archaeological Society 2001). However, Nanticoke points tend to be narrower and their normal length range is 30 to 45 mm. Both types are made from Onondaga chert and both usually have convex lateral edges and concave bases making it difficult to distinguish between the two types (London Chapter of the Ontario Archaeological Society 2001). The Emmerson Springs points range in size and there is no clear division between long narrow and small wide points. This suggests that all can be placed within the same type, and that this is the Daniels Triangular type. This is consistent with expectations based on the known distributions and chronological placement of these points: they are found as far northeast as Milton and are found at Neutral confederacy sites from A.D. 1550 until the mid-seventeenth century dispersal (London Chapter of the Ontario Archaeological Society 2001).

Figure 53. Complete points recovered from Emmerson Springs in 2003 and 2004.

The only Late Woodland point type that is specifically described as barbed is the Glen Meyer Tanged point, which is found on sites dating from ca. A.D. 700 to A.D. 1300. It seems unlikely that the points recovered from Emmerson Springs are Glen Meyer Tanged points. Indeed, the length of one point falls outside the expected range. Illustrations of Daniels Triangular Points show that occasionally the base is oblique to the centre of the tool, resulting in a barbed base (London Chapter of the Ontario Archaeological Society 2001). Given that both points fall easily within the dimensions described for Daniels Triangular points, the simplest explanation is that they are both variants of this type.

Wedges

The sample of wedges and wedge fragments recovered in 2003 and 2004 includes eight objects; all except for one are made from Onondaga chert. They include both objects that appear to have some type of standardized form and those that make be a by-product of bipolar reduction. The average size of the eight pieces is 19 mm X 17 mm X 6 mm. Many show hinge fracturing on opposed edges and bifacially, as would be expected of both bipolar reduction and from use as wedges.

Figure 54. Wedges recovered in 2003 and 2004

Scrapers

The sample of scrapers recovered from the 2003 and 2004 excavations includes four complete elongated side and end scrapers (Figure 55), two informal scrapers on flakes (Figure 56), six fragments of side and endscrapers and one fragment of a uniface that could be a scraper. All of the scrapers were made from Onondaga chert.

The complete side and end scrapers vary somewhat in length, width and thickness, however all show retouching around the entire lateral and distal margins of the flakes on which they were produced. In all cases this retouch is regular and fine, and semi-invasive. One scraper shows evidence of use damage in the form of a distal impact fracture. Flake scars on the ventral face of the narrow scraper that originate from the lateral margins could be from use damage but are more likely the result of an attempt to flatten the ventral face of this piece. The edge angle on the distal ends of these tools ranges between 70 and 110 degrees, showing considerable variation in the degree to which the tools were retouched and/or used. The lateral edge angles fall between 55 and 70 degrees, and there appears to have been less retouching of the lateral edges.

Figure 55. Side and endscrapers recovered from Emmerson Springs in 2003 and 2004

Two informal scrapers are made large irregularly shaped flakes. One is retouched around the entire perimeter while the other is retouched only on the distal end only. Both pieces have relatively steep retouch, approximating 90 degrees.

Figure 56. Informal scrapers on flakes

The scraper fragments include four distal fragments, two of which bear scars on the ventral face originating from the distal end, and which probably resulted from use-damage. One of these fragments is burnt. All of distal fragments showed retouch along the entire margin of the dorsal face (except the broken edge). The angle between the ventral face and the dorsal face at the distal end of these fragments ranges between 45 and 65 degrees, showing variation in the degree to which scrapers were retouched. Three fragments come from midden contexts and one from the N260 trench area.

Figure 57. Fragments of scrapers. Top row, distal fragments; bottom row, proximal fragment (right) and splinters (left)

Other scraper fragments include two proximal pieces, one of which is a thin possible unifacial tool that is not a scraper. The other is a small but elongated scraper. The uniface is retouched along all edges that are present, while the elongated scraper is only retouched on the distal end and right lateral margin.

The final scraper fragments are a lateral edge piece, possibly produced by resharpening or possibly produced through use damage, and a small distal fragment.

Scrapers derive from all excavated locations: four scrapers or fragments come from the in-field midden, two from the N260 trench, four from Midden 2 and the remaining four from the longhouse area.

Miscellaneous Chipped Stone

The 2003 and 2004 collection of chipped stone includes a small number of items that cannot be classified as chipping detritus, utilized flakes, or formed tools.

These include two larger pieces of chert, neither of them complete cores, but both probably imported as raw material. The larger is 52 g, and is long and triangular in cross-section. It bears no scars that can be used to determine the reduction strategy. The second is 13 g and is likely a produce of bipolar reduction. It has subsequently been utilized.

One small chunk bears two notches. This could be a fragment of a core, an object that was notched unintentionally or a small tool.

One object appears to be the convex base of a biface. It is thinned invasively with further modification of the edge bilaterally. It is 6 g and at least 7 mm thick.

The collection includes three possible drill fragments. One is a tip that could also be the tip of a narrow point, one is a medial fragment, and one is relatively complete but quite small. This object is T-shaped. It measures 21 mm in length and the bit is 13 mm in length, 8 mm wide and 4 mm thick. The bit is flaked alternately.

Utilized flakes

For the purposes of cataloguing objects with continuous marginal retouch or flake scars are considered 'utilized flakes', although these objects have not been subject to use wear analysis. In the 2003 season, 71 pieces out of nearly 3400 catalogued chipped lithics were classified as utilised flakes, while in 2004 the totals are 53 of over 2200 pieces. These objects make up very small proportion of the total assemblage (p=0.02), however it is possible that with careful examination other utilized flakes might be found among the chipping detritus.

Chipping detritus

The chipping detritus is described in some detail in the report on the 2002 excavations at Emmerson Springs (Hawkins 2002), therefore only a small sample is described below. All the material described comes from Midden 3. The objects are classified as complete flakes, broken flakes, flake fragments, and debris following the system outlined by Sullivan III and Rozen (1985). Assemblages that have particularly high proportions of debris are likely to have been produced using bipolar reduction because this does not produce traditional 'flakes'. The other two attributes examined include the nature of the platform and if this indicates breakage by a bending fracture (observable only on complete flakes and broken flakes), and the present of cortex on the dorsal face of complete flakes, broken flakes and flake fragments. The results of classification of nearly 500 pieces are shown in Table 34.

A very small proportion of this sample is cortical (p=0.02). There are two interpretations of this: first it is possible that nodules were roughed out at a quarry site, and cortical flakes were abandoned there; secondly, it may be that reduction of chert at Emmerson Springs focussed on the last stages of biface production, core reduction and resharpening – all of these activities produce flakes that are largely non-cortical. It is also possible that both factors contribute to the small proportion of cortical flakes.

Raw material was assessed visually. The majority of pieces are Onondaga chert (p=0.94). The other raw material present is whitish in colour, appears to be highly siliceous and sometimes bears a reddish cortex.

Complete flakes and broken flakes bear a platform and can be assessed to determine the nature of fracture that produced the flake. Bending fractures are expected for late stage thinning, while conchoidal fractures result from hard hammer percussion and are associated with primary flake manufacture. In this case, there is a high proportion flakes produced by bending fractures (p=0.59), indicating production or thinning of bifaces on site.

The breakdown of the sample by debitage category can provide insight on raw material characteristics and knapping modes. High proportions of debris are expected when the raw material is of poor quality and when bipolar reduction is employed. In this case almost a quarter of the debitage is classified as debris (p=0.23), suggesting that in some cases at least raw material nodules were reduced using bipolar reduction, perhaps when they became to small to reduce using freehand percussion.

Raw materials are identified as Onondaga or Other. In this case, all non-Onondaga pieces are whitish in colour but are not further identified. They comprise just over 5 % of the sample. The presence of debris indicates this raw material was worked at Emmerson Springs and was not simply imported in the form of complete tools. The

percentage of the sample made up of flakes or broken flakes produced by bending fractures is slightly higher for the other raw material (66%) than for Onondaga (58%), but the difference is not likely to be significant and at this time we must assume that the *chaîne opératoire* for Onondaga chert is not different than that for other chert.

Table 34. Attributes of lithic debitage recovered from Midden 3.

Provenience	Complete Flakes	Broken Flakes	Flake Fragments	Debris	Cortical pieces	Bending fractures	Raw Material
N298E185.5-1-15	5	4	21	10	3	7	Onondaga
N298E185.5-1-16	1	6	7	8	0	4	Onondaga
N298E186.5-1-13	14	11	11	9	1	16	Onondaga
N298E186.5-1-14	1	3	11	6	0	2	Onondaga
N298E186.5-1-15		2	1	1		2	*Whitish
N298E187.5-1-10	1	0	0	1	1	0	Onondaga
N298E187.5-1-11	1	1				2	*Whitish
N298E187.5-1-6	5	11	11	6		11	Onondaga
N298E187.5-1-7	1	4	5	6		5	Onondaga
N298E187.5-1-9				1			Onondaga
N298E188.5-1-7	5	10	11	10	1	10	Onondaga
N298E188.5-1-8	4	4	8	2		6	Onondaga
N300E184.5-1-5				2			Onondaga
N300E184.5-1-7	7	7	11	7	1	4	Onondaga
N300E184.5-1-8	5	8	16	7		7	Onondaga
N300E184.5-1-9		1	2			1	*Whitish
N300E185.5-1-15	6	5	15	3	0	3	Onondaga
N300E185.5-1-16	2	10	19	10	0	8	Onondaga
N300E185.5-1-17		1		2	1		Other
N300E186.5-1-10	7	8	9	5		10	Onondaga
N300E186.5-1-12	1	1	6	1	1	1	*Whitish
N300E187.5-1-14	8	7	7	8	0	7	Onondaga
N300E187.5-1-14	3	3	8	6	1	2	Onondaga
N300E187.5-1-15	1		2		1		*Whitish
Total	78	107	181	111	11	108	
Percent	16	22	38	23	2	23	

Ground and grinding stone

Stone not modified by chipping can be classified broadly into one of two groups: stone produced through reduction by grinding (axes, adzes, celts, pipes, beads) and stone used for grinding and other activities (manos, metates, hammerstones). We did not systematically collect fire-cracked rock, although student in 2003 undertook an experiment off-site to determine the length of time involved in heating rocks to the point that they could be used to boil water.

Ground stone

A total of 86 pieces from the 2003 and 2004 excavations are considered ground stone. The majority of these are ground stone fragments or non-chert detritus and are of little analytical value. Table 35 shows the breakdown of ground stone objects by type.

Table 35. Types of ground stone objects recovered in 2003 and 2004

Artefact type	N
Axes	2
Celts	3
Fragments	15
Non chert detritus	64
Stone effigy	1
Stone pipe	1
Total	86

Five celts or axes are broken and variable in size. They range from 20 g to 91 g, and reflect use in a range of tasks. While one of the heavier objects shows evidence of battering, one of the thinner pieces was more likely used in light-duty chiselling activities because it would have split if it were used to apply force to a material in a jarring fashion, or if it was hit. The raw materials include both slate and schist.

Lennox and Fitzgerald (1990: 423) indicate that ground stone axes are common until the last decades of the 16th century when iron trade axes replaced them. Given the lack of iron axes and the presence of ground axes, we may suggest that the site dates to the mid to late 16th century, but not the 17th century.

'Fragments' include pieces with ground faces, while 'non-chert detritus' does not.

Figure 58. Fragmentary ground stone axe

Figure 59. Fragmentary ground stone celt

A stone pipe fragment is described and discussed above.

The stone effigy is a very small piece, apparently carved from a relatively soft stone such as slate. It is oval in cross section. On one edge there is a longitudinal groove, from which originate three concave grooves that line both sides of the piece. On both sides, a line runs longitudinally down from these curved grooves. On the opposite edge, there is a series of shallow grooves running laterally. This is a very small piece, with no clear indication of what the complete piece would have been. Although the repertoire of Neutral ground stone includes stone effigy pipes, this piece seems too small. Given the size, it is may have been a pendant. The form is suggested of the tail, wing feathers and legs of a bird.

The 2003 and 2004 excavations resulted in recovery of no stone beads.

Grinding stone

Four types of grinding stone include hammerstones, manos (handstones), metates (bottom stones, grinders) and rubbing stones. Hammerstones are pecked and range in mass from 310 g to over a kilogram (Figure 60). Their presence is further indication of the knapping of stone on-site. Hammerstones are made from a range of raw materials. Manos bear evidence of smoothed facets. These range in mass from nearly 200 g to 1.8 kg. These too are made from various raw materials, but igneous rocks such as granite are frequently employed. Two metate fragments are fragments of large flattish rocks with smoothed facets, and/or working areas (**Error! Not a valid bookmark self-reference.**).

Table 36. Grinding stones recovered in 2003 and 2004

Grinding stone type	N
Hammerstone	9
Mano	8
Metate	2
Rubbing stone	1
Total	20

Figure 60. Pecked hammerstone

Figure 61. Metate fragment with area of wear in its centre

Metal

The 2002 excavations at Emmerson Springs resulted in the recovery of two pieces of copper-based metal, described by Anselmi (2003). This discovery was unexpected because none of the previous fieldwork had revealed the present of copper-based metal and the site was estimated to date to the early to mid-sixteen century. The metal cannot be identified as either European in manufacture or native copper without further testing, however if it is of European origin this may indicate a slightly later date for the site.

The 2003 and 2004 excavations at Emmerson Springs resulted in the discovery of an additional seven copper-based metal objects. A complete list is given in Table 37. Most of these objects are tubular constructs, and all are quite small.

Table 37. Copper based metal objects discovered at Emmerson Springs in 2002-2004.

Provenience	Year of discovery	Description
N310E189-1-12	2002	Long, wide tubular construct
N329E199-1-19	2002	Flattish rectangular object
N275E175-II-13-12	2003	Short, narrow tubular construct
N275E175-III-2-16	2003	Short pinched partially tubular construct
N280E195-1-12	2003	Long, wide tubular construct
N282E192-1-13	2003	Flat folded object
N285E159-II-8-20	2004	Long, narrow tubular construct
N285E159-III-5-10	2004	Long, narrow tubular construct
N287E159-I-4-15	2004	Short, wide tubular construct

Examination of the provenience information given in Table 37 reveals that metal objects derive from a number of contexts: the longhouse area on the lower terrace (N280E195, N282E192), the longhouse area on the upper terrace (N329E199), Midden 3 (N310E189), and the field edge midden (all remaining units). Of the five units excavated in the field edge midden, three produced metal objects. The sediment from one unit that did not produce metal objects (N280E174) was screened through ¼ inch mesh and it is possible that small metal objects may not have been detected in the excavation of this unit. Three of the objects recovered from these midden units were discovered in heavy fractions. This emphasises the need to consider recovery methods when comparing proportions of small sized objects.

Table 38 lists the dimensions of the recovered pieces by type. The pieces can be broadly classified into three groups: narrow or tight tubular constructs, wide or loose tubular constructs and flat pieces.

Narrow tubes include four objects (Figure 62). These vary in length from over 21 mm to under 5 mm. The smallest of these objects is pinched on one end and may not have been intended for the same purpose as the others. While the lengths range considerable, the widths lie within a relatively small range, with the average being 3.34 ± 0.59 mm. The cross-sections of these pieces are approximately oval (N285E159-III-5-10, N275E175-II-13-12) or subtriangular (N285E159-II-8-20, N275E175-III-2-16). The external edges of the rolled piece are convex (N285E159-II-8-20), irregular (N275E175II-13-12, N275E175-III-2-16), and jagged or toothed (N285E159-III-5-10).

The amount that they have been rolled ranges from about 1 time to 1.4 times. The approximate thickness of the metal is about 0.4 mm, with one piece (N285E159-II-8-20) being much thinner at under 0.2 mm.

Table 38. Dimensions of copper based metal objects.

Provenience	Description	Length (mm)	Width (mm)	Thickness (mm)	Thickness of metal (mm)
N282E192-1-13	Flat folded object	14.53	10.12	2.39	0.96
N329E199-1-19	Flat rectangular object	18.63	7.29		0.73
N275E175-II-13-12	Narrow tube	6.59	2.5	2.47	0.43
N275E175-III-2-16	Narrow tube	4.83	3.37	3.16	0.43
N285E159-II-8-20	Narrow tube	9.31	3.66	2.59	0.17
N285E159-III-5-10	Narrow tube	21.26	3.84	2.35	0.37
N310E189-1-12	Wide tube	26.75	8.06	5.92	0.48
N280E195-1-12	Wide tube	24.19	8.35	7.14	0.50
N287E159-I-4-15	Wide tube	5.82	6.87	3.70	0.23

There are three wide tubes in the collection, one that is short and very loosely rolled, and the other two are long and tightly rolled. One of the elongated tubes is closed on one end (N310E189-I-12). It is approximately oval in cross-section and has been rolled about 1.2 times. The other elongated tube (N280E195-I-1) has been over-brushed and the patina has been removed. It is triangular in cross-section and has been rolled about 1.5 times. The third wide tube is oval in cross-section and was rolled about 1. 2 times. As with the narrow tubes, the lengths of these tubes have a wide range: almost 6 mm to almost 27 mm. However it is worth noting that the lengths of the two elongated tubes are similar (Table 38). The average width of the wide tubes is 7.76 ± 0.78 mm. The external overlapping edge is straight in two cases, and convex and jagged in the other case (N280E195-1-12). The thickness of the metal these pieces are made from is slightly greater than the thickness of the metal the narrow tubes. The short piece is about half the thickness of the other pieces.

The remaining two objects are flat (Figure 63). One is folded (N282E192-1-13), while the other is not. The edges vary from smooth to jagged. The folded piece bears a thick, blackish patina that is chipping off in some areas. The thickness of these pieces is slightly greater than that of the rolled constructs, but remains under 1 mm.

In sum, all of the metal objects recovered to date from Emmerson Springs are either likely used or intended as decorative objects (beads) or are scrap: no other functional or decorative objects are part of the collection. The pieces are all quite small, and they are also thin. The question of whether these pieces were manufactured from native or European copper should be addressed in future chemical analyses (Hancock, et al. 1991), along with a description of the technology used to produce these.

Figure 62. Copper-based metal tubular constructs recovered from Emmerson Springs, 2002-2004. Top row: N287E159-I-4-15, N275E175_III-2-16, Middle row: N285-159-III-5-10, N285E159-II-8-20, N275E175-II-13-12, Bottom row: N280E195-I-12, N310E189-1-12.

Figure 63. Flat copper based metal objects recovered from Emmerson Springs (Right: N329E199-1-19, Left N282E192-I-13).

Worked Bone

A sample of the worked bone assemblage is described below. As identification of the faunal remains continues, more worked bone is identified.

Worked bone recovered in 2003 and 2004 includes three different types of objects: modified deer phalanges, portions of bone beads and one unfinished item.

Two modified deer phalanges are both flattened dorsally and ventrally, and are not drilled through the distal end. In one case, flattening on both faces is so extensive that there is a hole through the phalanx. In the other case, a hole does not pass through the bone and the dorsal face has been damaged making it impossible to assess the extent of flattening (Figure 64). Lennox and Fitzgerald (1990: 423) indicate that distally drilled deer phalanges are uncommon in the later contact period sites, having possibly been the functional equivalent of tinkling cones. While we have discovered metal at Emmerson Springs, none of the objects recovered could be described as tinkling cones.

Figure 64. Dorsal and ventral faces of two modified deer phalanges.

The second type of worked bone recovered from Emmerson Springs is the bone bead. Most of these are fragmentary, and little can be said about them because they are so incomplete that measurements are not meaningful in most cases. Figure 65 shows the more complete examples, and illustrates the variability within this class of objects. Some appear to be made from avian elements, and others from mammalian elements. They are variable in length. The main consistency appears to be in method of manufacture: both the beads and the fragmentary beads show evidence of extensive cutting around the circumference, possibly snapping to remove the bead from the discarded end, followed by polishing. Snapping is inferred because several examples are broken above or below the cut line (see Figure 66). Four beads have measurable lengths: they are 29.7mm, 22.7 mm, 29.1 mm, and 25.1 mm. Diameters could not be determined because most were split.

Figure 65. Fragments of relatively complete bone beads

Figure 66. Bone bead fragments

In addition to bone beads and worked deer phalanges, we recovered one unfinished worked bone object. This is a caudal vertebra, possibly from a canid, that has been cut around its circumference, possibly in preparation for bead production.

Figure 67. Caudal vertebra (probable canid) incised around one end

The worked deer phalanges both derive from Midden 2. Five fragments of bone beads come from Midden 3, one comes from Midden 2, and eight come from the longhouse area. The inscribed caudal vertebra comes from Midden 2.

In sum, the worked bone assemblage from the 2003 and 2004 field seasons is not large, but includes a number of items that are typical of the 16th century Neutral. We anticipate finding more worked bone as the faunal remains from the excavations are systematically identified.

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Faunal Analysis

by Alicia Hawkins, Lindsay Swinarton and Adrian Keen

Introduction

Faunal identifications were made at the Howard Savage Faunal Osteo-Archaeology Laboratory at the University of Toronto. This report incorporates identifications made by four different analysts (those listed above, and Suzanne Needs-Howarth). Reports by the individual analysts may be consulted for details of the characteristics of individual samples (Keen 2005; Needs-Howarth 2005; Swinarton 2005). Appendix 9 lists identifications and notes which analyst made the identification. Each of us employed a slightly different recording system but these have been harmonized for this report. Analysis continues, but by the time of writing we had examined over 37,382 specimens and identified over 1800 to Order or a lower taxonomic category. Thus, while the proportions are likely to change when all of the identifications have been made, those completed to date are assumed to be representative of the nature of the fauna represented. This summary reports material excavated in the 2002-2004 field seasons in addition to a small sample from earlier excavations.

Background

The faunal remains from Emmerson Springs should be considered in comparison with remains known from nearby sites of approximately the same age. Berg (1986) describes a sample of 28,947 pieces from the Wallace site. Stewart (2000) summarizes findings from 13 Neutral Iroquoian sites, including four from the Oakville Creek drainage south of Emmerson Springs. Metate and Irving Johnson may be roughly coeval with Emmerson Springs, while Brown and Carton were likely occupied at a later date. All four sites are villages. Table 39 shows the distribution of the most important mammalian species at these sites based on Number of Identified Specimens Present (NISP). Although NISP is heavily affected by fragmentation, in this case breakage of bones appears to be in part cultural (resulting from cooking, marrow extraction and ravaging by carnivores) and one may assume that the similar patterns governed fragmentation of certain bones compared with others at all concerned sites. Percentage distribution based on NISP, while not providing an accurate estimate of the relative dietary importance, can be used for comparison among sites.

Remains of white-tailed deer predominate at all sites in question. Stewart (2000: 98) asserts that the Crawford Lake area south of Emmerson Springs is noted for high densities of deer, and points out that seventeenth century ethnohistoric sources record plentiful deer in the Neutral area. Contrary to Prevec and Noble (1983), she sees no change in the exploitation of deer over time. Both Stewart and Berg assert that white-tailed deer made a very significant contribution to the Neutral diet.

Stewart combines percentages of *Canis familiaris* with *Canis* sp. with the result that at Irving Johnson and Brown dog remains ranked second to white tailed deer. This is also the case at Wallace. Stewart does not identify a clear pattern in changes to dog frequency over time. Similarly, there does not appear to be an identifiable pattern in the exploitation of beaver over time. Other important mammalian species identified are black

bear, wapiti, racoon and grey squirrel. Fur-bearing carnivores such as martens, mink and fox are found in very small numbers at all sites. A variety of small rodent remains (mice and voles) may be intrusive, may have been eaten or may have been longhouse pests.

Both Stewart and Berg identified a variety of birds, reptiles, amphibians and fish. Whitefish, passenger pigeons, wild turkeys and box turtles are the most common species. Identifiable fish remains were few from Wallace site (13 identifiable fish specimens) compared with Irving Johnson (58) and Metate (111).

Table 39. Distribution of selected mammalian species from five sites close to Emmerson Springs. Percentages do not total to 100 because some specimens have been excluded from the list. The values for the five most common taxa are shown in bold.

Species	Wallace (1500-1600)	Irving Johnson (1563-1583)	Metate (1563-1583)	Carton (1600-1620)	Brown (1615-1630)
n	2456	1697	1118	205	1507
Sylvilagus floridanus	0.7	0.1	-	-	-
Lepus americanus	0.3	0.1	-	-	-
Tamia striatus	1.8	0.8	0.5	**4.4**	0.1
Marmota monax	**3.0**	0.4	**2.2**	0.5	0.5
Sciurus carolinensis	2.2	1.5	1.3	-	-
Castor canadensis	**7.8**	**6.5**	**15.7**	**8.8**	**11.0**
Ondatra zibethicus	0.8	0.2	0.4	-	-
Canis familiaris	**8.5**	**4.1**	1.4	1.0	**3.6**
Canis lupus	0.1	0.6	0.1	-	-
Vulpes vulpes	0.1	0.2	0.3	-	0.3
Urocyon cinereoargenteus	0.2	0.1	-	-	-
Procyon lotor	0.2	0.8	0.5	**2.0**	**2.6**
Martes americana	0.1	0.1	0.1	-	0.1
Ursus americanus	2.5	**4.5**	**5.0**	**10.2**	**5.1**
Odocoileus virginianus	**53.2**	**52.2**	**38.4**	**64.9**	**58.0**
Alces alces	0.2	0.2	-	-	-
Cervus elaphas	**4.9**	**3.8**	**2.4**	0.5	0.5

Methods

At this time, 1822 specimens have been identified to a taxonomic lever of Order or lower. Although different analysts made identifications, all of us recorded the following information: taxon of the specimen, element, portion and proportion of the element present, the nature of cultural and natural modifications to the bone, and the number of specimens. The list of identifications given in Appendix 8 reflects all excavated contexts. Swinarton identified material from the midden units N279E175, N287E159 and N285E159. Keen and Hawkins both identified material from the other midden unit excavated in 2003, N275E175. Hawkins identified material from the plough zone including both house areas and the disturbed midden area from 2002, 2003 and 2004. Keen identified bones from posts, features and test pits. Needs-Howarth identified a group of specimens from the 2002 excavations that Hawkins had isolated as identifiable

but which she had not identified. These mainly derive from one meter square units within the ploughed field.

Distribution by Class

Cataloguers separated specimens by class and weighed fragments at that time (see Appendix 10). However, many cataloguers were not trained faunal analysts, and there are a number of corrections to class assignments. We have not had an opportunity to re-weigh the corrected catalogue categories; therefore, at this time we only present the breakdown in class by number of specimens. The breakdown by class presented here is that we determined, not that determined by cataloguers (See Figure 68).

Mammalian remains clearly dominate the assemblage, making up 93 % of the examined fragments. Similarly, mammalian bone accounts for 97 % of the specimens recovered from Wallace site. At both Wallace and Emmerson Springs, the class ranked second by count is Osteichthyes, followed by Aves. However, there are significantly more fish elements at Emmerson Springs and we recovered a greater relative proportion of amphibian remains from Emmerson Springs.[2] The latter difference may be related to post-depositional site formation processes because many amphibian elements appear less weathered than other specimens.

Table 40. Breakdown of faunal material by class. Data for Wallace from Berg (1986: 6)

	Emmerson Springs		Wallace	
Class	N	%	N	%
Mammalia	34,257	92.6	28,113	97.1
Aves	115	0.3	146	0.5
Reptilia	25	0.1	66	0.2
Amphibia	88	0.2	10	0.0
Osteichthyes	2343	6.3	548	1.9
Crustacean	1	0.0	6	0.0
Pelycypod	34	0.1	58	0.2
Indeterminate	115	0.3	0	0.0
Total	36,978		28,947	

[2] Proportions of fish remains compared using a difference of proportions test. The standardized difference in Z-scores is 145.0, which exceeds 1.65, which the value for rejection a two tailed test with a significance level of 0.10.

Figure 68. Breakdown of faunal material by class (N follows class).

Fragmentation

In the course of cataloguing the Emmerson Springs material, it became clear that, like many other Iroquoian faunal assemblages, the faunal material is heavily impacted by fragmentation. Berg was able to identify less than 9% of the Wallace material and at this time, we have only been able to identify 4.9 % of the specimens we have examined. This may change but is unlikely to that the proportion of identifiable fragments will significantly increase.

Modification by fire

One contributing factor to the low rate of identification is the proportion of specimens that have been burned. Table 41 shows the number and percentage of burned fragments from Emmerson Springs and Wallace. Approximately 70% of the specimens from Wallace showed evidence of heat modification compared with 48% from Emmerson Springs. At this time, the reasons for this are unclear, but possible explanations lie in differences in recovery methods and in the contexts excavated. We screened all sediment at Emmerson Springs, while at Wallace sediment from the plough zone was not screened in the second year of excavation (Crawford no date). Calcined and burned bone may be more obtrusive than unmodified bone and excavators working without screens may have been more likely to find such objects. Further, Crawford's team aimed for 100% sampling of features for flotation and sampled the undisturbed midden at Wallace (F93) extensively. We selected a strategy of sampling approximate 50% of the midden deposit for flotation and screening remaining sediment through ⅛" mesh. The higher sampling for flotation may have resulted in recovery of a greater amount of fragmentary burned bone from Wallace.

The percentage of burned specimens varies by class, with 52% of mammalian fragments being burned, 16% of avian remains and only 3% of fish remains. Very small numbers of reptilian and amphibian bones were burned, accounting for 8 and 2 % respectively. The difference in the proportions probably arises from a variety of factors. Fish and bird bone are less likely to survive burning. Mammalian bone, particularly deer bone, is larger and will produce more bone fragments. Differential cooking practices may

result in variation in the proportion of burned bones, however it is likely that most bones were burned after cooking, not during cooking.

Table 41. Heat modification of faunal specimens

	Emmerson Springs		Wallace	
	N	%	N	%
Heat modified	18,026	48.2	20,746	71.7
Unmodified	19,356		8,201	
Total			28,947	

Mammalian findings

Table 42 lists the mammalian taxa identified, the Number of Identified Specimens (NISP) and the percentage of identified mammalian specimens made up by each taxon. The five most common taxa are shown in bold. The percentage of white-tailed deer, domestic dog and gray squirrel are likely higher than shown, but some specimens could only be identified to family or genus. Of the sites in the vicinity of Emmerson Springs, the distribution of mammalian remains is most similar to that from Irving Johnson. The remains from both sites are dominated by white-tailed deer, with beaver, dog and bear also being important. Woodchuck does not make up a significant proportion of the remains from either site, and beaver is not as prevalent as at later sites such as Metate and Brown.

The number of different taxa identified from Emmerson Springs is lower than that from Wallace and some of the other sites in the Crawford Lake area. However, a measure of diversity that accounts for variation in sample size shows that there is little difference among sites (Table 42). When diversity and the total list of specimens are considered, this indicates dependence on white-tailed deer with addition of a variety of other species, some probably used primarily for pelts, others were likely pests and finally others may have been post-habitation additions to the deposits.

Table 42. Richness of mammalian assemblages from five Neutral Iroquoian sites

	Emmerson Springs	Wallace	Irving Johnston	Metate	Carton	Brown
N	1381	2456	1697	1118	205	1507
s	22	25	24	20	11	19
dl = (s-1)/LN(n)	2.90	3.07	3.09	2.71	1.88	2.46

Table 43. Mammalian taxa identified in samples recovered from 2002-4 (NISP)

Taxon	NISP	%
Sylvilagus floridanus	2	0.1
cf. *Homo sapiens sapiens*, *Homo sapiens sapiens*	37	2.7
cf. Rodentia, Rodentia	3	0.2
cf. Sciuridae, Sciuridae	119	8.6
Sciuridae (cf. *Sciurus carolinensis*)	2	0.1
Sciuridae (cf. *Sciurus niger*)	1	0.1
cf. *Sciurus carolinensis*, *Sciurus carolinensis*	49	3.5
cf. *Tamiasciurus hudsonicus*	23	1.7
cf. *Tamia striatus*, *Tamia striatus*	29	2.1
cf. *Marmota monax*, *Marmota monax*	29	2.1
cf. *Castor canadensis*, *Castor canadensis*	63	**4.6**
Muridae/Cricetidae	26	1.9
cf. *Peromyscus* sp., *Peromyscus* sp.	11	0.8
Peromyscus maniculatus	81	**5.9**
cf. *Microtus* sp., *Microtus* sp.	2	0.1
Microtus pennsylvanicus	5	0.4
cf. *Ondatra zibethicus*, *Ondatra zibethicus*	6	0.4
Erethizon dorsatum	4	0.3
Carnivora	3	0.2
Canidae	3	0.2
cf. *Canis* sp., *Canis* sp.	30	2.2
cf. *Canis familiaris*, *Canis familiaris*	58	**4.2**
cf. *Canis lupus*, *Canis lupus*	10	0.7
Vulpes vulpes	12	0.9
Urocyon cinereoargenteus	11	0.8
cf. *Ursus americanus*, *Ursus americanus*	85	**6.2**
cf. *Procyon lotor*, *Procyon lotor*	18	1.3
Mustelidae	1	0.1
Mustelidae (cf. *Gulo gulo*)	1	0.1
cf. *Mustela vison*	4	0.3
Martes pennanti	2	0.1
Artiodactyla	5	0.4
cf. Cervidae, Cervidae	73	5.3
cf. *Cervus elaphus*, *Cervus elaphus*	36	2.6
cf. *Odocoileus virginianus*, *Odocoileus virginianus*	536	**38.8**
cf. *Alces alces*	1	0.1
	1381	

Rodentia:

Elements from nine rodent species are present in the sample.

Several rodent species may represent intrusive animals or longhouse pests and may be of little economic importance. In particular, remains of deer mice and woodchuck are particularly complete, less stained than other bones and a number of elements of each species were found in the same context. Meadow voles are also of questionable archaeological significance.

A number of complete probable deer mouse elements were recovered in posts 359 and 407. Post 407 is a large, unusually shaped post that forms part of the house wall. Post 359 also forms part of the house wall, but is much smaller and is not irregular in shape. It is possible that both of these stains represent rodent burrows, however given that they fall on the line of posts that makes up the wall, it is also possible that mice nested in the walls either during the habitation of the house or after it was abandoned.

We did not recover woodchuck remains from features or posts in this excavation season. Woodchuck remains include two specimens that are burnt, suggesting that the previous inhabitants of Emmerson Springs did use this species. Further, the specimens that derive from unploughed midden deposits are incomplete, supporting the idea that woodchuck was used for meat or skins. However, other woodchuck remains may result from natural deaths. A number of complete, or nearly complete unburned specimens that all may have derived from a single individual were recovered from plough zone contexts in the N275E196 area.

Eastern chipmunks are also a burrowing species (Peterson 1966: 123), and therefore skeletal elements may represent natural deaths. However, many of the specimens are burnt and few specimens are found together in identical contexts. Most of the chipmunk elements derive from the midden units but are found throughout the deposits. A large number specimens are represented by 50% of the element or less, also suggesting that these are not *in situ* natural deaths.

Chipmunks and woodchucks are hibernating species (Peterson 1966: 116, 123), and utilization of these species suggests that the site was occupied between March and November.

Gray squirrel and red squirrel remains include both burnt and unmodified specimens. Most of the elements attributed to squirrel species were recovered from the midden units, but again, elements were found in different levels. The reason for this may lie in recovery methods. Flotation and use of ⅛" mesh screen increases the probability of recovering small mammalian remains. While grey squirrel remains far outnumbered red squirrel remains at Wallace (NISP: 54 grey squirrel vs. 3 red squirrel), at Emmerson Springs red squirrel accounts for about one half of the squirrel bones found. Both sites are well within the ranges of both species, although grey squirrels prefer hardwood forests (Peterson 1966: 108). It is likely that both species were used for food and fur. Stewart (2000: 102) suggests that chipmunks and squirrels were intentionally taken for furs. Nothing in the findings from Emmerson Springs suggests that this is not the case.

Two species of fine fur-bearing rodents are represented at Emmerson Springs: muskrat and beaver. As at other sites in the region, beaver is a much more important species than muskrat, which is represented by only a few elements (six in this case). Beaver accounts for nearly 5% of the remains from Emmerson Springs identified this year. In comparison with the findings from coeval sites (see Table 39), beaver makes up a relatively low proportion of identified specimens. However, at Irving Johnson, Metate and Brown beaver specimens rank second most numerous after white-tailed deer. At

Emmerson Springs, Carton and Wallace, they are the third most commonly recovered specimens. Although the number of identified specimens at most of these sites is greater than 1000, it is not clear the degree to which variability is affected by different analysts, different excavation contexts and recovery methods and different site types. At this time, it seems safe to conclude that beaver played an important role in the economy of the inhabitants of Emmerson Springs, undoubtedly being used for both fur and food. However, further conclusions, particularly with respect to the increasing importance of beaver through time resulting from the fur-trade, seem premature at this time.

Porcupine is represented by four elements. This species is common in the region.

Carnivora:

Elements from seven carnivore species from the families Canidae, Ursidae, Procyonidae, and Mustelidae are represented in the sample.

Canids are represented in the Emmerson Springs assemblage by dog, timber wolf, red fox and grey fox.

Domestic dog is the most common of the canids present. Domestic dog is also important at Wallace, Irving Johnson and Carton. All portions of the dog skeleton are represented. Dog bones are recovered in a variety of contexts and both burnt and unmodified specimens are present. Six of the dog specimens showed cut marks. These occurred on foot bones (metacarpals, metatarsals and phalanges), and on the innominate. A possible pathology was noted on one specimen: a scapula with evidence of arthritis. Both adult and immature dogs are present.

Ten specimens represent the timber wolf and these derive from a variety of contexts, and represent different body parts. Two of the wolf specimens are burnt but none show evidence of cut marks.

A large number of the *Canis* identifications come from Feature 160, a small pit. Based on size, it is likely that these represent a single wolf, however at this time we cannot rule out the possibility that the specimen is a coyote or large dog. Seventeen specimens from Feature 160 all come from the same individual. Feature 160 is located on the southern house wall, in the house interior.

Red fox is represented by twelve elements. This fur-bearing species is attracted to the disturbed habitats created by humans. None of the specimens show evidence of cut marks.

Grey fox, a species extirpated from southern Ontario, is represented by eleven specimens. All but one of the grey fox elements were recovered from one of the Midden 1 units. Several of these were recovered in close stratigraphic proximity and may derive from a single individual. Grey fox bones also occur in small numbers in other Neutral faunal assemblages.

Black bears, the only Ursid present in the region, are a relatively important mammalian species at Emmerson Springs. We identified 85 elements as black bear, which constitutes 6.2% of the assemblage and makes bear the species with the second most numerous. Adult and immature bears are represented. Bear bones are both burnt and unmodified by fire. Eight specimens bore cut marks. One unusual find is a worked bear phalanx, that had been treated in a similar fashion as worked deer phalanges. The distribution of bear bones by body part is worth noting. Elements from the distal extremities (carpals, tarsals, metapodials and phalanges) account for 53% of the bear

identifications, and cranial elements make up 33%. Berg (1986: 9) notes that phalanges and metapodials account for over half of the ursid bones from Wallace. This could suggest that entire bears were not transported to the site, and some bear specimens may be present because bear skulls and feet were maintained in skins. A second interpretation of this pattern is that the upper extremities and thoracic elements were reduced to unidentifiable fragments in order to extract marrow and fat.

Raccoons are represented by 18 elements that were recovered from both the field edge and house end midden. Some raccoon elements are burnt, and one showed evidence of cut marks.

Fur-bearing mustelids – weasels, mink, fisher, skunk and marten – make up a small proportion of assemblages in the Emmerson Springs region. Bones from two mustelids, a mink and a fisher, were identified with certainty. Additionally one specimen may derive from the wolverine.

Artiodactyla:

Three artiodactyls, all of them cervids, are represented in the sample.

The white-tailed deer is the species represented by the greatest number of specimens at Emmerson Springs and all the other Neutral sites discussed. If the percentage for Cervidae sp. are added to that of *Odocoileus virginianus*, the total is nearly 45%. This is slightly lower that the percentages calculated for some of the Crawford Lake sites, however the pattern from Emmerson Springs is not very different from that of other locations. Examination of the identifications by body portion shows that distal extremity bones are well represented, making up 56% of the identified specimens. This is almost certainly related to processing: lower extremities do not bear significant amounts of meat and were not apparently used for fat or marrow. Thoracic and upper extremity bones are present, but in lower proportions likely because these were reduced to unidentifiable fragments in processing. Nearly 30% of the white-tailed deer specimens are burnt and some show evidence of cutting (10%). Relatively few are worked (1%). A small number are gnawed (4%) and a few have been digested (2%).

A small number of elements represent wapiti (American elk) at both Emmerson Springs and other Neutral sites in the region. The wapiti is extirpated from southern Ontario, and the sub-species of wapiti once present in this area is now extinct (Peterson 1966: 321).

One element possibly represents a moose. The distribution of moose in recorded history does not extend as far south as Emmerson Springs (Peterson 1966: 328-329). However, moose is a minor component of other Neutral assemblages.

Minimum numbers of individuals and meat weights are not calculated in this report for a variety of reasons. It is clear, nevertheless, that artiodactyls would have made a very significant contribution to the economy of the inhabitants of Emmerson Springs.

Avian Findings

Avian remains make up a very small portion of the total faunal remains from Emmerson Springs (0.3%). Of the specimens identified as avian, only 17 have been identified to species (Table 44) and these represent a minimum of five taxa: the Common Loon, a dabbling duck, the Canada goose, Sandhill crane and Passenger pigeon. Passenger pigeon remains are the most numerous, as was also the case at the Wallace site.

Passenger pigeons are now extinct, the last dying in captivity in the early twentieth century. Sandhill crane is also commonly recovered in assemblages from Iroquoian sites. It is noteworthy that the remaining species are all waterfowl.

Table 44. Avian taxa identified in samples recovered from 2002-4 (NISP)

Taxon	NISP	%
Gavia immer	1	5.9
Anatidae	1	5.9
Anas sp.	1	5.9
Branta canadensis	3	17.6
cf. *Grus canadensis*, *Grus canadensis*	2	11.8
cf. *Ectopistes migratorius*, *Ectopistes migratorius*	9	52.9

Reptilian findings

Two orders of reptiles are present in Ontario and both are represented in the sample: turtles and snakes. Most of the reptilian specimens are small fragments of turtle carapace or plastron but these are not complete enough to allow for identification. Identified specimens include a carapace fragment from a snapping turtle, one mandible of a box turtle and four shell fragments from the painted turtle.

One vertebra has tentatively been identified as a garter snake, but the reference collections available are not complete enough to rule out all other species.

Table 45. Reptilian taxa identified in samples recovered from 2002-4 (NISP)

Taxon	NISP	%
Chelonia (Testudines)	15	
Chelydridae	1	11.1
Emydidae	1	11.1
Terrapene carolina	1	11.1
Chrysemys picta	4	44.4
cf. Thamnophis siralis	2	22.2

Amphibian findings

Amphibian remains derive mainly from midden contexts. It was possible to identify a number of specimens as either toad (Bufo) or frog (Rana), i.e., Anura. However, in only a few cases were we able to distinguish between the two. None of the specimens are burnt and several are complete. It therefore seems possible that some or all of the specimens are recent additions to the deposits.

Table 46. Amphibian taxa identified in samples recovered from 2002-4 (NISP)

Taxon	N
Anura	21
Bufo sp.	5
Rana sp.	8

Fish findings

Fish remains (6.3%) are more numerous than any other class of remains except for mammalian remains. Most fish elements are vertebrae, of which a portion have been identified primarily by Swinarton.

Table 47 shows the taxa of the identified specimens. Five orders are represented, and in several cases these are represented by a number of different taxa. The most numerous are salmonids and catostomids. Channel catfish prefer large deep bodies of water and it is unlikely that they were procured from the bodies of water in the immediate vicinity of Emmerson Springs. Clearly fish were an important component of the diet of the inhabitants of Emmerson Springs. Further identifications may assist in understanding fishing methods, and seasonality.

Table 47. Osteichthyes taxa identified in samples recovered from 2002-4 (NISP)

Order	Taxon	Common name	NISP
Anguilliformes	Anguilla rostrata	American eel	8
Cypriniformes	Cypriniformes (creek chub or similar)	Minnows and suckers	1
	Catostomidae	Suckers	72
	Catostomidae (cf. Moxostoma erythrurum)	Golden redhorse	1
	Moxostoma sp.	Redhorse	1
	Catostomus cf. commersonnii	White sucker	2
Siluriformes	Ictaluridae	Bullheads and catfish	8
	Ictaluridae (cf. bullhead)	Bullhead	1
	Ictalurus sp.	Bullheads and catfish	8
	cf. Ictalurus punctatus	Channel catfish	1
	Ameiurus sp.	Bullheads	1
Esociformes	Esocidae	Pike	1
Salmoniformes	Salmonidae	Salmon, trout	214
	Salmonidae (cf. trout)	Trout	1
	Salmonidae (cf. whitefish, herring)	Whitefish, herring	1
	Coregonus sp.	Whitefish	6
Perciformes	Centrarchidae	Sunfish	4
	Micropterus cf. dolomieu	Bass	1
	Percidae	Perch	2
	Sciaenidae	Drums and croakers	1

Other identifications

In addition to the specimens listed above, we recovered one calcined crayfish claw and 34 bivalve fragments, several of which are assigned to the family Unionidae.

Seasonality

A few taxa are useful for determination of the seasons of occupation of Emmerson Springs.

The avian species, the Common loon and the Canada goose, are present in the area in the spring and fall. The Canada goose may also breed in the area in the summer. Although now present throughout the winter, this is a recent change in migration habits.

Two mammalian species are discontinuous hibernators: the woodchuck and the eastern chipmunk. Both species are found mainly between March and October.

Finally, a frontal with an attached antler was identified. White-tailed deer shed antler in February or March and these grow quickly in the spring and reach full size in the fall before rutting season (Peterson 1966). The animal in question was likely killed in the summer or fall.

Swinarton (2005) has noted a number of immature individuals represented in the sample. These include a deer mouse, two squirrel, and a chipmunk. All died either in the spring or fall. Additionally, an immature red fox died sometime in the summer.

M. Latta (personal communication) has suggested that Emmerson Springs represents a spring and summer hamlet. At this time there is no definitive evidence that inhabitants were present in the winter, but several lines of evidence suggest a spring through fall occupation.

Discussion

As described above, the settlement patterns and material culture uncovered at Emmerson Springs in 2004 confirms its identification as a Late Iroquoian village, probably with affinities to other sites on the Niagara Escarpment or the Spencer-Bronte creek drainages. Given the estimated date of 1550 to 1580, identification as 'Huron' or 'Neutral' may be premature.

The introduction to this report introduced several research questions, which will now be considered.

1) Where are the longhouse walls associated with the features uncovered by excavations in 2002 and 2003?

The longhouse on the lower terrace runs approximately east to west, and our excavations appear to have uncovered the western end of this house. A row of posts immediately south of this may represent a second house or a palisade. A row of posts in an isolated unit to the east may represent an extension of the first house or may be a third house.

2) What is the nature of the hillslope midden north of midden units N275E175 and N279E175?

The hillslope midden at E159 appears quite localized, with the unit at N285 being much richer and deeper than that at N287. It appears that artefacts accumulated in a natural crevasse. None of the material in N285 appears plough disturbed, but the upper levels do appear to be formed by slopewash.

3) What is the extent of the hillslope midden?

Examination of this midden by testpitting determined that it extended from the top of the slope to the creek. However, it did not have great lateral extent, occurring mainly on the slope below N280-N287.

4) Is the estimation of site size determined in 2002 correct?

A second session of testpitting of the north section of the field, focussing on the eastern half did not result in a radical change in the estimation of site size.

Artefacts recovered in the 2004 season did little to change our assessment of the site age, nature or cultural affiliation. We recovered more copper-based metal but no glass trade beads. The pottery is dominated by types with vertical or oblique lines one the rim. The faunal remains suggest a group of people dependent primarily on white-tailed deer, but who also exploited a number of other species. There is nothing to suggest that this was not a small village dating to about 1550-1580, and occupied throughout the year.

Conclusions

The 2004 excavations at Emmerson Springs resulted in an expanded understanding of the settlement patterns of the site, and in the extent of the midden deposits adjacent to this area.

Suggestions for future excavations include:

1) expanding the excavations in to determine the length of longhouse 1;
2) expanding the excavations to the south to determine whether the row of posts paralle1 to longhouse 1 represent a second house or a palisade;
3) investigation of the area to the east where we discovered a clear row of posts;
4) investigation of the settlement pattern on the upper terrace; and
5) limited excavation of the Midden 1.

Midden 1 is a rich resource. The basic proportions of different animal species did not change a great deal when the sample examined was expanded from about 10,000 to over 30,000. Therefore, it seems unlikely that further identifications will result in major changes in the future. Similarly, the nature of other artifact classes appears to be fairly well known at this time. Therefore, excavation in Midden 1, which provides mainly artifactual and ecofactual data, should be conducted conservatively to preserve deposits for future excavations.

Emmerson Springs once again provided students with the opportunity to excavate in different contexts and gave them exposure to a wide range of artefact types. The site is a valuable resource and could be used in an educational context for many years to come.

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Appendix 1. Permissions granted by the property owner.

ONTARIO HERITAGE FOUNDATION
FONDATION DU PATRIMOINE ONTARIEN

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May 11, 2004

Dr. Scott I. Fairgrieve, Chair
Anthropology Program,Laurentian University
Ramsey Lake Road
Sudbury, ON
P3E 2C6

Dear Dr. Fairgrieve,

Thank you for your letter requesting permission to conduct an archaeological field school on the Scotsdale Farm property. At this time, the Ontario Heritage Foundation is pleased to allow the field school to take place with certain conditions. As discussed in my telephone conversation with Dr. Hawkins on April 21st, the Foundation is not able to grant your request for camping on this property in August. The group will have to make arrangements offsite. Use of Foundation buildings is also not possible in August due to prior Foundation commitments. We would also require that the University confirm that third party liability insurance will be provided for your students.

The availability of the Foundation's Archaeologist, Dena Doroszenko will depend upon her scheduled Foundation commitments. Once her schedule has been confirmed, her actual field participation time will be communicated to Dr. A. Hawkins. Ms. Doroszenko will also confirm with Dr. Hawkins the availability of field excavation equipment that could be made available to the project, and the requirements of Foundation archaeological projects.

The Ontario Heritage Foundation looks forward to working with Laurentian at Emmerson Springs.

Sincerely,

Beth Hanna

Beth Hanna,
Director
Heritage Programs and Operations

Cc: Dr. A. Hawkins

10 Adelaide Street East, Toronto, Ontario M5C 1J3 Telephone: (416) 325-5000 Facsimile: (416) 325-5071
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Appendix 2. Soil feel test used for assessment of soil texture

Figure 2–3. Determining soil texture by the "feel method." Taken from "A Flow Diagram for Teaching Texture-by-Feel Analysis," by Steve J. Thien, Journal of Agronomic Education, Vol. 8, 1979, pp. 54–55.

Appendix 3. Plan and profile photographs

N270E198

N276E192

N278E191

N272E198

Appendix 4. Data from Geophysical Surveys

Resistivity, June 2005
Current (I) = 20 mA
Resistance = R = V/I
Resistivity = 2παR
α = probe spacing = 1 m

Station N	V – E185	R – E185	Resist E185	V – E190	R – E190	Resist E190	V – E190	R – E190	Resist E190	Notes

Station E	V – N280	R – N280	Resist	V- N275	R – N280	Resist	V- N270	R – N280	Resist	Notes
173.5	**0.1579**	7.9	50	**0.1751**	8.76	55				Excavated and backfilled unit
174.5	**0.164**	8.2	52	**0.1751**	8.76	55				Excavated and backfilled unit
175.5	0.1645	8.23	52	0.176	8.8	55				
176.5	0.1403	7.02	44	0.1551	7.76	49				
177.5	0.1525	7.63	48	0.1655	8.28	52				
178.5	0.1921	9.61	60	0.1576	7.88	50	0.1663	8.32	52	
179.5	0.1606	8.03	50	0.1892	9.46	59	0.1797	8.99	56	
180.5	0.1845	9.23	58	0.2002	10	63	0.1754	8.77	55	
181.5	0.1915	9.58	60	0.2212	11.1	69	0.1991	9.96	63	
182.5	0.2264	11.3	71	0.2203	11	69	0.1768	8.84	56	
183.5	0.1952	9.76	61	0.2248	11.2	71	0.2441	12.2	77	
184.5	0.2222	11.1	70	0.2268	11.3	71	0.1782	8.91	56	
185.5	0.1858	9.29	58	0.225	11.3	71	0.2348	11.7	74	
186.5	0.1872	9.36	59	0.2126	10.6	67	0.1942	9.71	61	
187.5	0.1754	8.77	55	0.2188	10.9	69	0.2165	10.8	68	
188.5	0.1748	8.74	55	0.1861	9.31	58	0.2252	11.3	71	
189.5	**0.1486**	7.43	47	0.1856	9.28	58	0.1982	9.91	62	Excavated and backfilled unit and open unit
190.5	**0.2408**	12	76	0.2044	10.2	64	0.2263	11.3	71	Open unit: measurement in subsoil
191.5	**0.0929**	4.65	29	0.1826	9.13	57	0.2052	10.3	64	Open unit: measurment in subsoil
192.5	**0.3074**	15.4	97	**0.2299**	11.5	72	0.2159	10.8	68	Open unit: measurment in subsoil
193.5	**0.0855**	4.28	27	**0.1873**	9.37	59	0.2046	10.2	64	Backdirt pile over previously excavated unit
194.5	**0.228**	11.4	72	**0.202**	10.1	63	0.2531	12.7	80	Backdirt pile over previously excavated unit
195.5	**0.188**	9.4	59	**0.2022**	10.1	64	0.1961	9.81	62	Excavated and backfilled units north and south

196.5	**0.1544**	7.72	49	**0.242**	12.1	76	0.2358	11.8	74	Excavated and backfilled unit south
197.5	**0.1516**	7.58	48	**0.1777**	8.89	56	**0.1725**	8.63	54	Excavated and backfilled unit south
198.5	**0.1512**	7.56	48	**0.2426**	12.1	76	**0.2363**	11.8	74	Excavated and backfilled unit south
199.5	**0.1346**	6.73	42	**0.1915**	9.58	60	**0.0073**	0.37	2.3	Excavated and backfilled units north and south
200.5	**0.1303**	6.52	41	0.1887	9.44	59	**0.1209**	6.05	38	Excavated and backfilled unit south
201.5	**0.1122**	5.61	35	0.2318	11.6	73	0.1061	5.31	33	Excavated and backfilled unit south
202.5	0.1606	8.03	50				0.0729	3.65	23	
203.5	0.1969	9.85	62				0.0773	3.87	24	
204.5	0.1953	9.77	61				0.2119	10.6	67	
205.5	0.2262	11.3	71				0.2007	10	63	
206.5	0.217	10.9	68				0.1734	8.67	54	
207.5	0.2411	12.1	76				0.1726	8.63	54	
208.5	0.2513	12.6	79				0.1696	8.48	53	
209.5	0.1963	9.82	62				0.1545	7.73	49	
210.5	0.183	9.15	57				0.1461	7.31	46	
211.5	0.1668	8.34	52				0.1447	7.24	45	
212.5	0.1313	6.57	41				0.1289	6.45	40	
213.5	0.1516	7.58	48				0.1256	6.28	39	
214.5	0.1286	6.43	40				0.1496	7.48	47	
215.5	0.1414	7.07	44				0.1297	6.49	41	
216.5	0.1175	5.88	37				0.1691	8.46	53	
217.5	0.1076	5.38	34				0.1436	7.18	45	
218.5	0.1036	5.18	33				0.1667	8.34	52	
219.5	0.0976	4.88	31				0.1742	8.71	55	
220.5	0.1042	5.21	33				0.2034	10.2	64	
221.5	0.1059	5.3	33				0.1992	9.96	63	
222.5	0.1119	5.6	35				0.1903	9.52	60	
223.5	0.1045	5.23	33				0.1466	7.33	46	
224.5	0.1191	5.96	37				0.1319	6.6	41	
225.5	0.1135	5.68	36				0.1149	5.75	36	
226.5	0.1106	5.53	35				0.1365	6.83	43	
227.5	0.0919	4.6	29				0.0964	4.82	30	
228.5	0.0825	4.13	26				0.1001	5.01	31	
229.5	0.1121	5.61	35				0.1008	5.04	32	
230.5	0.0969	4.85	30				0.0981	4.91	31	
231.5	0.0963	4.82	30				0.0978	4.89	31	

232.5	0.1436	7.18	45	0.1241	6.21	39
233.5	0.1449	7.25	46	0.1107	5.54	35
234.5	0.164	8.2	52	0.1198	5.99	38
235.5	0.1771	8.86	56	0.113	5.65	35
236.5	0.1791	8.96	56	0.1101	5.51	35
237.5	0.1693	8.47	53	0.1263	6.32	40
238.5	0.1415	7.08	44	0.1207	6.04	38
239.5	0.1224	6.12	38	0.1569	7.85	49
240.5				0.1407	7.04	44
241.5				0.1348	6.74	42
242.5				0.149	7.45	47
243.5				0.1579	7.9	50
244.5				0.1421	7.11	45

Resistivity, August 2005
Current (I) = 5 mA
Resistance = R = V/I
Resistivity = $2\pi\alpha R$
α = probe spacing = 0.5 m

Station N	V – E185	R – E185	Resist - E185	V – E190	R – E190	Resist - E190	V – E190	R – E190	Resist - E190	Notes
250.75	0.54	108	339.3	0.42	84	263.9	0.57	114	358.1	Excavated and backfilled unit
251.25	0.48	96	301.6	0.38	76	238.8	0.5	100	314.2	Excavated and backfilled unit
251.75	0.43	86	270.2	0.35	70	219.9	0.56	112	351.9	
252.25	0.44	88	276.5	0.39	78	245.0	0.43	86	270.2	
252.75	0.39	78	245.0	0.32	64	201.1	0.46	92	289.0	
253.25	0.45	90	282.7	0.38	76	238.8	0.47	94	295.3	
253.75	0.47	94	295.3	0.32	64	201.1	0.5	100	314.2	
254.25	0.52	104	326.7	0.42	84	263.9	0.61	122	383.3	
254.75	0.55	110	345.6	0.41	82	257.6	0.58	116	364.4	
255.25	0.59	118	370.7	0.42	84	263.9	0.56	112	351.9	
255.75	0.57	114	358.1	0.38	76	238.8	0.44	88	276.5	
256.25	0.57	114	358.1	0.37	74	232.5	0.48	96	301.6	
256.75	0.51	102	320.4	0.37	74	232.5	0.43	86	270.2	
257.25	0.48	96	301.6	0.32	64	201.1	0.46	92	289.0	
257.75	0.43	86	270.2	0.42	84	263.9	0.45	90	282.7	
258.25	0.41	82	257.6	0.45	90	282.7	0.4	80	251.3	
258.75	0.38	76	238.8	0.53	106	333.0	0.44	88	276.5	Excavated and backfilled unit and open unit
259.25	0.34	68	213.6	0.5	100	314.2	0.48	96	301.6	Open unit: measurement in subsoil
259.75	0.41	82	257.6	0.6	120	377.0	0.47	94	295.3	Open unit: measurment in subsoil

Station	V – NE185	R – E185	Resist - E185	V – E190	R – E190	Resist - E190	V – E190	R – E190	Resist - E190	Notes
260.25	0.44	88	276.5	0.61	122	383.3	0.58	116	364.4	Open unit: measurment in subsoil
260.75	0.45	90	282.7	0.54	108	339.3	0.54	108	339.3	Backdirt pile over previously excavated unit
261.25	0.52	104	326.7	0.49	98	307.9	0.54	108	339.3	Backdirt pile over previously excavated unit
261.75	0.48	96	301.6	0.46	92	289.0	0.47	94	295.3	Excavated and backfilled units north and south
262.25	0.46	92	289.0	0.45	90	282.7	0.46	92	289.0	Excavated and backfilled unit south
262.75	0.5	100	314.2	0.52	104	326.7	**0.43**	86	270.2	Excavated and backfilled unit south
263.25	0.48	96	301.6	0.49	98	307.9	**0.41**	82	257.6	Excavated and backfilled unit south
263.75	0.42	84	263.9	0.87	174	546.6	**0.45**	90	282.7	Excavated and backfilled units north and south
264.25	0.45	90	282.7	0.69	138	433.5	**0.44**	88	276.5	Excavated and backfilled unit south
264.75	0.49	98	307.9	0.77	154	483.8	0.57	114	358.1	Excavated and backfilled unit south
265.25	0.46	92	289.0	0.65	130	408.4	0.55	110	345.6	
265.75	0.47	94	295.3	0.65	130	408.4	0.66	132	414.7	
266.25	0.53	106	333.0	0.53	106	333.0	0.61	122	383.3	
266.75	0.53	106	333.0	0.52	104	326.7	0.68	136	427.3	
267.25	0.56	112	351.9	0.51	102	320.4	0.52	104	326.7	
267.75	0.5	100	314.2	0.49	98	307.9	0.6	120	377.0	
268.25	0.41	82	257.6	0.52	104	326.7	0.51	102	320.4	
268.75	0.5	100	314.2	0.45	90	282.7	0.56	112	351.9	
269.25	0.39	78	245.0	0.49	98	307.9	0.53	106	333.0	
269.75	0.41	82	257.6	0.53	106	333.0	0.54	108	339.3	
270.25	0.35	70	219.9	0.41	82	257.6	0.6	120	377.0	
270.75	0.4	80	251.3	0.43	86	270.2	0.53	106	333.0	
271.25	0.31	62	194.8	0.4	80	251.3	0.57	114	358.1	
271.75	0.36	72	226.2	0.4	80	251.3	0.65	130	408.4	
272.25	0.41	82	257.6	0.43	86	270.2	0.57	114	358.1	
272.75	0.42	84	263.9	0.47	94	295.3	0.57	114	358.1	
273.25	0.43	86	270.2	0.45	90	282.7	0.69	138	433.5	
273.75	0.37	74	232.5	0.4	80	251.3	0.73	146	458.7	
274.25	0.48	96	301.6	0.35	70	219.9	0.72	144	452.4	
274.75	0.5	100	314.2	0.39	78	245.0	0.65	130	408.4	
275.25	0.54	108	339.3	0.47	94	295.3	0.74	148	465.0	
275.75	0.6	120	377.0	0.59	118	370.7	0.59	118	370.7	
276.25	0.51	102	320.4	0.54	108	339.3	0.64	128	402.1	
276.75	0.48	96	301.6	0.65	130	408.4	0.68	136	427.3	

Station	V – NE185	R – E185	Resist - E185	V – E190	R – E190	Resist - E190	V – E190	R – E190	Resist - E190	Notes
277.25	0.6	120	377.0	0.52	104	326.7	0.97	194	609.5	
277.75	0.55	110	345.6	0.55	110	345.6	0.65	130	408.4	
278.25	0.44	88	276.5	0.46	92	289.0	0.87	174	546.6	
278.75	0.43	86	270.2	0.3	60	188.5	0.57	114	358.1	
279.25	0.47	94	295.3	0.27	54	169.6	0.76	152	477.5	
279.75	0.47	94	295.3	0.26	52	163.4	0.72	144	452.4	
280.25	0.51	102	320.4	0.32	64	201.1	0.92	184	578.1	
280.75	0.47	94	295.3	0.45	90	282.7	0.74	148	465.0	
281.25	0.38	76	238.8	0.5	100	314.2	0.87	174	546.6	
281.75	0.47	94	295.3	0.58	116	364.4	0.66	132	414.7	
282.25	0.45	90	282.7	0.68	136	427.3	0.66	132	414.7	
282.75	0.41	82	257.6	0.66	132	414.7	0.53	106	333.0	
283.25	0.46	92	289.0	0.65	130	408.4	0.53	106	333.0	
283.75	0.5	100	314.2	0.66	132	414.7	0.45	90	282.7	
284.25	0.48	96	301.6	0.48	96	301.6	0.46	92	289.0	
284.75	0.4	80	251.3	0.52	104	326.7	0.54	108	339.3	
285.25	0.59	118	370.7	0.49	98	307.9	0.45	90	282.7	
285.75	0.35	70	219.9	0.48	96	301.6	0.4	80	251.3	
286.25	0.41	82	257.6	0.5	100	314.2	0.46	92	289.0	
286.75	0.27	54	169.6	0.42	84	263.9	0.42	84	263.9	
287.25	0.25	50	157.1	0.33	66	207.3	0.5	100	314.2	
287.75	0.25	50	157.1	0.29	58	182.2	0.59	118	370.7	
288.25	0.22	44	138.2	0.3	60	188.5	0.63	126	395.8	
288.75	0.25	50	157.1	0.3	60	188.5	0.66	132	414.7	
289.25	0.31	62	194.8	0.52	104	326.7	0.72	144	452.4	
289.75	0.34	68	213.6	0.59	118	370.7	0.64	128	402.1	
290.25	0.43	86	270.2	0.69	138	433.5	0.8	160	502.7	
290.75	0.4	80	251.3	0.86	172	540.4	0.7	140	439.8	
291.25	0.44	88	276.5	0.66	132	414.7	0.82	164	515.2	
291.75	0.43	86	270.2	0.63	126	395.8	0.84	168	527.8	
292.25	0.4	80	251.3	0.52	104	326.7	0.86	172	540.4	
292.75	0.42	84	263.9	0.42	84	263.9	0.67	134	421.0	
293.25	0.37	74	232.5	0.48	96	301.6	0.67	134	421.0	
293.75	0.41	82	257.6	0.46	92	289.0	0.66	132	414.7	
294.25	0.37	74	232.5	0.43	86	270.2	0.54	108	339.3	
294.75	0.39	78	245.0	0.44	88	276.5	0.68	136	427.3	
295.25	0.38	76	238.8	0.35	70	219.9	0.6	120	377.0	
295.75	0.37	74	232.5	0.39	78	245.0	0.66	132	414.7	
296.25	0.41	82	257.6	0.34	68	213.6	0.6	120	377.0	
296.75	0.4	80	251.3	0.31	62	194.8	0.57	114	358.1	
297.25	0.45	90	282.7	0.29	58	182.2	0.52	104	326.7	
297.75	0.36	72	226.2	0.35	70	219.9	0.5	100	314.2	
298.25	0.45	90	282.7	0.32	64	201.1	0.48	96	301.6	
298.75	0.4	80	251.3	0.37	74	232.5	0.47	94	295.3	

Station N	V – E185	R – E185	Resist - E185	V – E190	R – E190	Resist - E190	V – E190	R – E190	Resist - E190	Notes
299.25	0.41	82	257.6	0.42	84	263.9	0.5	100	314.2	
299.75	0.35	70	219.9	0.43	86	270.2	0.48	96	301.6	
300.25	0.38	76	238.8	0.46	92	289.0	0.57	114	358.1	
300.75	0.4	80	251.3	0.57	114	358.1	0.44	88	276.5	
301.25	0.32	64	201.1	0.53	106	333.0	0.46	92	289.0	
301.75	0.4	80	251.3	0.56	112	351.9	0.47	94	295.3	
302.25	0.33	66	207.3	0.57	114	358.1	0.39	78	245.0	
302.75	0.33	66	207.3	0.55	110	345.6	0.51	102	320.4	
303.25	0.39	78	245.0	0.6	120	377.0	0.4	80	251.3	
303.75	0.33	66	207.3	0.58	116	364.4	0.51	102	320.4	
304.25	0.44	88	276.5	0.63	126	395.8	0.44	88	276.5	
304.75	0.52	104	326.7	0.62	124	389.6	0.43	86	270.2	
305.25	0.53	106	333.0	0.58	116	364.4	0.5	100	314.2	
305.75	0.63	126	395.8	0.6	120	377.0	0.49	98	307.9	
306.25	0.47	94	295.3	0.76	152	477.5	0.62	124	389.6	
306.75	0.47	94	295.3	0.61	122	383.3	0.57	114	358.1	
307.25	0.48	96	301.6	0.83	166	521.5	0.65	130	408.4	
307.75	0.46	92	289.0	0.61	122	383.3	0.59	118	370.7	
308.25	0.55	110	345.6	0.75	150	471.2	0.53	106	333.0	
308.75	0.56	112	351.9	0.73	146	458.7	0.56	112	351.9	
309.25	0.54	108	339.3	0.7	140	439.8	0.63	126	395.8	

Magnetometer data, June 2004
Readings: nanoteslas - 57000

Station Easting	N 280	Station Easting	N 280	Station Easting	N 280
195	376	203	403	211	377
195.5	377	203.5	383	211.5	395
196	410	204	409	212	399
196.5	394	204.5	410	212.5	397
197	419	205	402	213	389
197.5	634	205.5	405	213.5	398
198	690	206	410	214	403
198.5	441	206.5	386	214.5	399
199		207	409	215	396
199.5		207.5	409	215.5	404
200		208	385	216	396
200.5		208.5	386	216.5	428
201		209	389	217	409
201.5		209.5	387	217.5	404
202	441	210	402	218	387
202.5	400	210.5	383	218.5	372

Station Easting	N 280
219	398
219.5	383
220	406
220.5	412
221	418
221.5	410
222	411
222.5	418
223	431
223.5	400
224	411
224.5	406
225	402
225.5	442
226	400
226.5	430
227	398

Station Easting	N 280
227.5	415
228	404
228.5	413
229	392
229.5	406
230	397
230.5	420
231	414
231.5	397
232	395
232.5	394
233	378
233.5	386
234	395
234.5	397
235	409
235.5	397

Station Easting	N 280
236	399
236.5	380
237	379
237.5	387
238	390
238.5	396
239	396
239.5	381
240	389
240.5	379
241	369
241.5	352
242	354
242.5	363
243	354
243.5	353

Magnetometer data, June 2004
Readings: nanoteslas - 57000

Station Easting	N 269.5 line	N 270 line	N270.5 line
200	418	442.8	424
200.5	386	413.9	429
201	397	380.6	408
201.5	393	398.7	408
202	399	406.6	410
202.5	406	418.5	408
203	411	409.1	401
203.5	413	418	411
204	406	393.2	405
204.5	405	398.6	402
205	405	421.9	401
205.5	411	404.1	406
206	400	404.8	404
206.5	394	394.7	400
207	394	403.4	410
207.5	400	396.4	404
208	398	397.4	407
208.5	417	447.7	430
209	415	453.2	448
209.5	413	421.7	409

Station Easting	N 269.5 line	N 270 line	N270.5 line
210	387	403.4	397
210.5	408	397.9	386
211	443	395.1	392
211.5	408	392	392
212	384	362.7	386
212.5	383	381.4	381
213	390	375.8	380
213.5	386	375.4	372
214	410	385.6	381
214.5	389	389.1	393
215	324	368	370
215.5	366	370.3	374
216	358	369.8	361
216.5	368	357	375
217	379	377.3	380
217.5	379	366.3	364
218	393	379.3	379
218.5	391	380.7	390
219	397	388.4	398
219.5	385	342.7	403
220	399	404.4	399
220.5	395	395.5	391
221	401	391.8	397
221.5	408	408.4	409
222	393	395.8	400
222.5	391	394.7	391
223	394	383.7	385
223.5	391	385.4	408
224	397	396.2	406
224.5	391	400.4	404
225	396	393.8	405
225.5	402	407	397
226	399	414.6	405
226.5	394	394.9	386
227	409	411.3	397
227.5	392	383.3	383
228	383	366.9	368
228.5	396	385.7	396
229	385	401.1	385
229.5	395	395.9	413
230	407	446.2	390
230.5	383	382.7	408

Station Easting	N 269.5 line	N 270 line	N270.5 line
231	367	375.7	393
231.5	370	386.1	397
232	383	405.6	405
232.5	381	370.9	398
233	386	401.5	423
233.5	387	395.6	408
234	386	407.9	414
234.5	380	399.1	414
235	378	395.6	404
235.5	370	372.5	393
240	373	382.1	381
240.5	376	379.3	391
241	381.5	378.2	372
241.5	369.8	377.9	379
242	388.7	377.1	384
242.5	384.8	381.7	384
243	389.4	382.6	377
243.5	379	375.1	378
244	368.6	360.5	366
244.5	369.8	362.7	367
245	354.2	353.4	361
245.5	347.4	350	357
246	342.1	336.1	361
246.5	355	353.7	364
247	348.1	345.8	360
247.5	342.2	354.9	363
248	335.8	351.3	362
248.5	333.7	337.9	334

Magnetometer data, August 2004
Readings: nanoteslas - 57000

Station northing	E185	E190	E195	E200	E205	E210
250	248	331	378	418	410	395
250.5	259	363	364	417	403	398
251	256	365	365	392	401	393
251.5	260	379	364	393	400	398
252	277	362	376	398	399	389
252.5	278	359	362	381	408	390
253	287	353	409	387	389	388
253.5	295	354	369	389	382	394
254	320	340	364	401	391	401
254.5	314	327	363	395	391	410

Station northing	E185	E190	E195	E200	E205	E210
255	315	342	365	381	410	405
255.5	314	381	368	382	398	414
256	319	307	367	385	407	399
256.5	329	345	378	389	384	381
257	338	357	367	383	383	386
257.5	339	353	364	378	382	379
258	335	365	362	376	377	393
258.5	350	346	368	369	396	398
259	349	351	360	374	390	397
259.5	348	346	363	365	384	397
260	348	347	385	362	376	382
260.5	352	353	380	364	386	386
261	356	342	365	368	407	380
261.5	362	349	351	380	381	361
262	328	359	364	348	380	365
262.5	359	355	378	355	379	378
263	348	355	360	362	394	377
263.5	355	355	350	382	377	388
264	351	359	349	379	377	374
264.5	351	351	359	386	374	382
265	354	360	343	396	378	389
265.5	357	368	353	390	360	392
266	356	362	331	388	385	385
266.5	356	372	360	396	389	391
267	344	371	361	401	390	371
267.5	342	365	375	395	391	387
268	353	355	370	384	394	407
268.5	359	368	370	382	398	389
269	355	359	354	392	392	389
269.5	351	355	363	315	395	397
270	362	369	357	381	399	392
270.5	355	372	369	390	393	376
271	380	366	371	398	396	354
271.5	382	369	367	395	394	374
272	366	379	366	394	389	366
272.5	363	365	386	401	394	366
273	363	369	371	412	392	369
273.5	370	383	375	424	389	362
274	366	371	375	407	390	367
274.5	357	373	393	404	389	393
275	354	348	385	421	372	386
275.5	342	349	331	391	380	389
276	364	361	377	373	381	406
276.5	374	377	390	387	426	385

Station northing	E185	E190	E195	E200	E205	E210
277	370	381	315	366	401	380
277.5	365	375	370	412	404	396
278	384	366	377	378	357	383
278.5	402	361	352	394	372	372
279	375	362	363	370	377	360
279.5	383	381	356	392	386	382
280	360	390	381	276	393	355
280.5	389	396	373	327	393	369
281	393	390	370	369	407	377
281.5	402	386	373	393	395	388
282	401	401	386	386	393	393
282.5	406	400	393	406	395	371
283	426	402	396	403	396	365
283.5	424	380	381	397	381	348
284	413	392	372	381	406	375
284.5	403	377	374	386	396	378
285	396	396	364	365	388	391
285.5	386	388	386	394	399	406
286	409	410	379	382	386	378
286.5	377	389	355	387	386	392
287	397	390	375	377	380	397
287.5	385	381	373	367	401	369
288	395	377	390	383	381	376
288.5	393	385	380	386	374	372
289	381	372	387	389	357	377
289.5	401	409	377	376	378	377
290	428	420	362	377	373	373
290.5	420	400	358	383	382	387
291	404	199	357	393	376	383
291.5	409	360	398	372	373	381
292	414	348	346	369	377	394
292.5	404	384	394	363	391	385
293	399	373	373	390	379	374
293.5	422	392	359	403	377	366
294	412	381	378	394	362	378
294.5	387	385	398	407	378	359
295	399	400	373	420	369	384
295.5	384	353	367	392	375	378
296	394	355	365	392	364	379
296.5	389	362	383	388	374	369
297	400	360	381	388	351	363
297.5	400	351	383	372	384	370
298	365	381	400	382	374	378
298.5	385	232	393	369	350	389

Station northing	E185	E190	E195	E200	E205	E210
299	366	342	373	363	365	373
299.5	379	372	404	370	358	382
300	353	365	327	355	353	369
300.5	346	381	394	358	312	378
301	406	416	378	359	371	379
301.5	382	357	364	370	370	383
302	370	373	354	382	370	383
302.5	390	368	376	395	388	379
303	379	345	373	421	379	373
303.5	363	419	380	393	374	392
304	351	362	364	393	373	383
304.5	366	352	385	406	362	367
305	381	360	395	378	374	386
305.5	368	378	387	369	352	375
306	359	350	375	358	380	368
306.5	383	373	359	382	382	364
307	381	382	379	363	369	363
307.5	387	398	377	383	369	371
308	382	362	359	387	360	365
308.5	370	318	363	373	364	377
309	384	307	321	359	372	395
309.5	380	183	362	374	364	348
310	385	374	359	362	367	367

Appendix 5. Metric attributes of Rim Sherds and Fragmentary Rim Sherds

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
260	199	1	0	0	0		1		grit	1	2			IN	CV	Yes			IN
260	199	1	0	0	0		2	50	grit	1	2	7.18		ST	ST	No			D
260	200	1	0	0	0		1	15	grit	1	2	9.28		CV	CX	No			D
260	202	1	0	0	0		1	10	grit	1	1	3.43	5.93	CX	CX	Yes	9.93	6.91	R
260	203	1	0	0	0		1		grit	1	2			IN	ST	Yes			IN
262	199	1	0	0	0		1	15	grit	1	2	4.71		CX	CV	No			D
262	199	1	0	0	0		2		grit	1	2	6.97		ST	ST	No			D
270	198	1	0	0	0		1		grit	1	1	5.41	7.13	ST	CX	Yes	7.45	8.38	S
272	196	1	0	0	0		1		grit	1	2	5.13		CV	CV	No			D
272	197	1	0	0	0		1	20	grit	1	2	4.79		CX	CX	No			D
275	175	0	0	101	0		101	15	grit	1	1	7.25	9.08	CX	ST	Yes	12.1	10.72	D
275	175	1	0	0	0		1	20	grit	1	1	3.64	4.77	CV	ST	Yes	11.73	5.8	D
275	175	2-01	0	8	0		8	25	grit	1	1	4.47	4.79	CV	ST	Yes	11.31	6.5	D
275	175	2-01	0	10	0		10		grit	1	1	4.99	7	CV	CX	Yes	11.18	8.88	D
275	175	2-01	0	11	0		11	15	grit	1	1	5.96	7.33	CX	CV	No			D
275	175	2-01	226	0	0		34		grit	2	1	5.9	6.2	ST	CV	Yes	10	8.1	D
275	175	2-01	226	0	0		34		grit	2	2	6.1		ST	CV	No			D
275	175	2-05	0	0	0		2		grit	1	1	5.59		CX	CV	No			D
275	175	2-05	0	23	0		23		grit	1	1	7.83		CV	ST	No			D
275	175	2-05	238	0	0		1		grit	1	2	4.8		CX	CV	Yes			S
275	175	2-08	242	0	0		1	15	grit	1	1	5.06	7.47	ST	CX	Yes	11.48	10.43	S
275	175	2-09	0	30	0		12	50	grit	1	1			IN	CX	Yes	16.78		D
275	175	2-10	0	34	0		1	30	grit	1	1	4.99	6.71	CV	CV	Yes	11.87	7.47	D
275	175	2-10	246	0	0		2		grit	1	2			IN	ST	No			D
275	175	2-10	246	0	0		3		grit	1	2			ST	IN	No			D
275	175	2-11	248	0	0		1		grit	1	2			IN	IN	No			D
275	175	2-12	0	0	0		1		grit	1	1	5.8		ST	ST	No			S

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
275	175	2-12	0	0	0		3		grit	1	2			IN	CX	No			S
275	175	2-13	0	55	0		7		grit	1	1	4.79	8.31	CV	ST	Yes	11.38	9.82	S
275	175	2-13	260	0	0		1	35	grit	1	2			CV	IN	No			D
275	175	2-14	0	0	0		1		grit	1	1	6.58		ST	CX	No			D
275	175	3-01	0	0	0		1		grit	1	2	4.9		CX	CX	No			R
275	175	3-02	0	0	0		2		gr mi	3	2			IN	ST	No			IN
275	175	3-02	263	0	0		1		grit	1	2			ST	IN	No			D
275	175	3-02	263	0	0		3	8	grit	1	2	2.8	4.96	CV	CX	Yes	6.38	5.99	D
275	175	3-04	0	0	0		1		grit	1	2			IN	ST	No			D
275	175	3-04	0	74	0		74		grit	1	2	6.65	7.1	CV	CX	No			R
275	175	3-04	0	77	0		77	20	grit	1	1	6.88	7.77	ST	CX	Yes	8.59	8.45	D
275	175	3-04	0	77	0		77	25	grit	1	1	3.6	8.76	ST	CX	Yes	9.37	9.61	R
275	175	3-04	0	79	0		79	35	grit	1	1	7.42	11.6	CV	CX	Yes	11.71	12.58	D
275	175	3-04	0	79	0		79	5	grit	1	1	6.02		IN	CV	No			R
275	175	3-05	0	0	0		1	20	grit	2	2	4.49	6.4	ST	ST	Yes	16.1	9	S
275	175	3-05	0	0	0		2		grit	1	2			IN	CV	No			IN
275	175	3-05	0	0	0		3		grit	1	2	5.2		ST	ST	No			S
275	175	3-05	2701	0	0		1		grit	1	1	3.4	5.84	CX	CX	Yes	8.07	6.05	S
275	175	3-05	2701	0	0		2		grit	1	2	4.9		ST	IN	No			D
275	175	3-06	0	0	0		1		grit	1	1	2.89	6.93	CX	CV	Yes	11.2	7.25	D
275	175	3-06	0	0	0		2	20	grit	1	1	8.1	8.7	CV	ST	Yes	10.5	9.9	D
275	175	3-07	0	0	0		1		none	1	2			CX	IN	No			S
275	175	3-07	274	0	0		1		grit	1	1	5.08	6.27	CX	CX	Yes	7.88	8.23	S
275	175	3-08	0	0	0		1	35	grit	2	2	9.58	9.61	CX	CV	No			D
275	175	3-08	0	0	0		2	15	grit	1	1	5.43	6.9	CX	CV	Yes	14.59	8.71	D
275	175	3-10	0	100	0		100		grit	1	1	4.5	5.34	CV	CX	Yes	6.51	6.94	S
275	175	3-12	0	0	0		1	20	grit	1	1	7.74	7.32	CV	CX	Yes	17.85	9.47	S
275	175	3-12	0	109	0		109	15	grit	1	2	3.35	6.8	CX	CX	Yes	13.1	7.6	S
275	175	3-15	0	0	0		1		grit	2	2	5.12		IN	IN	No			IN
275	190	1	0	0	0		1	25	grit	1	2	3.61		IN	CX	Yes	10.41		D

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
275	192	0	0	0	0	P474	1		grit	1	2	6.73		ST	CV	No			D
275	193	1	0	0	0		1	10	grit	2	1	5.12	5.01	CV	CX	Yes	6.26	5.63	D
275	194	1	0	0	0		1		grit	1	2			IN	CX	Yes	9.46		IN
275	198	1	0	0	0		1		grit	1	2	5.06		CV	IN	No			D
276	190	0	0	0	0	P528	1	25	grit	1	1	4.42	6.22	CX	CV	Yes	7.3	6.93	D
276	190	1	0	0	0		1	20	grit	1	1	4.93	7.05	CV	ST	Yes	7.82	7.29	D
276	190	1	0	0	0		2	10	grit	1	1	5.4	7	CV	CX	Yes	7.8	7.3	D
276	190	1	0	0	0		2	35	grit	3	2	8.1		CX	CV	No			D
276	192	1	0	0	0		1	35	grit	1	1		6.9	CV	CV	No			R
276	193	1	0	0	0		1	25	grit	1	1	4.62	10.92	CX	CV	Yes	13.37	13.41	D
276	194	1	0	0	0		1	7	grit	1	2	5.54		ST	CV	No			D
276	195	1	0	0	0		1	15	grit	1	2	4.75		ST	ST	No			D
276	196	1	0	0	0		1		grit	1	2			IN	ST	Yes	11.98		IN
276	196	1	0	0	0		2		grit	1	2	3.54		IN	ST	No			D
277	190	1	0	0	0		1	20	grit	1	1	5.87	9.23	CV	ST	Yes	13.86	9.52	D
277	192	1	0	0	0		1	10	grit	1	2	3.9		CX	CX	No			D
277	195	1	0	0	0		1		grit	1	1	5.46		CV	CX	No			D
277	200	1	0	0	0		1	35	grit	1	2	9.13		CV	CX	No			D
278	192	1	0	0	0		1		sand	1	1	3.5	5.83	CX	CV	Yes	10.79	6.85	S
278	193	0	0	0	0	p326	1	45	grit	3	2	4.03	7.7	CX	CX	Yes	10.27	10.05	S
278	194	1	0	0	0		1		grit	1	2	4.59		CX	ST	No			D
278	198	1	0	0	0		1		grit	1	2	6.49		IN	ST	No			D
279	175	1	0	0	0		1		grit	1	1	6.8		CV	CX	No			D
279	175	1-07	0	0	0		1	15	grit	1	2		6.34	ST	CX	Yes		7.04	IN
279	175	1-08	0	0	0		1	25	grit	1	1	6.45		ST	CV	No			D
279	175	1-08	0	0	0		7	25	grit	1	1	4.11	7.27	CV	ST	Yes	7.64	8.87	R
279	175	1-10	0	0	0		1		grit	1	1	5.68		CV	CX	No			D
279	175	2-02	250	0	0		1		grit	1	1	4.42		CV	CX	Yes	7.85	9.56	D
279	175	2-02	250	0	0		2		grit	1	2	5.22		IN	ST	No			D
279	175	2-05	258	0	0		1		grit	1	2	5.45		IN	ST	No			D

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
279	175	2-06	259	0	0		1	30	grit	1	1	8.58	6.8	CV	CV	Yes	10.3	10.56	D
279	175	2-08	0	0	0		1	25	grit	1	1	3.47	7.38	CV	CX	Yes	9.54	7.62	D
279	175	2-10	0	25	0		25		grit	1	1	4.4	7	CX	CV	No			R
279	175	2-11	0	0	0		1		grit	1	2			IN	CV	No			D
279	175	2-12	0	33	0		33	20	grit	1	1	5.19	9.62	CV	ST	Yes	14.12	11.13	D
279	175	2-12	267	0	0		1	20	grit	1	1	4.92	7.46	ST	CV	Yes	11.46	9.32	D
279	175	2-14	0	0	0		5	15	gr mi	1	1	3.06	8.36	ST	CX	Yes	7.47	9.08	S
279	175	2-14	0	0	0		5	30	gr mi	1	1	4.1		CX	ST	Yes			S
279	175	2-15	0	0	0		1		grit	1	2	7.16		CV	CX	No			D
279	175	3-01	277	0	0		1		grit	1	1	5.83		CX	ST	No			D
279	190	1	0	0	0		1		grit	1	2			IN	CV	Yes	12.2		IN
279	192	1	0	0	0		1		grit	1	2			IN	ST	No			S
279	229	1	0	0	0		1	10	grit	1	1	4.25	5.6	ST	CX	Yes	6.1	5.78	D
280	190	1	0	0	0		1		grit	1	2			ST	IN	No			D
280	190	1	0	0	0		2		grit	1	2			IN	IN	No			D
281	196	1	0	0	0		1	20	grit	1	1	3.33	6.37	ST	CX	Yes	9.32	6.65	D
282	196	1	0	0	0		1		grit	1	1	11.14		IN	ST	No			D
282	196	1	0	0	0		3		grit	1	2			IN	IN	No			S
283	195	1	0	0	0		1	30	gr sd	1	1	5		CX	ST	No			S
283	196	1	0	0	0		1	10	grit	1	1	3.61	7.41	CX	CV	No			S
283	196	1	0	0	0		2		grit	1	1	5	8.81	ST	CX	Yes	10.62	9.27	D
283	196	1	0	0	0		3		grit	1	2			IN	IN	Yes			IN
283	196	1	0	0	0		4		grit	1	2			IN	CV	Yes	8.42		IN
284	195	1	0	0	0		1		grit	1	1	4.67	3.54	CV	CX	Yes	8.92	5.87	D
284	195	1	0	0	0		2		grit	1	1	8.42		CV	CX	No			D
284	197	1	0	0	0		1	15	grit	1	2	5.68		CV	ST	Yes			D
285	159	0	0	0	0		1		grit	1	2	6.54	8.1	ST	CV	Yes	19.86	8.36	D
285	159	0	0	0	0		1	25	grit	1	1	8.61	8.91	CV	ST	Yes	12.7	11.18	D
285	159	0	0	0	0		1		gr mc	1	1	6.42	12.62	ST	CV	Yes	21.61	13.48	D
285	159	0	0	0	0		2	25	gr mi	1	1	7.92	10.93	CV	CV	Yes	24.08	13.99	D

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
285	159	0	0	0	0		2		grit	1	1	5.64	7.18	CX	CV	Yes	16.38	9	D
285	159	0	0	0	0		3		grit	1	2	4.78	11.72	CV	CX	Yes	16.1	11.57	D
285	159	1-01	0	0	0		1		grit	1	2	4.51		ST	ST	No			D
285	159	1-06	0	0	0		1		grit	1	1	6.93		CX	ST	No			D
285	159	1-07	0	0	0		2	25	gr mc	1	1	6.33	6.56	ST	CV	Yes	15.5	9.19	D
285	159	1-07	352	0	0		2		grit	1	2	3.8		IN	IN	No			S
285	159	1-11	0	47	0		47	25	grit	2	1	5		IN	CX	Yes	9.6		D
285	159	1-11	0	47	0		47		grit	2	1	5.9	10.7	CX	IN	Yes	15.7	13.7	IN
285	159	1-11	0	53	0		53	40	grit	1	1	5.98	9.11	CV	CX	Yes	60.49	11.36	D
285	159	1-12	0	0	0		1		grit	1	2	6.4		IN	IN	No			D
285	159	1-13	0	0	0		1	45	gr mc	1	1	4.8	7.6	ST	CV	Yes	11.4	10.6	S
285	159	1-13	0	0	0		2		gr mc	1	1	18.7	9.7	CV	CV	Yes	19.9	14	D
285	159	1-14	0	64	0		64		grit	1	1	12.86	14.95	CV	CX	Yes	23.39	15.78	S
285	159	2-01	0	0	0		1	9	grit	1	1	4.3	6.3	ST	CX	Yes	6	6.8	D
285	159	2-02	364	0	0		1		grit	1	1	7	6.16	ST	ST	Yes	15.77	9.1	D
285	159	2-02	364	0	0		2	30	grit	1	1	3.09	6.57	ST	ST	Yes	8.61	8.36	R
285	159	2-03	365	0	0		1	45	grit	1	1	5.91	5.34	ST	CX	Yes	9.49	10.18	D
285	159	2-03	365	0	0		2		grit	1	2	3.41		IN	CX	Yes	15.12		R
285	159	2-05	0	0	0		2		grit	1	1	4.38	6.83	CV	CX	Yes	15.8	6.7	S
285	159	2-07	0	0	0		3		grit	1	1	3.85	6.83	ST	CX	Yes	11.76	8.57	D
285	159	2-07	0	0	0		4	10	grit	1	1	2.25	7.37	CX	ST	Yes	7.41	8.39	R
285	159	2-07	0	0	0		1		grit	1	1	7.24	9.63	CX	ST	Yes	16	7.91	D
285	159	2-08	368	0	0		1	30	grit	1	1	3.63		IN	CX	Yes	18.14		S
285	159	2-08	368	0	0		2		grit	1	1	4.6	6.8	CX	CV	No			R
285	159	2-08	368	0	0		3	30	grit	1	2	6.11		ST	CX	No			D
285	159	2-13	0	0	0		1		grit	1	2	7.04		ST	ST	No			D
285	159	2-14	0	0	0		1	15	grit	2	1	7.34	6.82	CX	CV	No			S
285	159	2-14	0	0	0		2		grit	1	2	5.29	8.18	CV	ST	Yes	12.54	10.74	D
285	159	2-16	0	0	0		2		grit	1	1	3.37	7.34	CX	CV	Yes	11.04	6.4	D
285	159	2-16	0	0	0		4		grit	1	2	3.95		CV	CX	No			R

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
285	159	2-16	0	74	0		74	30	grit	1	1	6.26	10.29	CV	CX	Yes	59.12	13.69	D
285	159	2-17	0	0	0		1		grit	1	1	19.95	15.65	CV	CX	Yes	15.97	14.94	S
285	159	3-01	0	83	0		83		grit	1	1	5.81		ST	ST	No			D
285	159	3-03	0	92	0		92		grit	1	1	6.65	5.05	CV	CX	Yes	19.9	10.07	D
287	159	1-04	0	17	0		17	25	grit	1	1	7.72	12.32	CX	CV	Yes	16	10.57	S
287	159	1-04	0	18	0		18	8	grit	1	1	5.82	6.04	CV	CX	Yes	12.08	8.4	S
288	185	1	0	0	0		1	25	grit	1	1	2.74	8.61	CX	CX	Yes	13.5	10.25	D
298	186.5	1	0	0	0		1	20	grit	1	1	3.37	8.81	ST	CV	Yes	9.75	9.74	D
298	186.5	1	0	0	0		2		grit	1	2		7.68	CX	CX	Yes	15.96	8.92	R
298	187.5	1	0	0	0		1		grit	1	1	3.69	9	CX	ST	Yes	14.47	10.53	D
298	187.5	1	0	0	0		19		grit	1	2	5.38		IN	ST	No			D
298	187.5	1	0	0	0		20		grit	1	1	7.39		IN	ST	No			D
298	188.5	1	166	0	0		1		gr sd	1	1	4.6	6.2	CX	CX	Yes	13.05	8.15	S
298	188.5	1	166	0	0		1		grit	1	1	7.5		IN	ST	No			D
298	188.5	1	166	0	0		1		grit	1	1	10.1		ST	IN	No			S
299	185	1	0	0	0		1	25	grit	1	1	4.6	8.48	CX	CX	Yes	12.3	9.12	D
299	185	1	0	0	0		2		grit	1	1	4.77	4.78	CV	CV	Yes	11.48	6.07	D
299	185	1	0	0	0		3	20	grit	1	2	7.65		IN	ST	No			D
299	188	1	0	0	0		1	10	grit	1	1	3.89	6.22	CX	CV	Yes	9.36	8.39	D
299	188	1	0	0	0		2		grit	1	1	4.04		CV	CX	No			D
299	188	1	0	0	0		3		grit	1	2	6.68		CV	CV	No			D
300	185.5	1	0	0	0		1		none	1	1	4	5.58	CV	ST	Yes	15.5	8.11	S
300	185.5	1	0	0	0		2	15	grit	1	2	4.41		IN	CX	Yes	11.78		D
300	185.5	1	0	0	0		3		grit	1	2	5.79		IN	CX	No			D
300	185.5	1	0	0	0		4		grit	1	2	6.47		CX	CV	No			D
300	185.5	1	0	0	0		5		grit	1	2	6.16		CV	CX	No			S
300	185.5	1	0	0	0		7		grit	1	2			CV	IN	No			S
300	187.5	1	0	0	0		1	15	grit	1	1	4.97	8.77	ST	CX	Yes	10.76	8.23	S
300	187.5	1	0	0	0		2	20	grit	1	1	5.02	7.83	ST	ST	Yes	8.73	8.41	D
300	187.5	1	0	0	0		3		grit	1	1	6.78	10.54	CV	CX	Yes	13.13	14.29	D

North	East	Layer	Flot #	PP#	Test Pit	Post Mould	Catalogue number	Diameter	Temper	Number	Object Type	Lip Thickness	Thickness below base	Interior Curvature	Exterior Curvature	Collared	Collar Height	Collar Base Thickness	Lip Shape
300	187.5	1	0	0	0		4	20	grit	1	2	9.33		ST	CV	No			D
300	187.5	1	0	0	0		5		grit	1	2	5.1		ST	CX	No			D
999	999	0	0	0	0	P541	1		grit	1	1	11.15	5.88	ST	CV	No			D
999	999	0	0	0	14		1		grit	1	2	6.86		CX	ST	No			D

Appendix 6. Attributes of decoration of Rim Sherds and Fragmentary Rim Sherds.

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
260	199	1	1		IN	IN		IN	IN	BAAB-03	I	B	BABA-03	I	P		IN	IN	IN
260	199	1	2	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
260	200	1	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
260	202	1	1	A	N	N	A	N	N	BAAC-11	S	P	A	N	N		IN	IN	Huron Incised
260	203	1	1		IN	IN		IN	IN	BAAB-03	I	B		IN	IN		IN	IN	IN
262	199	1	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
262	199	1	2	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
270	198	1	1	A	N	N	A	N	N	BAAB-11	S	P	A	N	N		IN	IN	Huron Incised
272	196	1	1	A	N	N	A	N	N	BAAC-02	I	B		IN	IN		IN	IN	IN
272	197	1	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
275	175	0	101	A	N	N	A	N	N	BAAA-11	S	B	A	N	N		IN	IN	Huron Incised
275	175	1	1	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Lawson Incised
275	175	2-01	8	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	2-01	10	A	N	N	A	N	N	*	I	B	A	N	N	A	N	N	?Pound blank
275	175	2-01	11	A	N	N	BAAA-11	S	B	A	N	N	A	N	N		IN	IN	Innisfill Plain

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
275	175	2-01	34	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
275	175	2-01	34	A	N	N	A	N	N	BAAB-02	S	P		IN	IN		IN	IN	Huron Incised
275	175	2-05	2	A	N	N	A	N	N	DDAC-09	I	B		IN	IN		IN	IN	Lalonde High Collared
275	175	2-05	23	A	N	N	A	N	N	DAAF-27	I	B		IN	IN		IN	IN	High collared
275	175	2-05	1	A	N	N	BAA	S	B	A	N	N	A	IN	IN		IN	IN	IN
275	175	2-08	1	A	N	N	A	N	N	BAAF-21	I	B	A	N	N		IN	IN	Huron Incised
275	175	2-09	12		IN	IN	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron/Lawson incised
275	175	2-10	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	2-10	2		IN	IN	A	N	N	A	IN	IN		IN	IN		IN	IN	IN
275	175	2-10	3	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	175	2-11	1		IN	IN	BAAC-03	S	B		IN	IN		IN	IN		IN	IN	IN
275	175	2-12	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	2-12	3		IN	IN	A	N	N	BAAB-02	S	B		IN	IN		IN	IN	IN
275	175	2-13	7	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	2-13	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	175	2-14	1	A	N	N	A	N	N	BAAB-02	S	B		IN	IN		IN	IN	IN
275	175	3-01	1	A	N	N	A	N	N	BAAC-11	I	P		IN	IN		IN	IN	IN
275	175	3-02	2		IN	IN		IN	IN	DGAE-17	I	B		IN	IN		IN	IN	High Collared

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
275	175	3-02	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	175	3-02	3	A	N	N	BAAB-11	I	B	BAAB-11	I	P	A	N	N		IN	IN	Sidey Notched
275	175	3-04	1		IN	IN	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
275	175	3-04	74	A	N	N	A	N	N	CABE-36	I	B		IN	IN		IN	IN	IN
275	175	3-04	77	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	3-04	77	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	3-04	79	A	N	N	A	N	N	BAAB-11	S	B	A	N	N		IN	IN	Lawson Incised
275	175	3-04	79	A	N	N	A	N	N	A	N	N	A	N	N		IN	IN	Ripley Plain
275	175	3-05	1	A	N	N	A	N	N	A	N	N	A	N	N		IN	IN	Graham-Rogers Plain
275	175	3-05	2		IN	IN		IN	IN	FGED-03	I	B		IN	IN		IN	IN	High collar?
275	175	3-05	3	A	N	N	A	N	N	BAAB-02		IN		IN	IN		IN	IN	IN
275	175	3-05	1	A	N	N	A	N	N	BAAB-11	S	P	A	N	N		IN	IN	IN
275	175	3-05	2	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	175	3-06	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	3-06	2	A	N	N	BAAA-11	S	P	A	N	N	A	N	N		IN	IN	Innisfill Plain
275	175	3-07	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	175	3-07	1	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Huron Incised
275	175	3-08	1	A	N	N	BAAA-11	S	B	A	N	N	A	N	N		IN	IN	Innisfill Plain

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
275	175	3-08	2	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Huron Incised
275	175	3-10	100	A	N	N	A	N	N	BAAA-11	I	B	A	N	N		IN	IN	Lawson Incised
275	175	3-12	1	A	N	N	A	N	N	A	N	N	A	N	N		IN	IN	Graham-Rogers Plain
275	175	3-12	109	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Huron Incised
275	175	3-15	1		IN	IN	A	N	N		IN	IN		IN	IN		IN	IN	IN
275	190	1	1		IN	IN	A	N	N	CAAC-20	I	B	A	N	N		IN	IN	Warminster crossed
275	192	0	1	A	N	N	A	N	N	DAA	I	B		IN	IN		IN	IN	High collared triangular
275	193	1	1	A	N	N	BAAB-11	S	B	BAAB-11	I	B	A	N	N		IN	IN	Sidey Notched
275	194	1	1		IN	IN		IN	IN	BAAB-11	I	B	A	N	N		IN	IN	IN
275	198	1	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
276	190	0	1	A	N	N	A	N	N	BAAA-11	I	B	BABA-02	I	B		IN	IN	Pound Necked
276	190	1	1	A	N	N	A	N	N	BAAC-11	S	P	A	N	N		IN	IN	Lawson Incised
276	190	1	2	A	N	N	A	N	N	BAAC-11	I	B		IN	IN		IN	IN	Lawson incised
276	190	1	2		IN	IN	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	Huron Incised
276	192	1	1	A	N	N	BAAB-11	S	P	A	N	N	A	N	N		IN	IN	Innisfil Plain
276	193	1	1	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Huron Incised
276	194	1	1	A	N	N	A	N	N	BAAA-02	I	B		IN	IN		IN	IN	IN

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
276	195	1	1	A	N	N	BAAA-11	S	B	BAAB-02	I	P		IN	IN		IN	IN	Sidey Notched
276	196	1	1		IN	IN		IN	IN	BAAB-11	I	P	A	N	N		IN	IN	IN
276	196	1	2		IN	IN	A	N	N	BAAA-02	I	P		IN	IN		IN	IN	IN
277	190	1	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Lawson Incised
277	192	1	1	A	N	N	A	N	N	DAA	I	P		IN	IN		IN	IN	IN
277	195	1	1	A	N	N	BAAB-11	S	B	BAAA-11	I	B	BABA-03	I	B		IN	IN	IN
277	200	1	1	A	N	N	A	N	N	A	N	N		IN	IN		IN	IN	IN
278	192	1	1	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
278	193	0	1	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Huron Incised
278	194	1	1	A	N	N	A	N	N	BAAB-01	I	P		IN	IN		IN	IN	IN
278	198	1	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
279	175	1	1	A	N	N	A	N	N	A	N	N		IN	IN		IN	IN	IN
279	175	1-07	1	A	N	N		IN	IN	BAAB-03	I	B	A	N	N		IN	IN	IN
279	175	1-08	1	A	N	N	BAAB-11	S	P	BAAB-02	I	B		IN	IN		IN	IN	Sidey Notched
279	175	1-08	7	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Huron Incised
279	175	1-10	1	A	N	N	A	N	N	BABA-02	I	B		IN	IN		IN	IN	IN
279	175	2-02	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
279	175	2-02	2		IN	IN	A	N	N	BAAB-	I	B		IN	IN		IN	IN	IN

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
										02									
279	175	2-05	1		IN	IN	A	N	N	BAAC-02	I	P		IN	IN		IN	IN	IN
279	175	2-06	1	A	N	N	A	N	N	BAAA-11	S	B	A	N	N		IN	IN	Lawson Incised
279	175	2-08	1	A	N	N	A	N	N	BAAB-11	S	B	A	N	N		IN	IN	Lawson Incised
279	175	2-10	25	A	N	N	A	N	N	A	N	N	BAAA-03	I	B		IN	IN	Ripley Plain?
279	175	2-11	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
279	175	2-12	33	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Lawson Incised
279	175	2-12	1	A	N	N	A	N	N	BAAB-11	I	B		IN	IN		IN	IN	Huron Incised
279	175	2-14	5	A	N	N	BAAA-11	I	B	BAAB-11	I	P	A	N	N		IN	IN	Sidey Notched
279	175	2-14	5		IN	IN	A	N	N	A	N	N	A	N	N		IN	IN	Graham Rogers Plain
279	175	2-15	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	High Collar
279	175	3-01	1	A	N	N	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
279	190	1	1		IN	IN		IN	IN	BAAB-11	I	P	A	N	N		IN	IN	IN
279	192	1	1		IN	IN	A	N	N	BAAC-02	S	P		IN	IN		IN	IN	IN
279	229	1	1	A	N	N	BAAB-11	S	B	BAAB-11	I	B	BABA-01	I	B		IN	IN	Sidey Notched
280	190	1	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
280	190	1	2		IN	IN	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
281	196	1	1	A	N	N	A	N	N	BAAB-	I	P	A	N	N		IN	IN	Huron Incised

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
										11									
282	196	1	1		IN	IN	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
282	196	1	3	A	IN	IN	A	N	N		IN	IN		IN	IN		IN	IN	IN
283	195	1	1	A	N	N	BCBD-21	S	N	A	N	N		IN	IN		IN	IN	Neutral Nicked Lip
283	196	1	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
283	196	1	2	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
283	196	1	3		IN	IN	A	N	N		IN	IN		IN	IN		IN	IN	IN
283	196	1	4		IN	IN		IN	IN	BAAA-5	I	B	A	N	N		IN	IN	Lawson Incised
284	195	1	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron/Lawson Incised
284	195	1	2	A	N	N	A	N	N	FGAF-02	I	B		IN	IN		IN	IN	High collared
284	197	1	1	A	N	N	A	N	N	BAAB-01	I	P		IN	IN		IN	IN	IN
285	159	0	1	A	N	N	A	N	N	DDAB-01	I	P		IN	IN		IN	IN	IN
285	159	0	1	A	N	N	A	N	N	BAAB-11	S	C	A	N	N		IN	IN	Huron Incised
285	159	0	1	A	N	N	A	N	N	BAAF-11	I	P	A	N	N	A	N	N	Huron Incised
285	159	0	2	A	N	N	A	N	N	BAAF-11	I	P	A	N	N		IN	IN	Lawson Incised
285	159	0	2	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	0	3	A	N	N	A	N	N	BAAC-11	S	B	A	N	N		IN	IN	Huron Incised
285	159	1-01	1	A	N	N	A	N	N	CAAB-	I	P		IN	IN		IN	IN	High collared

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
										11									
285	159	1-06	1	A	N	N	EHBD-12	S	P	DDAC-11	I	B		IN	IN		IN	IN	IN
285	159	1-07	2	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	1-07	2	A	N	N	A	N	N	BAA	I	B		IN	IN		IN	IN	IN
285	159	1-11	47	A	IN	IN	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	1-11	47	A	N	N	A	N	N		IN	IN	A	N	N		IN	IN	IN
285	159	1-11	53	A	N	N	BAAB-11	S	B	DGAC-17	I	B	A	N	N	A	N	N	Syracuse Notched
285	159	1-12	1	A	N	N	BAAB-11	S	B	BAAB-02	I	B		IN	IN		IN	IN	IN
285	159	1-13	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	1-13	2	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	1-14	64	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Lawson Incised
285	159	2-01	1	A	N	N	A	N	N	BCBD-11	S	P	A	N	N		IN	IN	Neutral nicked lip
285	159	2-02	1	A	N	N	A	N	N	BAAA-11	S	B	A	N	N		IN	IN	Huron Incised
285	159	2-02	2	A	N	N	A	N	N	BAAB-11	S	B	A	N	N		IN	IN	Huron Incised
285	159	2-03	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	2-03	2	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Huron Incised
285	159	2-05	2	A	N	N	BCAD-01	S	B	BCAD-02	S	B	A	N	N		IN	IN	Seed Incised
285	159	2-07	3	A	N	N	A	N	N	BAAB-	S	B	A	N	N		IN	IN	Huron Incised

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
										11									
285	159	2-07	4	A	N	N	A	N	N	BAAA-11	S	P	A	N	N		IN	IN	Huron Incised
285	159	2-07	1	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
285	159	2-08	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
285	159	2-08	2	A	N	N	BAA	S	B	A	N	N	A	N	N		IN	IN	Neutral nicked lip
285	159	2-08	3	A	N	N	A	N	N	BAA	I	B		IN	IN		IN	IN	High collar?
285	159	2-13	1	A	N	N	BAAA-11	I	B	BABA-02	I	B		IN	IN		IN	IN	IN
285	159	2-14	1	A	N	N	A	I	P	A	N	N	A	N	N		IN	IN	Neutral punctate lip
285	159	2-14	2	BAAB-11	I	P	A	N	N	BAAA-11	S	P	A	N	N		IN	IN	Huron incised
285	159	2-16	2	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
285	159	2-16	4	A	N	N	A	N	N	A	N	N		IN	IN		IN	IN	IN
285	159	2-16	74	A	N	N	A	N	N	BAAF-11	I	B		IN	IN		IN	IN	Lalonde High Collar
285	159	2-17	1	A	N	N	A	N	N	BAAC-11	I	B	A	N	N		IN	IN	Lawson Incised
285	159	3-01	83	A	N	N	A	N	N	BAAB-02	I	P		IN	IN		IN	IN	IN
285	159	3-03	92	A	N	N	A	N	N	BAAA-11	I	P	A	N	N		IN	IN	Huron Incised
287	159	1-04	17	A	N	N	BCAD-01	S	B	A	N	N	A	N	N		IN	IN	Neutral punctate lip
287	159	1-04	18	A	N	N	BAAA-16	I	P	BAAC-15	I	P	A	N	N	BCBD-11	I	P	Sidy notched
288	185	1	1	A	N	N	A	N	N	BAAB-	I	B	A	N	N		IN	IN	Huron Incised

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
										11									
298	186.5	1	1	A	N	N	A	N	N	BAAA-11	I	B	A	N	N		IN	IN	Huron Incised
298	186.5	1	2	A	N	N	A	N	N	A	N	N	A	N	N		IN	IN	Ripley Plain
298	187.5	1	1	A	N	N	A	N	N	BAAA-11	S	P	A	N	N		IN	IN	Huron Incised
298	187.5	1	19		IN	IN	A	N	N	BAAB-02	I	P		IN	IN		IN	IN	IN
298	187.5	1	20		IN	IN	A	N	N	BAAB-02	I	P		IN	IN		IN	IN	IN
298	188.5	1	1	A	N	N	A	N	N	BAAB-11	S	B	A	N	N		IN	IN	Huron Incised
298	188.5	1	1		IN	IN	A	N	N	BAAB-02	I	B		IN	IN		IN	IN	IN
298	188.5	1	1	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
299	185	1	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
299	185	1	2	A	N	N	A	N	N	BAAA-11	I	B		IN	IN		IN	IN	Lawson Incised
299	185	1	3		IN	IN	A	N	N	DGAB-01	I	B	A	N	N		IN	IN	High collared
299	188	1	1	A	N	N	A	N	N	BAAB-11	I	P	A	N	N		IN	IN	Huron Incised
299	188	1	2	A	N	N	A	N	N	A	N	N		IN	IN		IN	IN	Ripley Plain
299	188	1	3	A	N	N	A	N	N	BAAB-01	I	P		IN	IN		IN	IN	IN
300	185.5	1	1	A	N	N	BCAD-01	S	B	BAAB-11	S	C	A	N	N		IN	IN	corded
300	185.5	1	2		IN	IN	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron/Lawson Incised
300	185.5	1	3		IN	IN	A	N	N	BABA-01	I	B		IN	IN		IN	IN	IN

North	East	Layer	Cat. No.	Interior band	Interior tech	Interior tool	Lip band	Lip tech	Lip tool	Collar	Collar band tech	Collar tool	Neck band	Neck tech	Neck tool	Shld band	Shld tech	Shld tool	MacNeish Type
300	185.5	1	4	A	N	N	A	N	N	BAAA-02	S	P		IN	IN		IN	IN	IN
300	185.5	1	5	A	N	N	A	N	N	A	N	N		IN	IN		IN	IN	IN
300	185.5	1	7	A	N	N	A	N	N		IN	IN		IN	IN		IN	IN	IN
300	187.5	1	1	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
300	187.5	1	2	A	N	N	A	N	N	BAAA-11	I	B	A	N	N		IN	IN	Huron Incised
300	187.5	1	3	A	N	N	A	N	N	BAAB-11	I	B	A	N	N		IN	IN	Huron Incised
300	187.5	1	4	A	N	N	A	N	N	BAAA-02	I	P		IN	IN		IN	IN	IN
300	187.5	1	5	A	N	N	A	N	N	BAAC-02	I	B		IN	IN		IN	IN	IN
999	999	0	1	A	N	N	BAAC-11	I	B	A	N	N	A	N	N		IN	IN	Collingwood collarless
999	999	0	1	A	N	N	A	N	N	BABA-02	I	B		IN	IN		IN	IN	IN

Appendix 7. Catalogue of smoking pipe fragments and basic description

Data collection by Aleksandra Pradzynski

PROVENIENCE	DESCRIPTION	TEMPER	WEIGHT GR	COMMENTS
N261E199 I-11 S	Stem fragment	Sand	5.0	Orange
N269E200 I-12 S	Stem fragment	None	2.4	Brown, burnished
N270E173.5 I(III)-15 M	Bowl fragment	None	5.0	Orange, possible red ochre on exterior
N272E197 I-4 S	Stem fragment	None	6.3	Brown
N275E175 II-1-9 M	Stem fragment	None	3.0	Orange, burnished exterior
N275E175 II-1-13 M	Bowl fragment	None	1.9	Brown, decorated, coronet
N275E175 II-1-45 M	Bowl fragment	None	3.7	Orange, decorated, mends with N275E175 II-6-4
N275E175 II-6-4 M	Bowl fragment	None	2.9	Brown, decorated, mends with N275E175 II-1-45
N275E175 II-11-5 M	Bowl fragment	None	3.5	Brown, plain
N275E175 II-12-8 M	Juvenile pipe bowl fragment	Sand	0.4	Brown, decorated
N275E175 II-12-9 M	Bowl fragment	Sand	3.3	Brown, burnished interior, plain
N275E175 III-1-7 M	Stem fragment	None	2.1	Buff
N275E175 III-5-9 M	Stem fragment	None	2.4	Brown, mouthpiece, flared form
N275E175 III-5-10 M	Bowl fragment	None	0.9	Red, plain
N275E175 III-13-6 M	Stem fragment	None	9.1	Brown, burnished exterior, 2 mended pieces
N275E175 III-15-4 M	Bowl fragment	None	4.0	Brown, decorated
N275E199 I-5 S	Bowl fragment	Sand	2.5	Orange, plain
N276E189 I-5 S	Stem fragment	None	0.6	Buff
N276E196 I-9 S	Stem fragment	Sand	0.7	Brown, burnished, mouthpiece
N277E193 I-3 S	Bowl fragment	None	2.6	Brown, burnished, decorated
N277E194 I-4 S	Stem fragment	None	0.6	Orange
N277E197 I-6 S	Bowl fragment	None	0.5	Brown, burnished, decorated
N277E191 I-1 S	Bowl fragment	None	11.6	Orange, burnished, decorated, effigy
N277E191 I-2 S	Bowl fragment	None	3.2	Orange, burnished interior, decorated
N277E201 I-3 S	Bowl fragment	None	1.2	Brown, burnished interior, decorated
N277E201 I-4 S	Bowl fragment	None	2.6	Buff, burnished interior, plain
N278E194 I-5 S	Stem fragment	Sand	2.7	Brown
N278E196 I-5 S	Bowl fragment	Sand	0.5	Brown, burnished, decorated
N278E196 F55 II-3 S	Stem fragment	None	3.4	Orange
N279E190 I-10 S	Bowl fragment	N/A	0.9	Grey, plain, banded slate
N279E175 II-14-9 M	Stem fragment	None	2.8	Brown, burnished, 2 mended pieces
N279E196 I/38-1 S	Stem fragment	Sand	9.2	Brown, burnished
N279E197 I-16 S	Bowl fragment	N/A	8.1	Grey, plain, limestone, coronet
N279E198 0-3 S	Stem fragment	Sand	12.9	Brown
N280E165 I-3 M	Stem fragment	Sand	5.1	Brown, burnished interior
N280E174 II-43 M	Stem fragment	None	0.8	Orange
N280E174 II-44 M	Stem fragment	None	2.7	Brown, burnished
N280E174 II-70 M	Bowl fragment	None	1.1	Brown, burnished, decorated, conical
N280E174 PP8 M	Stem fragment	Sand	2.0	Orange, burnished, mouthpiece
N280E191 I-5 S	Bowl fragment	Sand	5.2	Orange, burnished, decorated
N282E195 I-15 S	Stem fragment	None	2.6	Brown, burnished
N283E194 I-5 S	Bowl fragment	Sand	2.6	Buff, burnished, decorated
N283E196 I-8 S	Stem fragment	None	2.7	Orange, burnished, mouthpiece, flared form
N284E195 I-7 S	Bowl fragment	Sand	7.4	Orange, decorated, conical?
N284E197 I-2 S	Stem fragment	None	2.4	Buff, square form

	PROVENIENCE	DESCRIPTION	TEMPER	WEIGHT GR	COMMENTS
Emmerson Springs Excavations 2002-2004	N284E197 I-4 S	Stem fragment	Sand	5.5	Brown, burnished, mouthpiece, 2 pieces
	N284E197 I-5 S	Bowl fragment	None	1.8	Orange, burnished, decorated, barrel
	N285E159 II-5-1 M	Whole pipe	None	28.2	Brown, burnished, plain, conical, tapered stem
	N290E189 I-6 S	Bowl fragment	Sand	2.3	Brown, burnished, decorated
	N299E185 I-9 M	Stem fragment	None	0.7	Brown
	N299E185 I-9 M	Stem fragment	None	0.9	Brown
	N299E185 I-10 M	Bowl fragment	None	1.5	Buff, plain
	N299E187 I-5 M	Stem fragment	None	3.9	Orange
	N299E187 I-5 M	Stem fragment	None	1.0	Brown, burnished, mouthpiece
	N299E188 I-8 M	Stem fragment	Sand	4.0	Brown, burnished
	N299E188 I-9 M	Bowl fragment	None	1.8	Orange, burnished, plain
	N299E189 I-5 M	Bowl fragment	None	5.2	Orange, burnished, decorated, coronet
	N299E189 I-5 M	Stem fragment	None	0.5	Brown, burnished
	N300E185.5 I-12 M	Stem fragment	None	0.8	Brown, burnished
	N300E186.5 I-1 M	Bowl fragment	None	5.3	Brown, burnished, Mortice
	N300E186.5 I-6 M	Stem fragment	None	3.4	Orange, burnished
	N300E187.5 I-10 M	Stem fragment	Sand	6.5	Orange, burnished, decorated
	N300E187.5 I-11 M	Bowl fragment	None	1.7	Orange, burnished, decorated, coronet
	N315E209 0-2 S	Stem fragment	Sand	3.1	Brown, burnished
	N329E179 I-1 S	Stem fragment	None	1.3	Orange
	N329E200 I-7 S	Bowl fragment	Sand	0.9	Brown, burnished, 2 pieces
	N330E199 I-5 S	Stem fragment	None	0.7	Brown
	N331E198 I-3 S	Bowl fragment	Sand	1.9	Brown, burnished
	N331E198 I-9 S	Stem fragment	None	2.5	Brown, burnished
	N331E198 I-10 S	Stem fragment	None	2.1	Orange, burnished
	N331E198 I-11 S	Stem fragment	Sand	0.6	Brown, burnished, 3 pieces
	N331E199 I-10 S	Stem fragment	None	0.8	Orange
	N331E199 I-11 S	Stem fragment	Sand	1.0	Brown
	N331E199 II/F64-20 S	Bowl fragment	Sand	4.7	Brown, burnished, decorated, vasiform
	N333E196 I-12 S	Bowl fragment	None	1.2	Orange, burnished
	N384E200 I-6 S	Stem fragment	Sand	2.2	Orange
	Midden I 0-1 M	Bowl fragment	Sand	5.7	Brown, burnished, decorated
	Midden I 0-2 M	Bowl fragment	None	3.5	Brown, burnished, decorated, barrel
	Test Pit #3 (2002)	Stem fragment	None	2.8	Brown, burnished, square form
	Test Pit #3 I-1	Elbow fragment	Sand	15.5	Orange, burnished
Previous Excavation	0119	Bowl fragment	Sand	5.7	Orange, burnished, decorated
	0194	Bowl fragment	None	6.0	Brown, burnished, decorated, human effigy
	0255(a)	Stem fragment	None	4.2	Brown, burnished, mouthpiece
	0255(b)	Stem fragment	None	6.5	Brown, burnished, mouthpiece
	0458	Bowl fragment	Sand	3.0	Orange, plain
	0888	Bowl fragment	Sand	5.3	Brown with red colouration, 2 mended pieces, decorated, coronet
	1014	Bowl fragment	Sand	3.1	Brown, burnished, plain

Settlement Area: n=46 (49%)
Midden Area: n=38 (40%)
Centralia: n=14
Test Pit: n=2 (2%)
Surface Collection: n=8 (9%)

Collection: n=8

Complete Pipe: n=1
Bowl fragments: n=45
Stem fragments: n=46
Elbow: n=1
Juvenile pipe bowl: n=1

Total: n=94

Denatopia: n=69
Palisadia: n=1
Test Pit: n=2
Surface

Appendix 8. Attributes of Chipped Stone Points

North	East	Layer	Catalogue number	Object Type	Raw material	Broken	Portion present	Burnt	Notched	Location of notch	Mass (g)	Length mm	Width mm	Thickness mm	Invasiveness of retouch, Side 1	Type of retouch, Side 1	Invasiveness of retouch, Side 2	Type of retouch, Side 2	Point Type	Comments
279	194	1	3	41	Onondaga	No	C	No	No		2.2	26.8	15.7	5	I	S	I	S	Daniels	some edges have step retouch
279	229	1	8	60	Onondaga	Yes	D	No	No		0.4	13	9	3	C	S	C	S	IN	
275	175	2-12	5	41	Onondaga	Yes	C	Yes	Yes	S	2.9	34.4	18.5	3.5	M	S	M	S	Dewaele	some edges have step retouch
275	175	3-04	78	41	Onondaga	No	C	No	No		3.1	30.2	19.5	5.6	I	S	I	S	Glen Meyer	
255	175	3-07	5	60	Collingwood	Yes	D	No	No		0.2	8.3	8.3	2.3	M	S	M	S	IN	
284	196	1	12	60	Onondaga	Yes	P	No	No		1.3	14	22.45	3.1	M	S	M	S	IN	Possibly Nanticoke
283	196	1	9	41	Onondaga	No	C	No	No		1.5	28.1	15.6	3.9	I	S	I	S	Nanticoke	
283	195	1	16	41	Onondaga	No	C	No	No		3.5	34.6	32.5	2.6	M	T	N	IN	IN	Unknown
277	201	1	8	60	Onondaga	Yes	P	No	No		1.5	17.95	19.8	2.6	M	S	M	S	Daniels	
276	196	1	15	60	Onondaga	Yes	D	Yes	No		0.4	16.1	9.5	2.2	I	S	I	S	IN	
277	190	1	11	60	Onondaga	Yes	M	No	No		0.5	15	9.7	2.5	M	S	I	S	IN	
277	201	1	5	41	Onondaga	No	C	Yes	No		2	21	17.8	5.5	I	S	M	S	Daniels	some edges have step retouch
277	197	1	12	60	Onondaga	Yes	D	No	No		0.6	18.5	9.85	3	I	S	I	T	IN	Possibly not Point
275	195	1	3	41	Onondaga	No	C	No	No		1.6	27	14.4	4.9	I	S	I	S	Nanticoke	
280	193	1	5	41	Onondaga	No	C	Yes	No		1.4	23	19	3.7	M	S	M	S	Daniels	
276	190	1	6	41	Onondaga	No	C	Yes	No		1.3	26.6	13.8	3.95	M	S	M	S	Daniels	
285	159	2-02	11	60	Onondaga	Yes	D	No	No		0.1	8	6	2.25	I	S	I	S	IN	
298	186.5	1	17	60	Onondaga	Yes	D	No	No		0.4	14	10.7	2.6	M	S	I	S	IN	

North	East	Layer	Catalogue number	Object Type	Raw material	Broken	Portion present	Burnt	Notched	Location of notch	Mass (g)	Length mm	Width mm	Thickness mm	Invasiveness of retouch, Side 1	Type of retouch, Side 1	Invasiveness of retouch, Side 2	Type of retouch, Side 2	Point Type	Comments
285	159	1-09	5	41	Onondaga	No	C	Yes	No		1.3	25	13.8	3.9	M	T	M	S	Daniels	
300	186.5	1	7	41	Onondaga	No	C	Yes	No		2	24.2	17.4	4.3	I	S	M	S	Daniels	
285	159	1-06	10	60	Onondaga	Yes	D	Yes	No		1.6	20.4	14.65	4.8	I	S	M	T	IN	

Artefact code: 41 – Projectile point, 60 – Projectile point fragment
Portion present: P – Proximal, M – Medial, D – Distal
Invasiveness of retouch: M- Marginal, I – Invasive, C – Covering
Nature of retouch: S – Scalar, T – Step, IN - Indeterminate

Appendix 9. Identified faunal remains