

**ARCHAEOLOGICAL MONITORING
AND MITIGATION OF THE
PARKING STRUCTURE
AT THE FORKS**

Submitted to

The Forks North Portage Partnership

**QUATERNARY
CONSULTANTS
LIMITED**

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EXECUTIVE SUMMARY

The construction of the parking structure at The Forks occurred in the west portion of the paved parking lot, immediately north of the Manitoba Theatre for Young People. Due to the archaeological sensitivity of the area, a comprehensive heritage resource management program was developed prior to the onset of construction. The value of such a program, wherein the developer, the contractor, and the sub-contractors are aware of the monitoring and mitigative components of each construction phase, was soundly demonstrated. Comprehensive archaeological recoveries of heritage resources, as required under the Manitoba Heritage Resources Act, occurred with no construction delays.

During the monitoring of the drilling of pile seating holes, sensitive zones were determined resulting in appropriate mitigative operations during the excavations for pilecaps and grade beams. Prior to the final excavations for the floor level of the sub-surface north half of the structure, a team of professional archaeologists undertook mitigative excavations of a 1300 year old cultural horizon. Recovery of diagnostic lithic tools, identified as the Avonlea Tradition, and ceramic sherds, identified as Laurel ware, suggests that two different cultural groups were camped at this location circa A.D. 650. The pattern of cultural material indicates several localized activity areas with largely sterile areas between them.

The Avonlea/Laurel cultural horizon probably extends to the east and south of the mitigated areas within the footprint of the parking structure. This indicates that comprehensive heritage resource management plans will be required if any sub-surface activity is planned for the remainder of the paved parking lot.

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1.0 INTRODUCTION

The Forks North Portage Partnership determined that they would undertake the development of a parking structure at the northwest corner of the paved parking lot, Lot P2, at the north side of Forks Market Road. This structure occupies the entire west half of the parking lot (Figure 1) and has sub-surface components. The north and south halves of the structure are staggered with the north half beginning below grade and the south half beginning at grade. The project impacts result from three separate components—drilling for the seating of piles, excavation of pilecaps and trenches for the north and east grade beams, and block excavation of the north half to below the finished floor level.

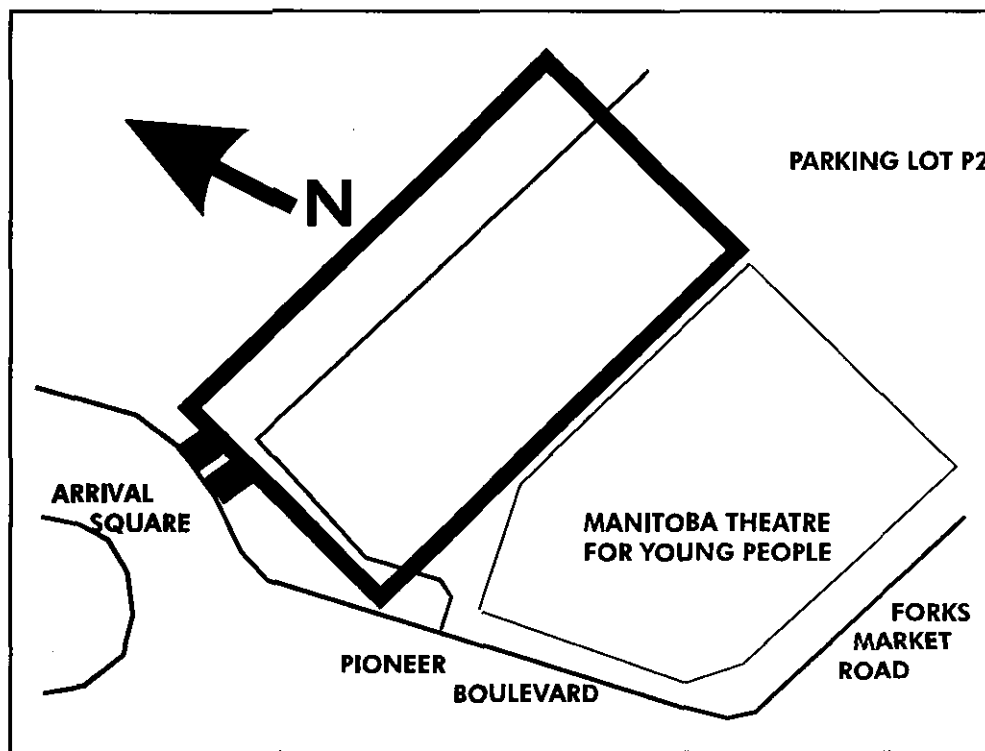


Figure 1: Location of Parking Structure

Due to the high probability of impact upon sub-surface heritage resources, a comprehensive heritage resource management program was developed by Quaternary Consultants Ltd. The operational aspects of this program were carried out under the terms of Heritage Permit A74-01 (Appendix A), issued by Historic Resources Branch, Manitoba Culture, Heritage and Tourism.

1.1 Pre-Construction Planning

Meetings were held involving Mr. Jeff Badger of The Forks North Portage Partnership, representatives of PCL Constructors Ltd., and Sid Kroker of Quaternary Consultants Ltd. These meetings discussed various options for implementing an impact assessment and the types of construction monitoring which would be required to alleviate resource impact. The initial operation was the monitoring of the five geo-technical holes. The results of this program, undertaken under Heritage Permit A69-01, were discussed in an initial report (Quaternary 2001). This report detailed necessary steps for the construction monitoring program as well as relevant data obtained during projects in adjacent vicinities.

The client chose not to have an intensive impact assessment involving the excavation of linear trenches across the impact zone. The reasons were twofold: as the spacing of the trenches may miss the presence of localized archaeological deposits, considerable construction monitoring would be required in any instance and secondly, the trenches, under the floor of the parking structure, could result in localized subsidence, thereby weakening the structure. This decision entailed the need for more intensive construction monitoring and the development of a plan spelling out the necessary actions for monitoring each type of construction activity, as well as the steps which would be taken to mitigate impact for each of those actions. This plan was communicated to Historic Resources Branch, who concurred with the plan and issued the heritage permit.

1.2 Monitoring of Pile Augering

A total of 128 holes were drilled for the seating of piles using a truck-mounted auger with a 16" (40 cm) bit. The holes were drilled to an average of 5 metres depth, although those along the south edge, adjacent to the Manitoba Theatre for Young People, were drilled deeper to minimize vibration impact caused by driving the piles. The piles were arranged singly, or in clusters, around the perimeter of the structure footprint with a central row (Figure 2).

Archaeological investigation consists of visual inspection of the soil column observed from the auger cuttings. The operator drills a 5 foot (1.5 metre) section of the auger bit into the ground and then extracts it for observation of the soil column. Given the plasticity of the soil and the resultant deformation of the soil column by the auger, only thicker soil layers are readily observable. Thin horizons tend to become smeared and, if observable, can not always be accurately placed in a vertical context. The skill of the drill operator is a factor in that the rotational speed of the auger and cessation of rotation at the end of each five foot drilling segment determines the degree of smearing and spiral deformation of the sediments. After each drilling and extraction, another five foot section is drilled until the desired depth is reached.

When the excavations extend into undisturbed original sediments below the fill horizons, the archaeologist watches for buried soil horizons and changes in soil texture which could indicate

possible former ground surfaces. The changes in type of deposit (fill versus original sediment) and texture (silt versus clay) are recorded as are any indicators of possible cultural layers.

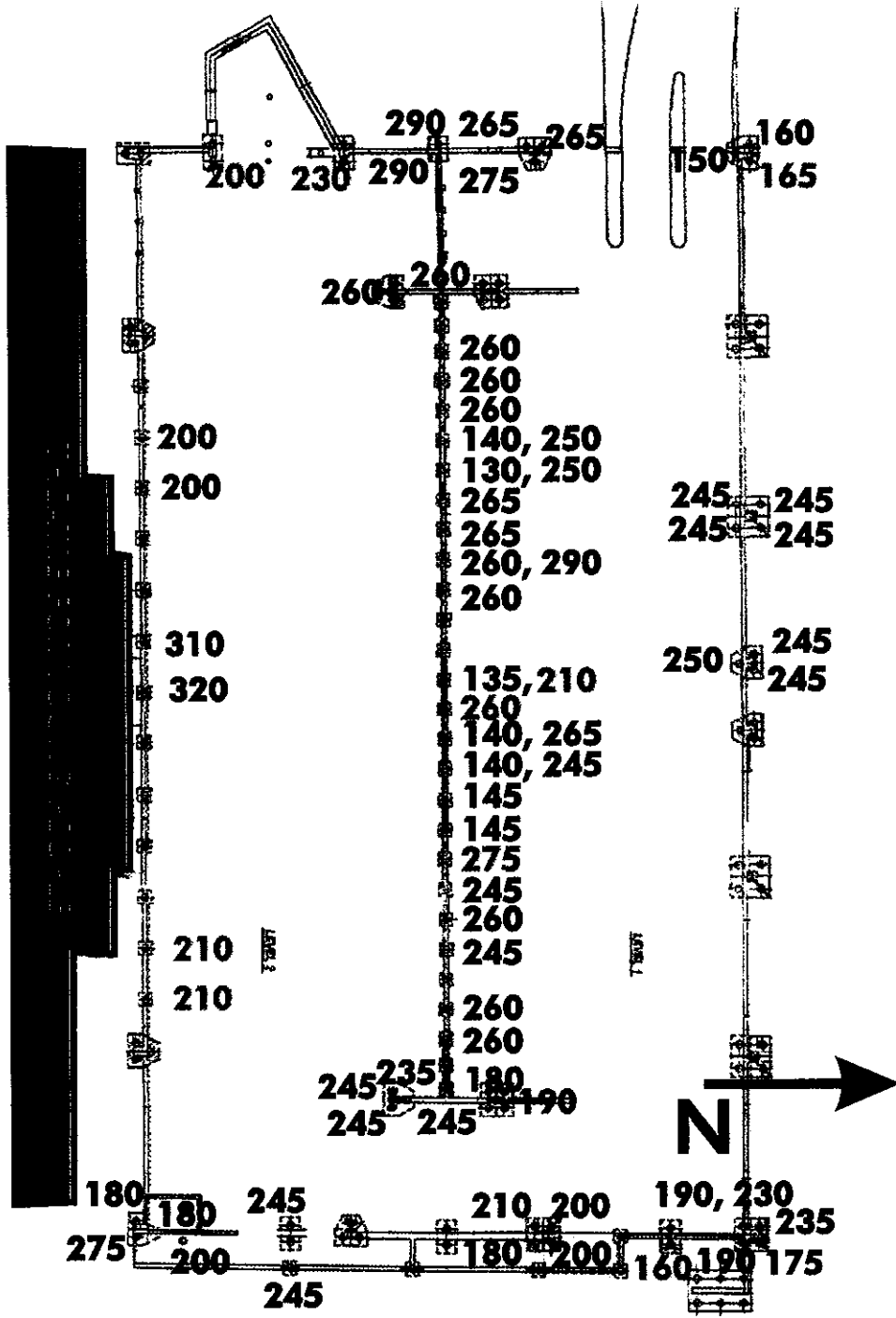
The indicators are buried soil horizons and/or charcoal layers, ash lenses, or reddish stained soil. The presence of a buried soil layer, denoted by a dark brown or black loam layer, indicates a stable ground surface between floods which would have deposited sediments. Charcoal or ash can indicate either a natural event, such as a brush or prairie fire, or a cultural event, such as a campfire. The colour change is usually indicative of oxidation of the iron particles in Red River silt by heat—the more intense the heat, the redder the soil. If evidence of fire is observed, the layer is investigated to ascertain if the cause was natural or cultural. The presence of food remains, particularly mammal or fish bones, resting upon a buried soil is a positive indicator of an archaeological occupation horizon. Other positive indicators are the presence of fragments of earthenware containers and/or lithic tools or flakes resulting from tool manufacture.

Most of the piling locations provided some evidence of strata that could contain archaeological deposits. Layers of charcoal, albeit thin and intermittent, were recorded across the footprint (Figure 2). Occasionally a layer of fire-reddened soil was observed. These instances of evidence of intense heat were recorded at nine auger holes. Cultural evidence, usually in the form of butchering remains—fish and mammal bone, was recovered from five holes.

The depths recorded during augering are not to be considered as exact. Due to field circumstances, such as slumpage in the holes, fallback off the auger, and spiral deformation, depths of layers can be different from those recorded from wall profiles. The cultural layers recorded at the east end of the centre line appeared to be at depths of 180 and 190 cm. After excavation for pilecaps, the undulating cultural horizon was found to occur at a depth of 145 to 160 cm below the current surface (after the asphalt had been stripped) and would have been originally 155 to 170 cm below surface.

1.3 Monitoring of Pilecap and Grade Beam Excavations

Mechanized equipment was used to excavate around each of the piles, or pile clusters, to a depth of 30 cm below cutoff. The depth of cutoff was relatively shallow, 125 cm, on the south wall. The remainder of the excavations for the centre line, north wall, and east wall were considerably deeper extending to depths approaching 3 metres. The efficacy of the monitoring was dependent upon the type of bucket used by the backhoe. Where the excavation was conducted with a ditching bucket, the smooth blade of the bucket and the generally shallower cuts enabled a more rigorous examination of the excavated soil. When the backhoe was outfitted with a toothed excavation bucket, the cuts tended to be deeper and would leave a very ragged base of excavation, making observation of thin soil and/or cultural layers extremely difficult.



- 245** Depth of charcoal layer
- 210** Depth of burned soil layer
- 190** Depth of cultural layer

Figure 2: Piling Locations and Sub-surface Observations

Within the parameters of the monitoring program, the backhoe operator was aware of the need for mitigative action if cultural material was encountered during the pilecap excavations. These excavations tended to be 1.0 metres on all sides of the piles to allow for room for the construction of concrete forms. The trench for the grade beams which would sit on the pilecaps was excavated as part of this operation and resulted in a continuous trench linking each of the piles and pile clusters around the perimeter of the structure, except for the ramp area at the northwest corner of the footprint.

Two types of recovery of cultural material occurred as a result of this phase of the construction. In those instances where the presence of cultural material was not noted during the excavation and only located through inspection of the walls of the trench or pilecap hole, samples were collected from the soil wall (Figure 3). The second type of recovery occurred when the cultural horizon was observed during the excavation and the backhoe operator would scoop the horizon and encapsulating soil matrix and place it off to the side for archaeological investigation at a later time. It tended to be the case that the more comprehensive mitigative recovery occurred when the backhoe was using the ditching bucket. This would be a preferred option from an archaeological monitoring point of view. However the bucket is smaller and is not able to excavate large areas as quickly as the tooting bucket so that contractors tend to prefer the latter implement.

The locations of recovery of cultural artifacts is depicted on Figure 3. The locations where the entire horizon within the pilecap excavation was recovered are denoted by a solid block, while those where material was recovered, after the fact, from the walls of the excavation are denoted by red lines.

1.4 Mitigative Excavations

As a result of the monitoring of the pilecap excavations, an extensive cultural horizon was encountered to the north of the centre line in the area which was to be excavated for the base of the subsurface Level 1 floor. Traces of the cultural horizon occurred at a depth of approximately 130 cm below original surface. The initial plans for partial excavation of Level 1 called for excavation of approximately one metre of soil, resulting in a slight overburden above the cultural deposit. A small backhoe with a ditching bucket was utilized to remove the overburden so that the mitigative excavations could proceed rapidly.

The area of mitigative excavations is depicted on Figure 3 and encompassed 28 square metres. The excavations, employing a field team of experienced professional archaeologists, required one week of operation. The area was gridded into one metre squares (Plate 1) so that the provenience of all recovered artifacts could be recorded and used to reconstruct the activities that had occurred in the past. Hand excavations were undertaken with trowels and other appropriate implements (Plate 2). Cultural features, such as hearths, were mapped as well as the locations of all diagnostic artifacts—lithic tools, ceramic sherds, and bone tools.

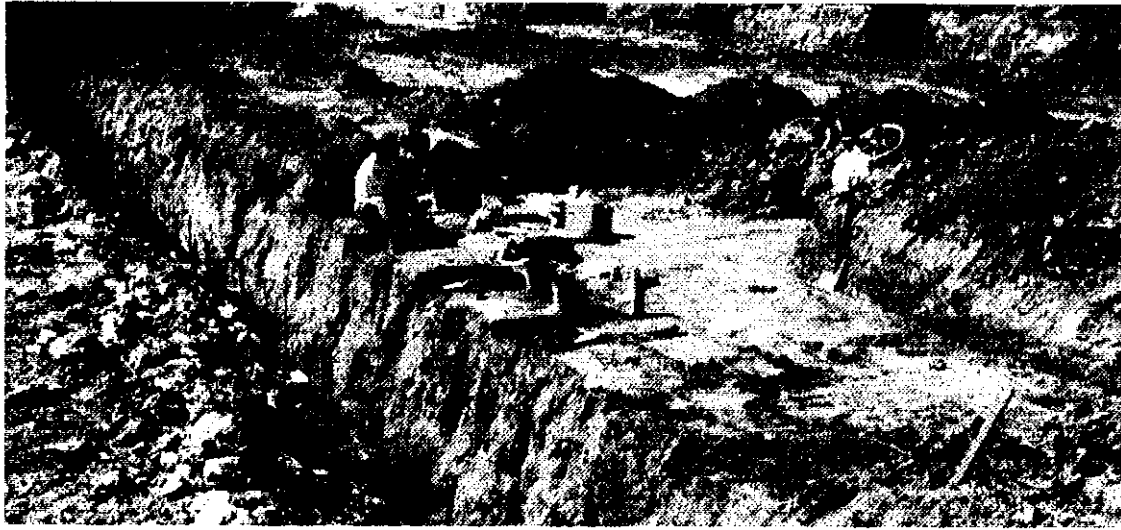


Plate 1: Mitigation Excavation Area at Beginning of Recovery Procedures



Plate 2: Archaeological Team Excavating Cultural Horizon

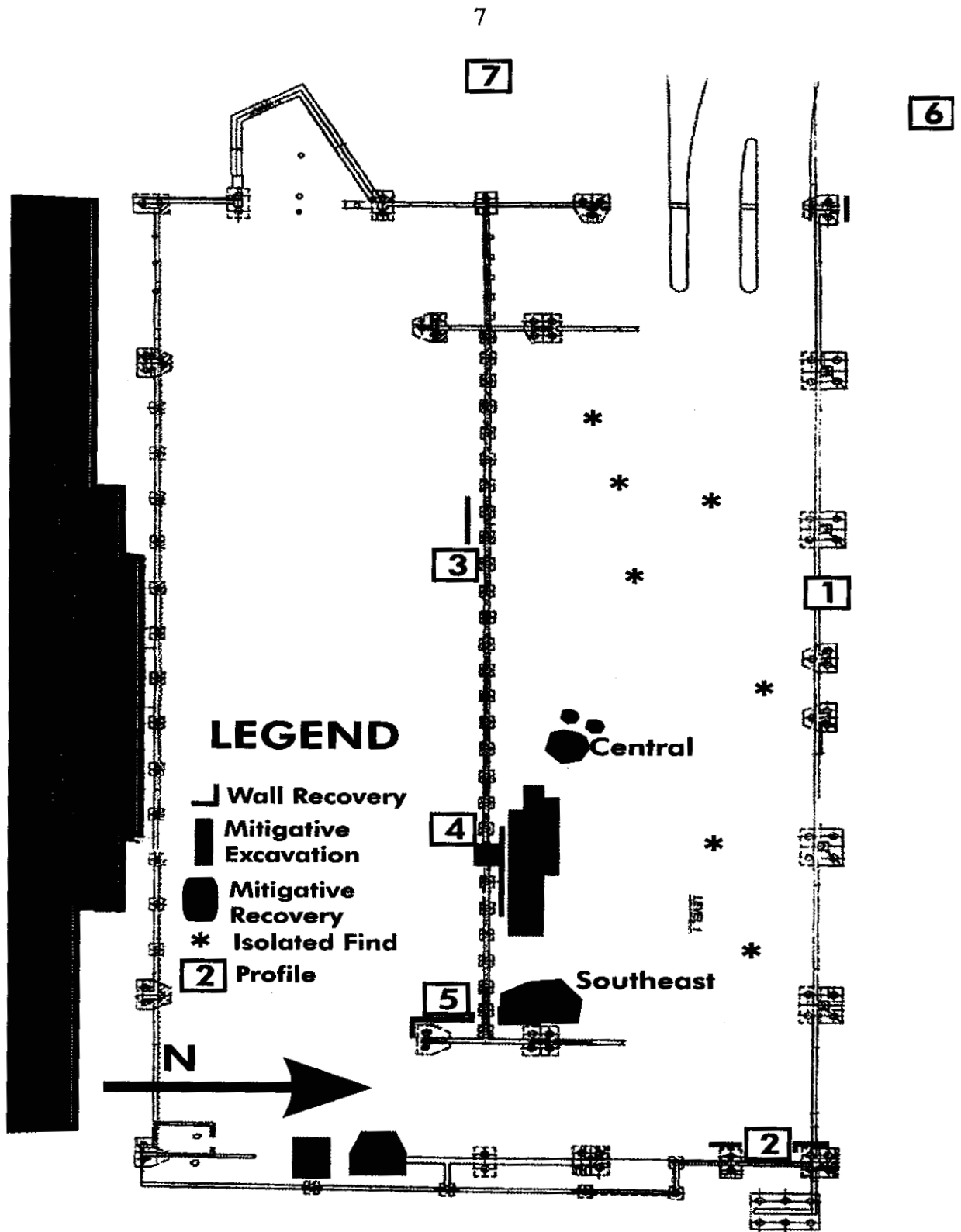


Figure 3: Archaeological Recovery Areas and Soil Profile Locations

1.5 Mitigation of Level 1 Excavations

After the archaeological removal of the cultural material adjacent to the centre line, mechanized equipment continued the excavation of Level 1 to the required depth. This excavation was undertaken in two parts with a strip, nearly one third the width, occurring adjacent to the centre line first. This excavation was required to install drainage pipe as well as the stabilization of the centre wall.

This excavation was undertaken with a backhoe fitted with a ditching bucket which allowed fine control of depth of cuts. Based on the known locations of cultural material in the central portion and eastern portion of this area (Figure 3), the backhoe operator was extremely conscientious. He would take thin cuts down to the depth at which the cultural horizon had been noted in the mitigation area and, if material was present, would scoop the matrix and place it off to the side for future archaeological recovery. The largest area was in the southeast corner of the excavation and covered at least 12 square metres. The cultural material in the central portion was intermittent and sparse.

The second phase of Level 1 excavations resulted in the lowering of the floor of the entire area to the base depth. This was undertaken with the backhoe fitted with a toothed bucket. The backhoe operator was as careful as his machine permitted in attempting to determine if cultural material was present during the excavation. He would strip most of the 20 to 30 centimetres of soil above the potential location of the cultural horizon with a single cut. Then he would rake the area with the teeth of the bucket to allow the archaeologist to determine if cultural material was present. If no material was present the next cuts would excavate to base. If material was present, the monitoring archaeologist would do non-provenienced recovery of the material in an expeditious manner. The locations of recovery are depicted on Figure 3.

Preparatory to the excavation of the ramp at the west end of the structure, which leads to Pioneer Boulevard, the Centra gas line had to be relocated. This entailed the excavation of two vertical shafts for horizontal boring. These were monitored and soil profiles were recorded. The final excavations were the two vertical shafts for the connection of the building drainage system to the LDS under Pioneer Boulevard. The soil profiles were recorded.

1.6 Study Team

The entire archaeological resources management program was directed by Sid Kroker (Senior Archaeologist). The monitoring of the drilling of pile holes, the excavations for pile caps, the excavations for grade beams, Level 1 excavations, and excavations for the west ramp was undertaken by Sid Kroker. The monitoring of parts of the block excavations for Level 1 required the employment of a second archaeologist, Barry Greco.

The mitigative excavations employed Sid Kroker as supervisor and Barry Greco (MA), Catherine Flynn (PhD Candidate), Donalee Deck (MA), and Ernie Reichert (BA) as professional archaeological excavators.

Laboratory operations, resulting from artifact recovery, were supervised by Pam Goundry (Research Archaeologist). Primary artifact preparation was undertaken by Sid Kroker and Pam Goundry. Computer cataloguing was completed by Pam Goundry. Documentation, final analyses, and report preparation have been undertaken by Sid Kroker and Pam Goundry.

1.7 Archaeological Site Designation

Each artifact is assigned a Borden designation as part of its catalogue number. The Borden designation, consisting of a four-letter prefix and a numerical suffix, is a Canada-wide system of identifying archaeological sites based upon latitude and longitude (Borden 1954). The four letter identifier, DILg, designates a geographical block between 49° 50' and 50° 00' North latitude and 97° 00' and 97° 10' West longitude. Within each block, archaeological sites are assigned sequential numbers upon discovery. This site, lying south of Water Avenue, west of the Red River, and east of the CNR Main Line Embankment, had been previously designated as DILg-33. As numerous archaeological projects have occurred within the site boundaries over the past decade (Kroker 1989; Kroker and Goundry 1990, 1993a, 1993b, 1994; Quaternary 1988, 1989a, 1989b, 1990a, 1990b, 1990c, 1992, 1993a, 1993b, 1994a, 1994b, 1995a, 1995b, 1995c, 1996a, 1996b, 1996c, 1998a, 1998b 1999a, 1999b, 1999c, 2000a, 2000b, 2000c, 2001, 2002a), the site designation has been expanded to include a sequential year/project identifier. The identifier for the Parkade project is 02A, denoting that this is the first project at the site during 2002.

1.8 Laboratory Procedures

During the project, a total of 9754 artifacts were recovered. These were brought to Quaternary laboratory facilities, where they were washed and sorted by material class and identified by the lab personnel. Material of the same type (e.g., Knife River Flint flakes) within the same location and depth were combined under a single catalogue number.

Each artifact received a catalogue number consisting of the Borden designation for the site and a sequential number for permanent identification, i.e., DILg-33:02A/####. All pertinent data associated with the artifact was entered into the computer cataloguing system. The cataloguing system is based upon the Canadian Heritage Inventory Network (CHIN) system (Manitoba Museum of Man and Nature 1986; Kroker and Goundry 1993a:Appendix B). The computer cataloguing program is derived from **DBASE3®** and generates individual artifact catalogue cards.

Processed artifacts were prepared for storage by inserting the specimens and the catalogue card into standard plastic storage bags, then stapling the bags closed. At the end of the project, all recovered artifacts will be delivered to the Manitoba Museum of Man and Nature which is the repository designated by The Forks North Portage Partnership and the City of Winnipeg for artifacts recovered during development projects at The Forks.

2.0 STRATIGRAPHY

The stratigraphy across the area of impact shows a moderate degree of similarity with distinctive layers occurring at similar depths. The deepest observations occurred during the monitoring of the pile augering. However, as the primary focus of this activity was the identification of potential cultural horizons, detailed stratigraphy was not recorded. Macro-stratigraphic layers were recorded, such as riverine silty clay or sand, but finer details such as colour variations between layers of silty clay were not noted. The pile holes adjacent to the Manitoba Theatre for Young People were the deepest, extending to approximately eight metres, while the remaining holes were drilled to a depth of five metres.

The observations, in terms of charcoal and cultural layers, are depicted on Figure 2. Subsequent excavations illustrated that thin layers are often not observable in the extracted soil column on an auger bit. This is most readily evident with the irregular recording of the Avonlea/Laurel cultural horizon at depths ranging from 120 cm below surface to 145 cm below surface, especially along the centre line of piles. It should also be noted that this horizon, during mitigative excavations, was found to be sparse in many portions of the excavated area and, in many of the auger holes, there may often have been no cultural material and only a thin (2 to 3 mm thick) charcoal-stained soil horizon.

The best opportunities for recording stratigraphic profiles occurred during the excavations for pilecaps. The excavated area extended approximately one metre to all sides of the piles and/or pile clusters to provide space for constructing the forms. Profiles were recorded at selected locations (Table 1, Figure 3). The upper layer of asphalt and underlying gravel base, usually 12 to 15 cm thick, had already been stripped from the area so that the uppermost recorded layer is fill material. The upper layers reflect activities as recent as the Stage I construction project (Kroker and Goundry 1990) when much of the railroad cinder level was removed and some of it replaced with gravel during the construction of the parking lot. Below the cinder level, layers of disturbed clay and silt occur as fill deposits relating to railroad land modification activities in the latter part of the 19th century.

The buried soil horizons represent stable soil-forming periods between floods which would have deposited sediment on the existing surface. Profile #3 shows four soil strata above the Avonlea/Laurel cultural layer, while other profiles show fewer. Not every flood would deposit sediment at all locations, depending upon water flow speed, sediment load, ice jams, tree falls, back eddies, etc. However, there is a high degree of conformity across the site with several soil layers and distinctive riverine sedimentation layers being observed at many of the profile locations. The slightly undulating Avonlea/Laurel cultural horizon occurred at approximately 120 to 140 cm below surface at three profile locations, the mitigative excavation area, and the two pilecap excavations at the east edge of the footprint.

STRATUM	PROFILE #	#1	#2	#3	#4	#5	#6	#7
Railroad fill		115	110	72	72	75	61	120
Disturbed top soil		120	125	82	83			180
Buried A Horizon				84				
Brown silty clay				90	85		66	
Buried A Horizon				96			74	
Brown silty clay				100	110	100	81	
Buried soil horizon				101		101	82	
Brown silty clay				111		104	98	
Buried soil horizon				112		105		
Brown silty clay				120	137	125		
AVONLEA/LAUREL CULTURAL HORIZON				123	138	128		
Brown riverine silty clay		146	147	172	178	130	143	
Buried A Horizon		148	160				144	
Light brown silty clay			162			132	153	
Buried A Horizon			164				153	
Grey-brown clayey silt		150						
Brown silty clay		177	174			142		
CULTURAL HORIZON			175					
Charcoal layer		178						
Brown silty clay		181	193				206	
Marly brown silty clay				184	197	175	226	201
Brown sandy silt				186	201	181		208
Diffuse buried soil horizon		181	195					
Brown silty clay		183	214	189	225	216		
Diffuse buried soil horizon		183	215		120			

Mottled brown silty clay	196	224	230	213			
Flood-smear horizon	204	224					
Grey-brown silty clay	209	229		225			
Buried soil horizon	209	229		226			
Grey-brown silty clay	215	234	250	256			
Marly brown silty clay	257	267					
Charcoal layer	258	267		256			
Brown silty clay	265						290
Red-brown silty clay	270						
Brown sandy silt	282				240		294
Brown silty clay	290	273		262	257		323
Charcoal layer							323
Brown silty clay							328
Brown sandy silt							341
Brown silty clay							364
Grey-brown silty clay							401
Charcoal layer							401
Grey-brown silty clay							436

Table 1: Soil Profiles from Selected Locations

In general, soil strata show a dip in elevation towards the northeast. Part of this perceived dip may be the presence of underlying undulating stratigraphy, as is evidenced by the Avonlea/Laurel cultural layer (Profiles #3, #4, #5). Inasmuch as continuous profiles were not recorded, being beyond the scope of a mitigative project, this perception is somewhat subjective but is borne out by the correlations between Profile #1 and Profile #2.

3.0 HISTORIC ARTIFACTS

A total of twenty-one historic artifacts were recovered, all either storage or dinnerware containers. These have been analysed within the functional categories based on the CHIN cataloguing format. The recovery methodology is weighted in favour of artifacts that can be identified to function or manufacturer, be identified with a specific product, or be used to obtain a temporal date.

3.1 Containers

This category includes all artifacts, or portions of artifacts, which are used to contain products. It tends to cross-cut other functional divisions, with assignment to the category based upon form as much as function. The category contains several sub-categories (Manitoba Museum of Man and Nature 1986), two of which are applicable to the artifacts recovered during this project:

- ◆ Storage - the purpose of the container is to hold material, e.g., bottles, jars, tin cans; and
- ◆ Dinnerware - the artifact is used in the serving or eating of food.

Within the analytical and computer cataloguing hierarchy, dinnerware is considered as a sub-category of containers. However, for discussion purposes, it is usually treated as a distinct and separate group. In part, this is due to the large quantities usually recovered, as well as the detail of information that can be derived from dinnerware specimens. Accordingly, the dinnerware recoveries are discussed in Section 3.2.

3.1.1 Storage

Storage containers include most of the commonly used artifacts in today's material culture. Many products are sold, transported, carried, or stored in a container of some type: box, jar, sealer, can, bottle. All four of the recovered storage containers are glass bottles which could be identified to the type of container—condiment, beer, beverage, and wine.

3.1.1.1 Condiment and Food Produce Containers

Representatives of this class are often difficult to identify as many producers used unmarked bottles to which paper labels were affixed. Sometimes the shape of a sherd or a bottle can identify the product, such as the distinctive Ketchup bottle. Some producers had bottles manufactured in private molds which were embossed with their name, e.g., the Heinz Company.

DILg-33:02A/31 is a complete aqua bottle with "C S & CO LD" embossed on the base. In addition, the number "82201" is embossed below the initials. This bottle has horizontal finish seams and a vertical mold seam extending to the top of the lip indicating manufacture in an automatic bottling machine. Cannington Shaw & Company, of St. Helens, Lancashire, England, was an early innovator in machine bottle making and had installed Owens machines as early as 1906 (Toulouse 1971:147-

150). The company was an initial part of the formation of United Glass Bottle Manufacturers which provides a terminal date of 1913 for the observed logo. The wide mouth would have been sealed with a metal snap cap and the bottle probably contained pickles or some other food product. The number on the base may be a mold number.

3.1.1.2 Beer Bottles

As many brewing companies manufactured soft drinks and beer, their bottles could have contained either product. Those which are known to have contained beer are discussed under this heading, while bottles from firms which manufactured both products are discussed in the Beverage category.

One complete brown bottle, DILg-33:02A/32, was designated as a beer bottle. It has a company logo, "MCD & S", the name, "MCDONAGH & SHEA", "WINNIPEG, MAN.", and a mold number, "4", embossed on the body. This is a product of the McDonagh & Shea Brewery of Winnipeg. In 1887, John McDonagh and Patrick Shea purchased the Celestin Thomas brewery in Winnipeg. Based on manufacturing techniques, the earliest McDonagh & Shea bottles are clear or aqua in colour with the later bottles being dark brown. In 1926, McDonagh & Shea became Shea's Winnipeg Brewery, thereby providing a terminal date for the bottles from this company. McDonagh & Shea solely bottled beer and did not have a side-line of soft drinks.

All bottles produced by McDonagh & Shea have crown finishes. The earlier bottles were blown-in-mold (up to circa 1920), with the later specimens, like this one, being produced by automatic bottling machines. Variations occurred over time in the format of the embossings and Chopping (1978) provides illustrations of most of these types. Chopping's types appear to follow a roughly chronological order with the taxonomy based upon manufacturing techniques and embossing characteristics. However, the dates for each type have yet to be determined. DILg-33:02A/32 is identified as Chopping Type MWIN BC7-3.

3.1.1.3 Beverage Bottles

Without paper labels, it is usually impossible to ascribe a specific product to an archaeologically recovered bottle. Thus, the bottles are assigned to the generalized Beverage class. Depending upon the data embossed on the artifact, it may be possible to identify the producer of the contents, the manufacturer of the container, both, or neither. DILg-33:02A/33 is a complete long-necked brown bottle with a crown finish which was manufactured in an automatic bottling machine. There are no marks on this specimen, thus it is impossible to assign it to a specific firm.

3.1.1.4 Wine Bottles

One of the identifying features of early wine bottles was the kick-up which is a raised section of the base. This feature originated as a sediment trap and is currently retained as a tradition. Often, a mamelon—a small downward projecting dome of glass—is present in the centre of the kick-up. DILg-33:02A/34 is an olive-coloured bottle missing most of the neck and the finish. It has a kickup but no mamelon.

3.2 *Dinnerware*

Plates, cups, bowls, etc. are types of containers and, technically, are catalogued as a sub-category of the container hierarchy. Seventeen ceramic dinnerware artifacts were recovered. Ceramic dinnerware includes place settings—plates, small bowls, cups and saucers—and serving pieces—platters, large bowls, creamers. Archaeological recoveries are often too fragmented to allow exact identification and this is reflected in the use of object types such as bowl?, plate?/saucer?, and bowl?/cup?. Because dinnerware is usually manufactured in sets of the same pattern, the decorative features of a set cross-cut the types of objects. The seventeen artifacts are separated into groups based on colour and, within each colour category, decorative design and any information such as manufacturer and jobber will be discussed.

3.2.1 *White Ceramics*

White sherds are only fragments of complete objects—there may be patterns with other colours that fit onto these sherds. Four white sherds were recovered from this site. Two of these are plain white with no indication of a pattern or a manufacturer. DILg-33:02A/22 is a base sherd from a cup, while DILg-33:02A/26 is a body, base sherd from a plate. The cup sherd is thin-walled (2.7 mm), while the plate sherd is very thick (6.7 mm), representing a more utilitarian style of dinnerware than the cup.

The remaining two plain, white, thick-walled specimens have portions of maker's marks on them. DILg-33:02A/23 is a basal sherd (6.2 mm thick) from a plate. The name "GRIND..." and a "V..." are printed, in green, on the base. The product could derive from W.H. Grindley & Company of Tunstall, Staffordshire or from their subsidiary, Grindley Hotel Ware Company Ltd. The Hotel Ware products usually had the word vitrified as part of the maker's mark, whereas the parent company did not (Godden 1964:293-294). The Grindley Hotel Ware Co. Ltd. has produced pottery from 1908.

DILg-33:02A/24, also a 6.2 mm thick basal sherd from a plate, has "GOWA..." and "T..." printed inside an outline of either a crown or a banner, in green, on the base. No firm with the name Gowan or any near approximation can be found in Godden (1964), Kovel (1953, 1986), or Poche (1974). If it is a crown outline, it may be a British firm, or, alternatively, if it is a banner, it may be a jobber company such as Gowans, Kent and Company of Winnipeg (Kroker and Goundry 1993a:85). A jobber firm is usually a retail or wholesale company which orders large supplies of a product and as part of the order has their name imprinted on the product as well as that of the manufacturer. This particular company was present in Winnipeg from 1882 to 1922.

3.2.2 *Green-on-White Ceramics*

Thirteen specimens all have the ubiquitous dark green lines on a white background pattern on them (Table 2). This pattern consists of a thick line with a thin line immediately below it and a second thin line considerably below that. The thick line often appears to differ in thickness and in the shade of green. The third line, the other thin one, often occurs at various positions on the body, partially

reflecting the type of object. For example, on the cup, it occurs halfway down the body, while on the plates it occurs at the junction of the body with the base.

CAT. #	QTY	OBJECT	PORTION	COMMENTS
20	1	cup	lip,body	very thin-walled (2.4 mm)
21	1	cup	body,base	very thin-walled (2.5 mm)
25	1	plate	lip,body,base	"G...";thin-walled (4.1 mm)
27	1	plate	lip,body,base	thick-walled (6.9 mm)
28	3	plate	lip,body	thin-walled (5.1 mm)
29	4	plate	lip,body	thick-walled (6.8 mm)
30	2	plate	lip,body	thin-walled (5.2 mm)
TOTAL	13			

Table 2: Three Green Lines Pattern

Only one specimen, DILg-33:02A/25, has any markings on it. The "G..." and the trace of an outline, in green, could represent the Gowans, Kent & Company, similar to the mark on the white specimen, DILg-33:02A/23.

The variation in thickness probably represents different types of plates and/or saucers, i.e., dinner versus bread and butter or dessert plates. The paste of all specimens is roughly similar, at least at a macroscopic level. The most notable variation between the sherds is the shade of green with two or perhaps three different shades. One shade on DILg-33:02A/29 has a definite olive tinge. Other sherds have slightly varying shades of an emerald green (DILg-33:02A/25, 27, 28, and 30). In previous reports (Quaternary 2002a:98-101, 2002b:43-44), the colour was found to be indicative of the manufacturer with the olive shade being produced by Ridgways of Staffordshire, England and the emerald shades being produced by other British firms (Grindley, John Maddock and Sons, and G. Meakin).

4.0 AVONLEA/LAUREL HORIZON

Numerous pre-European cultural horizons have been encountered during various development projects at The Forks. The majority of the recovered artifacts from the excavation components of the Parkade appear to derive from a single cultural occupation. If more than one occupation occurred, it appears that they could have been close together in time with horizontal stratification, i.e., on the same soil level but at different, minimally overlapping locations. The manifestations of this occupation are intermittent with localized concentrations of material. Between these concentrations, a thin charcoal layer occasionally containing small, light fish bone fragments is present. It would seem that the charcoal layer derives from flood smear of the hearths of the occupation or from a grass fire that occurred shortly after the occupation. Recoveries occurred during different phases of the construction, each with its own degree of control of provenience. For analytical purposes, all recoveries from the cultural horizon will be examined *in toto*. Analysis of activity areas and density of deposition will be restricted to the area that underwent mitigative excavation (Figure 3).

Due to the non-contiguous nature of the excavations, it was not always possible to determine if the cultural material derived from isolated localities was directly associated with the primary occupation zone. Accordingly, the recoveries from these loci will be analysed in Section 5.0.

The analytic format will first examine the primary diagnostic artifacts, i.e., lithic tools and ceramics. Following these sections, the faunal and floral recoveries will be described to provide a brief outline of subsistence strategies. Tools made of bone are analysed within the faunal section.

4.1 *Lithic Artifacts*

The lithic component of pre-European tool kits is the portion that tends to preserve the best. Bone and wooden tools, as well as clothing and other organic artifacts, decay or burn during prairie/forest fires. Due to the indestructibility of stone artifacts, they have become one of the standard diagnostic tools for assessing cultural affiliations. This assessment is predicated upon the assumption that there were standardized forms for each type of artifact within each cultural group at a specific time period. However, considerable variation can occur due to the degree of skill of the individual tool maker, the quality of the lithic material from which the tool is being made, and the borrowing of ideas from other cultural groups.

Archaeologists record a sequence of measurements on various aspects of different tools. These measurements can be used to perform statistical comparisons with other tools within the site and between sites. The standardized types of measurements for projectile points are different from other tools and include the length and width of the blade, the length and the width of the base, the depth and angle of side-notches (if present), and the angle of the tip.

Other lithic tools tend to be less diagnostic than projectile points. In the case of cutting and scraping tools, form is often determined by function as well as qualities of the lithic material. For these tools,

the measurements focus on the working edge: the width of the working edge; the length of the working edge (the distance off-linear which is positive for convex edges like scrapers and negative for concave edges like spokeshaves); and the edge angle.

Detritus is the category under which the byproducts and waste elements of the tool manufacturing process are catalogued. This category refers to lithic material and includes flakes and cores. The category also includes waste products from the manufacture of bone or wooden tools. These are described in the faunal or floral sections.

The manufacture of stone tools is a complex process. Cobbles and pebbles of the desired raw material are struck with a hammerstone to remove flakes. A source cobble with flakes removed is known as a core. The flakes, which have been removed, are further shaped using a stone or antler billet to strike off smaller flakes to thin the original object and to produce the desired shape. At this time, a pointed implement called a flaker, usually made of antler, is used to press small flakes from the edge to produce a sharp, straight cutting edge. During this process, many flakes are produced—some are further modified as retouched flakes, others are used *as is* as expedient cutting tools, but most are discarded at the place of manufacture.

The 125 lithic artifacts are analysed within the following categories: tools (6 = 4.8%), detritus (74 = 59.2%), fire-cracked rock (44 = 35.2%), and unmodified lithic material (1 = 0.8%). The locations of the recoveries are depicted on Figure 5 (Section 4.6).

4.1.1 Lithic Tools

Six lithic tools were recovered—one projectile point, one scraper, one drill, two retouched flakes, and one utilized flake. Each type will be described in the appropriate sections below.

4.1.1.1 Projectile Point

DILg-33:02A/85 is a complete side-notched projectile point (Plate 3) made from a banded whitish chert. The specimen was recovered from Unit A2 (Figure 5). The flaking is bifacial pressure flaking which, due to the microcrystalline nature of the lithic material, tended to be contracting rather than lamellar. The slightly concave base has no evidence of grinding. The length is 19.5 mm, the width is 13.0 mm, the thickness is 4.3 mm, and it weighs 0.9 grams. Specific measurements include the blade width of 11.1 mm, the blade length of 15.0 mm, and a tip angle of 61°. The side notches are shallow being 1.0 and 0.6 mm. The configuration of the projectile point resembles some of the points used in Kehoe's typology. Specifically, DILg-33:02A/85 resembles specimens Plate 12:Q and Plate 12:U (Kehoe 1973:Plate 12) which he terms Gull Lake variety from the initial Gull Lake research. The specimen also resembles Figure 11:D recovered during the 1984 reinvestigation of the Avonlea site EaNg-1 as well as Figure 11:Z from the earlier 1956 investigations (Kehoe *et al.* 1988:Figure 11). An examination of Avonlea sites in Manitoba has shown that the phase occurs throughout the southwest corner of the province reaching the junction of the Red and Assiniboine Rivers (Joyes

1988:Figure 14). The projectile points have been identified from numerous sites including the Pre-Emption site (Goundry 1981) and the Stott Site (Nicholson 1976).

4.1.1.2 Scraper

DILg-33:02A/249 is a natural flake of Tongue River Silicified Sediment which has been used as a scraper (Plate 3). The artifact, recovered from Unit A6 (Figure 5), measures 21.4 mm long, 14.7 mm wide, 10.6 mm high with a weight of 3.0 grams. The cleavage produced during core reduction resulted in a working edge angle of 59° along a linear working edge measuring 16.0 mm. It is possible that this implement originally was longer. The wear pattern on the working edge consists of moderate step fracturing.

4.1.1.3 Drill

DILg-33:02A/663 is the distal portion of an attenuate bifacially flaked object (Plate 3). It was located during the mitigative recovery of the southern pilecap excavation at the east edge of the footprint. It is made from a grey cryptocrystalline chert which shows some evidence of a patina. The sharpening flakes are overlapping lamellar pressure flakes at oblique angles to the working edge. The artifact has obviously been broken and the distal portion is missing. The length is 28.0 mm, the width is 12.8 mm, and the thickness is 4.4 mm. It weighs 1.0 grams and has a tip angle of 35°. This tool would have been mounted in a straight wooden shaft and used with hand friction or horizontal movement of a bow string to drill holes in bone or wood objects.

4.1.1.4 Retouched Flakes

Two retouched flakes were curated (Table 3). DILg-33:02A/448 is a thin triangular flake of Knife River Flint (Plate 3), from Unit B7 (Figure 5). It has unifacial retouch on the left margin and the distal portion of the right margin. DILg-33:02A/720 is a thin trapezoidal flake of Knife River Flint which has unifacial retouch on the left and right margins (Plate 3). This tool was recovered during mitigative operations from the recovery locality at the northern side of the east end of the centre line. The left margin has a concave working edge, i.e., by definition a spokeshave, while the right margin is nearly linear with a slight degree of concavity. Both tools were hafted in a bone or wood handle.

CAT.#	LENGTH	WIDTH	THICK	WT	WORKING EDGE MEASUREMENTS		
					WIDTH	LENGTH	ANGLE
448	27.8	19.0	2.8	0.8	18.6 (L)	0.8 (L)	22° (L)
					9.4 (R)	0.4 (R)	25° (R)
720	36.2	41.6	4.0	2.0	25.1 (L)	-3.4 (L)	28° (L)
					18.6 (R)	-0.4 (R)	41° (R)

Table 3: Measurements on Retouched Flakes

4.1.1.5 Utilized Flake

One utilized flake was recovered. This type of artifact consists of an unmodified flake produced during tool manufacture which is used *as is* for expediency purposes. The flake may have a sharp edge and be used as a cutting tool or it may have a steep natural cleavage enabling its use as a scraping implement. DILg-33:02A/412 was recovered from Unit B5 (Figure 5). It is a triangular Knife River Flint flake with a thin left margin showing cutting wear and a steep right margin with wear polish from scraping action (Plate 3). The overall dimensions are 20.1 mm long, 13.2 mm wide, and 4.5 mm thick. It weighs 0.9 grams. The left working edge is linear with slight undulations and extends for a length of 16.7 mm. It has an edge angle of 20° as opposed to the right working edge which has an angle of 48° . The steep portion of the right edge of the flake extends for a distance of 14.7 mm and has a slight degree of wear polish on the top and proximal edge of the working face. Four or five micro step fractures are present on the working edge indicating very limited use.

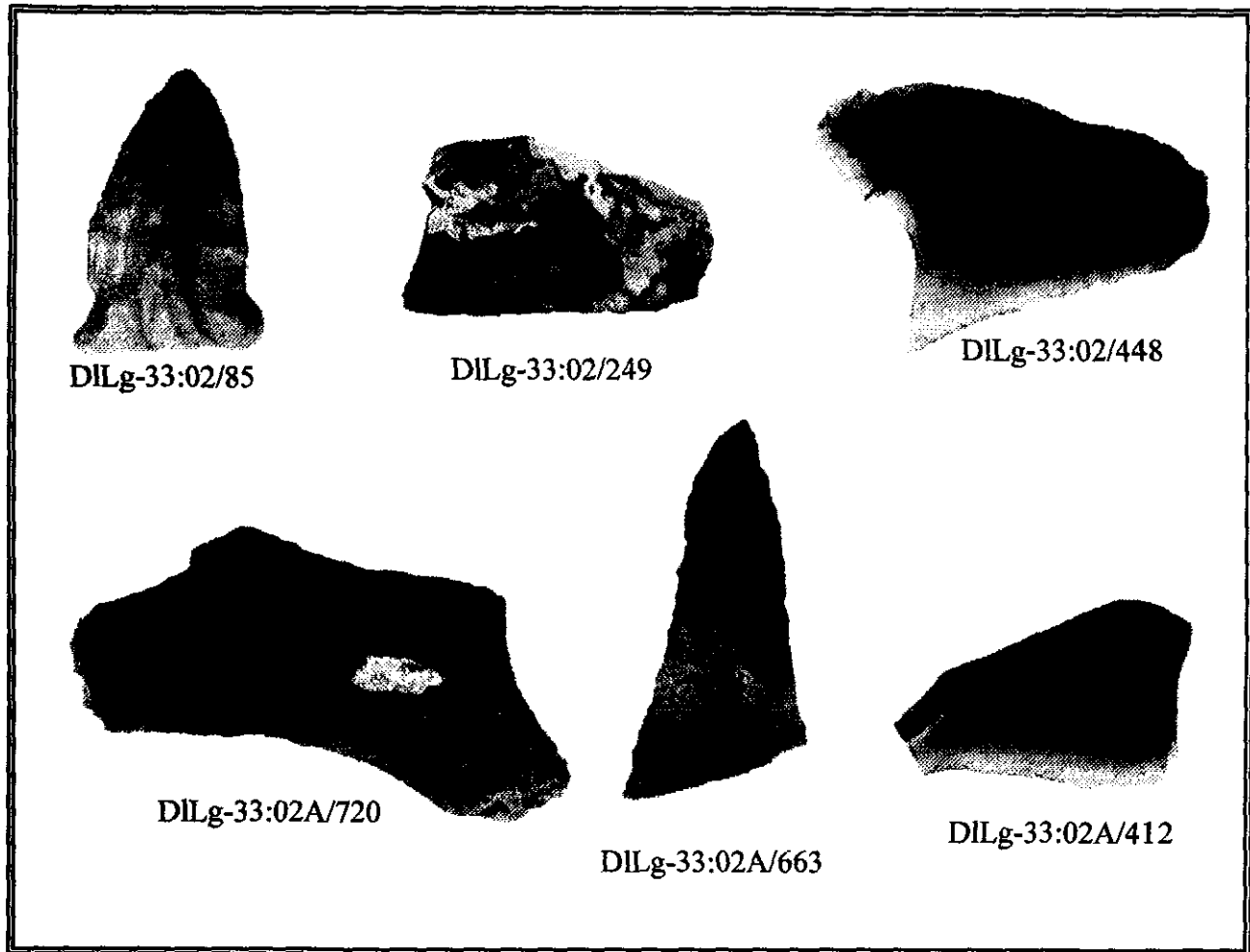


Plate 3: Lithic Tools from the Avonlea/Laurel Horizon (2x actual size)

4.1.2 Detritus

Seventy-four lithic flakes (Table 4) were recovered. Within the flakes, seven lithic material types were represented, the predominant one being undifferentiated chert (44 flakes = 59.5%). The second most frequent material is Knife River Flint (20 flakes = 27.0%), which is ubiquitous in Manitoba archaeological sites. As the source area is distant from the Winnipeg region, the presence of Knife River Flint and Tongue River Silicified Sediment in this site may suggest procurement through trade or mining from quarry sources in North Dakota (Burns 1995:33-34).

MATERIAL	GROUP	QUANTITY	FREQUENCY	WEIGHT	FREQUENCY
Chalcedony	I	1	1.4	0.1	0.5
Chert	IV	44	59.5	11.1	51.4
Knife River Flint	II	20	27.0	6.6	30.6
Quartzite	IV	1	1.4	0.5	2.3
Selkirk Chert	V	6	8.1	2.2	10.2
Swan River Chert	I	1	1.4	0.3	1.4
Tongue River	II	1	1.4	0.8	3.7
TOTAL		74	100.2	21.6	100.1

Table 4: Flake Recoveries by Material Type

An examination of source areas of lithic detritus can provide information about the movements and trade patterns of the occupants of an archaeological site. Often, suitable lithic material for tool manufacture is collected when encountered and carried until used. Naturally, among nomadic peoples, higher quality stone will be retained longer than more common, lower quality material and would be used to manufacture tools which are intended to be retained. Regionally, the lithic material types can be organized into five groups:

- Group I: Materials found throughout the western portion of Manitoba. This group includes Swan River Chert from the Swan River Valley region near the Saskatchewan border and St. Ambrose Chert from Lake Manitoba. Other materials, i.e., chalcedony and agate, are found in deposits such as the Souris Gravel Pits.
- Group II: Materials found to the south. The primary example of this group is Knife River Flint which occurs at quarry locations in North Dakota. Tongue River Silicified Sediment is also found in surficial deposits in North Dakota.
- Group III: Materials found east and north of the Red River. Associated with the Canadian Shield, this group contains quartz, rhyolite, etc.
- Group IV: Materials whose distribution is a result of glacial transportation and can be found throughout the province. This group is represented by quartzite, siltstone, and the various types of undifferentiated chert.

Group V: Materials from nearby quarry sources. This group is represented by Selkirk Chert and the limestone matrix in which the nodules occur.

The most frequent group is Group IV, representing 60.9% of the total. Group II provides 28.4% followed by Group V which provides 8.1%. Group I provides only 2.8% and Group III is absent. Inasmuch as lithic materials are not available at the site, all material would have been transported to the location by the occupants. Some materials, such as Group IV, could have been obtained at creek mouths and riffle areas to the west along the Assiniboine River. Group V materials could have been found slightly downstream on the Red River at the St. Andrews Rapids (Selkirk Chert). Most of the other lithic types are the result of long-distance transport. The most predominant groupings of lithic materials would represent source areas recently visited by the occupants.

An assemblage such as this one, which shows a strong reliance on locally obtained material, indicates a knowledge of regional lithic source areas and suggests the practise of gathering tool-quality material when the opportunity arises. As certain types of material are favoured for specific tools, often that type of material is carried until needed. Thus, representations of previously visited areas can occur as components of the current lithic assemblage. In this case, the amount of Knife River Flint would suggest that it was one of the more favoured materials and was frequently used as long as supplies lasted. This aspect can be seen with the modification of detritus flakes into retouched and utilized flakes. With other types of materials, detritus flakes would have likely been discarded. The frequency of Knife River Flint could also suggest that the occupants of the site had recently arrived from the quarry locations in North Dakota. Alternatively, given the river junction location of the site, an individual trader or trading group from the south may have arrived recently thereby permitting the resident group the opportunity to augment their supply of Knife River Flint.

4.1.3 Fire-cracked Rock

Forty-four fire-cracked rocks were recovered (Table 5). Concentrations of fire-cracked rock tend to indicate hearths and cooking activities areas. Fire-cracked rocks are those specimens which have evidence of being subjected to intense heat. Depending upon the structure of the rock, extreme temperature variations causes different results. Fine-grained homogenous lithic cobbles, such as limestone, quartzite, and rhyolite will spall and shatter into angular fragments, while coarse-grained granitic rocks will tend to decompose into smaller granular fragments of the different parent materials, i.e., quartz, biotite, feldspar, etc.

Granitic specimens account for the highest number as well as the greatest weight. The other two types, diorite and schist, are also granular rocks that demonstrate the same behaviour as granite. The fragmented nature of the granitic specimens may have been the result of several instances of heating which would increase the degree of decomposition. This would be the case if the specimens were used as hearth stones. However, during the mitigative excavations, little fire-cracked rock was recovered directly adjacent to the excavated hearths.

MATERIAL	QUANTITY	FREQUENCY	WEIGHT	FREQUENCY
Diorite	4	9.1	91.0	13.1
Granite	39	88.6	600.7	86.3
Schist	1	2.3	4.3	0.6
TOTAL	44	100.0	696.0	100.0

Table 5: Frequency of Types of Fire-cracked Rock

There are a limited number of purposes which granitic rocks can fulfill, one of which is as raw material for tool manufacture. Granitic cobbles can be shaped, by pecking and grinding, into hammerstones. The granular nature of the stone precludes the manufacture of cutting implements, although tabular granitic spalls can be shaped into chithos.

Stones could have also been used as boiling stones. Ethnographic literature records the use of heated stones to cook soups and stews. The liquid food, in a hide, basket, or ceramic container, is gradually raised to boiling point by the addition of stones which have been heated in the adjacent fire. The documentation does not record if certain types of stones were preferred or if it was a case of using what was available. Intuitively, one would suspect that hot stones, which would produce small granular spalls upon suffering thermal shock when submerged in cold liquid, would not be the optimum choice.

4.1.4 Unmodified Lithic Material

Given that the site location is in a flood deposition zone, all rock would have been imported into the location by people. It is remotely possible that some lithic specimens could have been rafted into the area on winter ice. Only one lithic artifact was recovered which showed no evidence of cultural alteration, either flake scars or heat modification fracture lines. DILg-33:02A/841 is a large Swan River Chert cobble which was probably carried onto the site as a lithic resource. It weighs 1328.6 grams.

4.2 Ceramic Artifacts

For thousands of years people have been making vessels of fired clay in which to carry water, store food, cook meals, or use in ceremonies. Potsherds—broken pieces of ceramic vessels from archaeological sites—constitute an important component of most artifact assemblages. These sherds provide information on the people who lived at a particular site and when they lived there, as well as some indications of other groups with whom they traded. Broken pottery may also contain traces of the foods that were cooked and impressions of the textiles and baskets that were present. Pottery can be analysed through many different types of intensive analyses, most of which fall beyond the purview of a mitigative archaeological report.

The development of ceramics in Manitoba began over two thousand years ago with the production of pottery known as *Laurel*. The term *Laurel* does not designate a particular ethnic or linguistic group, it is merely the name of the site in Minnesota where this type of pottery was first recovered. Laurel ceramics are usually manufactured by coiling and shaped into conoidal vessels with slightly constricted necks terminating in unthickened lips. The exterior surface is usually smooth with numerous decorative elements, including punctates, bosses, dentate stamps, incisions, and cord impressions.

Avonlea is a term first applied to a projectile point style and the cultural/temporal phase with which it is associated (HRB 1989). In addition, the term has been applied to ceramic vessels associated with this phase. A brief description of cultural attributes is provided by Reeves (1970:159-160, 166, 1983:101-105) with estimated dates of A.D. 200 to A.D. 700.

Around A.D. 500, a change in pottery styles occurred. These differences include a shift to a globular rather than conical shape, textured surface finishes, and different manufacturing techniques which include the use of fabric wrapped paddles and/or molding inside a woven textile bag. Decorations were frequently applied with cord wrapped tools and there seems to be an increasing regional differentiation in pottery styles.

Like any other specialized profession, archaeologists have devised an analytical language wherein words may have different meanings or connotations than in standard English. While this specialized language is mutually comprehensible between archaeologists, definitions need to be provided to enable the public to gain insight into the archaeological analysis process. The main terms used in ceramic analysis are defined below.

Colour: Colour is used to ascertain information on the firing technique. Brighter hues such as red, orange, terracotta, and beige infer the presence of a firing environment with ample oxygen, while darker colours such as deep iron red, gray, brown, and black suggest a reducing (or oxygen deprived) firing atmosphere. However, due to the vagaries of open pit firing, one area of a pot may be reduced while another has oxidized. As well, these vessels were used over an open fire on a day-to-day basis and this subsequent use affects the final colours of the pot. Once the pot has broken and the sherds discarded, subsequent fires (either domestic or natural) may affect the final colour of the potsherds. In fact, this particular attribute is often unimportant since sherds of radically different colours later turn out to be from the same vessel, with one next to the other in a reconstruction.

Temper Type: Temper is the non-plastic material added to clay to enhance its structural strength, reduce shrinkage, decrease plasticity, and improve the finished vessel's ability to withstand the firing process. In this region, tempering material is almost invariably crushed granite, while sand and shell, though less common, are not unheard of. The choice of tempering material may vary between different cultural groups and also changes over time. Therefore major changes in the type, size, and quantity of temper can be informative.

Paste Type: Paste is a term used to describe the fired clay body itself. A set of descriptive terms—flaky, compact flaky, laminated, compact laminated, blocky, grainy, and compact—can be used to express the degree of paste compactness. Flaky describes the loosest, least compact paste (resembling pie crust) while compact paste is one in which very little layering or lamination is visible.

Sherd Thickness: Thickness is an important attribute because it provides information about the technical skill of the potter herself as well as the choice of clay used to create a pot. Certain clays lend themselves more readily to thin walls than others, while with other types of clay, no amount of skill or finesse will yield a thin wall. Thickness does seem to vary through time with the thickest walls often found on early pottery. In general, wall thickness decreases as one gets closer to the present.

Charred Deposits: Charred deposits on the interior and exterior surfaces of pot sherds can be subjected to chemical analysis. This may provide some idea of what was cooked in the pot. Additionally, radiocarbon dating by linear accelerator can use very small quantities of carbon and produce dates for the last use of the vessel.

Surface Treatment: The surface finish of a pot is due primarily to the method of manufacture. The appearance of pottery results from a combination of the tools used to make the pot and the clouding arising from the use of the vessel over an open fire. Textured surface finishes can be created in a number of ways: by using a carved or fabric wrapped paddle, by making the pot inside a curved support lined with a piece of fabric, by manufacturing the pot inside a woven bag, or by beating the outer surface with a rough piece of bone or wood. Textured surfaces may be wiped or scraped smooth when the vessel is completed and the use of a plain paddle during the manufacturing process also results in a smooth surface. Surface finishes are both regionally and temporally variable and are considered diagnostic.

Accordingly, the surface treatments visible on body sherds are extremely variable and are lumped into three broad categories: textile impressed, obliterated textile, and smooth. Textile impressed pottery is that which shows unaltered textile/fabric impressions on the outer surface, with the term *textile impressed* being used to encompass a broad range of surface impressions. *Obliterated textile impressions* result when the original impression is lightly smoothed over and obscures the details of the weave, probably when the vessel was leather hard. *Smooth* surface finishes show no indication whatsoever of any pre-existing textile impression. Such pots may have been manufactured using a plain paddle. It is important to note that the surface finishes on the rim and those on the body may be radically different; bodies may be textile impressed while the rim is smoothed and vice-versa.

Decorative Treatment: Decorative treatment can be divided into a number of fairly large, descriptive categories: stamped, incised, trailed, cord impressed, cord-wrapped object impressed (CWOI), and obliterated CWOI.

Vessel Number: Rim sherds were assigned to different vessels whenever possible. Vessels were assigned individual numbers only where it was certain that the sherds did indeed belong to different vessels; that is, where it was reasonably certain that the sherd in question could not be matched with any other designated vessel in the assemblage. This was achieved by closely examining the decorative motifs, their arrangement on the vessel itself, and the tools used to produce these marks.

For this study, a rim sherd is defined as any portion of the vessel that contains decorative elements. This generally includes the upper one third of a vessel: the lip, neck, and sometimes the shoulder. Body sherds were examined to record basic data such as quantity, weight, surface finish, etc.

A total of 245 ceramic sherds was recovered. There are 147 body sherds and sherdlets and 98 rim sherds and sherdlets which could be allocated to fourteen vessels. The discrete vessels identified from the recoveries during the mitigative excavations are depicted on Figure 6 (Section 4.6).

4.2.1 Body Sherds

As with every ceramic assemblage, the bulk of the sherds are from the body of the pot. Mathematically, this makes sense since the decorated portions of the vessel usually account for less (generally much less) than 20% of the total vessel surface. Body sherds have traditionally been considered less diagnostic than the rims, necks, and shoulders that comprise the decorated portion of the vessel. Body sherdlets, designated as such due to their small size (an area less than a dime), derive from the same vessels and thus are analysed together with the larger body sherds.

For body sherds, surface treatment was the only attribute apart from weight that was recorded (Table 6). The number of small, exfoliated sherdlets has resulted in a skewing of the frequency of attributes when examined by quantity. This disparity appears to be rectified if the weight is used as the indicator of frequency of attributes within the assemblage. The assemblage was dominated by smooth surface treatments which accounted for 85.1% of the total weight. Obliterated textile impressions accounted for 5.9% of the total weight, with 9.0% being undeterminable.

SURFACE FINISH	QTY	FREQUENCY	WT	FREQUENCY
TEXTILE IMPRESSED	0	0.0	0	0.0
OBLITERATED TEXTILE IMPRESSED	2	1.4	17.6	5.9
SMOOTH	91	61.9	253.0	85.1
UNDETERMINED	54	36.7	26.8	9.0
TOTAL	147	100.0	297.4	100.0

Table 6: Surface Characteristics of Body Sherds and Body Sherdlets

Many body sherds will probably match rim sherds which have been designated as vessels. Based on provenience and the characteristics of temper and paste, it may be possible to assign some of these body sherds to designated vessels. This procedure could be undertaken in conjunction with vessel reconstruction but falls beyond the purview of a mitigative recovery project.

4.2.2 Rim Sherds

The 98 rim sherds have been assigned to fourteen vessels, which are depicted on Plate 4. The rim sherds are dominated by cord impressed decoration with several other different techniques present (Table 7). Types of temper and paste were not differentiated for these vessels but will be commented on, where applicable, in the discussion of the individual vessels. The thicknesses of the sherds range between 5.2 mm and 8.6 mm, a range that could generally be considered as thick. The majority of the vessels have a smooth surface finish with only two specimens having indications of an obliterated textile impressed surface. Lips are present on six of the designated vessels (#1, 3, 4, 6, 8, and 11).

VESSEL #	QTY	WT	THICKNESS	SURFACE FINISH	DECORATIVE TECHNIQUE
1	2	4.3	7.7	smooth	none
2	9	32.9	7.6	smooth	cord impressed
3	9	15.5	8.5	smooth	cord impressed
4	12	15.5	7.3	smooth	cord impressed, stamped
5	1	4.2	7.7	smooth	dentate stamped, punctated
6	51	189.7	6.5	smooth	cord impressed
7	4	9.9	6.9	smooth	dentate stamped
8	1	6.5	6.0	obliterated textile	CWOI, dentate, punctated
9	1	10.2	6.6	smooth	CWOI, stamped
10	1	1.9	5.2	smooth	punctated
11	2	25.9	7.5	obliterated textile	punctated
12	1	11.3	8.6	smooth	stamped
13	1	0.6	n/a	smooth	stamped
14	3	19.2	7.0	smooth	cord impressed
TOTAL	98	347.6			

Table 7: Rim Sherd Characteristics

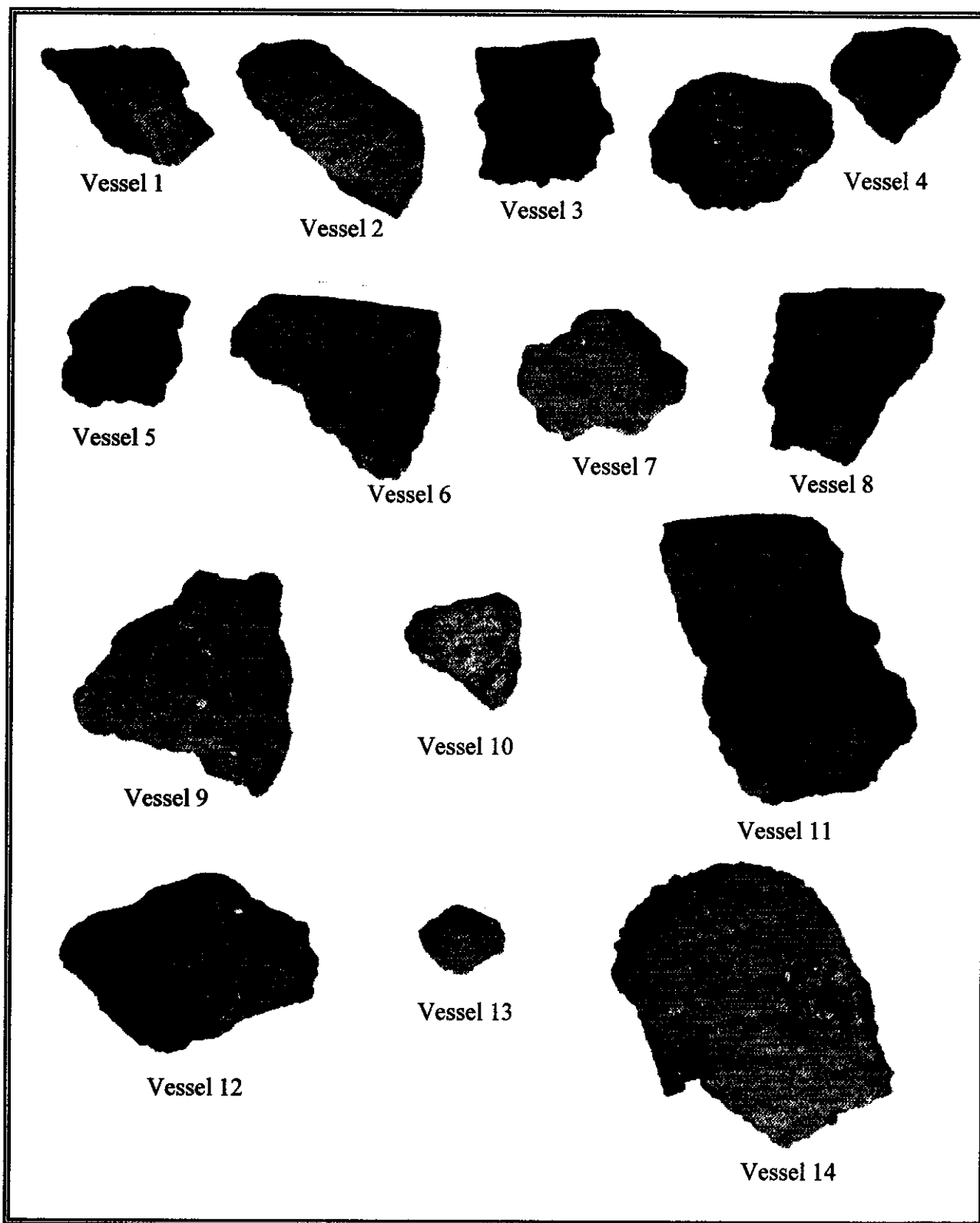


Plate 4: Designated Ceramic Vessels (actual size)

Vessel 1 is the simplest specimen with a smooth surface and no decorative technique on the sherds assigned to this vessel. The neck appears to be vertical and there are some scraping marks on the interior surface. The lip is flat with an upward rise towards the interior. The paste is relatively hard. The sherds have irregular reddish discolouration, perhaps reflecting post-depositional heating. At present, DILg-33:02A/60, 61, and 773 have been assigned to this vessel. DILg-33:02A/61 is a body sherd from the same excavation area with the same paste and discolouration as the primary identifying rim sherd DILg-33:02A/60.

Vessel 2 has nine rim sherds (DILg-33:02A/90, 94, 180, 181, 184, 185, 186, and 187) and one body sherd (DILg-33:02A/92) assigned to it. None of the specimens have a lip but the neck portions demonstrate closely spaced horizontal rows of cord impressions—six rows per centimetre. One shoulder sherd, DILg-33:02A/181, suggests that the body of the vessel was smooth with no trace of textile impressions. The paste is hard with minimal fine temper. Some post-depositional heating has occurred as two of the sherds have reddish discolouration.

Vessel 3 has nine rim sherds and sherdlets (DILg-33:02A/136, 137, and 772). Lips are present on three of the sherds and have differing degrees of flattening of a rounded lip surmounting a vertical neck. The decorative technique consists of parallel rows of impressed twisted cord. While similar to Vessel 2, the cord is thicker, more widely spaced—four rows per centimetre, and has a slight upward oblique angle (15°). The temper is coarse grit and the resulting sherds are somewhat friable.

Vessel 4 has twelve rim sherds of varying sizes, DILg-33:02A/182 and 183. DILg-33:02A/183 has a flattish lip and appears to have a vertical neck. The decorative technique, on the neck sherds, consists of parallel rows of tightly twisted thick cord as well as parallel rows of linear stamps, 4.0 mm in length. The decoration on the lip sherd consists of one row of oblique linear stamps below the lip followed by the cord impressions on the neck. The temper is moderately large grit and the sherds are somewhat friable, but less than Vessel 3. Most sherds are discoloured indicating heat after deposition which perhaps has induced the friability.

Vessel 5 is a neck sherd, DILg-33:02A/245, decorated with linear stamps, 6 to 7 mm long, in more or less horizontal rows. Remnants of two punctates, spaced 16.5 mm apart, are present. The punctates appear to have been tapered rectangular, similar to those on Vessel 11, with slight bossing on the interior. The temper is coarse grit.

Vessel 6 consists of 51 rim sherds, DILg-33:02A/63, 93, 331, 332, 333, 334, 335, 336, and 349. The lip is present on DILg-33:02A/331 and is flat above a vertical neck. The decoration consists of impressions of slightly twisted thin cord. At the lip, the orientation appears to be vertical, however on many of the other sherds both vertical and oblique markings occur. The sherds are relatively thin and quite hard with minimal friability. The temper is fine grit. Some carbon encrustation occurs on a small proportion of the sherds assigned to this vessel.

Vessel 7 consists of two rim sherds, DILg-33:02A/410 and 532, and two rim sherdlets, DILg-33:02A/411. The smooth surface on DILg-33:02A/532 is decorated with numerous small

stamps—linear 2.8 mm, curved linear 2.6 mm, and ovate 2.2 mm. Due to the smallness of this sherd, it is impossible to determine whether these are more or less horizontal rows or wandering vertical rows. DILg-33:02A/410 has similar, but widely spaced, vertical rows of dentate stamps. The temper is fine grit and only DILg-33:02A/532 has slight carbon encrustation.

Vessel 8 is a rim sherd, DILg-33:02A/504, which has a slightly rounded lip on a minimally outward flaring neck. The decoration consists of three components—vertical impressions below the lip, at least three rows of dentate stamps, and an interior rectangular punctate resulting in an exterior boss. The vertical impressions are faint but are definitely cord wrapped object impressions (CWOI) spaced relatively closely with five impressions over a 2 cm distance. The dentate stamps are linear and measure 8.8 mm in length. The area, below the lip, which has minimal markings from the CWOI impressions shows evidence that the surface of the vessel is obliterated textile impressed. Grit is sparse but, where present, is fine grained.

Vessel 9 is a large rim sherd, DILg-33:02A/505, with no lip present. The decoration consists of a row of vertical CWOI, 2.2 mm wide, spaced relatively closely with six impressions over a 2 cm distance. The second component of decoration is horizontal rows of stamps which appear to be made from an obliquely cut bird bone resulting in a horizontal V-shaped impression. The grit is sparse and ranges from fine to medium. The paste appears to be very similar to Vessel 8 and this carbon encrusted sherd could be a lower portion of that vessel which has several zones of decoration.

Vessel 10 is a single rim sherd, DILg-33:02A/660, lacking a lip. This is the thinnest sherd recovered and one of the more friable. The exterior is decorated with a row of conical punctates and the interior is decorated with similar punctates but slightly larger in diameter. The fine grit is dense. The sherd, particularly the exterior surface, is friable and reddish in colour.

Vessel 11 is two rim sherds, DILg-33:02A/618 and 717, both with lips. The rounded lip surmounts a relatively plain vertical neck. Evidence of obliterated textile impressions occur. The only decorative element, on DILg-33:02A/618, is a vertically oriented rectangular punctate, 6.4 mm by 2.8 mm in size. This punctate is 27.6 mm below the lip on the exterior surface. The grit is minimal but ranges from fine to very coarse. Some carbon encrustation occurs on both sherds.

Vessel 12, DILg-33:02A/633, is a neck sherd decorated with irregular spaced linear stamps, varying in length between 3.8 mm and 6.5 mm. Based on the curvature of the sherd, it would appear that these form vertical rows. The fine grit is relatively sparse and the paste appears to resemble that of Vessel 11. Heavy carbon encrustation is present on the interior surface.

Vessel 13 consists of a single rim sherdlet, DILg-33:02A/222, decorated with small linear stamps, 2.7 mm long. The temper is fine grit and the paste again resembles Vessel 11 and 12.

Vessel 14 consists of three sherds which fit together, DILg-33:02A/894. There is no lip present. The specimens are decorated with linear impressions of loosely twisted cord spaced widely apart. The

horizontal markings are 5.5 to 7.5 mm apart. The grit is moderate to fine and the exterior surface shows some indication of post-depositional heat trauma including spalling as well as discolouration.

Ceramics in Avonlea sites do not appear to be a common occurrence. Most reported sites have less than three identified vessels and often only a small number of body sherds. The ceramics from the Avery Site in southwestern Manitoba (Joyes 1969) are parallel grooved resulting from paddling with a carved paddle (Johnson 1988:139). This style of pottery has also been reported by Tratebas and Johnson (1988:137) in Montana, Klimko and Hanna (1988:27-29) from the Avonlea Site in Saskatchewan, and Ruebelmann (1988:200) in northern Montana. Other types of recovered ceramics are plain (Frison 1988:157) and net impressed (Quigg 1988a:75, 1988b:148; Smith and Walker 1988:85). A third type of ceramic decoration has been reported, from western Montana, consisting of oblique CWOI (Quigg 1988b:146-147). Locally, a reconstructed ceramic vessel from the mitigation of the Travel Manitoba Idea Centre at The Forks (Quaternary 1994b:5-8) has been identified as Avonlea by Speidel (1996:72-81)

Given the "meeting place" aspect of The Forks, it is possible that more than one cultural group is represented at this occupation horizon. The projectile point is indicative of the Avonlea phase. This current ceramic assemblage has a much wider range of decorative styles, surface treatments, and decoration elements than found in the literature pertaining to Avonlea ceramics. However, none of the ceramics fit into the Blackduck and later derivative styles which are ubiquitous in the area. There are many similarities with Laurel style elements that have been published in the archaeological literature (Mantey and Pettipas 1996), more so than with the elements accepted as Avonlea. Specifically, the dentate stamped vessels are reminiscent of a standard Laurel decorative technique. Vessel 4, Vessel 5, Vessel 12, Vessel 13, and Vessel 14 are all dentate stamped with linear stamps of different lengths. These are comparable to Laurel dentate varieties (Mantey and Pettipas 1996:10-12, 17-19), while the small dentate stamps—Vessel 4 and Vessel 7—or the small circular punctates—Vessel 10—are similar to other varieties (Mantey and Pettipas 1996:11, 18). Cord wrapped object impressions (CWOI) such as those on Vessel 8 and Vessel 9 have been recorded on Laurel pots (Mantey and Pettipas 1996:14). The twisted cord impressions seen on Vessels 2, 3, 4, 6, and 14 are not identified in the investigated literature. The unusual V-shaped stamps on Vessel 9 are similar to a sherd excavated at Wanipigow (Malainey 2002:pers.comm.). Hence, the ceramic vessels are considered to be Laurel ware, although some may represent a fusion of attributes, while others may be regional variants.

4.3 Faunal Remains

The largest number of artifacts recovered consist of faunal objects—bone tools, butchering remains, natural faunal deposits, and samples. The total number is 8947 with a total weight of 13,114.7 grams. Of this total, 19 are bone tools and 34 are samples with the remainder being either butchering remains (Table 8) or naturally deposited specimens (Table 9). The faunal material was identified using the standard references: Casteel (1976), Clarke (1981), Gilbert (1973), Mundell (1975), Olsen (1960, 1964, 1968, 1971), Schmid (1972). All of the faunal remains were examined and identified

as specifically as possible: body part, age of individual, and species. Evidence of butchering techniques, such as cut marks, was recorded as was the condition of the specimen, i.e., charred, broken, chewed, or gnawed.

4.3.1 Faunal Tools

Four worked bone implements (19 fragments) were recovered. All are broken and would have been discarded when they no longer fulfilled their function as a tool. Some artifacts consist of more than one fragment. The locations of the tools recovered during the mitigative excavations are depicted on Figure 5 (Section 4.6).

4.3.1.1 Awls

Two awls were catalogued. Awls would be used to pierce tanned hide for the insertion of sinew or fibre for sewing. Usually, the shaft of the implement is sturdy and the point is quite sharp. Most archaeologically recovered awls are broken, as a favoured tool would be carefully handled and seldom lost.

DILg-33:02A/384 consists of two fragments which fit together (Plate 5). The length is 80.3 mm, the width is 11.9 mm, the thickness is 6.2 mm, and it weighs 2.8 grams. The distal end has been carved and ground into a conical point and the body of the awl has a natural groove indicating that the element from which it was manufactured is either a rib or ulna from a medium/large mammal. The specimen was recovered from Unit B4 (Figure 5)

DILg-33:02A/533 is two fragments of the distal portion of a pointed flat implement (Plate 5). In addition to the tapered point, one of the lateral sides has been carved to produce a scraping edge with a working edge angle of 27°. The length is 27.6 mm with a width of 14.3 mm and a thickness of 2.3 mm. It weighs 0.6 grams and was recovered from Unit C2 (Figure 5). The original element is mammalian flat bone and could be a scapula or mandible. The breakage at the proximal end is recent but no other components of this tool could be located.

4.3.1.2 Scraper

Scrapers were used in the early phases of the clothing manufacturing process to remove tissue and fat from hides prior to tanning. Often scrapers are made of lithic material, but the cortical portion of bone has a hard enough texture to withstand heavy pressure. The advantage of bone is that it will not as readily cut or tear more delicate hides. DILg-33:02A/896 consists of nine fragments of mammalian flat bone (Plate 5). It was probably manufactured from a scapula although a mandible can be modified to produce a similar configuration. The majority of the fragments have fresh breaks and can be fitted together although some have pre-depositional breaks. The functional portion of this tool is a linear edge on the largest fragment which has been ground to produce a relatively sharp working edge, 32.8 mm long, with an edge angle of 28°. The beveling has occurred on both dorsal and ventral surfaces as opposed to the ground working edge on the awl tip, DILg-33:02A/533. Due

to the similarity of the basic bone material and the modifications, it is quite possible that the two artifacts were part of a single multi-component tool. The total weight of these nine fragments is 7.5 grams and it was recovered from Unit C2 (Figure 5).

4.3.1.3 Unidentified Implement

DILg-33:02A/884 consists of eight fragments of antler (elk or moose) which fit together to form part of a worked tool. Carving has occurred on at least three sides of the antler resulting in a flat upper surface and tapering relatively flat lateral sides. Although incomplete, the specimen has a reconstructed length greater than 160 mm with a width at least 39.5 mm and a thickness of 50.2 mm. The total weight is 153.0 grams. The breakage is a mixture of recent and pre-depositional. The aspect of moderate to heavy weathering on internal facets of the fragments indicate that the tool broke during use and was discarded. Subsequently, impact with the teeth of the backhoe bucket shattered portions of the artifact. Not enough of the artifact was recovered during monitoring of the block excavation of the north portion of Level 1 to reconstruct the artifact. Ethnographically, elk antler has been used to form fleshers and elbow scraper.

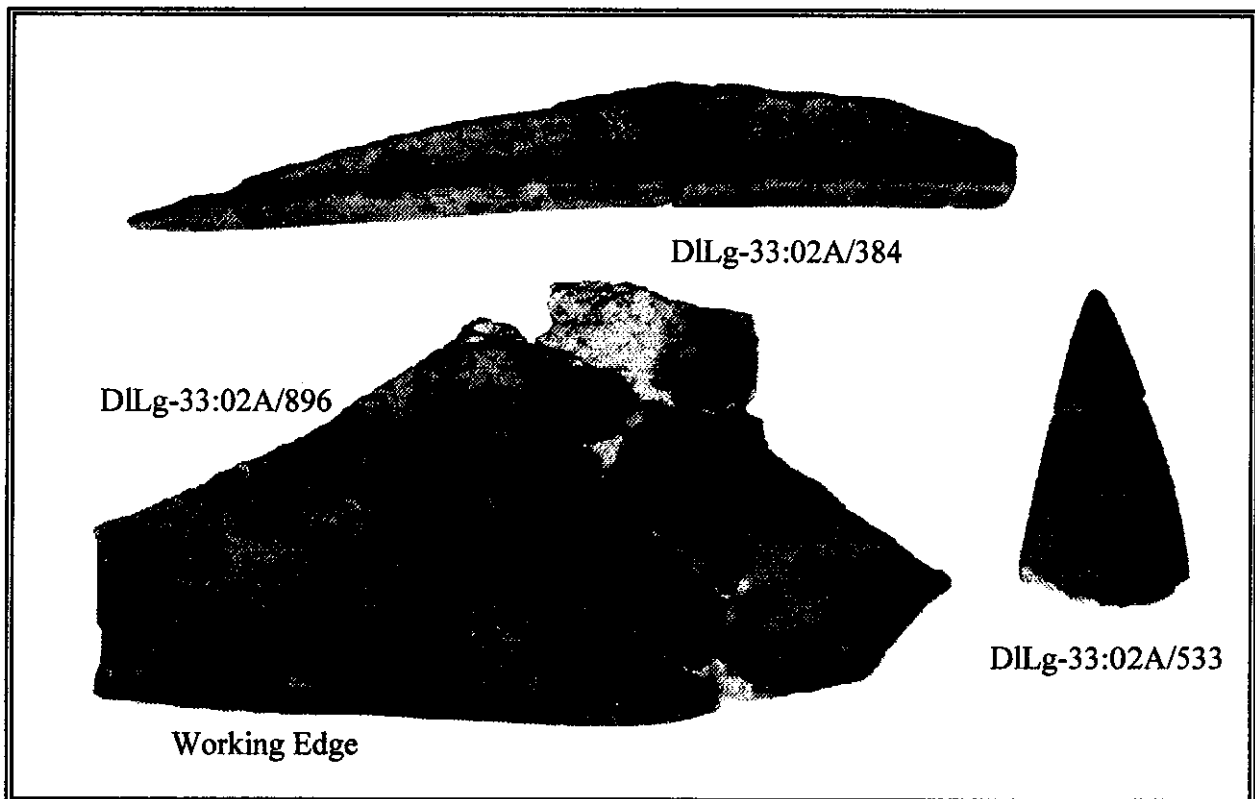


Plate 5: Bone Hideworking Tools (1.5x actual size)

4.3.2 *Butchering Remains*

As is usually the case in archaeological sites, the highest percentage of artifacts is the residue from food procurement and processing, i.e., butchering remains. A total of 8853 artifacts, with a combined weight of 9264.5 grams, was recovered (Table 8). While samples could be construed as butchering remains, in that they are the result of cluster cataloguing of minute residue obtained during the wet screening process, they are not included in the quantities or weights of butchering remains. This is done so as not to skew the percentages inordinately in favour of undetermined or unidentifiable fragments. As such, the quantities that can be identified to specific taxa more closely reflect the actual food procurement practices of the peoples that were camped at this location.

The frequencies of each taxon are calculated on the combined weight and quantities of all taxa to give a picture of the relative frequency within the entire faunal food assemblage. It should be noted that even though these are considered as butchering remains, some taxa may have been harvested solely for their fur rather than food.

Within the mitigative excavation area, the weight of the faunal recoveries for each unit was calculated. The results, depicted on Figure 7 (Section 4.6), show a varying pattern of deposition.

Evidence of butchering is preserved on the bone elements in the form of cut marks where the joints were separated and/or the flesh was stripped from the bone for further preparation. A large percentage of mammalian bone, especially long bones, exhibits spiral fracture indicating breakage while fresh, probably for the production of bone grease. In this process, the bones are broken into small fragments (Zeirhut 1967:35) and then boiled to extract the fat (Paget 1909:78). The resulting bone grease, variously termed marrow fat, soft fat, and grease (Hurlburt 1977:19-21), was consumed directly or used for making pemmican. The product has been described as "...quite hard like tallow, and has the appearance and very nearly the flavour of the richest yellow butter" (Catlin 1926:131).

Some post-depositional trauma occurs during or immediately after the food preparation process when bone fragments are placed into the fire. The result is bone which is either charred or calcined (so thoroughly burned that only the inorganic white calcium carbonate remains). Charred bones account for 1.0% of the total mammal sample, while calcined bones are 2.2%. All of these modified elements tend to be small and usually unidentifiable. There appears to be a differential treatment of fish butchering remains as only one fish vertebra is charred. This may be a product of the initial butchering where the head is discarded prior to cooking.

Other post-depositional trauma is also recorded on butchering remains. Carnivore chewing, either by domesticated dogs or scavenging canids, occurs on a single canid femur. This proportion tends to suggest that dogs were not present in the campsite. Calcium is not a common mineral for animals to obtain from natural sources and the consumption of bone to obtain it is evident in rodent gnawing of the discarded butchering remains. Only one element, a large mammal unidentifiable specimen, shows the characteristic tooth marks of small rodents, i.e., mice and voles.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Undifferentiated Aves				
Medium/Large Aves	1	<0.1	0.5	<0.1
Medium Aves	1	<0.1	1.1	<0.1
TOTAL AVES	2	<0.1	1.6	<0.1
Undifferentiated Fish	4637	52.4	319.1	3.4
Catfish (<i>Ictalurus</i> sp.)	111	1.3	118.4	1.3
Drum (<i>Aplodinotus grunniens</i>)	1	<0.1	0.7	<0.1
Sucker family (Catostomidae)	130	1.5	19.1	0.2
TOTAL FISH	4879	55.1	457.3	4.9
Freshwater Clam (Unionidae)	85	1.0	18.6	0.2
Fat Mucket (<i>Lampsilis radiata</i>)	6	0.1	21.0	0.2
Black Sand-shell (<i>Ligumia recta</i>)	2	<0.1	23.2	0.3
TOTAL SHELLFISH	93	1.1	62.8	0.7
Undifferentiated Mammal	368	4.2	124.0	1.3
Large Mammal	3143	35.5	3085.9	33.3
Medium/Large Mammal	17	0.2	18.1	0.2
Medium Mammal	40	0.5	28.8	0.3
Small/Medium Mammal	41	0.5	11.0	0.1
Small Mammal	15	0.2	1.7	<0.1
Deer/Cow Family (Artiodactyla)	14	0.2	50.9	0.5
Deer Family (Cervidae)	1	<0.1	6.2	0.1
Deer (<i>Odocoileus</i> sp.)	3	<0.1	23.3	0.3
Cow Family (Bovidae)	-	-	-	-
Bison (<i>Bison bison</i>)	163	1.8	5297.2	57.2
Carnivore Family (Carnivora)	5	0.1	0.4	<0.1
Dog/Wolf (<i>Canis</i> sp.)	20	0.2	71.3	0.8
Weasel Family (Mustelidae)	-	-	-	-
Skunk (<i>Mephitis mephitis</i>)	2	<0.1	3.7	<0.1
Rabbit Family (Leporidae)	-	-	-	-
Jack Rabbit (<i>Lepus</i> sp.)	34	0.4	7.1	0.1
Rodent Family (Rodentia)	-	-	-	-
Beaver (<i>Castor canadensis</i>)	4	<0.1	8.7	0.1
Muskrat (<i>Ondatra zibethicus</i>)	1	<0.1	1.5	<0.1
Squirrel (<i>Sciurus</i> sp.)	8	0.1	3.0	<0.1
TOTAL MAMMAL	3879	43.8	8742.8	94.4
TOTAL FAUNAL	8853	100.0	9264.5	100.0

Table 8: Faunal Remains

A small portion of the mammal assemblage consists of juvenile and/or foetal bone. Three foetal specimens (2 ribs and 1 vertebra) derive from medium or medium/large animals. Juvenile specimens are recorded for three different size ranges: small/medium, medium, and large. Nine elements including metapodials, long bones, and vertebra are identified with the small/medium animals. The other elements identified as juvenile are all vertebral fragments with 63 assigned to large mammal and three assigned to medium mammal. While it is tempting to use the presence of foetal or newborn animals as an indicator of a spring occupation, it must be noted that historical records have documented bison bearing calves as late as August. Young of most species are usually born in the spring and bone has reached its adult appearance by the time the individual is 6-8 months old. Hence, the presence of juvenile individuals, while suggesting a late summer/fall occupation, is not absolute evidence. It would appear that two immature animals are represented with one foetal individual.

Archaeologists have many techniques to analyse the protein component of Pre-Contact diets. The most common method is to determine the minimum number of individuals of each species represented at the site. This is done by selecting the most frequent element, e.g., left dentary of a catfish, right femur of a bison, etc., and using that number as the minimum number of animals that would have been harvested. A rigorous analysis uses these minimum numbers and an average body weight of the particular species to determine the amount of usable meat that is represented by the bones in the faunal assemblage. This can be further refined by using base line measurements of the specific element and calculating percentage size ratios of the recovered specimens and then applying that correcting value to the usable meat formula. As an example, a dentary from a 10 kilogram catfish measures a certain length and the archaeological specimens may range from 50% to 150% of that size. Hence, the usable meat would be a compilation of the combined ratios times 10 kgs. A study of this type would fall within academic parameters and is beyond the scope of a mitigative project.

The frequency of the butchering remains are illustrated by both quantity and weight (Figure 4). In the quantity graph, the fish remains are slightly greater than the other taxa. However, as fish bone is small and light in comparison to the larger and denser mammal bone, the proportions tend to be reversed when weight is considered. In this rather simplistic type of analysis, the amount of available meat is deemed to be relatively proportional to the weight of the residue, although in the case of shellfish, the weight of the discarded shell is considerably greater than that of the available meat.

With the above caveats, it can be seen that the majority of the protein component of the occupants' diet was fulfilled by meat from mammals, with bison being the main contributor. Much of the bone that could not be identified beyond large mammal probably also derives from bison. The other species—deer, dog/wolf, skunk, rabbit, beaver, muskrat, and squirrel—supplied minor amounts of the diet.

Within the fish, catfish and sucker were predominant. Seasonality is not a factor in the harvest as all species identified in the assemblage spawn in the spring. Based on the mix of species, it may be possible that net fishing occurred. Further analysis of vertebra and scales, which can often be identified to specific taxa within a rigorous analysis, could produce data which would determine the season of harvest, as annular growth rings (like tree rings) occur in both elements.

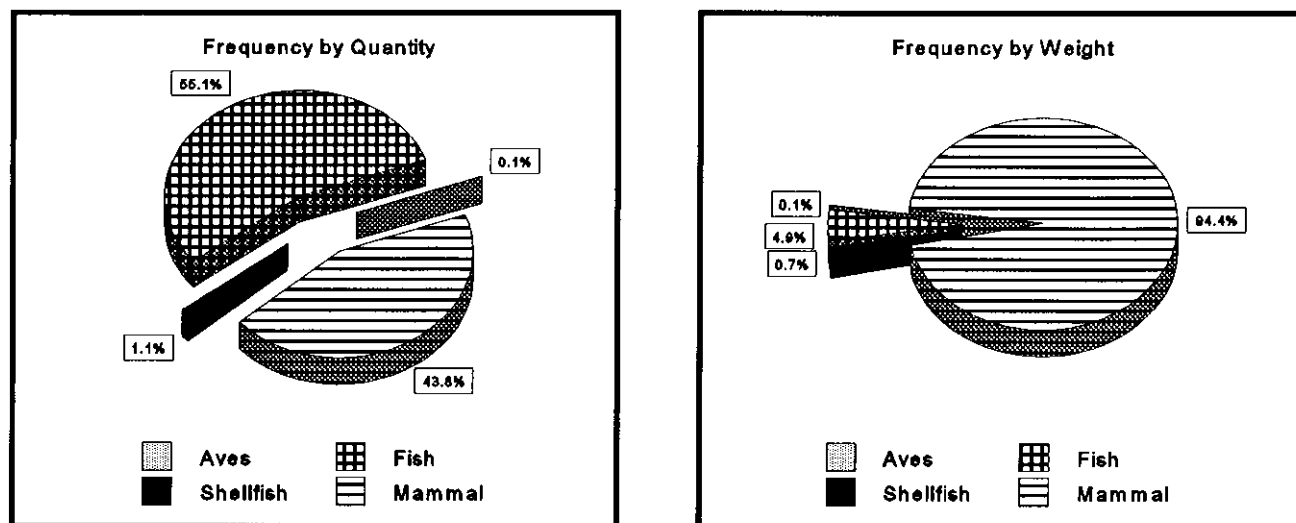


Figure 4: Butchering Remains from Avonlea/Laurel Horizon

The low proportion of bird remains suggests that the occupation did not take place during either the spring or fall migration periods. Alternatively, the option of bird hunting was not as economically productive as that of fishing or big game hunting and birds were only obtained when the opportunity arose during other activities. It would seem that shellfish were actively gathered—perhaps an activity for children, along with plant and berry harvesting.

4.3.3 Naturally Deposited Fauna

Representations of non-food faunal remains are often incorporated into cultural deposits. Forty-one specimens have been curated (Table 9). These include frogs, which burrow into the soil for hibernation, and small rodents who are natural residents scavenging occupation sites.

The aquatic taxa, freshwater snails and pea clams, are deposited as part of the sediment load during flood episodes and are part of the soil substrate below the cultural level. As the cultural material mixes slightly with the upper portion of the original soil, these taxa are incorporated within the cultural matrix.

4.3.4 Samples

Samples are an expeditious mechanism for the cataloguing of myriads of minuscule recoveries. These consist of specimens recovered on a 2 millimetre or a 1 millimetre screen and contain diverse artifacts, i.e., charcoal fragments, shell fragments, and small fragmented bone elements. Intensive detailed study of the material catalogued as samples may result in the identification of various plant or animal species, but most of the dominant taxa are already represented by larger recoveries. The additional information obtained through a comprehensive analysis of samples is usually that of degree and further confirmation of specific taxa rather than the identification of previously unrecorded

species. Thirty-four samples weighing 3682.2 grams were catalogued. One of the samples, DILg-33:02A/572, consists of ash from a hearth deposit.

TAXON	QTY	FREQUENCY	WT	FREQUENCY
Amphibia				
Frog (<i>Anura</i>)	4	9.8	0.3	7.3
TOTAL AMPHIBIAN	4	9.8	0.3	7.3
Freshwater Snails (Gastropoda)				
Ramshorn Snails (Planorbidae)	3	7.3	0.2	4.9
Pond Snails (Lymnaeidae)	11	26.8	0.5	12.2
TOTAL GASTROPODS	14	34.1	0.7	17.1
Freshwater Clam (Eulamellibranchia)				
Pea Clams (Sphaeriidae)	4	9.8	0.3	7.3
TOTAL CLAM	4	9.8	0.3	7.3
Mammal				
Undifferentiated Rodent	6	14.6	1.4	34.1
Small Rodent (Rodentia)	12	29.3	1.0	24.4
Ground Squirrel (<i>Spermophilus</i> sp.)	1	2.4	0.4	9.8
TOTAL MAMMAL	19	46.3	2.8	68.3
TOTAL	41	100.0	4.1	100.0

Table 9: Natural Faunal Remains

4.4 Floral Remains

The 340 floral recoveries consist of charcoal fragments and one seed. The majority of the charcoal specimens are quite small with the combined weight of only 22.1 grams (an average weight of .07 gms per fragment). Microscopic analysis of the fragments could determine the species in some of the cases. While an intensive analysis is beyond the scope of a mitigative report, it can be assumed that most of the charcoal would derive from locally available trees—oak, maple, willow, poplar, and birch.

The seed, DILg-33:02A/862, weighing 0.1 gm, is identified as puccoon (*Lithospermum* sp.) (Montgomery 1977:59). The three native species of this genus are common in grassland situations in the prairie and parklands (Looman and Best 1979:613-615).

4.5 Radiocarbon Samples

One sample was submitted to Brock University, St. Catharines, Ontario for radiocarbon dating. The submitted material was mammal bone—a bison radius recovered from excavation Unit B12 (DILg-33:02A/58). It weighed 325.2 grams. The analysis yielded a calculated age of 1235 ± 40 years B.P. (Before Present) which with C_{13} correction yields 1402 ± 40 years B.P., with a resultant calibrated age of 1300 ± 40 B.P. or A.D. 650. This date conforms with the later phases of the Avonlea cultural period which is estimated to have occurred in Manitoba between A.D. 400 and A.D. 700 (HRB 1989). It also fits within the later portion of the Laurel period which has been dated between B.C. 200 and A.D. 1000 (HRB 1989).

4.6 Activity Areas

The area which required mitigative excavation (Figure 3) appears to be a peripheral section of a dense activity area. There are remnants of four hearths, three of which are clustered closely together (Figure 5). The presence of lithic tools, such as the retouched flake and the utilized flake, suggests that some food processing occurred in this area. The occurrence of hideworking tools—the lithic scraper and the bone implements—indicates that clothing manufacture, at least the preliminary phases, occurred adjacent to the hearths. The presence of numerous lithic flakes show that stone tool manufacture was also occurring in this locality.

Rim sherds which have been assigned to discrete vessels are also concentrated in the area around the hearths (Figure 6). This would suggest that many of the pots were broken during cooking activities. Body sherds tend to be scattered over the area, perhaps as a result of shattering or adhering to people's feet as they walked through the campsite.

The faunal remains, plotted by weight on Figure 7, show that the densest deposits occurred adjacent to the hearths. The major exception to this is Unit B12 which contained several large bison bones accounting for the disproportionate weight of recoveries when compared with nearby units.

The compiled data indicates that three campfires existed in the units A4, A5, and B3. These may have been used at the same time or they may have been sequential fires during the same occupation. It would appear that most activities took place adjacent to the campfire areas with the residue of these activities occurring in a semi-circular pattern around the hearth remnants. The remainder of the campsite would occur to the south in the area under Level 2 of the Parkade and, as such, is safe from impact for the foreseeable future.

Indicators of the extension of the site into the central and southeast recovery areas can be seen in the distribution maps (Figures 5, 6, and 7). Some lithic detritus and body sherds, as well as moderate amounts of faunal material, were recovered from the eastern end of the mitigation excavation area. These would be the peripheral manifestations of the activity area encompassed by the southeast recovery area (Figure 3). Artifacts do not have exact proveniences but were recovered from the matrix which had been removed *en bloc*. These include one retouched flake and rim sherds from

Vessel 11 and Vessel 14. The drill was recovered from the southward extension of the excavation at the east end of the centre line as was the rim sherd identifying Vessel 12. It would appear that this was a peripheral component of a large activity area located to the south and the west of the east end of the centre line under Level 2 of the Parkade.

The single hearth remnant in Unit C11 as well as the increasing faunal remnants in the western end of the excavation area would apparently tie in with the central recovery area which was located slightly to the north and west (Figure 3). No lithic tools were recovered and only sherds from vessels which had already been identified in the excavation area—Vessel 1 and Vessel 3—were recovered. This area of sparse deposits appears to be an outlier of the periphery of the activity area occurring in the excavation area.

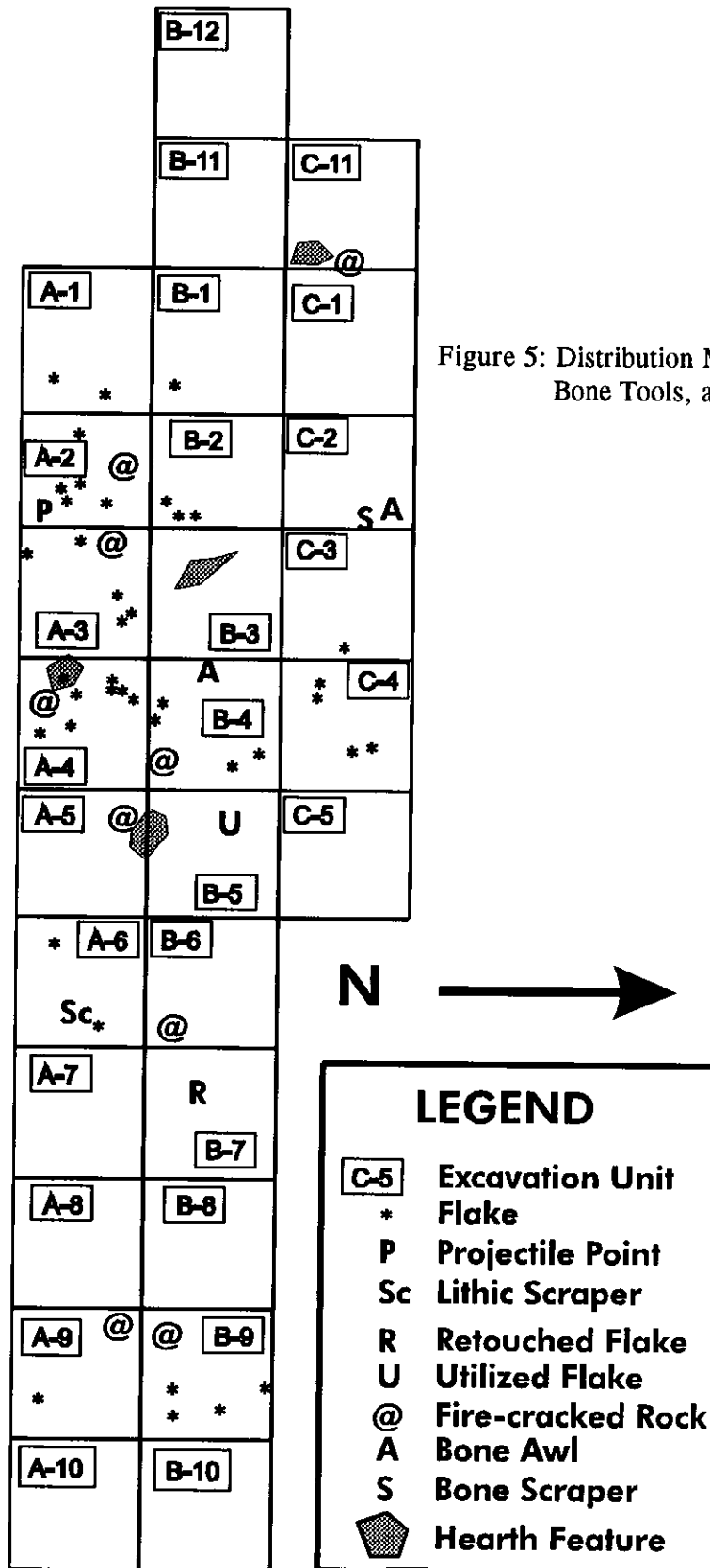


Figure 5: Distribution Map of Lithic Artifacts, Bone Tools, and Hearths

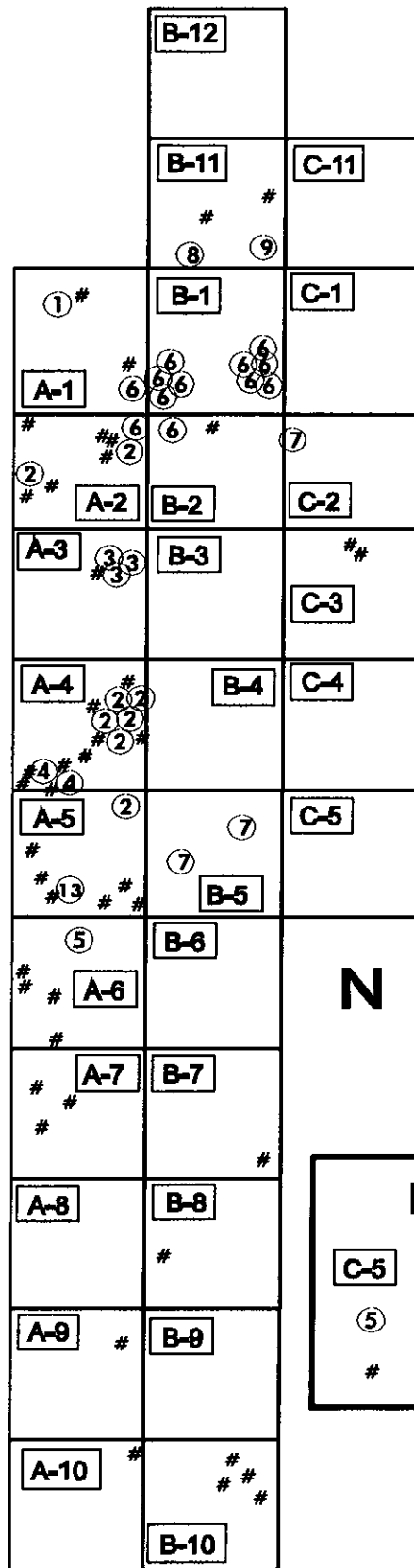


Figure 6: Distribution Map of Ceramic Vessels and Body Sherds



LEGEND

- C-5 Excavation Unit
- 5 Vessel Number
- # Body Sherd

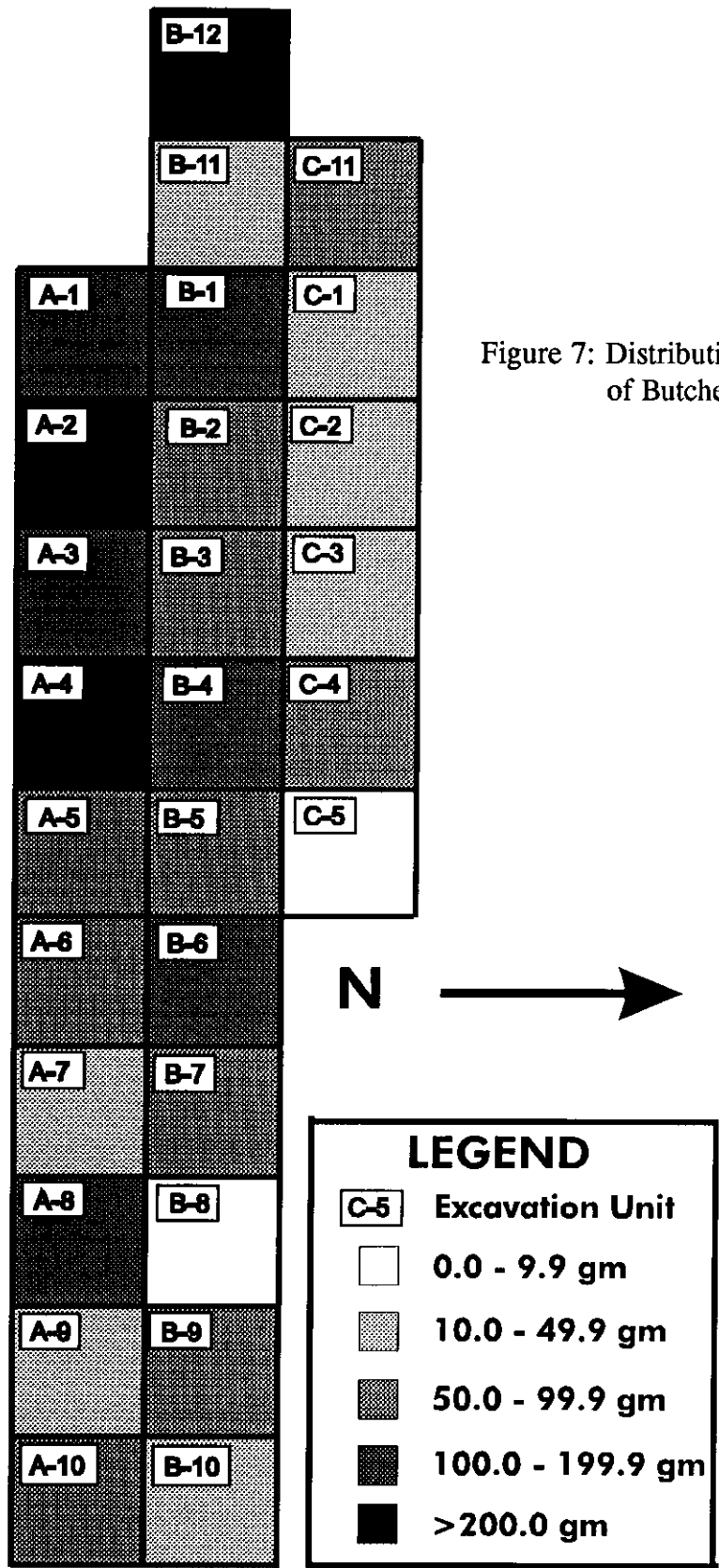


Figure 7: Distribution Map of Density of Butchering Remains

5.0 OTHER PRE-CONTACT HORIZONS

Cultural resources were recovered during the piling drilling and pilecap excavation that did not appear to be stratigraphically linked to the Avonlea horizon. These locations are:

1. west end of centre line at a depth of 260 cm;
2. south edge of footprint at a depth of 200 cm;
3. northeast corner of footprint at a depth of 175 cm; and
4. northwest corner of footprint at a depth of 175 cm.

No diagnostic material was recovered from any of these locations and, as such, it is not possible to ascertain cultural affiliations for any. Each of the locations will be discussed as a section with potential correlations suggested.

5.1 *West End of Centre Line*

This cultural deposit was identified through material recovered on the auger during the drilling of the hole for seating the westernmost pile of the centre line (Figure 2). At a depth of 260 cm, encapsulated in a silty clay matrix, fragments of large mammal bone, probably bison, were recovered. These consisted of two scapula fragments (DILg-33:02A/6) and one skull fragment (DILg-33:02A/5). The total weight is 25.9 grams. DILg-33:02A/6 has evidence of butchering techniques in that it has a cut mark and thus is not naturally deposited.

Based on the depth, 1.3 metres below the average depth of the Avonlea/Laurel horizon, and using the previously determined rate of accretion of one metre per millennium (Kroker and Goundry 1990:162), the estimated age of this horizon is between 2000 and 3000 years ago. Thus it may correlate with the previously recorded archaic horizons (Kroker 1989; Kroker and Goundry 1990, 1993a, 1993b, 1994; Quaternary 1993b) adjacent to the north bank of the Assiniboine River.

5.2 *South Edge of Footprint*

This horizon was identified during the drilling for piles. It was located in the western third of the south boundary of the footprint at a depth of 200 cm (Figure 2). The recoveries were all faunal remains consisting of one fish scale (DILg-33:02A/4), 39 small unidentifiable mammal fragments (DILg-33:02A/3), one large mammal long bone fragment (DILg-33:02A/2), and one bison scapula fragment (DILg-33:02A/1). The total weight of the recoveries is 18.0 grams. No evidence of butchering was present on the specimens, however the fragmentation suggests food processing.

The evidence from the drilling along the south perimeter suggests that there is an extensive, albeit intermittent, horizon at this depth. Burned soil was recorded at 200 cm and 210 cm both east and west of the cultural location with a charcoal layer at the same depth immediately adjacent and at the southeast corner. Without continuous profiles, the position of this horizon relative to the Avonlea/Laurel horizon cannot be ascertained. It appears that it may be earlier, although soil strata

tend to dip to the northwest. During Stage I installations of sub-surface services, several cultural deposits were located along Pioneer Boulevard at depths of 190 centimetres (Kroker and Goundry 1990:29-36), some of which may be continuations of the Avonlea/Laurel horizon or other occupations of a similar time period.

5.3 Northwest Corner of Footprint

This cultural horizon was recorded during the excavation of the cluster of piles at the northwest corner. It occurred as a diffuse flood-smear layer about 3 cm thick, ranging in depth between 168 cm and 175 cm. Within the soil layer which contained charcoal flecks, two large mammal (probably bison) bone fragments were recovered—a tarsal bone (DILg-33:02A/842) and a long bone fragment (DILg-33:02A/843). The faunal recoveries weighed 92.7 grams.

Given the tendency for soil horizons to have a northward declivity, it is possible that this is a disjunct continuation of the Avonlea/Laurel horizon. However, without a continuous profile to confirm the linkage, the horizon is considered to be discrete, although it too may link with a previously located cultural horizon along Pioneer Boulevard (Kroker and Goundry 1990:29-36).

5.4 Northeast Corner of Footprint

This cultural horizon was recorded during the drilling for the cluster of piles at the northeast corner. It occurred as a diffuse layer at a depth of 175 cm. The soil layer contained charcoal flecks and some butchering remains. One charcoal fragment (DILg-33:02A/16), six fish scales (DILg-33:02A/17), 21 unidentifiable fish bone fragments (DILg-33:02A/18), and one charred fish bone fragment (DILg-33:02A/19) were recovered. The faunal recoveries weigh 0.7 grams and the charcoal weighs 0.1 gram. Subsequent monitoring during the excavation for pilecaps and examination of the walls of the excavated area yielded no further evidence of cultural material. It is possible that the auger encountered a small pocket of flood deposited material which had been eroded from an adjacent cultural deposit or that the cultural deposit was very localized and sparse such that it was not observable during mechanized excavation.

As is the case with the previous location, it is possible that this is a disjunct continuation of the Avonlea/Laurel horizon. However, without a continuous profile to confirm the linkage, the horizon is considered to be discrete.

6.0 DISCUSSION

No further archaeological investigations are required for the construction of the parking structure. During the phased construction, appropriate archaeological monitoring and mitigation was conducted, as required under the Heritage Act, for each of the components. These included monitoring of the drilling of pile seating holes, excavations for pilecaps and grade beams, mitigative excavations of an occupation horizon, and mitigative recovery during block excavations.

The recovered cultural resources are the residue left behind by a group of people who camped at this location approximately 1300 years ago. The diagnostic artifacts yield identification of two different cultural traditions, i.e., the projectile point being typologically specific to the Avonlea phase and the ceramic artifacts being indicative of the Laurel ceramic tradition. It may be that this was a single group of people using artifacts which have been archaeologically identified, on the basis of specific artifacts, as distinct (lithic tools versus ceramics).

The identified cultural loci within the impact zone appear to be only a small peripheral portion of a larger campsite. The cultural horizon is known to extend southward of the centre line under Level 2 of the Parkade (Figure 3) as well as to the southeast of the footprint. While all cultural resources under the unexcavated Level 2 are intact and protected from impact for the foreseeable future, potential development to the east of the parking structure could result in impact upon this horizon. The presence of Avonlea ceramics at a depth of 145 centimetres at the Travel Manitoba Idea Centre (Quaternary 1994b; Speidel 1996) suggests that there are probably components of the cultural horizon between the eastern edge of the parking structure and the Idea Centre. The recovery of cultural material along Forks Market Road (Kroker and Goundry 1990) suggests that additional archaeological resources are sure to exist under the remaining portion of the paved parking lot.

Therefore, **it is strongly recommended** that appropriate heritage resource management strategies be employed in conjunction with the design and construction of any future structures within the area of the paved parking lot.

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APPENDIX A
HERITAGE PERMIT



Heritage Permit No. A74-01

Pursuant to Section/Subsection 53 of *The Heritage Resources Act*:

Name: Quaternary Consultants Ltd.
Address: 130 Fort Street
Winnipeg MB R3C 1C7

ATTENTION: Mr. Sid Kroker

(hereinafter referred to as "the Permittee"),

is hereby granted permission to:

monitor construction of a parking structure containing a subsurface component, located north of the Manitoba Theatre for Young People at DILg-37, The Forks, in order to undertake appropriate mitigation should significant archaeological resources be encountered,

during the period:

February 18 – March 31, 2003.

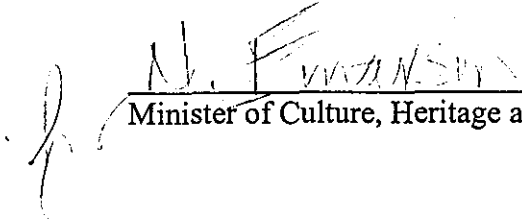
This permit is issued subject to the following conditions:

- (1) That the information provided in the application for this permit dated the 15th day of February 2002, is true in substance and in fact;
- (2) That the permittee shall comply with all the provisions of *The Heritage Resources Act* and any regulations or orders thereunder; **Please note attachment re custody and ownership of heritage objects**
- (3) That the Permittee shall provide to the Minister a written report or reports with respect to the Permittee's activities pursuant to this permit, the form and content of which shall be satisfactory to the Minister and which shall be provided on the following dates:
- (4) July 31, 2003;
- (4) That this permit is not transferable;
- (5) This permit may be revoked by the Minister where, in the opinion of the Minister, there has been a breach of any of the terms or conditions herein or of any provision of *The Heritage Resources Act* or any regulations thereunder;
- (6) Special Conditions:



- a. All heritage objects are to be deposited with the Manitoba Museum by July 31, 2003, or permanent curation and storage, unless appropriate loan requirements are arranged with the Curator of Archaeology prior to that date;
- b. A complete set of archaeological field records, catalogue sheets, laboratory analysis records, photographs, reports, etc. are to be deposited with the Manitoba Museum of Man and Nature upon completion of the archaeological research, or sooner if required, and any subsequent revisions or additions to these records are to be filed as soon as possible thereafter;
- c. Neither the Government of Manitoba nor the party issuing this permit shall be liable for any damages resulting from any activities carried out pursuant to this permit, and the Permittee specifically agrees, in consideration for receiving this permit, to indemnify and hold harmless the Minister and the Government of Manitoba, the Minister and any employees and officials of the Government, against any and all action, liens, demands, loss, liability, cost, damage and expense including, without limitation, reasonable legal fees, which the Government, Minister or any employee or official of the Government may suffer or incur by reason of any of the activities pursuant to or related to this permit.

Dated at the City of Winnipeg, in Manitoba, this 15th day of February 2002.


Minister of Culture, Heritage and Tourism