City of Winnipeg
Glacial Sand and Gravel
Pine Ridge Gravel Pit Aggregate Assessment

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1.0 Introduction

UMA Engineering Ltd. was retained by the City of Winnipeg, Glacial Sand & Gravel to update the aggregate resource assessment of the Pine Ridge Gravel Pit property (Drawing No. 01) completed by UMA Engineering Ltd. in 1999. The purpose of this assessment is to develop a better understanding of the quantity and quality of aggregate material remaining on site so that informed decisions can be made concerning the future disposition of the operation.

1.1 Scope of Work

The scope of work for this assessment was presented in the UMA proposal dated October 6, 2005. As presented in the proposal, the scope of work included the following components:

- 1. A topographic survey of the areas mined since the last 1999 survey was carried out to determine the current configuration of the surface topography in the pit.
- 2. A test pit excavation program was conducted to get detailed information and samples from within the upper 5 metres of the soil profile.
- 3. A test hole drilling program was completed to obtain information and samples from the deeper portion of the soil profile inaccessible to the backhoe. Both solid stem auger and mud rotary drilling techniques were used.
- 4. Representative samples collected during the field program were submitted for laboratory gradation analysis to assess material quality.
- The collected information from the current and previous investigations was analyzed and a reserve estimation prepared.

1.2 Site Location

The Pine Ridge Gravel Pit is located approximately 20 kilometres northeast of Winnipeg, near the south boundary of the Birds Hill Provincial Park. The property is located within Legal Subdivision 9 through 14, Section 5, Township 12, Range 5 East. The property is comprised of approximately 96 hectares (238 acres). The property is bounded to the west by Heatherdale Road, to the east by Veron Road and to the north by Hillside Road. Access to the gravel pit is from Heatherdale Road.

1.3 Classification of Aggregates

Gradation specifications for aggregates can be found in the American Society for Testing and Materials and the Canadian Standards Association manuals. In general, aggregates are classified by: silt content (percent by weight less than 80 um sieve); sand content (percent by weight between 80 um and 5 mm sieves); and gravel content (percent by weight greater than 5 mm sieve). Aggregates are also classified based on the uniformity of gradation depending on the intended end use.

For an aggregate to be free draining (ie: filter materials), the percent passing the 80 um sieve should be in the 0 to 5 percent range. Aggregates with greater than 15% passing the 80 um sieve will generally be poorly drained and susceptible to frost.

Four basic ranges of sand and gravel content based on the percent retained on the 5 mm sieve are used to generally classify aggregates for a variety of uses. These ranges are: 0 to 10 percent; 10 to 30 percent; 30 to 60 percent; and greater than 60 percent. The classification must also take into consideration the limitations presented above regarding the percent passing the 80 um sieve. Examples of typical aggregate uses based on the above ranges include:

- Aggregates with 0 to 10 percent retained on the 5 mm sieve are used in fine concrete, seal coat paving, plaster and masonry mortar, and as winter road sand.
- Aggregates with 10 to 30 percent retained on the 5 mm sieve are used to prepare concrete blocks and concrete culverts, and as granular backfill.
- Aggregates with 30 to 60 percent retained on the 5 mm sieve are used for railway sub-ballast, roadway base coarse, granular road surfacing, and bituminous paving mixtures.
- Aggregates with greater than 60 percent retained on the 5 mm sieve can be used for coarse filters, coarse concrete, or can be crushed and blended to give the required gradations.

Poor quality sand and gravel deposits (less than 20 percent retained on the 5 mm sieve) can be screened and blended to produce the required gradations.

2.0 Physiographic Setting

2.1 Topography and Vegetation

The topography of the Birds Hill area is generally rolling, rising approximately 20 metres above the local prairie level within regions to the west and south and up to 40 metres in the northern and eastern regions. Depressions up to 16 metres below prairie level exist in the southwest and middle portions of the region.

The natural vegetation in the general area of the Pine Ridge Gravel Pit consists of stands of native prairie grasses and forested areas containing trembling aspen, bur oak, white spruce, balsam poplar, willow and scrub brush.

2.2 Surficial Geology

The Pine Ridge Gravel Pit is contained within the Birds Hill Glaciofluvial Complex, an assemblage of aggregate materials ranging from fine sand to coarse gravels. The deposits are typically underlain by glacial till materials consisting of clays, silts, sands and gravels. The aggregates of the Birds Hill Glaciofluvial Complex were derived from the erosion of bedrock materials to the east and northeast, and consist primarily of varying combinations of limestone and granite.

2.3 Bedrock Geology

The bedrock beneath the Birds Hill Glaciofluvial Complex consists of limestones and dolomites of the Red River Formation underlain by shales and sandstones of the Winnipeg Formation. The depth to bedrock is highly variable, ranging from 5 metres in the northeast region of Birds Hill to greater than 40 metres beneath the main Birds Hill Complex.

2.4 Hydrogeology

While the full definition of the hydrogeology of the Pine Ridge Gravel Pit was beyond the scope of this study, it was noted that groundwater was encountered at two distinct elevations. Based on the observed water level within the ponds in Pit B and the observed depths to saturated soil conditions in the test holes drilled below Pit A, the current groundwater level is estimated to be at an elevation of approximately 247 metres (+/-) within Pit A and Pit B. In the area of the South Fine Sand Hole, saturated soil conditions and ponded water are at an elevation of approximately 262 metres (+/-). The review of the available information on the geology of this site indicates that groundwater in the area of the South Fine Sand Hole is perched on the underlying low permeability clays and tills. It is likely that as precipitation infiltrates into the area it accumulates as groundwater on the clay tills and eventually flows into the deep trough structure which hosts the bulk of the Pine Ridge aggregate resources. From there, it likely infiltrates into the underlying bedrock.

Relative to the potential development of the aggregate resources below the water table, a hydrogeologic assessment would be required to determine if the water table can be lowered by pumping or if it would be necessary to utilize a dredge or similar technology to access those resources below the water table. Any plan to lower the water table by pumping would require a Water Rights License from the province, and potentially an Environment Act license. Municipal approvals for the drainage of the discharge water may also be required.

3.0 Previous Work

3.1 1974 Pine Ridge Pit Survey (Drysdale Report)

A test drilling program was undertaken during November and December 1974 to evaluate the soil conditions within the area of Legal Subdivisions 11 and 12 at the Pine Ridge Gravel Pit. The area investigated was approximately 7.3 hectares (18 acres) in size and is located to the south/southwest of Pit A and extending to the southern boundary of the Pine Ridge Gravel Pit property.

Thirty-nine test holes were completed to depths ranging from about 3.6 to 11.0 metres below grade. Test hole logs and a sketch plan of the test hole locations were completed as part of the survey. In 1984, an assessment of the test drilling program was performed (see Glanville Report).

3.2 1984 Pine Ridge Pit Report (Glanville Report)

Mr. J.I. Glanville, P. Eng. was retained by the City of Winnipeg's Equipment and Material Services Branch in 1984 to assess the quantity of materials identified within the area of the 1974 survey. As part of the assessment, an attempt was made to locate and survey the 1974 test hole locations. Of the original 39 test holes, fifteen locations were positively identified. An additional 13 locations were assumed based on field observations. The remaining eleven locations could not be found.

Due to the lack of detailed soil information collected during the 1974 test drilling program, a gross estimate of material quantities was made. The calculated material quantities include:

Stone (probably 25 to 100 mm): 70,000 m³
 Gravel: 90,000 m³
 Coarse Sand: 200,000 m³
 Medium Sand: 35,000 m³
 Fine Sand: Not Calculated

The results of the material assessment concluded that there appears to be a layer of coarse sand and/or gravel that is located in an approximate north-south direction through the study area. The layer appears to dip beneath an upper layer of sand to the south-southwest and extends beyond the study area to the north-northeast.

3.3 1987 Pine Ridge Pit Survey

A detailed site investigation was conducted between November 6 and December 11, 1987 to evaluate the soil conditions within the entire Pine Ridge Gravel Pit property with the exception of the area previously investigated during the 1974 survey. In total, an area of approximately 70.2 hectares (173.5 acres) in size was investigated.

The site investigation consisted of 136 test pit excavations and 3 test holes. The test pit excavations were completed to depths ranging from about 3.0 to 8.5 metres below grade. The test holes were completed to depths ranging from 4.0 to 16.2 metres in an area deemed to have potentially good gravel. The test pit excavations and test holes were all visually logged in the field. Samples of aggregate were collected from the test pit excavations to determine the amount of material retained on the 6.4 mm sieve. All material retained on the 6.4 mm sieve is referred to as stone. The location of the test pit excavations and test holes are shown on Drawing No. 02. Copies of the original site plans depicting the test pit locations.

stratigraphic information and gradation information are presented in the UMA Engineering report of the previous assessment of this property (UMA Engineering, 1999).

Based on the results of the area investigated, it was estimated that approximately 215,000 m³ of good gravel (ie: greater than 25% stone) existed on the site and that the material was concentrated on only 3.3 hectares of the site. The remaining property, 66.9 hectares, was reported as containing mostly sand and hardpan to a depth of 7.0 metres with some intermittent pockets of stone.

3.4 1998 Pine Ridge Gravel Pit Property Assessment (UMA Engineering)

The most recent assessment of the aggregate resources available within the Pine Ridge Gravel Pit was completed by UMA Engineering Ltd. in 1998. The investigation included a survey of the topography of the property at that time, the completion of 30 test pit excavations, the drilling of 9 test holes, and the completion of gradation and petrographic analyses of collected samples. Copies of the 1998 test pit and test hole logs have been included in Appendix A. Copies of the 1998 gradation curves have been included in Appendix B

Based on the assessment of the information available at that time, the following reserves were estimated:

	Unprocessed Sand:	7,573,000 tonnes
•	Processed Sand:	7,573,000 tonnes
•	Pit Run:	1,644,000 tonnes
•	Coarse Aggregate for Concrete/Asphalt:	3,350,000 tonnes

The results of the petrographic analyses completed on the samples from the pit indicate that the average composition is 27 percent granite and 71 percent limestone. The remaining 2 percent consists of sandstone and calcite cemented clastic material.

3.5 Birds Hill Mineral Management and Rehabilitation Study

The Birds Hill Mineral Management and Rehabilitation Study was undertaken to recommend a plan for extraction of aggregate resources and the rehabilitation of the subsequent pit landscapes in the Birds Hill area. The study was completed by UMA Engineering Ltd. on behalf of the Province of Manitoba Energy and Mines Branch in 1985. The study assessed the existing situation and considered the implications of future mineral extraction and land use development. Recommended policies and environmental standards were proposed for the Birds Hill area in order to develop controls for future aggregate extraction operations, post-extraction land uses and land uses on properties adjoining aggregate operations.

3.6 Aggregate Resources of the Winnipeg Region

The purpose of this study was to provide qualitative and quantitative estimates of aggregate potentially available to support construction requirements in the Capital Region over the long term. The study was completed by UMA Engineering Ltd. on behalf of the Province of Manitoba Department of Mines, Resources and Environmental Management, Mineral Resources Division in 1976. The report included forecasts of aggregate demand, estimates of the quality and quantity of aggregate available in the region, an airborne resistivity survey east of Birds Hill, and a seismic survey in the RM of Rockwood area.

4.0 Site Investigation Program

The site investigation program undertaken at the Pine Ridge Gravel Pit included the completion of a topographic survey to establish the current surface elevations, a test pitting program to obtain detailed information and samples from the upper 5 metres of the soil profile, and a test hole drilling program to obtain information and disturbed samples from the deeper portion of the soil profile. Test pit and test hole locations were selected to enhance the information obtained from previous investigations.

All test pit excavations and test holes were visually logged in the field by UMA personnel for soil type, moisture content, consistency, density and composition. The description of the soils encountered and the sampling locations are included in the logs contained in Appendix C.

Representative samples were collected as grab or composite samples at selected locations using ASTM Standard D75-87 as a sampling guideline. Samples were placed in uniquely labelled sample bags and transported to the UMA geotechnical laboratory for gradation analysis. The gradation analysis results are included in Appendix D.

4.1 Topographic Surveying

In order to establish the current site topographic conditions, a topographic survey was completed by UMA Engineering personnel using GPS survey equipment on November 16 to 23, 2005. The base station used was a Trimble 4700 receiver and the rover unit was a Trimble 5800 receiver. The survey method used was real time kinematics. Specific activities completed as part of this survey and limitations to the survey include:

- The survey was limited to areas that had been mined since the last UMA survey, with sufficient overlap to allow the current survey to be merged with the previous survey.
- Any existing stockpiles within the gravel pit were excluded from the survey. The area surrounding
 the stockpiles was surveyed and the surface elevations assumed to project linearly between data
 points on opposite sides of the stockpiles.
- The gravel pit is being actively mined and variations from the conditions at the time of the survey are to be expected.

Following completion of the survey, the information was processed to prepare the surface topographic contour plot provided as Drawing No. 03.

4.2 Test Pitting

Twenty seven test pit excavations were completed on December 19 to 21, 2005 to evaluate the shallow soil conditions. The excavations were completed using a Cat 330B backhoe supplied by Borland Construction. The excavation depths ranged from 2.4 to 4.6 metres. All excavations were backfilled upon completion using the excavated material.

The locations of the test pits are shown on Drawing No. 02. The test pit investigations were focused primarily on the Pit A, Pit B and South Fine Sand Hole areas, as previous investigations had adequately investigated the shallow conditions in other areas.

4.3 Reconnaissance Auger Drilling Program

Seven reconnaissance auger test holes were completed at selected locations within the pit on January 11, 2006 using a Brat drilling rig owned and operated by Paddock Drilling Ltd. The test holes were drilled using 125 mm solid stem augers to depths ranging from 7.6 to 32 metres. The purpose of these test holes was to obtain additional information on the stratigraphy at depth at this site and the drilling conditions so that decisions could be made on the preferred drilling method for the follow-up depth drilling program. In general, it was found that sufficient cobbles and boulders were present to necessitate the use of mud rotary or dual rotary drilling methods. All test holes were backfilled with drill cuttings upon completion. The locations of the test holes completed as part of this program are shown on Drawing No. 02. In general, test holes were terminated when the basal clay or till materials were encountered, or when further progress could not be made due to the drilling conditions. The results of these test holes are provided on the logs included in Appendix C and are summarized as follows:

- Test hole TH06-28 was drilled on the west side of Pit A and adjacent to the main access road to the pit. The test hole encountered primarily sand to a depth of 6.1 metres followed by clay.
- Test hole TH06-29 was drilled from the base of the south-central portion of Pit A. The test hole
 encountered primarily gravel to a depth of 7.3 metres, followed by sand with decreasing gravel
 content with depth. The water table was encountered at a depth of approximately 14.3 metres
 below grade, and the test hole was extended to 32 metres without encountering the basal clay or
 till materials.
- Test hole TH06-30 was drilled on the ridge between Pits A and B. The test hole encountered gravelly sand to a depth of 12.2 metres followed by clay.
- Test hole TH06-31 was drilled from the base of the north-central portion of Pit A. The test hole
 encountered primarily gravel to a depth of 7.6 metres, followed by sand. The water table was
 encountered at a depth of approximately 14.8 metres below grade. The test hole was drilled to
 15.2 metres without encountering the basal clay or till materials.
- Test hole TH06-32 was drilled to the west of the northern portion of Pit A. The test hole
 encountered sand with gravel to a depth of 4.6 metres followed by coarse grained sand with
 lesser amounts of gravel. The test hole was drilled to an auger refusal depth of 15.2 metres
 without encountering the basal clay or till materials.
- Test hole TH06-33 was drilled to the west of the northern-central portion of Pit A. The test hole
 encountered sand to a depth of 3.4 metres followed by gravel to a maximum refusal depth of
 drilling of 15.2 metres. Basal clay or till materials were not encountered.

4.4 Mud Rotary Drilling Program

On the basis of the results of the reconnaissance drilling program, and in consideration of the available budget for this investigation, the decision was made to proceed with the depth investigation using mud rotary drilling techniques. The technique is considered suitable to obtain information on the stratigraphy at depth, however, a significant amount of disturbance and sorting of the samples occurs during the drilling process. Therefore, the results of these test holes, and in particular the gradation analyses obtained must be considered in light of the drilling method used.

Five test holes were completed on February 1 to 6, 2006 using a Canterra mud rotary drill owned and operated by Maple Leaf Enterprises Ltd. The test holes were drilled to depths ranging from 13.7 to 60.7 metres and samples were collected periodically from the return cuttings. All holes were backfilled with drill

cuttings upon completion. The locations of the mud rotary test holes are shown on Drawing No. 02. The results of these test holes are provided on the logs included in Appendix C and are summarized as follows:

- Test hole TH06-34 was drilled from the base of the north-central portion of Pit A near test hole TH06-31 to obtain further information on the extent of granular materials at depths below 15.2 metres [Note: the information for the upper 15.2 metres on this test hole log was extracted from the more accurate auger test hole TH06-31]. Below 15.2 metres, the test hole encountered gravelly sand to a depth of 22.8 metres, followed by a gravel till material to a depth of 38.7 metres. The remainder of the test hole consisted of silt till to the limestone bedrock surface at a depth of 60.4 metres.
- Test hole TH06-35 was drilled to the west of the north-central portion of Pit A. The test hole
 encountered fill and clay material to a depth of 2.4 metres followed by sand and till to a depth of
 18.9 metres. The remainder of the hole consisted of gravel to the maximum depth of drilling of
 36.6 metres.
- Test hole TH06-36 was drilled at prairie level near the northwest corner of Pit A. The test hole
 encountered primarily gravel to the maximum depth of drilling of 13.7 metres.
- Test hole TH06-37 was drilled at prairie level near the northeast corner of Pit A. The test hole
 encountered gravelly sand to a depth of 6.1 metres followed primarily by sand to the maximum
 depth of drilling of 22.9 metres.
- Test hole TH06-38 was drilled to the west of the north-central portion of Pit A, near test hole TH06-33. The test hole encountered primarily gravel with varying amounts of sand to the maximum depth of drilling of 27.4 metres.

4.5 Gradation Analyses

Gradation analyses of selected samples from the investigation were completed at the UMA Engineering geotechnical laboratory using ASTM Standard C136-92 as a guideline for the analyses. The results of these analyses are summarized in Table 1 and the gradation curves are provided in Appendix D.

5.0 Quantification of Existing Reserves

5.1 Stratigraphic Interpretation

Based on the analysis of the information collected as part of this and previous investigations, the stratigraphy beneath the Pine Ridge Gravel Pit has been interpreted as shown in section on Drawing Nos. 04 to 08. For the purposes of estimating reserves, the stratigraphic interpretation has been simplified to show the major mineable units based on the predominant material type. Variations in the gradations and quality of material within the major units exist but cannot be subdivided with the available information. The interpretation of the economic value of these deposits must take into consideration these variations in material type and quality.

In general, the interpreted stratigraphy can be described as follows:

- The surficial soils beneath the property consist almost entirely of aggregates predominantly in the sand grain size range. The exception is the gravel that has been exposed beneath the entire length of Pit A (Section D, Drawing No. 07) and a small area of gravel that has been exposed in the southern portion of Pit B (Section E, Drawing No. 08). Gravel lenses and layers exist within the sand unit however they are either of insufficient size or there is insufficient information to subdivide these as mineable units. Based on the investigation results from the current and 1998 study, an estimated 15% of this material has a grain size greater than the 5 mm sieve. The sand is generally described as clean, well graded and locally can contain a significant proportion of gravel. Gradation analyses (Table 1) indicates the clay and silt content varies from 0.1 to 2.7%, the sand content varies from 63.0 to 99.5%, the gravel content varies from 0.5 to 32.5%, and the cobbles content varies from 0.0 to 18.0%. East and north of Pit B, and in the southwest corner of the property near the South Fine Sand Hole, the sand extends down to the underlying clay/till interface.
- Either exposed at surface in Pit A or underlying the sand to the west of the north half of Pit A is the only significant discrete gravel zone remaining on the property. This gravel zone is interpreted to dip to the west to northwest from the north half of Pit A towards the west and north west property boundaries. The available information indicates that this zone may be up to 22 metres thick and consists of gravel, sandy gravel and local layers and lenses of sand. Gradation analyses of samples collected from this unit (Table 1, Sample Nos. G17, 18, 30, 47 and 54) indicates the clay and silt content varies from 0.0 to 10.6%, the sand content varies from 14.1 to 35.0%, the gravel content varies from 64.8 to 83.2%, and the cobbles content varies from 0.0 to 11.0%. Lesser quantities of gravel are also present in the southern portions of Pit A and Pit B, and as small lenses and layers within the upper sand unit. Of the nine samples analyzed from the gravel unit (Table 1), two had a percent retained above the 5 mm sieve in the 30 to 60 percent range (38.1 and 53.1%), and seven had a percent retained above the 5 mm sieve in excess of 60% (62.5 to 82.7%).
- Underlying the gravel beneath Pit A and to the west is a lower sand unit (Section A, Drawing No. 04). Only a limited amount of information is available from this lower unit. It is described as ranging from fine to coarse sand and containing varying amounts of silt and gravel. Further investigation may obtain sufficient information to further subdivide this unit. However, given the significant depth of this unit, for the purposes of this assessment it has been included as a single unit.

• The base of the granular deposit is underlain by clay and/or clay/silt till to the bedrock surface at a depth of approximately 60.7 metres below the current base of Pit A. A contour plot of the interpreted upper surface of the clay/till layer is provided as Drawing No. 09. As can be seen on the drawing, a deep north-south trending channel in the clay/till surface exists beneath Pit A which has been infilled with the granular material that form the bulk of the remaining reserves at this property. The available information indicates that the channel widens in the northwest corner of the property, and the elevation of the top of the clay/till unit has not been established in this area. For the purposes of this assessment, it has been assumed that the top of the clay/till unit occurs at an elevation of 220 metres, or approximately 45 metres below the natural prairie level in this area. A similar smaller channel structure in the upper clay/till surface is also present below Pit B.

5.2 Reserve Estimation Procedures

The estimation of the volume of aggregate reserves remaining at the Pine Ridge Gravel Pit was made using the Autodesk Land Development Desktop digital terrain modeling software program. The software utilizes the information from the surface topography survey and the interpreted stratigraphy from the test pit/test hole program to develop a three dimensional model of the deposit and calculate the volumes of the various material types.

For the purposes of this volume estimation, the deposits have been subdivided into four material classifications above the assumed base of the aggregate materials at the clay/till interface. The material classifications used include:

- Accessible Gravel This volume includes the readily accessible gravel beneath the developed portions of Pit A and Pit B.
- Undeveloped Gravel This volume includes the gravel located to the west of the north portion of Pit A which is overlain by sand which would need to be removed to access the gravel.
- Sand Stripping This is the estimated volume of sand which would need to be removed to
 expose the undeveloped gravel in the northwest portion of the property.
- Other Sand This is the estimated volume of sand remaining elsewhere on the property, including the surficial sand that covers most of the eastern portion of the property and the sand which occurs at depth below the gravel. Gravel lenses and layers are present within this volume however they are either too small or there is insufficient information available to subdivide this unit for volume estimation purposes.

In preparing this volume estimate, a number of assumptions were made concerning the lateral extents of the various material classifications. These assumptions were made to facilitate the volume estimation process and do not substantially affect the overall estimates. The assumptions include:

- The interpreted geology of the dipping gravel deposit has been simplified to that shown on Drawing Nos. 04 and 05 for volume estimation purposes. The geology in this area is likely more complex than that shown however there is insufficient information to refine the interpretation further. This simplification does not substantially affect the overall volume estimate, however further investigations are warranted before a mining plan is developed to extract the aggregates from this area.
- All existing stockpiles have been excluded from the estimate. The estimate only includes in-situ material.

- All granular materials below the gravel layer have been included under the volume estimation for
 other sand due to the indicated predominant presence of sand. This unit contains varying
 amounts of silt and/or gravel and further investigations would be required in future to further
 subdivide this unit so that a refined estimate of volumes can be prepared. The material is present
 at depth, primarily below Pit A and further investigations are not considered warranted at this
 time.
- A water table at 247.0 metres has been assumed in order to estimate reserves above and below the water table.
- The northwest corner of the property from the south limit of the cleared hydro line right of way (Drawing No. 02) has been excluded from the reserve estimate due to the presence of hydro towers. It may be possible to access portions of the reserves in this area while maintaining adequate setbacks from the tower foundations. Development of a mining plan to confirm the feasibility of this was beyond the scope of this study.

5.3 Estimated Reserves

The estimated remaining in-situ reserves (excluding stockpiles) have been estimated as follows:

Material Classification	Above W	ater Table	Below W	ater Table	То	tal
	(Cubic Metres)	Tonnes ⁽¹⁾	(Cubic Metres)	Tonnes ⁽¹⁾	(Cubic Metres)	Tonnes ⁽¹⁾
Accessible Gravel	1,266,000	2,785,200	29,000	63,800	1,295,000	2,849,000
Undeveloped Gravel	755,000	1,661,000	287,000	631,400	1,042,000	2,292,400
Sand Stripping	360,000	720,000	0	0	360,000	720,000
Other Shallow Sand	7,214,000 ⁽²⁾	14,428,000	0	0	7,214,000 ⁽²⁾	14,428,000
Deep Sand	0	0	3,000,000	6,000,000	3,000,000	6,000,000
Totals	9,595,000	19,594,200	3,316,000	6,695,200	12,911,000	26,289,400

Notes:

- A material unit weight of approximately 2.0 (sand) to 2.2 (gravel) tonnes/m³ has been used to estimate the tonnage of in-situ material remaining.
- 2. The shallow sand reserve includes an estimated 15% of aggregate with a gradation greater than the 5 mm sieve which could potentially be mined as discrete lenses and layers, or which could potentially be processed to separate it from the finer grained material.

Petrographic analyses of samples recovered during the 1998 study indicate that the mineralogy is primarily limestone and dolomite (71%) and granite (27%), with minor amounts (2%) of sandstone.

6.0 Summary

The City of Winnipeg currently operates an aggregate extraction facility at the Pine Ridge Gravel Pit located northeast of the city. Aggregate materials have historically been mined primarily from two pits on the property, Pit A and Pit B. Historically, material has also been mined from the North and South Fine Sand Holes located on the west side of the property. As part of deliberations concerning the future disposition of the property, UMA Engineering was retained to update the previous UMA Engineering 1998 estimate. As part of its assessment, UMA Engineering completed a number of site activities to obtain information on the current status of the site. These activities included: a topographic survey, the excavation of 27 test pits, and the drilling of 7 solid stem auger test holes and 5 mud rotary test holes. This information was assessed in conjunction with information from previous studies to develop an updated interpretation of the nature and extent of aggregate materials remaining on the site.

Beneath the undeveloped portion of the property, the predominant aggregate is in the sand grain size range, with varying amounts of gravel. The review of the investigation results from the current and 1998 study indicates that an estimated 15% of this material has a grain size greater than the 5 mm sieve. This coarser material occurs as gravel lenses and layers within this unit that are either of insufficient size to subdivide them into mappable units or there is insufficient information to reliably subdivide these zones, or it occurs intermixed with the finer material and would need to be processed to extract it. This sand unit typically extends down to the underlying clay/till interface.

Beneath the developed portion of the property, the remaining aggregate material consists primarily of gravel with areas of sand. The most significant discrete gravel zone on the property is located beneath the length of Pit A and dips beneath a sand cover unit to the west and northwest. Gradation analyses of samples collected from this unit indicates the clay and silt content varies from 0.0 to 10.6%, the sand content varies from 14.1 to 35.0%, the gravel content varies from 64.8 to 83.2%, and the cobbles content varies from 0.0 to 11.0%. The majority of the gravel is in the greater than 60% retained above the 5 mm sieve range.

Digital terrain modelling procedures were used to estimate the remaining volume of the various materials at this site. On the basis of the interpreted limits of the various major material types, the reserve estimation was subdivided into 4 categories: accessible gravel, undeveloped gravel, sand stripping, and other sand. Based on the available information, the estimated remaining in-situ reserves (excluding stockpiles) is as follows:

Material Classification	Above Wa	ter Table	Below Wat	ter Table	То	tal
	(Cubic Metres)	Tonnes ⁽¹⁾	(Cubic Metres)	Tonnes ⁽¹⁾	(Cubic Metres)	Tonnes ⁽¹⁾
Accessible Gravel	1,266,000	2,785,200	29,000	63,800	1,295,000	2,849,000
Undeveloped Gravel	755,000	1,661,000	287,000	631,400	1,042,000	2,292,400
Sand Stripping	360,000	720,000	0	0	360,000	720,000
Other Shallow Sand	7,214,000 ⁽²⁾	14,428,000	0	0	7,214,000 ⁽²⁾	14,428,000
Deep Sand	0	0	3,000,000	6,000,000	3,000,000	6,000,000
Totals	9,595,000	15,594,200	3,316,000	6,695,200	12,911,000	26,289,400

Notes:

- 1. A material unit weight of approximately 2.0 (sand) to 2.2 (gravel) tonnes/m³ has been used to estimate the tonnage of in-situ material remaining.
- 2. The shallow sand reserve includes an estimated 15% of aggregate with a gradation greater than the 5 mm sieve which could potentially be mined as discrete lenses and layers, or which could potentially be processed to separate it from the finer grained material.

Petrographic analyses of samples recovered during the 1998 study indicate that the mineralogy is primarily limestone and dolomite (71%) and granite (27%), with minor amounts (2%) of sandstone.

7.0 Limitations

The information and data contained in this report, including without limitation the results of any sampling and analyses conducted by UMA Engineering Ltd. ("UMA") pursuant to its Agreement with the Client, have been developed or obtained through the exercise of UMA's professional judgement and are set forth to the best of UMA's knowledge, information and belief. Although every effort has been made to confirm that this information is factual, complete and accurate, UMA makes no guarantees or warranties whatsoever, whether express or implied, with respect to such information or data.

UMA shall not by act of issuing this report to be deemed to have represented thereby that any sampling and analyses conducted by it have been exhaustive, and persons relying on the results thereof do so at their own risk.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by the Client, their officers and employees, and others having legitimate business relations with the Client. Any such use and reliance shall be subject to the limitations set forth in the preceding paragraphs.

Respectfully Submitted,

UMA Engineering Ltd.

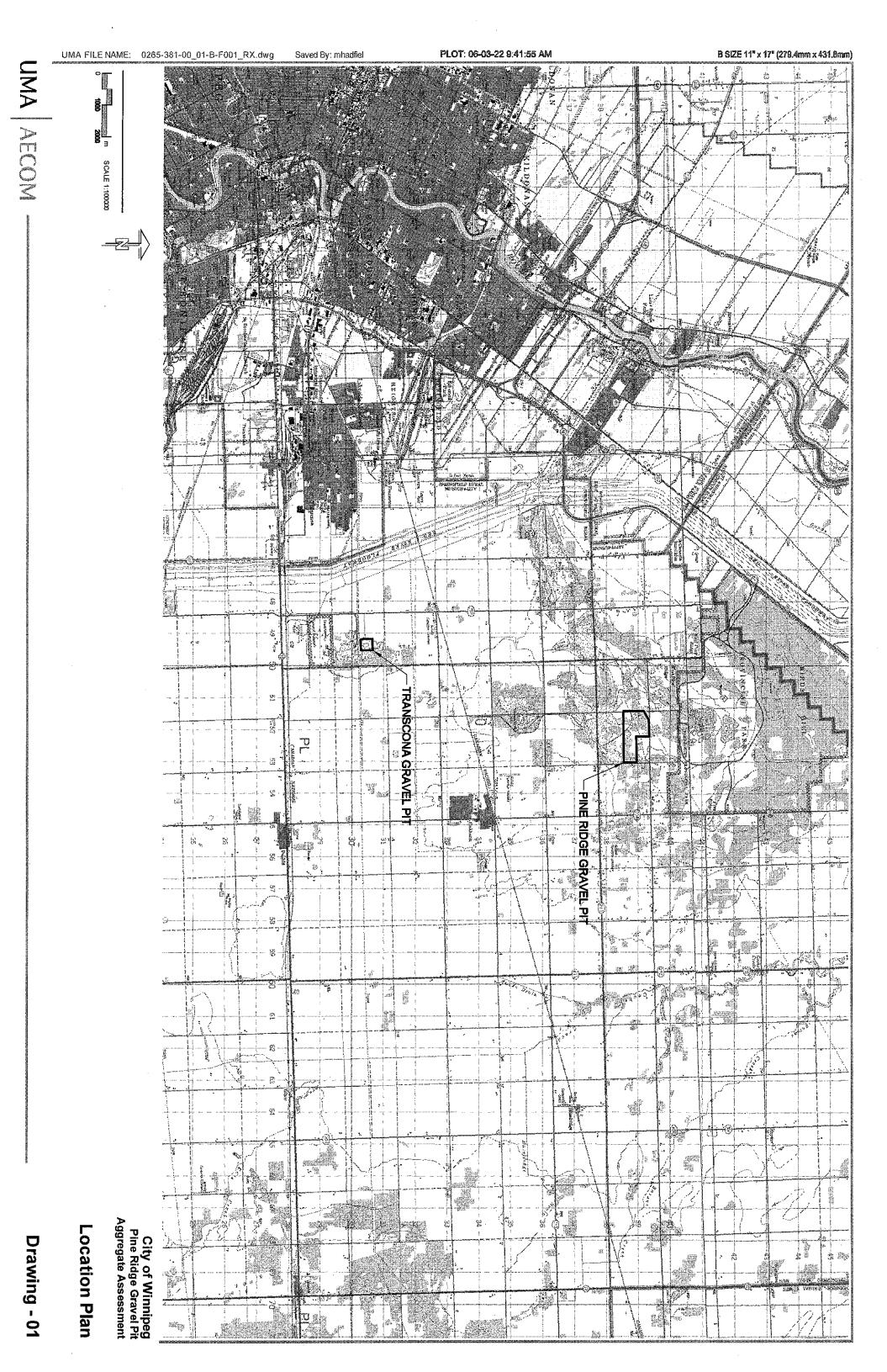
Steve Wiecek, P.Eng., P.Geo. Senior Hydrogeologist

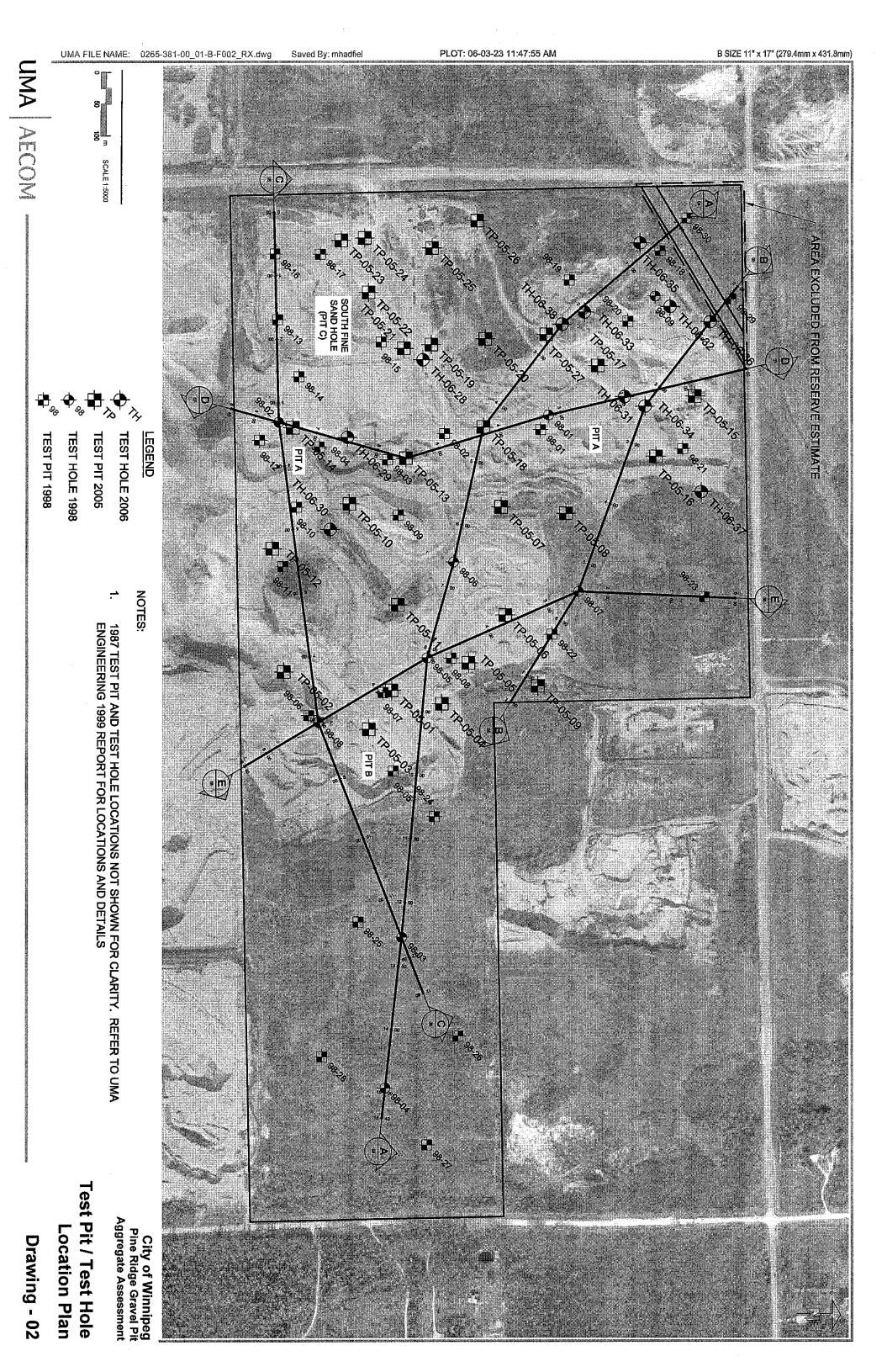
Earth and Water

Table 1
City of Winnipeg - Pine Ridge Pit Aggregate Assessment
Test Pit/Test Hole Samples - Gradation Analyses

	n Auove 5 mm Size	13.5	4.6	74.5	32.2	9.9	25.7	29.9	62.5	53.1	82.7	71.8	45.8	68.3	0.0	33.4	19.3	− % Above	5 mm Size	38.1	0.2	69.1	31.2	48.5
	seludo)	0.0	0.0	10.8	8.0	0.0	0.0	0.0	11.0	0.0	4.0	11.0	0.0	13.0	0.0	18.0	0.0		Cobbles	0.0	0.0	0.0	0.0	0.0
Ciellin Sixex Digition	Gravel	23.6	10.3	73.3	28.7	11.8	32.5	38.2	72.1	9.09	84.7	65.4	64.8	69.3	0.5	18.2	29.4	Grain Size Distribution	Gravel	76.8	8.6	83.2	62.1	75.1
Orella Size			87.0	15.2	63.0	88.1	6.99	61.6	16.6	39.2	11.1	23.6	35.0	17.4	99.5	63.6	6.69	Grain Size	Sand	20.9	70.5	14.1	36.0	14.3
	Olav ann Sill	1.0	2.7	0.7	0.3	0.1	9.0	0.2	0.3	0.2	0.2	0.0	0.2	0.3	0.1	0.2	0.7		Clay and Silt	2.3	20.9	2.7	1.9	10.6
	Soil Type	Sand	Sand	Gravel	Sand	Sand	Sand	Sand and Gravel	Gravel	Gravel	Gravel	Gravel	Sand and Gravel	Gravel	Sand	Sand	Sand	<u> </u>		Gravel	Sand (Till)	Gravel	Sand and Gravel	Gravel
	Sample Number	G2	83	GŞ	<u>G7</u>	G10	G11	G12	G14	G15	G16	G17	G18	G22	G23	G28	G29	Semala Nimbor	Sellit plis Mullius	G30	639	G47	G50	G54
	Test-Pit Number Samp	TP05-01	TP05-02	TP05-03	TP05-04	TP05-07	TP05-10	TP05-11	TP05-13	TP05-14	TP05-14	TP05-15	TP05-16	TP05-18	TP05-19	TP05-26	TP05-27	est Hole	Number ⁽¹⁾	TH06-34	TH06-35	TH06-36	TH06-37	TH06-38

Notes: 1. All test hole samples were collected using mud rotary drilling methods and may not be fully representative of the in-situ gradation (i.e. fines may have been removed during drilling).





10:1 VERTICAL EXAGGERATION

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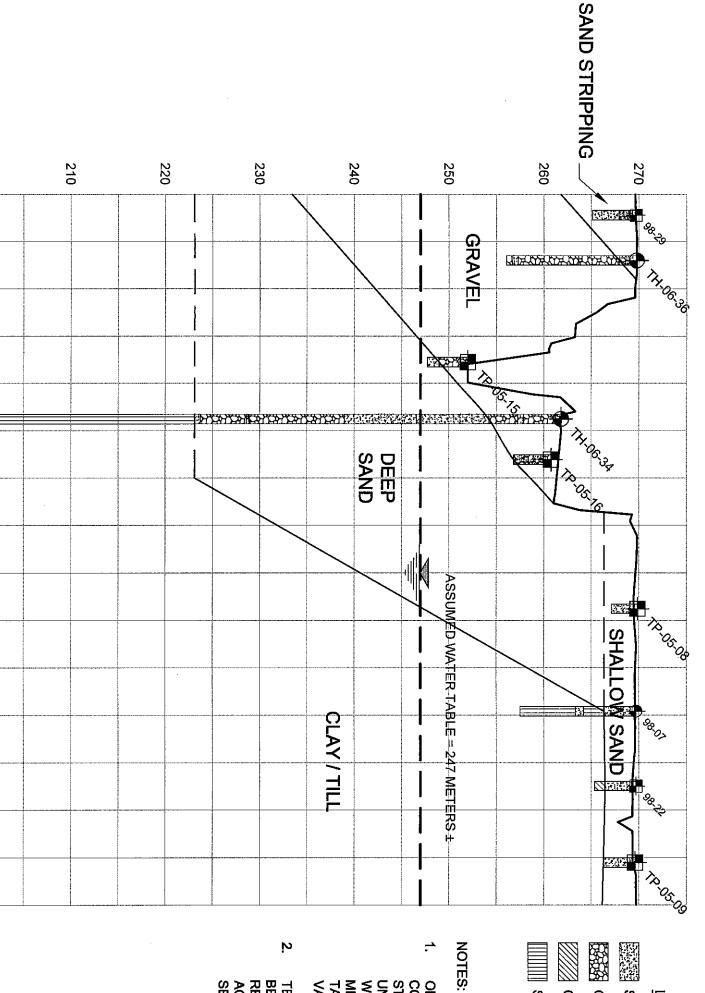
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LEGEND

SAND

CLAY GRAVEL

SILT

MAJOR STRATIGRAPHIC CONTACT ASSUMED STRATIGRAPHIC CONTACT

TEST HOLE / TEST PIT INFORMATION HAS BEEN PROJECTED ONTO THE SECTION. REFER TO DRAWING NO. 02 FOR THE ACTUAL LOCATION RELATIVE TO THE SECTION LINE. VARIATIONS. TAKE INTO CONSIDERATION THESE

UNITS (IE: SAND LENSES AND LAYERS WITHIN GRAVEL). INTERPRETATIONS OF MINEABILITY AND ECONOMIC VALUE MUST

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Aggregate Assessment City of Winnipeg Pine Ridge Gravel Pit

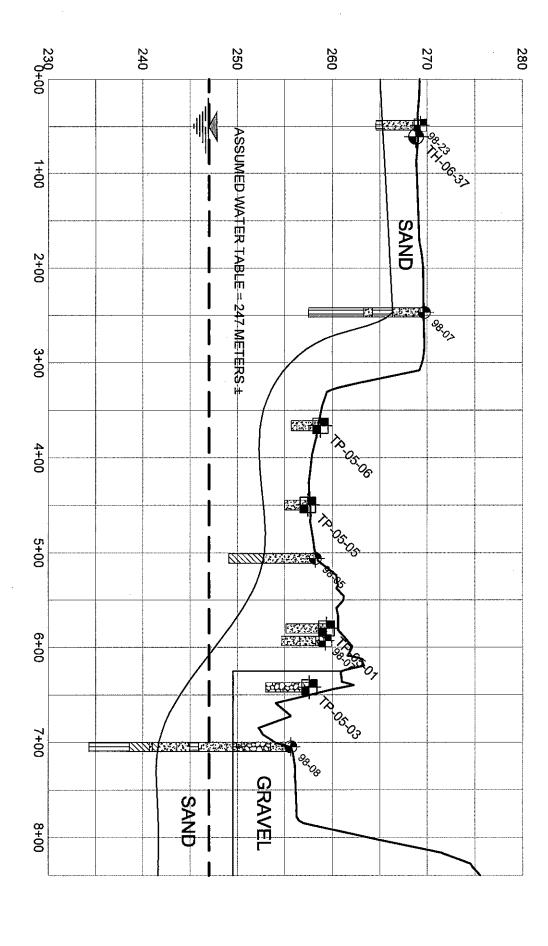
Section B

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Aggregate Assessment City of Winnipeg Pine Ridge Gravel Pit

Section C





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10:1 VERTICAL EXAGGERATION

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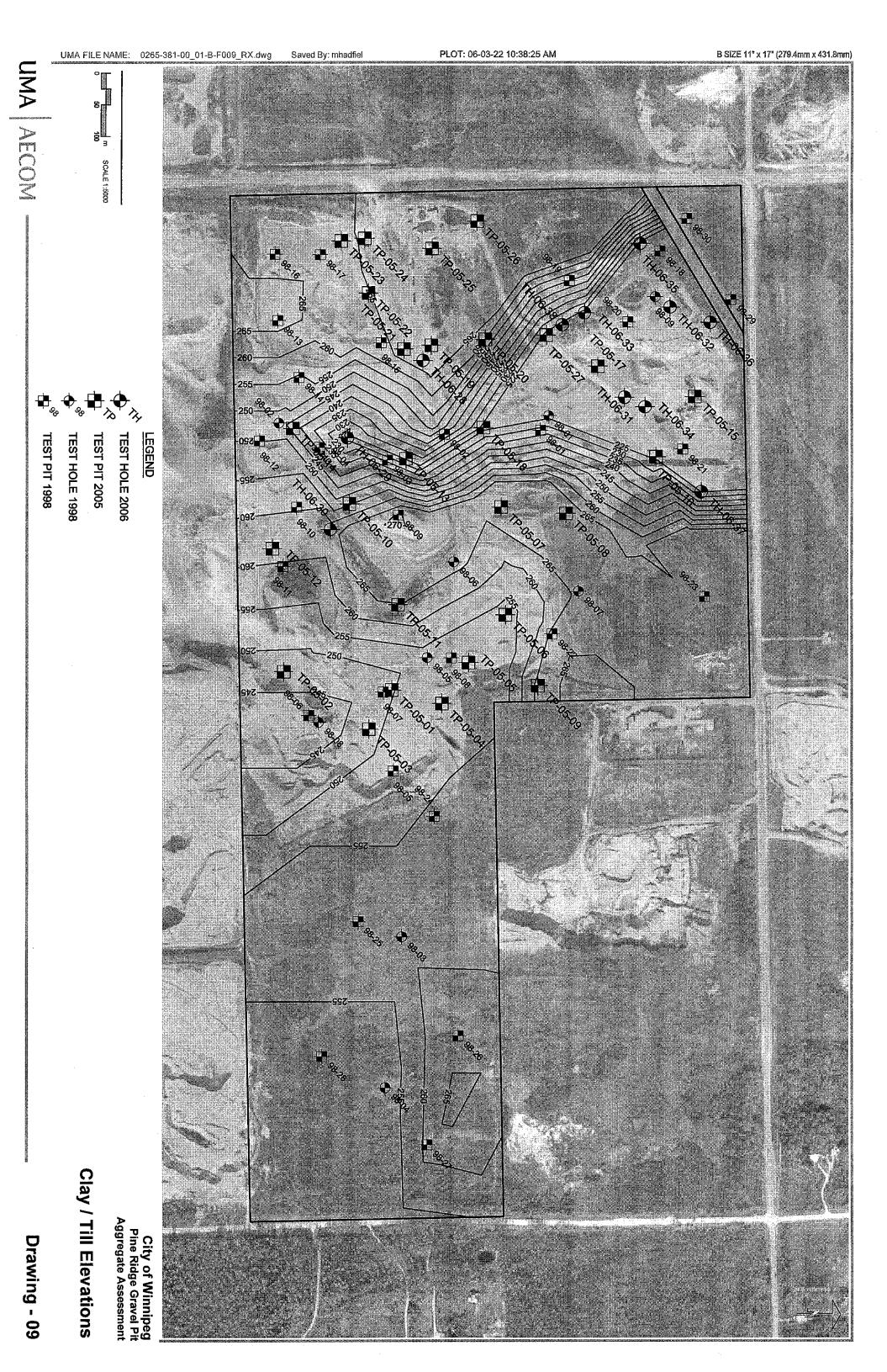
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THESE VARIATIONS.

Aggregate Assessment City of Winnipeg Pine Ridge Gravel Pit Section E



Appendix A 1998 Test Pit/Test Hole Logs

			EXCAVATED BY: Chob		Ltd	l	-			T PIT			2 -1			4
		81 111111111111111111111111111111111111	BACKHOE: Track Mou	inted Cat 200							NO:			5-01	-02	-
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SAMPL	ETY	PE COMPOSITE SHELBY TUBE	DISTURBED	■NO REC	OVE	<Υ 	Щ	CORE	BAKI	(EL.		THIRE.	LINE	TIPE		\dashv
DЕРТН(m)	SOIL SYMBOL	Soil Descrip			SAMPLE TYPE	SAMPLE NO									ELEVATION(#t)	
0.0	4	SAND AND GRAVEL —trace silt and cobb	les												- E	
<u> </u>	• :	—well graded —maximum size 20cm													E-856.	٥
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-															E-855.	٥.
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-		SAND —fine grained													£ ~~	
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-		GRAVEL —sandy, some cobbles			-										E-850.	٥.
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-	4	END OF TESTPIT AT 5.2 METRES IN SAN	D AND											ŀ	E-840).0
_		GRAVEL	D 1410				'									
-		-no seepage or sloughing											<u> </u>		=-839 E	1.0
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98/12/01		Winnipeg. Manitoba		Fig. No:						1				ra	ye i 0i	<u> </u>

			EXCAVATED BY: Chabo		Ltd				TEST				<u> </u>			
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DEРТН(m)	SOIL SYMBOL	Soil Descrip	**		SAMPLE TYPE	SAMPLE NO										ELEVATION(ft)
0.0	4	GRAVEL(STOCKPILE) -20mm size clean	aravel	· · · · · · · · · · · · · · · · · · ·	\vdash			-		-		-				1.
- VIII -	. 4	GRAVEL —sandy, some cobbles —maximum size 13cm	gravei		-											-862.0
	•	->40% granite, decreasing with													E	-861.0
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	*	-moist below 0.6 metres			. 1			i								-860.D
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DEPTH(m)	SOIL SYMBOL	So Descri				SAMPLE TYPE	SAMPLE NO							ж :		
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-	4	boulders		5	•											
-	1	-maximum size 36cm -moist														
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PROJE	CT: F	PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chab		Ltd.				ST PIT			9-4		
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		ngineer: LB							VATIO					
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DEРТН(m)	SOIL SYMBOL	Soil Descrip	-		SAMPLE TYPE	SAMILE NO								ELEVATION(ft)
0.0		SAND —peaty												899.0
-		GRAVEL —sandy, trace cobbles	· · · · · · · · · · · · · · · · · · ·											898.0
- - -					. "			***************************************						-897.0 -897.0
— 1.0°	4	SAND —gravelly, trace cobbles		-									-	896.0 E
_														895.0 E
- - -														894.0 E
- 2.0														893.0 E
														892.0
-					·									E-891.0
- - 3.0	1	SAND AND GRAVEL —trace cobbles —moist				•••								E-890.0
-	1													E-889.0
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-	4					1								E-887.0
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<u> </u>	1	END OF TESTRIT AT A O HETDES IN SANG	D AND											E-884.0
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	PINE RIDGE GRAVEL PIT	ECXAVATED BY: Chab		Ltc	l.			_	T PIT	 	P-5		
	Y OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200									3-01-	-02
	NGINEER: LB						· ·		OITAV				<u> </u>
SAMPLE TY	PE COMPOSITE SHELBY TUB	E DISTURBED	■NO REC	OVEI	₹Y I	<u> </u>	CORE	BARR	EL	WIRE	LINE-	-TYPE	
DEPTH(m) SOIL SYMBOL	Soi Descrip			SAMPLE TYPE	SAMPLE NO								ELEVATION(ft)
0.0	SAND AND GRAVEL -trace cobbles											-	840.0
- -	-maximum size 13cm												839.0
	-wet below 0.6 metres						······						E 838.0
- - - 1.0						ļ 							
-													
													836.0
													835.0
— 2.0	-flow of water and sand into pit				1	 							
	below 2.13 metres				,					 			833.0
	-trace to some silt below 2.7 me	tres			,								832.0
3.0	-maximum size 20cm below 3.0	metres			2								831.0
-	END OF TESTPIT AT 3.4 METRES IN SAN												E-829.0
-	-seepage and sloughing below 2. metres				,								828.0
- 4.0 -										 			827.0
-													E-825.0
-						•••••							825.0
5.0										 			824.0
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PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabe		LIQ.			TEST			117-		0.2
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200								23-01-	02
PROJECT ENGINEER: LB SAMPLE TYPE COMPOSITE SHELBY TUI	BE DISTURBED	NO RECO	WEDY	П	ไดกตะ	BARRE			.6 (m)	-TYPE	
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SAND -trace gravel and cobbles											838.0
-maximum size 8cm -maist below 0.3 metres											E 000.0
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-trace gravel below 0.6 metres	· · · · · · · · · · · · · · · · · · ·										836.0
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END OF TESTPIT AT 4.5 METRES IN SAI	ND .										823.0
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		IGINEER: LB					<u> FII</u>	1===			N: 25				
SAMPL	E TY	PE COMPOSITE SHELBY TU	ibe disturbed	NO RE	COVE	RY	Щ	CORE	BARR	EL		WIRE	LINE-	TYPE	_
DEРΤΗ(m)	SOIL SYMBOL	So Descri			SAMPLE TYPE	SAMPLE NO	W.								
0.0	200	COBBLES(STOCKPILE) -100 mm scre	ened stone		_										
-	, A	GRAVEL —some sand, trace cobbles —well graded													
	۲.	-maximum size 18cm													
<u> </u>	• · ·	 becoming finer with depth trace gravel below 0.6 metre 	20												
	i	-trace graver below 0.0 metre	.5												
— i.0		SAND -some gravel													
-		1161 42													٠
		-moist below 1.2 metres													
															••••
<u> </u>															
_ — 2.0							ļ								
-															
-															
_															••••
				•		1									
_ — 3.0															•••
- 0.0															
F															• • • •
F															
-			•												
— 4. 0				:											
															. •
-															
Ę.		END OF TESTPIT AT 4.6 METRES IN SA —no seepage or sloughing	IND		-										
F		-no seepage or sloagining													
5.0 															•••
	:. :														
				. :					<u>.</u>						••••
-				erigina di Salaharan Tanàna di Salaharan											
						ľ									
6.0		IIMA Engineening		LOGGED BY:	JC	<u> </u>	<u> </u>			COMF	PLETIO	N DE	PTH:	4.6 m	
		UMA Engineering		REVIEWED B	Y: LI	F .				COMF	LETE:	09/	09/98	3	
		Winnipeg, Manitoba		REVIEWED B	Y: U	F				COMF	LETE:	09/	09/98	3 Page	

PROJECT: PINE RIDGE GRAVEL PIT					EXCAVATED BY: Chabot Enterprises Ltd.							TEST PIT NO: TP-8							
CLIENT: CITY OF WINNIPEG					BACKHOE: Track Mounted Cat 200							PROJECT NO: 0265-323-01-02							
PROJECT ENGINEER: LB												ELEVATION: 257.59 (m)							
SAMPLE TYPE COMPOSITE SHELBY TUBE					☑DISTURBED ☐NO RECOVERY ☐						CORE	ORE BARREL WIRE					LINE-TYPE		
DEPTH(m)	SOIL SYMBOL			Soil Descrip				SAMPLE TYPE	SAMPLE NO										ELEVATION(ft)
0.0		SAND	-trace gravel														1		845.0
- - -			-moist, cross b	edded				-											-844.0
- - -						• .													-843.0
— 1.0 																			-842.0
-			-increase in gra	avel below 1.2 met	res				1										-841.0
		i .	· .				• .												-840.0
_ — 2.0																			-839.0
- -																,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			-838.0
- -																			837.0
- - 3.0			metres	sloughing below 2.7			· · · · · · · · · · · · · · · · · · ·												-836.0
- -				.7 METRES IN SANI sloughing below 2.7															-835.0
- - -																	!		
- - - 4,0						-													-832.0
		٠.			•														
- - -				•				-											-830.0
•																			-829.0
5.0 - -																			-828.0
- -																			-827.0
6,0				· · · · · · · · · · · · · · · · · · ·		· .													826.0
UMA Engineering Ltd.							LOGGED BY: JC						COMPLETION DEPTH: 2.7 m						
Winnipeg, Manitoba							REVIEWED BY: LF					<u> </u> C	COMPLETE: 09/09/98						
98/12/ 0 1 0	9.584M	(PREMEW)	minnipe			Fig. No:					Page 1 of 1								
					•	•		`											

PROJE	CT: F	INE RIDGE GRAVEL PIT	EXCAVATED BY: Chabot E			TEST PIT I		
		Y OF WINNIPEG	BACKHOE: Track Mounted	d Cat 200			NO: 0265-323-01-	-02
		NGINEER: LB			<u> </u>		: 274.18 (m)	·\
SAMPI	ETY	PE COMPOSITE SHELBY TUBE	DISTURBED	NO RECOVERY	CORE	BARKEL	WIRE LINE-TYPE	
DEPTH(m)	SOIL SYMBOL	Soil Descrip		SAMPLE TYPE SAMPLE NO				ELEVATION(ft)
0.0	हा है। हा हो हो	PEAT —some gravel, trace rootlets —loose, dry						899.0
<u>-</u>		SAND —gravelly —maximum size 5cm —dry						<u>E</u> -898.0
<u>-</u>		SAND AND GRAVEL -trace cobbles		<u> </u>				897.0
-1.0		-well graded, loose -maximum size 10cm						<u>=</u> -896.0
-	. 4			1				895.0
- - -			<u> </u>					894.0
- 2.0		SAND —gravelly, trace cobbles —compact						[-893.0
		-maximum size 18cm-gravel occurs in 3cm thick seam	ns					892.0
-				2				
3.0								890.0
- - -								889.0
F	77	CLAY —some sand, trace gravel	·	3				
-		END OF TESTPIT AT 3.7 METRES IN CLA' -no seepage or sloughing	7	· ·				887.0
- 4.0 -								E
 -								885.0
<u>-</u> -								884.0
5.0 								
E			S. C.					-882.0
-								881.0
6.0				00055 511 15		100115	LETIAN DEDTI 7.7	880.0
	-	UMA Engineering L	td.	OGGED BY: JC REVIEWED BY: LF			LETION DEPTH: 3.7 n LETE: 09/10/98	<u>n</u>
		Winnipeg, Manitoba	. =	ig. No:		TOURIT		e 1 of 1
07 /44 /70								

.,		· · · · · · · · · · · · · · · · ·	: Chabot Enterprises	Ltd.				EST			TP-		
			ck Mounted Cat 200			•	F	ROJE	CT N	NO: 02	65-3	23-01-)2
		NGINEER: LB	· ·	· ·	·					: 275.			
SAMPLE	ΕΤ	(PE COMPOSITE SHELBY TUBE DISTURE	SED NO RECC	OVERY	, · 	∭c(RE B	ARREL		∏ Wi	RE LINE	-TYPE	
	SOIL SYMBOL	Soil Description		SAMPLE TYPE	SAMPLE NO								ELEVATION(ft)
- 0.0		PEAT —sandy, trace gravel											
		n—loose, dry SAND —trace gravel and cobbles —compact —maximum size 10cm											903.0 902.0
- W		-moist											901.0
1.0													900.0
-								<u></u>	,				899.0
													898.0 E
- 2.0					-			<u></u>					897.0
- 1					1								896.0
													-895.0
- 3.0					:								894.0 893.0
													892.0
-4.0											s.		891.0
													890.0
	****	END OF TESTPIT AT 4.6 METRES IN SAND -no seepage or sloughing	<u> </u>										-889.0
-5.0							ļ						888.0
													887.0
							******						-886.0 -885.0
6.0					\perp								
٠		UMA Engineering Ltd.	LOGGED BY: J REVIEWED BY:							TION D		4.6 m	
		Winnings, Manitoba	Fig. No:	L.I.				100	MIC LLE	. (C. US	/ 1U/	Page 1	of 1
/11/30 04:57	7PM (F	PINERIOC)	** ***********************************			***							

PROJECT: PINE RIDGE		EXCAVATED BY: Chabo			<u> </u>		PIT NO		7-77	1 00
CLIENT: CITY OF WIND		BACKHOE: Track Moun	ted Cat 200				JECT NO /ATION: :		-323-0	1-02
PROJECT ENGINEER: SAMPLE TYPE	COMPOSITE SHELBY TUBE	DISTURBED	■NO REC	OVERY	CORI				(m) UNE-TYPI	<u> </u>
	COMPOSITE STREET TOBE	r Distourer	- NO INCO			- DAM	<u> </u>	Janua	CINE III	
DEPTH(m) SOIL SYMBOL	Soi Descrip	and the second s		SAMPLE TYPE SAMPLE NO						ELEVATION(ft)
DO DEAT -S	andy, trace rootlets									898.0
- 🚞 - liq	ght grey to brown ose, dry									Ē
SAND —	some gravel	and the second								897.0
_ —m	oist									E-896.0
[E-030.0
1.0			-	1						<u>E</u> -895,0
										894.0
-										······
F										E-893.0
										892.0
- 2.0 										······· E
			·							891.0
_	A. Company									<u>E</u>
										890.0 E
										E-889.0
3.0				2						
-										888.0
_		·	•							Ē
		•								887.0
										E886.0
				•						E
— 4.0 (******) - (******)				÷		·····				E-885.0
- FND OF	TESTPIT AT 4.3 METRES IN SAN	n								
L I I	o seepage or sloughing	U								
<u> </u>						i				E-883.0
										E
5.0										<u>=</u> 882.0
										E
<u> </u>										E-881.0
-			•	1						E E-880.0
										E 333.1
										879.0
6.0 T	MA Engineering L		LOGGED BY:	JC			COMPLET	ION DE	PTH: 4.3	m
	Winnipeg, Manitoba	ou.	REVIEWED BY Fig. No:	r: LF	-		COMPLET	Ŀ 09/		ge 1 of 1
 98/11/30 04:58PM (PINERIOG)	umuhes' manicona		1119-110-			<u> </u>			+ U	y
						-				

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		_td.		IESI PI		1P-1 <u>-</u>		
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Moun	ted Cat 200			1		265-323	-01-0	2
PROJECT ENGINEER: LB	· ·	<u> </u>				ON: 274	.36 (m)		
SAMPLE TYPE COMPOSITE SHELBY TUE	BE DISTURBED	NO RECO	VERY .	CORE	BARREL	W	ire line-t	YPE	
Soi Swall Descri		1.	SAMPLE 1YPE SAMPLE NO						ELEVATION(ft)
DEAT -sandy, trace rootlets									-900.0
- light grey to brown - loose, dry GRAVEL -some sand									899.0
- loose - well graded									-898.0
-maximum size 6cm -dry									-897.0
			:						896.0
									-895.0
SAND —trace gravel — 20 —sloughing below 1.8 metres									-894.0 -893.0
SAND —gravelly, trace cobbles —well graded	<u> </u>								892.0
- maximum size 15cm - GRAVEL AND SAND -trace cobbles and	J								-891.0
boulders			1						890.0
			-						-889.0
								,	888.0
- 4.0 · · · · · · · · · · · · · · · · · ·									-887.0
END OF TESTPIT AT 4.3 METRES IN SA -no seepage, sloughing below 1. metres									886.0 885.0
									884.0
- 5.0 - -								1	-883.0
									882.0
6.0		LOCOLD DV	10		Ioni	IDI ETIAN	DEPTH: 4	13 m	-881.0
UMA Engineering l Winnipeg, Manitoba	Ltd.	LOGGED BY: J REVIEWED BY: Fig. No:			CON	APLETE: (09/10/98	r.o m Page 1	of 1
98/11/30 04:58PW (PINERIOC)									

PROJE	CT: F	PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabol		Ltd.			T PIT N		TP-1.		
		Y OF WINNIPEG	BACKHOE: Track Mount	ted Cat 200			_			35-323	01-0	2
		NGINEER: LB			-	<u> </u>		VATION			·	
SAMPI	LE T	YPE COMPOSITE SHELBY TUBE	DISTURBED	NO RECO	WERY	_ IIIIco	re bari	₹D.	<u> </u>	E LINE-1	IYPE	
ОЕРТН(m)	SOIL SYMBOL	Soil Descrip			SAMPLE TYPE							ELEVATION(ft)
0.0 - -	한 한 한 한 한 한 한 한 한 한	−light grey to brown −loose, dry										-888.0
- - -	412 41 00 c15	SAND —fine grained, trace gravel —moist									.,	-887.0 -886.0
1.0 1												885.0
[[[
- - - 2.0		ODAVEL A Lucy and blank										-883.0 -882.0
- - -	4	GRAVEL —sandy, trace cobbles —maximum size 10cm										881.0
- - -												880.0
- 3.0 -					2							879.0 878.0
- - -	7											877.0
- 4.0 -		CLAY —silty, some sand —light brown, moist —medium plasticity										876.0 875.0
- - -		END OF TESTPIT AT 4.0 METRES IN CLA' -no seepage or sloughing	Y									874.0
- - - 5.0												873.0 872.0
- -												871.0
- - - -											•	870.0
6.0				LOGGED BY:				[COMPI	FTION I	DEPTH: 4		869.0
		UMA Engineering L	td.	REVIEWED BY	: LF	:		COMPL	ETE: 0)/10/98	}	
		Winnipeg, Manitoba		Fig. No:	<u> </u>						Page 1	of 1

			EXCAVATED BY: Chabot		Ltc				1	T PIT			2 –1			
			BACKHOE: Track Mount	ted Cat 200							NO:			3-01	-02	_
		NGINEER: LB				<u>-</u>					N: 27				· · ·	
SAMPL	E TY	PE COMPOSITE SHELBY TUBE	DISTURBED	■ NO REC	OVE	₹Ŷ	Ш	COKE	BARR	KEL .		WHE	LINE-	ITPE		
DEPTH(m)	SOIL SYMBOL	Soil Descrip			SAMPLE TYPE	SAMPLE NO			-			- I				ELEVATION(#t)
0.0	11 11 11 11 11 11 11 11 11 11 11 11 11	PEAT —sandy, trace rootlets —light grey to brown													ııı Mının	392.0
• •	1 8 8 8 1 8 8 3	-loose, dry														891.0
• •		SAND —fine grained, trace gravel —dry													muddan	890.0
- 1.0 							.,,									889.0
- -																0.888
- - -	\$ \ . \ \	GRAVEL —sandy —maximum size 6cm —moist													. 1	887.0
- 2.0 	4.	SAND —gravelly —gravel content increases with de	pth													886.0 885.0
- - -																884.0
- - -						1									ուրուսուրո	883.0
- 3.0 -							******									882.0
						 						<u></u>			<u> </u>	881.0
- -	*****			٠.											ment lenn	-880.0
4.0. - -																-879.0
- - -		END OF TESTPIT AT 4.3 METRES IN SAN -no seepage -sloughing above 1.98 metres	D													-878.0
- -		Siddy, mily above the side of													- [-877.0 -
5.0 - -															THE STATE OF THE S	-876.0 -875.0
- - -															E	-874.0
															minimum and an area of the contract of the con	-873.0
6.0	-	IIMA Engineering I	+ d	LOGGED BY:	: JC					COM	PLETI	ON D	EPTH	4.3	m	
		UMA Engineering L	ıu.	REVIEWED B	Y:	F				COM	PLETE	: 09,	/10/	98 Pa	ge 1	of 1
		Winnipeg, Manitoba		Fig. No:						<u> </u>			_	P0	ye i	U) [

PROJE	CT: F	ine ridge gravel pit	EXCAVATED BY: Chabot			test pit n		
		y of Winnipeg	BACKHOE: Track Mount	ed Cat 200			0: 0265-323-01-0	2
		NGINEER: LB					271.6 (m)	
SAMPI	LE TY	PE COMPOSITE SHELBY TUBI	DISTURBED	NO RECOVERY	CORE	BARREL	WIRE LINE-TYPE	
DEPTH(m)	SOIL SYMBOL	Soi Descrip		SAMPLE TYPE				ELEVATION(ft)
0.0	1 3 3 3 3 1 3 3 3 3	PEAT —sandy, trace rootlets —light grey to brown —loose, dry						-891.0 -890.0
- - -		 —layer of cabbles along base of a SAND —fine to medium grain size, trace gravel —uniform with depth, moist 						-889.0
- 1.0 -		-sloughing from 0.4 metres						-888.0 -887.0
- - - -								-886.0
- - 2.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			1				885.0 884.0
- - -								-883.0
- 3.0								-882.0 -881.0
- - -	1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4							-880.0
- - - - 4.0		END OF TESTPIT AT 4.0 METRES IN SAN	ID.					-879.0 -878.0
- - - -		-no seepage -sloughing of sidewalls below 0.4						-877.0
- - -								-876.0 -875.0
5.0 - -								- 874.0
								-873.0 -872.0
6.0	<u> </u>	UMA Engineering L Winnipeg, Manitoba	td.	LOGGED BY: JC REVIEWED BY: LF Fig. No:			TION DEPTH: 4.0 m TE: 09/10/98 Page 1	

PROJE	CT: F	PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chab	ot Enterprises	Ltd				TEST				<u>P-</u>		
CLIENT	: CIT	Y OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200					PROJ	ECT	NO:	0265	32	3-01-	02
PROJE	CT E	NGINEER: LB							ELEV	ATION	l: 26	5.08	(m)		
SAMPI	EΤ	PE COMPOSITE SHELBY TUB	DISTURBED	NO RECO	WEF	Ŷ		CORE I	BARRE	L		WIRE	LINE-	-TYPE	
DEРΤН(m)	SOIL SYMBOL	Soi Descrip			SAMPLE TYPE	SAMPLE NO									ELEVATION(ft)
- 0.0 - -		SAND —fine grained, trace gravel —compact, moist													869.0
-										,	ļ				868.0
- - -		GRAVEL AND SAND —trace cobbles —well graded —maximum size 10cm				2									867.0
1.0 - -	7//	-water table at 0.6 metres -sloughing of sidewall material		ı											
 - -		\ below 0.6 metres CLAY —grey —firm, moist to wet													865.0
		-high plasticity						***************************************							864.0
2.0 											 !				863.0
_															862.0
-						1									860.0
3.0 - -															859.0
- - -									<u>. </u>						858.0
_ _ 4.0															857.0
- - -															856.0 E
		END OF TESTPIT AT 4.6 METRES IN CLAY	Υ								<u></u>				855.0
- - 5.0		-water table at 0.6 metres-sloughing of sidewalls from 0.6 metres to 1.2 metres													854.0
- - -															853.0 852.0
- - -										***************************************					851.0
6.0		UMA Engineering L	td.	LOGGED BY: J REVIEWED BY:									PTH: 10/9		1 of 1
98/11/30 0	4;58PM	Winnipeg, Manitoba		Fig. No:			•			-				rage	1 of 1

		PINE RIDGE GRAVEL PIT	BACKHOE: Track Mour						_		11. NO			/ -323-	-01-	n2
		Y OF WINNIPEG NGINEER: LB	DAUNTUE: ITACK MOUI	ited Cat 200		-					10N:				01-	V.4.
SAMP			E DISTURBED	■NO REC	COVER	Ý		CORE	BAR					NE-T	/PE	· ·
DEPTH(m)	SOIL SYMBOL	Soi Descrip	1		SAMPLE TYPE	SAMPLE NO	* * .	-								ELEVATION(ft)
0.0		SAND —fine to medium grained, trace	aravel			-				_		_		-		E 870.0
-	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	-moist				1				***************************************						869.0
- - -																E-868.0
1.0																867.0
- -						. :										866.0
- - -		CLAY —grey —firm, moist to wet —high plasticity														865.0 -864.0
- 2.0		—seepage into the pit at 1.5 met	res.													863.0
- -				g en en												862.0
- - -																861.0
3.0 - -							•						1			860.0
- - -																859.0 -858.0
- - - 4.0																.E-857.0
<u>-</u>				· :												856.0
<u>-</u> -						:										855.0
- 5.0		END OF TESTPIT AT 4.9 METRES IN CLA -seepage at 1.5 metres	Y			:										854.0
<u>-</u> -	-	-no sloughing		:												853.0 -852.0
- - -						,						************				851.0
6.0		TTNA TO	1.3	LOGGED BY:	JC					COI	MPLE	TION	DEP	TH: 4.	.9 m	<u> </u>
		UMA Engineering L	la.	reviewed B						COI	MPLE	ſE: (09/10	0/98		1 of 1
98/11/30	04:58PM	Winnipeg, Manitoba		Fig. No:				•		<u> </u>			•	t	uye	I VI 1

PROJEC	CT: F	PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chab		Ltd.				IT NO:		⁷ –18		
CLIENT:	: CIT	Y OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200			. F	ROJEC	CT NO:	0265	-323-	-01-0)2
PROJEC	CT E	NGINEER: LB					E	LEVATI	ION: 26	9.65	(m)		
SAMPL	ĒΤ	PE COMPOSITE SHELBY TUBE	DISTURBED	■NO REC	OVERY	Пс	ORE B	ARREL		WIRE	LINE-T	YPE	
тн(m)	SOIL SYMBOL	Soi Descrip			SAMPLE TYPE SAMPLE NO		1						ELEVATION(ft)
0.0	ट. ह. इस हा	PEAT -sandy, trace rootlets, trace gra-	rel						Ī		Ī		
-	<u> </u>	-brown	•				i						884.0
		-loose, dry											
-		SAND —fine grained, trace silt, gravel o	ind					ļļ.		·			883.0
		cabbles —light brown, compact, dry											
- [-maximum size 10cm											882.0
1.0	•												
-													881.0
_													
-													880.0
- [E-879.0
— 2.0								1		ļ			E878.0
				er fra									E-877.0
-								 -		ļ			
													876.0
- :		-gravel content increases below		100									
- 3.0		2.7 metres						ļļ.		ļļ			875.0
-				•									Ė I
_													874.0
-			•										
-			÷										873.0
-													Ē
- :													872.0
-4.0								1-1					
-													E-871.0
-													
- [ļ		ļļ.		ļļ			870.0
<u> </u>		END OF TESTPIT AT 4.6 METRES IN SAN)										
-		-no seepage or sloughing											869.0
5.0								<u>ļ.,.</u> ,					
-													868.0
	j	•											[
-													867.0
													E
-													856.0
													E
6.0		TIMA To		LOGGED BY:	Jc L -	<u></u>	<u> </u>	ICO	VIPLETIO	N DE	7H: 4	.6 m	E
		UMA Engineering L	ta.	REVIEWED BY					VIPLETE:		10/98		
8/12/01 09:	-5044	Winnipeg, Manitoba	<u> </u>	Fig. No:								Page	1 of 1
الالقالية، وت	***	I TOUTHARD											

			WINNIPEG ER: LB		BACKHOE: Trac						•						(m)	3-01	
	LE TY		COMPOSITE	SHELBY TI	ube Disture	BED -	NO REG	COVE	RY	П	COR							-TYPE	
DEPTH(m)	SOIL SYMBOL		JOHN SSILE	Sc Descri	oil			SAMPLE TYPE											(1) (1) (1)
0.0		SANE	-fine to med	lium grained, trac	e silt														-8:
			and gravel -moist, dense	•															E
			-maximum si	ze 4cm		•									į				<u>E</u> -8:
			*.																E_8
																			· E
1.0																			<u>=</u> 8
																			E 8
													į		į				E
																			E -8
																			<u> </u>
2.0																			E°
														i					E 8
								ľ	1										Ē.
							j.	,	-										····E-8
			÷				÷												E_8
3.0																			.
							•												8
					:														<u>E</u> -8
•			٠						٠.										Ē
									ŀ										<u> </u>
4.0																			<u>E</u> .8
		*																i	E
					•						- 4								8
		Ï			•				9						······				<u>-</u> -8
																			- [
5.0							:												8
		END	OF TESTPIT AT -no seepage	5.0 METRES IN S.	AND														E.
			iio ooopago			. *													E-8
										ļ				••••••		-			····\ <u>E</u> _8
																			шш
6.0		L		<u> </u>				<u></u>	<u> </u>				12				DTF :		8
			UMA En	gineering	Ltd.	IL IR	ogged by Eviewed e	: 'JC }Y: L	F	•			CO	MPLE	:110N :TE:	09/ 09/	PTH: 10/9	5,0 n 8	1
	<u>:</u>	(PINERIOG	Winni	peg. Manitoba			ig. No:					i	Ĭ					Pag	e 1 of

PROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		Lto.		TEST PH N		
CLIENT: CITY OF WINNIPEG	BACKHOE: Track Mour	ited Cat 200				NO: 0265-323-	-U1-U2
PROJECT ENGINEER: LB		-				: 270.38 (m)	
SAMPLE TYPE COMPOSITE SHELBY TUBE	DISTURBED	NO REC	OVERY	CORE	BARREL	WIRE LINE-TY	PE
Soil Descrip			SAMPLE TYPE SAMPLE NO				ELEVATION(ft)
0.0 SAND —silty, some peat							-887.0
- light brown, loose, dry SAND —medium grained, trace gravel —maximum size 4cm —dry to maist							-886.0 -885.0
SILT -light brown, dry							
			1				884.0
SAND —medium grained, trace gravel —maximum size 4cm	· · · · · · · · · · · · · · · · · · ·						-883.0 -882.0
-dry to moist							881.0
— 2.0 							880.0
SILT -clayey, trace sand -dry, stiff, some oxidation stains							879.0
							878.0
- 3.0 -			2				877.0
							876.0
							875.0
							874.0
SAND AND GRAVEL —maximum size 13c			3				B73.0
END OF TESTPIT AT 4.6 METRES IN SANE GRAVEL -no seepage or sloughing) AND						872.0
— 5.0 -							870.0
							869.0
							=-86B.0
UMA Engineering Lt	.d.	LOGGED BY: REVIEWED BY			COMPL COMPL	ETION DEPTH: 4. ETE: 09/10/98	
Winnipeg. Manitoba	·	Fig. No:			<u></u>	<u> </u>	Page 1 of 1

	T: PINE RIDGE GRAVEL PIT CITY OF WINNIPEG	EXCAVATED BY: Chabot BACKHOE: Track Mounte			PROJECT		P-21 5-323-01-0	<u>n2</u>
	T ENGINEER: LB	DOMINGE. ITACK MOUNTE	OUL ZUU			N: 269.47		U.Z.
	TYPE COMPOSITE SHELBY TUBE	DISTURBED	NO RECOVERY	CORE			LINE-TYPE	_
DEFIN(III)	Soil Descrip	4	SAMPLE TYPE	SAMPLE NU				
	PEAT —sandy, some gravel, trace rootle	ts						E
ย ย	문학 —dark brown, dry 프로							
4	SAND AND GRAVEL —trace cobbles and boulders							Hillian
	-well graded -maximum cobble size 10cm							шиш
) •	-maximum boulder size 38cm -moist	•						<u> </u>
• • •	invist							udanı
•								Trivial I
4	-reduction in coarse fraction from 1.5 metres to 2.7 metres	l Participation						E
) - -								
.*	N A							milin
4.				1				
			: _					1
•		·						
4.								
•								
• •								
•	. 4							
*		e e e						
4.	END OF TESTPIT AT 4.6 METRES IN SAND	AND						
	GRAVEL -no seepage or sloughing							
	2.5F 23. 2. 2.5mg; m/g	•						Ē
	TIMA TI	<u> </u>	OGGED BY: JC		COMPI	ETION DF	PTH: 4.6 m	Ē
	UMA Engineering Lt Winnipeg, Manitoba		VIEWED BY: LF	······		ETE: 09/		_

		INE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		Ltd					PIT N			<u> -22</u>	
		y of Winnipeg	BACKHOE: Track Mour	ited Cat 200									32301-	-02
		NGINEER: LB										.66 (r		
SAMPL	ΕΤΥ	PE COMPOSITE SHELBY TUBE	DISTURBED	NO RECO	OVER	ťΥ	∭c	ORE B	ARREL	[W	IRE LIN	NE-TYPE	
DEPTH(m)	SOIL SYMBOL	Soil Descrip	the state of the s		SAMPLE TYPE	SAMPLE NO								ELEVATION(ft)
0.0		PEAT —sandy, trace gravel, trace rootle —dark brown, loose, moist	els											884.0
-		SAND —medium to coarse grained, trace fine to medium gravel, trace boulders —loose, moist	Ce											-883.0 -882.0
1.0 - -		-maximum size 28cm												
-						1								-880.0 -879.0
— 2.0 -					5									878.0
-														-877.0
3.0	///	CLAY -sandy, some silt												875.0
-		-mottled light and dark brown -firm, moist, low plasticity												874.0
- - - - 4.0														872.0
- - -		END OF TESTPIT AT 4.3 METRES IN CLA	Y											871.0
-		-no seepage or sloughing												
														### 868.0
- - - -														867.0
- - 6.0		UMA Engineering L	<u> </u>	LOGGED BY:		<u> </u>							H: 4.3 n	
98/11/30 O	159PM	Winnipeg, Manitoba	.u.	REVIEWED BY Fig. No:	ή: <u>Π</u>	F			C	OMPLE	ETE:	09/11	/98 Page	e 1 of 1
	• *													

PROJE	CT: F	PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		Ltd					PIT			P			
		Y OF WINNIPEG	BACKHOE: Track Moun	ited Cat 200						JECT					1-0	2
		ngineer: LB		<u></u>		:				/ATIO						
SAMP	LE T	(PE COMPOSITE SHELBY TUBE	DISTURBED	NO RECO	ΧEF	Y	Ш	JCORE	BARR	<u>D</u>		WIRE	LINE	-TYP	E	
DEPTH(m)	SOIL SYMBOL	Soi Descrip			SAMPLE TYPE	SAMPLE NO										ELEVATION(ft)
0.0	411 41 41-41	, — · · · · · · · · · · · · · · · · · ·								Τ						883.0
-	한 한 한 한 한 한 한 한 한 한	cobbles and rootlets -loose, dry -maximum grain size 8cm														-882.0
	677 #1 677 61	SAND —medium grained, trace gravel	<u> </u>													-881.0
1.0		-gravel size 1 to 4cm -moist		*												-880.0
<u> </u>																-879.0
- - -																-878.0 -877.0
2.0																876.0
-						1										-875. 0
		 becoming wet and compact below 2.4 metres increase in gravel content below metres 														 87 4 .0
— 3.0 -																-873.0
-																871.0 870.0
 4.0 		SILT —sandy, trace to some clay —wet, high plasticity														869.0
-																
E		END OF TESTPIT AT 4.6 METRES IN SILT -no seepage													Ē	-868.0
- 5.0		-sloughing at 4.6 metres														−867. 0
-															THIMME	-866.0
- - -	-															-865.0
6.0				·		·									-	-864.0
	1	UMA Engineering L	td.	LOGGED BY:	IC_					OMPL					m	
		Winnipeg, Manitoba	n en f	REVIEWED BY: Fig. No:	<u>L</u>	·			<u> </u>	OMPL	EIL:	09/	11/9		1e 1	of 1
		ummheg manicana		priya noa					<u> </u>					rut	10 I	<u> </u>

		PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		Ltd				PIT N		TP-			
		Y OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200			 						1-02	
_		NGINEER: LB	·	· · · · · · · · · · · · · · · · · · ·							903 (ı	_		
SAMPL	ΕΤ	PE COMPOSITE SHELBY TUBE	DISTURBED	NO REC	OVEF	RY	ORE B	ARREL		Wil	RE LINE	-TYPE	E	
ОЕРТН(m)	SOIL SYMBOL	Soil Descrip			SAMPLE TYPE	SAMPLE NO							(a)NOITW C I	ELEVATION(ft)
0.0	6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1	PEAT —sandy, trace gravel, trace rootle —loose, dry	ts											382.0
-		SAND —some gravel, trace cobbles —moist, well graded —maximum size 10cm —sloughing below 0.4 metres											<u>-</u>	380.0
- 1.0 		3.003											=======================================	379.0
-						1					-			378.0
- 2.0														376.0
- - -													T. L.	375.0 374.0
- - - - 3.0														373.0
3.0 						:								372.0 371.0
- - -														370.0
4.0 - -		END OF TESTPIT AT 4.0 METRES IN SAND —no seepage —sloughing below 0.4 metres											ш	369.0 368.0
- -													<u>-</u>	367.0
5.0 5.0 												,		366.0
- - - -														365.0 364.0
6.0				LOGGED BY:	JC			Ica	OMPI F	TION	DEPTH	4.0	F	363.0
98/11/30 O	& EADIN	UMA Engineering Lt Winnipeg, Manitoba	.d.	REVIEWED BY	/: LF	•	 	Ċ	OMPLE	TE: 0	9/11/	98	ge 1 of	f 1
30/ 11/ 3 U U	TAIN	i armon)												

		PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabe		Ltd	•			TEST				7-2		
		Y OF WINNIPEG	BACKHOE: Track Mou	nted Cat 200											1-02
PROJE SAMPI		NGINEER: LB PE SHELBY TUE	E DISTURBED	■NO RECO	OVE	Y Y		CORE	ELEV/					i) -Type	•
SAMPL	LE 1	LE COMLOSIE SUFFRE INF	E MNISIAKEEN	HIN KEVI		1	لللا	OUNE	DANKE	-	لي	mil	UNE	1172	<u> </u>
ОЕРТН(т)	SOIL SYMBOL	Soi Descrij	•		SAMPLE TYPE	SAMPLE NO	· ; • · ·								ELEVATION(ft)
0.0		DEAT and types grown types root	ala.					•				- 2	:	:	E-884.0
<u> </u>	47.47 67.67 97.47	PEAT —sandy, trace gravel, trace root —dark brown to black, dry	ets												E-804.0
-	81. 81. 81. 81.	dank brown to blash, try													883.0
-	<u> </u>		1								ļ				<u> </u>
-	*** ***	SAND —medium to coarse grained, gr	velly												E-882.0
}		trace cobbles	a vony,	7											E
1.0		-well graded, moist									ļ				881.0
<u> </u>		-maximum size 10cm-sloughing below 0.6 metres											į		Ę
}		-sloughing below 0.0 medes													880.0
-											ļ				
-			•												E-879.0
}						-									E-878.0
-2.0									<u></u>		ļ				<u>-</u>
<u> </u>			•												E-877.0
-														i	E
-				* **		1					ļ				- 876.0
ŀ															Ē
F															875.0
3.0										<u>.</u>					
t				4										į	E-874.0
-															ŧ
-									<u></u>		ļ				- 873.0
															872.0
[• '												E-8/2.0
4.0											ļ				<u>-</u> 871.0
-															E
-		END OF TESTPIT AT 4.3 METRES IN SAI	ND .												E-870.0
Ι.		-no seepage									ļ				
Ŀ		-sloughing below 0.6 metres												•	869.0
[-															
- 5.0											ļ				868.0
-														:	E
-															867.0
_				;						<u>.</u>	<u>.</u>				<u>E</u>
-														1	E-866.0
<u> </u>															Ē ,,,,
6.0		<u>-</u>		·	Ш										865.0
		UMA Engineering I	.td	LOGGED BY:	JC				Ž	OMPL	ETIO	N DE	PTH:	4.3	m
		Winnipeg, Manitoba		REVIEWED BY Fig. No:	: U	•			-	OMPL	TIL	NA/	11/3		e 1 of 1
98/11/30 0	15:00PM	(PINERIOC)		11-31-11-5											<u> </u>
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PROJECT: PINE RIDGE GRAVEL PIT				ot Enterprise	~~~~	<u>i.</u>	• •		TEST				<u>'-2'</u>		
CLIENT: CITY OF WINNIPEG		BACKHOE:	Track Mour	nted Cat 20	0									<u>-01-0</u>)2
PROJECT ENGINEER: LB		· · · · · · · · · · · · · · · · · · ·	•				- , , , , , , , , , , , , , , , , , , ,		ELEVA						
SAMPLE TYPE COMPOSITE	SHELBY TUBE	∑ DIS	STURBED	NO R	ECOVE	RY	Ш	CORE	BARREL			YIRE I	LINE-	TYPE	,
SOIL SYMBOL	Soil escrip	tion	· .		SAMPLE TYPE	SAMPLE NO						•			ELEVATION(ft)
PEAT —sandy, trace gravel,	trace rootlet	s											T		879.0
= 100se, dry															878.0
-moximum size 20cm)														877.0
- 1.0		-													876.0
															875.0 E
												<u>.</u>			874.0
- 2.0 ; ·															873.0
	1 metres					.1									-872.0
	V														871.0
															870.0
- 3.0 ♣															869.0
															868.0
															867.0
- 4.0 CLAY —silt seams - brown with grey mot	tlina														866.0
-firm, moist, low to r	nedium														865.0
].* 									864.0
END OF TESTPIT AT 4.9 MET -no seepage or slaug		<u>. </u>	•	<u> </u>	."										863.0
- Indiserpoge of stong	mig						. :								862.0
															861.0
6.0	· · ·			<u> </u>										3	860.0
UMA Engine	ering It	ď		LOGGED B	Y: JC				C	OMPL	ETIO	N DE	PTH:	4.9 m	
OMA Eligilie	oritaka Tung ili	u.		REVIEWED	BY: L	<u>F</u>			<u> C</u>	UMPL	ĿIĒ:	09/	11/9		1 of 1
Winnipeg, M	lanitoda		· · · · · · · · · · · · · · · · · · ·	Fig. No:								-		i uye	, VI 1
	•	**													

PROJE	CT: F	INE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo		.td.		TEST PIT		P-27	
CLIENT	: CIT	OF WINNIPEG	BACKHOE: Track Moun	ited Cat 200					-323-01-0	2
PROJE	CT E	NGINEER: LB	·		٠	·		N: 267.156		
SAMPI	LE TY	PE COMPOSITE SHELBY TUBE	DISTURBED	NO RECOV	VERY	CORE	BARREL	WIRE	INE-TYPE	
DΕРΤΗ(m)	SOIL SYMBOL	Soi Descrip		יומאר די ומיארס	SAMPLE 17PE SAMPLE NO					ELEVATION(ft)
0.0	22.22	PEAT -sandy, trace gravel, trace				2.2				-876.0
	20 20 20 20 20 20 20 20 20 20 20 20 20 2	rootlets —black —loose, dry								-875.0
-		GRAVEL AND SAND —trace cobbles and boulders								-874.0
- 1.0		-loose, well graded, dry -maximum size 25cm			1					873.0
-										-872.0
- -	4	SAND —fine grained, trace gravel —loose, dry to moist								-871.0
2.0		-100se, dry to moist								-870.0
-										869.0
- -										868.0
- - 3.0										-867.0
-					2					-866.0
- - -										865.0
- - - 4.0										-864. 0
-					: -					-863.0 -862.0
-	4444	END OF TESTPIT AT 4.6 METRES IN SAN	D							
- - 5.0		-no seepage or sloughing								861.0
- 5.U -	1									-860.0 -859.0
<u>-</u>										—659.0 —858.0
6.0				4	-					857.0
6.0		TIMA Desire	-	LOGGED BY: J		<u> </u>			TH: 4.6 m	
1		UMA Engineering L	ita.	REVIEWED BY:				LETE: 09/1	11/98	
		Winnipeg, Manitoba	· · · · · · · · · · · · · · · · · · ·	Fig. No:			<u> </u>		Page 1	of 1

		PINE RIDGE GRAVEL PIT	EXCAVATED BY: Cha		Lto	1.		Ţ	EST	PIT I	10 :	T	P-2	28	
		Y OF WINNIPEG	BACKHOE: Track Mo	ounted Cat 200				F	PROJE	ECT I	NO:	026	5-32	3-01	-02
		ngineer: LB						E	LEVA	TION					
SAMPI	LE T	PE COMPOSITE SHELBY TUBE	DISTURBED	NO REC	OVE	RY	c	DRE B	ARREL			WIRE	LINE	-TYPE	
ОЕРТН(т)	SOIL SYMBOL	Soil Descrip	* .		SAMPLE TYPE	SAMPLE NO									ELEVATION(ft)
0.0	6.4 6. 5.1 5.	PEAT —sandy, trace gravel, trace				 									Ē
_	27. 27. 27. 41	rootlets													892.0
-	57. 57 57. 57 57. 57	-black -loose, dry	•	4											Ē
ļ	57. 57. 47. 47.														[8 91.0
	2000	DOLUNEDO AND CORPLES													E-890.0
-		BOULDERS AND COBBLES —some sand —well graded	ana gravei												E 030.B
— 1.U -		-maximum boulder size 46cm						··•							E 889.0
_															Ē
-	***														888.0
-								·							····E
_		-size decreasing gradually with de	epth	•											887.0
- 2.0		to a maximum of 15cm at 2.1 n	netres												Ē
- 2.0	555	OAND 1													
-		SAND —trace gravel —maximum size 4cm													E-885.0
- '		maximali bizo ram	*. *.											<u>.</u>	
															884.0
-															
- 3.0															883.0
_															
-		•		• • •		1									882.0
-						,			ļ						<u>=</u> -881.0
-															001.0
-															E-880.0
 4.0	****														
-															879.0
~									ļ						E-878.0
-		END OF TESTPIT AT 4.6 METRES IN SAND)	٠.			-								Ē
-		-no seepage or sloughing													877.0
— 5. 0				•					ļ						E_876.0
-															E 0/0.0
-															E-875.0
-				**					ļļ						[
- -															874.0
-															Ē
6.0		TIRE TO THE TOTAL	1.	LOGGED BY:				<u> </u>	100	MPIC	TION	ו ווביי	-πr	4.6 m	<u>=</u> 873.0
		UMA Engineering L	.d.	REVIEWED BY		-							11/9		
98/12/01 11	O-CYNAMI I	Winnipeg, Manitoba	<u> </u>	Fig. No:											1 of 1

ROJECT: PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chat			<u>1. </u>			_		ΓNO:	:	P-		
JENT: CITY OF WINNIPEG	BACKHOE: Track Mou	unted Cat 200	<u> </u>	—	-							23-0	1-0
ROJECT ENGINEER: LB	r Morrisonen	— No ne		<u>.</u>	П	Пооп			ON: 2				
AMPLE TYPE COMPOSITE SHELBY TUB	E DISTURBED	NO RE	COVE	KY T	ᆛШ	_cor	E BARF	<u> </u>		WIRE	. LINE	-TYPE	
Soi NWB Descrip			SAMPLE TYPE	SAMPLE NO									
0.0 발표 PEAT —sandy, gravelly 프트 —loose, dry													
GRAVEL AND SAND —trace cobbles						ļļ					ļ		
-well graded, dry -maximum size 13cm													
i.o											ļ	ļļ.	
				'									
		•											

8													
SAND —medium to coarse grained, gra	velly,												
trace cobbles -well graded, moist													
-maximum size 13cm													
****** ******				.		ļļ.							
	:	•											
		•											
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L .					·····					ļļ			<u>E</u>
END OF TESTPIT AT 4.6 METRES IN SANI)												
-no seepage or sloughing													Ē
0				ŀ									€
						1							E
							İ						Į.
							1						E
				.			i						E
<u> </u>	· · · · · · · · · · · · · · · · · · ·												Ē
UMA Engineering Lt	.d.	LOGGED BY: REVIEWED BY	JC • IF						LETIO LETE:			4.6 m	n
Winnipeg, Manitoba		Fig. No:	. U					'OML	uniti:	ן /כט	1/3	Page	e 1
30 OSLOOPM (PINERIOG)	•						_	_					

		PINE RIDGE GRAVEL PIT	EXCAVATED BY: Chabo			1.			TEST				P			
		Y OF WINNIPEG	BACKHOE: Track Mour	nted Cat 200)				PROJE					3-0	1-0	2
		NGINEER: LB							ELEVA							
SAMPL	£Τ	YPE COMPOSITE SHELBY TUBE	DISTURBED	NO RE	COVE	RY		CORE I	BARREL	-	I I	MRE	LINE-	-TYPI	Ε	
DEPTH(m)	SOIL SYMBOL	Soil Descrip			SAMPLE TYPE	SAMPLE NO										ELEVATION(ft)
0.0		PEAT -sand, trace gravel and rootlets										_				-884.0
n.		-dark brown, loose, dry													-	
-		SAND -medium to coarse grained, som	е												. [-883.0
•		gravel, trace cobbles -moist													፟	
-		-maximum size 8cm													Ē	-882.0
-		-sloughing below 3cm													Ē	
1.0				•					- 						····-Ē	-881.0
-							:							Ì	. [
-															. [-880.0
-										ļļ					<u>E</u>	
_														:	E	-879.0
-															E	
- 2.0															Ē	-878.0
- 2.0 -				•											E	
															Ē	-877.0
•						1									Ē	
-															······Ē	-876.0
-			•													
-								:							Ē	875.0
- 3.0									<u>.</u>						·····Ē	
-			*. 									-		1	[-874.0
-															1111	
. }							ļļ			ļļ						-873.0
-			•	1.											Ē	970.0
-]			44	•											E	-872.0
-40										ļļ					Ē	-871.0
. "															Ē	-U.I 16-
											i		ĺ	į	Ē	-870.0
_															Ē	0,0.0
-															E	-869.0
.															Ē	
.		END OF TESTPIT AT 4.9 METRES IN SAND	<u> </u>								į			Ī	E	-868.0
- 5.0		-no seepage		· · · · · · · · · · · · · · · · · · ·			<u>†</u>	·····						<u>i</u>	······Ē	
.		-sloughing below 3cm												į	E	-867.0
			•.								į		•		E	
.							<u> </u>		<u> </u>			<u>:</u>	···· <u>}</u>	<u>.</u>	·····Ē	-866.0
.]													į		Ē	1
• .															E	-865.0
6.0				LOGGED BY:	뉴				- 1~	MPL	TION	ו חבי	DTU:	40	E	
4.		UMA Engineering Lt	.d.	REVIEWED B	у. Ү: Ц				C)MPLL	ETE	09/	11/9	7.7 8	111	
		Winning Manitoba		Fig. No:											je 1	of 1
B/11/30 04	K:SSPN	(PINERIOG)							-							_
				÷										•		

		INE RIDGE GRAVEL PIT Y OF WINNIPEG	DRILLED BY: Friesel DRILL TYPE: TH 50									TH-	-1 323-0	i _n
		NGINEER: LB	DRILL SIZE: 152 m									.21 (r		1-0.
SAMPL				■ NO REC	COVE	RY	ППс		BARREL	_			''/ IE—TYPE	
	Π.						<u> </u>	O11C			LILL!	711 AT C11		
全	SYMBOL	So	il		F	9			1,					
DEPTH(m)	∑ S					Ш								
	SOIL	Descri	ntion		SAMPLI	AM P								İ
	8	20011	P 01011		S	\cdot S								
0.0	· ; ;	GRAVEL -some sand			+									
1.0	ا ب	-gap graded 0.25cm to 1.5cm			28	1								
2.0	` : <u>:</u>	-rounded, maximum size 3cm		•										
3.0		-maximum angular size 4cm -60% limestone, 40% granite			×	2								
4.0		oom innescone, 40% grainte						···•						••••
- 5.0					×	3						<u>į</u>	. <u> </u>	
6.0	* 4					4		·						
- }						'								
7.0	`:∢				×	5	ļ						. .	• • • • • • • • • • • • • • • • • • • •
8.0	· .				Ì									•••••
9.0	• • •	SAND -gravelly			-	6							<u>.j</u> j.	
10.0		-rounded, maximum size 5cm				7		·					·}	
11.0				•		'			<u></u>					
12.0					×	8								
13.0		-15cm gravel seams below 12.2	: metres										1	
- 14.0					×	9			···•				. 	
- 15.0						10			<u>.</u>				<u> </u>	
16.0	//	OLAV -Utt			_	10								
F. 1		CLAY —stiff	±.	*,	×	11								•••••
- 17.0						.							·	•••••
- 18.0	****	SAND —medium grained, trace gravel			×	12						·····	••••••	•••••
- 19.0		-loose -sharp angular grains				,,						····		
-20.0		Sharp drigatal grants	• •		×	13							·	
-21.0			•			14								
- 22.0				,							••••••	•••••		•••••
-23.0				*	\times	15								••••• ••••
-24.0						15	ļ					···		
					\sim	16								
- 26.0			•		×	17							-	
- 27.0 -				4	$ \mathbf{x} $	18	<u>-</u>	:: <u> </u> ::			······			
28.0			·									····		
- 29.0						19						<u>.</u>	1	
~30.0			·	·		20								
31.0		END OF TESTHOLE AT 30.5 METRES IN	SAND			-~							ļļ	
32.0				,			······	··•···			•••••		ļļ	
- 33.0								·					<u> </u>	
-34.0									<u> </u>					[
35.0	_		A.			.								
	:	UMA Engineering I	h t.	LOGGED BY:					CO	MPLE	TION	DEPTH	: 30.5	m
			nu.	REVIEWED BY	Y: LF				C0	MPLE	TE: 0	9/15/		
/11/30 02:1	10PM (PI	Winnipeg, Manitoba	· .	Fig. No:				. :					Page	1

PROJEC	r: P	INE RIDGE GRAVEL PIT DRILLED BY: FI									10: T				.
		OF WINNIPEG DRILL TYPE: THE									: 0265		01	-02	
		IGINEER: LB DRILL SIZE: 15	2 mm trice								273.62		-		
SAMPLE	ΤΥ	PE GRAB SAMPLE SHELBY TUBE DISTURE	BED	NO RECO	VERY			ORE B	ARREL	<u> </u>	WIRE	LINE-	TYPE		
TH(m)	SOIL SYMBOL	Soil Description				SAMPLE NO				· · · · · · · · · · · · · · · · · · ·					S DEPTH(ft)
0.0	. 4	SAND AND GRAVEL -fine gravel and coarse			><	,									- 5.0
- I.	٠.٩	sand -rounded				'								<u>F</u>	5.0
-2.0 -3.0	. 4	-maximum size 5cm			×	2									- 10.0
-4.0					×	3									15.0
— 5.0 -		SAND —trace gravel —maximum size 2cm	· .		×	4									- 20.0
6.0		GRAVEL -sandy										ļļ		E	
7.0	*	—rounded, trace angular		*	\bowtie	5	<u>.</u>					<u></u>		[- 25.0
80	 I	-maximum size 3cm -60% limestone, 40% granite				6		···				<u></u> j		<u>E</u>	30.0
9.0	 T	-00% liftestone, 40% grante				V						<u></u>			- 50.0
10.0					×	7									- 35.0
11.0	•														
12.0	• *				×	8									40.0
13.0	4.		-			9									45.0
14.0						-		····.				• • • • • • • • • • • • • • • • • • • •			
15.0	. 1				×	10						•			50.0
16.0		-cobble greater than 15cm diameter encountered at 16 metres			×	11		 				<u> </u>			55.0
E 17.0		encountered at 10 mores	•									<u></u>			
E-18.0					M	12									60.0
E- 19.0						13			••••						65.0
E-20.0		SAND —gravelly		•										,	Ē
E-21.0		—well graded —rounded, trace to some angular			×	14									70.0
22.0		-maximum angular size 2cm						<u>.</u>							Ē
E -23.0						15									75.0
24.0					×	16									80.0
25.0															Ē
26.0				<u> </u>	_×	17									85.0
F		SILT TILL —sandy				10								ļ	90.0
E 27.0		—light brown			×	18							ļ	ļ	30.17
28.0					\blacksquare	19				ļ				ļ	E- 95.0
29.0	╨	END OF TESTHOLE AT 29.0 METRES IN SILT		•						<u></u>				ļ 	
30.0		TIL								ļ				ļ	E-100.0
31.0			* *												.E_105.0
32.0										·					E
33.0								······		ļ	ļļ				E_110.0
34.0											<u> </u>			ļ	Ē
35.0		<u> </u>	- 1	OGGED BY	<u>. l</u>	<u> </u>		<u>: </u>	IC	OMPL	ETION	DEPTH	1: 29	.0 m	<u> </u>
1		UMA Engineering Ltd.	. [REVIEWED I	BY: L	F					ETE: 0		/98		
		Winnipeg, Manitoba		ig. No:									<u> P</u>	age	1 of 1
98/11/30	07:10P	M (PINERHOL)													

PROJECT: PINE RIDGE GRAVEL PIT DRILLED BY: Friesen Drillers Ltd. TEST HOLE NO: TH-3										
CLIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 Fo				PROJECT NO: 0265-323-01-02					
PROJECT ENGINEER: LB	DRILL SIZE: 152 mm	n tricone bit			ELEVATION: 269.62 (m)					
SAMPLE TYPE GRAB SAMPLE SHELBY TUBE	DISTURBED	NO REC	OVERY	CORE	BARREL	WIRE LINE-TYPE				
Soil Descrip	4		SAMPLE TYPE SAMPLE NO				DEPTH(ft)			
= 0.0 SAND -trace gravel							0.0			
-rounded, trace angular -zo -maximum size 3cm -50% limestone, 50% granite			× 1				- 5.0			
E 1771 5	· · · · · · · · · · · · · · · · · · ·		<u> </u>				10.0 			
SAND AND GRAVEL —rounded —maximum size 2cm			3				15.0			
- 60% limestone, 40% granite - 7.0 SAND -trace gravel	·		4				- 20.0			
9.0 -increase in density and fines per			× 5				- 25.0			
-increase in density and finer sar at 8.8 metres	ıd.		≥ 6 ≥ 7			E	- 30.0			
-cobble of >10cm at 11.3 metres			8 8				- 35.¢			
-cobble of >10cm at 11.9 metres	-						- 40. (
-light brown			× 9				– 45. (
E 15.0	;; LT		10				- 50.0			
F 16.0 TILL TILL							– 55.0			
E 18.0							– 60.¢			
E-19.0 E-20.0							- 65.0			
E-21.0							70.0			
E 23.0	·						75.0			
E-24.0 E-25.0							- 80.0			
26.0							- 85.0			
27.0 28.0							90.0			
29.0							- 95.0			
30.0 31.0							-100.0			
=-32.0 =-32.0							-105.0			
- 33.0 - 34.0							-110.6			
IIMA Engineering Lt		LOGGED BY: J	C I		COMPLE	TION DEPTH: 15.2 m				
UMA Engineering Lt	α.	REVIEWED BY:				TE: 09/16/98				
Winnipeg, Manitoba		Fig. No:				Page 1 c	of 1			

									_^^				
		DRILL TYPE: 1250 Fai DRILL SIZE: 152 mm		···	PROJECT NO: 0265-323-01 ELEVATION: 270.484 (m)							-02	
				-000 67	٦\٠	<u></u>							
AMPLE TY	PE GRAB SAMPLE SHELBY TUBE	DISTURBED	NO RE	JUVE!	\1	Щ	JUKE	BARREI			TE LIN	E-TYPE	-1-
DEPTH(m) SOIL SYMBOL	Soil Descript			SAMPLE TYPE	SAMPLE NO								
0.0	CAND trans gravel		· · · · · · · · · · · · · · · · · · ·					-					=
1.0	SAND —trace gravel —rounded												
2.0	-maximum size 2.5cm				,							.	
3.0	-60% limestone, 40% granite			×	2							1	E
4.0													E
5.0			•	×	3							<u> </u>	
6.0				Ξ	4								<u>E</u>
7.0						<u>i</u> .		<u>†</u>					
8.0				×	5							. <u></u>	
9.0				×	, R							1	<u>E</u>
					Ĭ							<u> </u>	
10.0	GRAVEL —sandy			×	.7								
11.0	-well graded -rounded, some angular												E
12.0	-maximum rounded size 2cm			. ≥<	8								
13.0 · · · · · · · ·	-maximum angular size 3cm			×	9								
14.0	-maximum size 4cm below 13.7	metres											
15.0				×	10								
16.0				×	11								
7.0		$q_{ij} = q_{ij}$											
18.0				×	12								
19.0	SILT TILL —sandy, trace clay			_ ×	13								
20.0	—light brown												<u>E</u>
21.0				×	14								
22.0				×	15								1
23.0	END OF TESTHOLE AT 23.2 METRES IN SI	LT		7									[
24.0	TILL		*										
25.0													
26.0		·											E
27.0													
28.0													E
29.0			·					<u>-</u>					
0.0									1			ļ <u>.</u>	
31.0			٠			 	<u>.</u>						E
32.0						<u>-</u>						<u> </u>	
33.0									ļ			1	<u></u>
34.0									i				E
55.0	TIMA Engineering T4		LOGGED BY	: JC		<u>-</u> _	<u></u> :_	IC	OMPL	ETION	DEPTH	: 23.2	m
	UMA Engineering Lt	u.	REVIEWED (3Y: L				C	OMPL	ETE: 0	3/16/	′ 98	•
1/30 OZ:10PN (Winnipeg, Manitoba		Fig. No:			_						Page	e 1 (

PROJECT: PINE RIDGE GRAVEL PIT	DRILLED BY: Friesen D				TEST HOLE NO: 1H-5						
CLIENT: CITY OF WINNIPEG DRILL TYPE: 1250 Failing Rig PROJECT NO: 0265-323-01-02											
PROJECT ENGINEER: LB DRILL SIZE: 152 mm tricone bit ELEVATION: 258.23 (m) SAMPLE TYPE GRAB SAMPLE SHELBY TUBE DISTURBED NO RECOVERY CORE BARREL WIRE LINE—TYPE											
SAMPLE TYPE GRAB SAMPLE SHELBY TUBE	DISTURBED	■ NO RECU	NEKT		BARREL	MIKE	UNE-ITPE				
Soil Slow Descrip			SAMPLE TYPE SAMPLE NO					DEPTH(ft)			
SAND -trace gravel								0.0			
-loose			x 1					5.0			
-well graded							ļļļ				
- 3.0 - rousided - maximum size 1cm			× 2				<u> </u>	··E- 10.0			
-4.0			<u>≥</u> 3					·- 15.0			
5.0	· 			ļ				-E 13.3			
CLAY —sondy			4					20.0			
-dark grey							<u> </u>				
-wet, high plasticity			M_{5}				1				
Ean			Μĩ				1				
END OF TESTHOLE AT 9.1 METRES IN C	.AY					-	1				
[-11.0]		•					<u> </u>	∵ = 35.0			
[-12.0]								::[::[=_ 40.0			
13.0							\$				
F 1 1							<u> </u>	<u>+45.0</u>			
E 14.0					<u> </u>		1	: <u>[</u>			
E 15.0							<u> </u>	50.0			
E-16.0								<u></u>			
E-17.0							ļ	- E			
E 18.0							\$!!	E 60.0			
E-19.0							<u> </u>				
E-20.0							<u> </u>				
E-21.0							ļļ	::E-70.0			
E-22.0							1	· [
E-23.0							1	E- 75.0 E			
E-24.0							<u> </u>	E 80.0			
E-25.0							<u> </u>	-E			
26.0							ļ	E-85.0			
E-27.0								E 90.0			
<u>-</u> 28.0								.E 33.0			
E-29.0							Ĭ <u>.</u>	95.0			
= 30.0							<u> </u>	:: <u>[</u>			
31.0							<u> </u>	<u></u> ≣-100.0			
32.0								[<u>E</u> <u>E</u> -105.0			
E-33.0					<u></u>		<u> </u>				
F I I								E-116.0			
- 34.0 - 35.0							1	: <u>E</u>			
UMA Engineering L	ł d	LOGGED BY:	JC		COMF	LETION DE	PTH: 9.1 m				
	tu.	REVIEWED BY	: LF		COMF	LETE: 09/		1 05 1			
Winnipeg, Manitoba 98/11/30 OZ:10PM (PNERHOL)		Fig. No:	 .		<u>: </u>		rage	1 of 1			

ROJECT: PINE RIDGE GRAVEL PIT					E NO: TH NO: 0265	
LIENT: CITY OF WINNIPEG	DRILL TYPE: 1250 F					
ROJECT ENGINEER: LB	DRILL SIZE: 152 mr		. ПП	ELEVATION		
AMPLE TYPE GRAB SAMPLE SHELBY T	ube Disturbed	NO RECOVERY		BARREL	LLLWIRE	LINE-TYPE
So Descr			SAMPLE NO			
						
SAND AND GRAVEL —gap graded 0.4	to 1cm					
-1.0 4.7 —rounded -2.0 —maximum size 3cm			1		ļļļ	
-70% limestone, 30% granite			2			
SAND —trace to some gravel						
CLAY -sandy, some silt		×	3		<u></u>	
-5.0 —dark grey -6.0 —wet, high plasticity			4			
7.0 SILT TILL —some clay		×	5			
-8.0 -light brown			6			
- 9.0						
- 10.0		\Box	_			
-12.0		M	7			
END OF TESTHOLE AT 12.2 METRES	n silt					
- 14.0 TILL - 14.0						
- 15.0						
-16.0						
-17.0						
-18.0						
19.0						
- 20.0						
-21.0						
-22.0						
- 23.0	•					
-24.0	<i>2</i>					
- 25.0	* **					
- 26.0						
- 27.0	•					
- 28.0						
- 29.0						
- 30.0						
-31.0						
- 32.0						
-33.0						
-34.0						
35.0		LOGGED BY: JC		ICOME	LETION DE	PTH: 12.2
UMA Engineering	Ltd.	REVIEWED BY: LF		COMF	LETE: 09/	17/98 Pac
<u>Winnipeg, Manitot</u>		Fig. No:				

	Engineer: LB		DRILL SIZE: 152 mr		<u> </u>			ELEVATION: 269.7 (m)		
SAMPLE 7	YPE GRAB SAMPLE	SHELBY TUBE	⊠ disturbed	BNO R	ECOVERY	COR	E BARREL	WIRE	LINE-TYP	
DEPTH(m) SOIL SYMBOL		Soil Descrip			SAMPLE TYPE SAMPLE NO					
0.0	SAND -fine to medium	arained, trace o	ravel							
- 1.0	-rounded				× 1					
- 2.0	-maximum size 1	Icm								
- 3.0	OUT TIL		· · · · · · · · · · · · · · · · · · ·		_ ≥ 2					
- 4.0	SILT TILL —sandy —light brown				2 3					
- 5.0			e e e e e e e e e e e e e e e e e e e							
- 6.0	SAND -fine to medium	grained			→ 4					
- 7.0	SILT TILL —light brown				5					
8.0										
- 9.0					× 6					
- 10.0					2 7					
- 11.0										
- 12.0	END OF TESTHOLE AT	12.2 METRES IN S	LT		8					
- 13.0	TILL		· ···	-						
- 14.0										
- 15.0										
- 16.0										
17.0										
18.0										
- 19.0 - 20.0				*						
-21.0		•	•							
- 22.0										
- 23.0										
-24.0										
- 25.0										
- 26.0	-			i .						
- 27.0										
- 28.0										
- 29.0										
-30.0										
-31.0	4 - 2 4									
32.0										
- 33.0										
-34.0										
35.0	IIMA Engis	noomina Ti		LOGGED B	Y: ,JC			PLETION DEP		
	UMA Engir		u.	REVIEWED	BY: LF			PLETE: 09/1	17/98	
/12/01 09:20AM	(GMERHOT) ALTTITIDES	<u>, Manitoba</u>		Fig. No:		-			Pa	

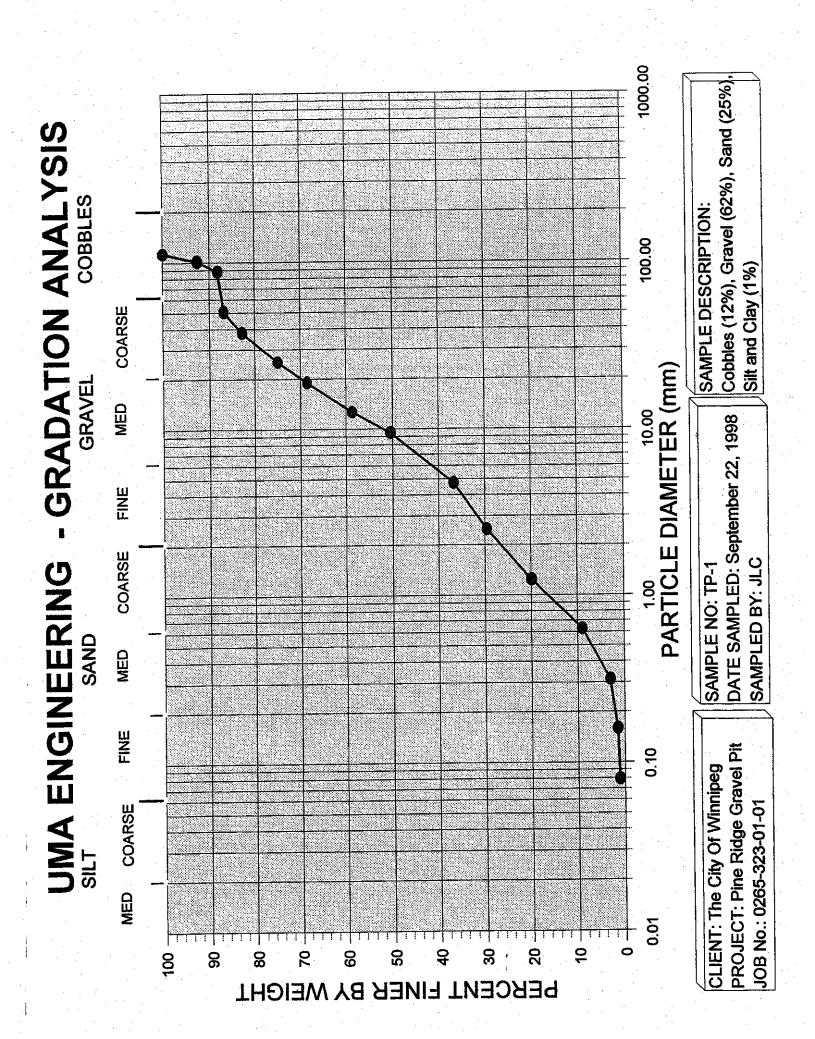
PROJECT: PINE RIDGE GRAVEL PIT DRILLED BY: Friesen Drillers Ltd. CLIENT: CITY OF WINNIPEG DRILL TYPE: 1250 Failing Rig							TEST HOLE NO: TH-8 PROJECT NO: 0265-323-01-02						
		NGINEER: LB DRILL SIZE: 152 mm tr										, U1 -(
PROJECT ENGINEER: LB DRILL SIZE: 152 mm tricone bit ELEVATION: 255.64 (m) SAMPLE TYPE GRAB SAMPLE SHELBY TUBE DISTURBED NO RECOVERY CORE BARREL WIRE LINE—TYPE													
DEPTH(m)	SOIL SYMBOL	Soil Description	mo neo	SAMPLE TYPE	SAMPLE NO	Щоог	DOM	**		jenista t	al 1		DEPTH(ft)
0.0		SAND -coarse grained, gravelly		Н									0.0
— 1.0 =		-rounded, trace angular -maximum rounded size 5cm	,	×	1								5.0
— 2.0	7	-maximum angular size 3cm			,								Ē
3.0	• ;	-70% limestone, 30% granite		\times	2		<u>.</u>			ļ <u>.</u>			10.0
 4.0	4.	GRAVEL —sandy, light brown		×	3					ļļ.			E- 15.0
- 5.0	4 -	-maximum size 2.5cm -5cm thick sand lenses								ļ			
0.8		SAND AND GRAVEL —rounded		×	. 4		•••••	<u></u>		ļ			20.0
7.0		-maximum size 0.75cm			5								Ē
- 8.0		-70% limestone, 30% gravel		\mathbb{Z}	,					ļļ.			25.0
9.0		SAND —fine grained, trace gravel —rounded, maximum size 0.5cm		×	6		<u>.</u>			ļļ.			30.0
- - 10.0	m	-dense											
— 11.0 :		ISILT TILL		×	7								35.0
– 12.0		SAND —fine grained			8					ļ <u>.</u>			Ē
- 13.0					١	ļ				!			E- 40.Ω
				\times	9		·····						E 45.0
- 14.0		CLAY —silty, light grey											
- 15.0 :		SAND —fine grained		×	10		ļ <u>.</u>						50.0
- 16.0		CLAY -stiff		L	11					ļļ.			Ē
- 17.0		SILT TILL —light brown			l ''		<u>.</u>			ļ <u>i</u> .			55.0 E
- 18.0		one thee light broken		×	12		····			ļ <u>.</u>			60.0
- 19.0			± *										
- 20.0				×	13								65.0
-21.0					14								70.0
- 22.0		END OF TESTHOLE AT 21.3 METRES IN SILT											10.0
- 23.0		TILL AND THE STATE OF THE STATE	•							ļ			75.0
-24.0	. 1												
- 25.0						<u> </u>	İ			<u></u>			80.0
- 26.0										ļ			85.0
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- 29.0										ļ <u>i</u>			95.0
- 30.0				-						ļ			= 100.0
-31.0													E 100.0
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- 33.0													
- 34.0			•				<u></u>			ļ			110.0
35.0			<u> </u>			<u> </u>							
		UMA Engineering Ltd.	OGGED BY:	JC				COMPL				1.3 m	
			REVIEWED BY	<u>: LF</u>				COMPL	ETE:	09/1		Dage 1	of 1
8/12/01 0	9:20AM (Winnipeg, Manitoba F	ig. No:									-uge I	VI I
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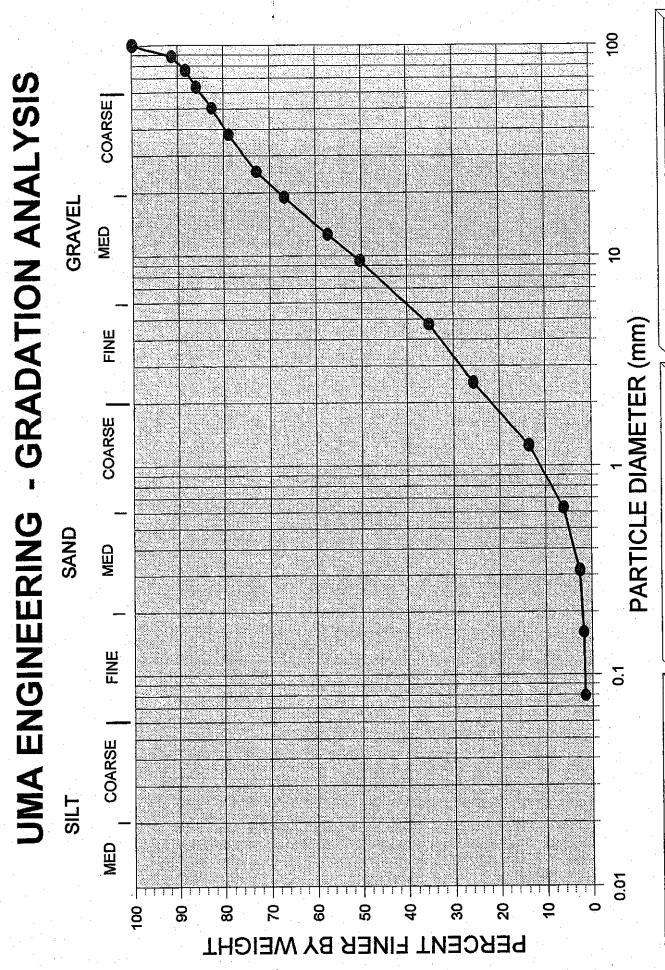
OJECT: PINE RIDGE GRAVEL PIT														
ENT: CITY OF WINNIPEG	DRILL TYPE: 1250 I					PROJECT NO: 0265-323-01-0					02			
OUECT ENGINEER: LB DRILL SIZE: 152 mm tricone bit ELEVATION: 270.02 (m) MPLE TYPE GRAB SAMPLE SHELBY TUBE DISTURBED NO RECOVERY CORE BARREL MINE LINE—TYPE														
ALTE ILLE MICHAEL SAMPLE SHETRA INF	e		COVE	KY T	, LIL	COKE	BAK	IKEL		MIKE	: UNI	-111	<u></u>	
Soi Descrip			SAMPLE TYPE	SAMPLE NO				:						DEPTH(ft)
SAND —gravelly, well graded			+								ļ			<u> 0.0</u>
o -rounded, maximum size 1.5cm				١,	-	····					ļ	ļ		Ē.
n —layer of cobbles 20cm thick at	0.6	*]							ļ			·E~ 5.(
metres				2				•••••				ļ		Ē 10
-60% limestone, 40% granite			4					<u>.</u>			<u></u>	ļ		Ē
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	K .	* .	×	3							ļ	ļ		E- 15
-rounded trace annular											ţ			Ē
maximum rounded size 3.5cm)			4			<u>.</u>			<u> </u>	ļ			₽ 20
□ → □ — maximum angular size 8cm				_			·				ļ			E
0 ← 1 −65% limestone, 35% granite	÷	# **		5							<u> </u>	·····		E 25
-gravel, sandy below 7.9 metre	28			6							<u></u>			Ē 70
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معاليسية لمساهية المناسبة			×	7							ļ	ļ		Ē 35
-maximum angular size 4cm			1								<u> </u>			
-maximum rounded size 2.5cm			×	8										E-40
.0 -65% limestone, 35% granite			L				···			- 	 	<u> </u>		Ē
-cobbles >13 cm from 12.2 m	etres to			9							ļ			E 45
15.2 metres				10						<u> </u>	<u></u>	ļ		Ē
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O TTAKA TA		LOGGED BY:	JC		<u> </u>		- 1	COMP	i FTIO	N DF	ртн.	27 /	4 m	
UMA Engineering L	td.	REVIEWED BY		·				COMP					. 111	
Winnipeg, Manitoba	· 	Fig. No:											ge 1	of 1
1 OD:20AM (PINERHOL)														



Appendix B 1998 Gradation Curves

	; •		



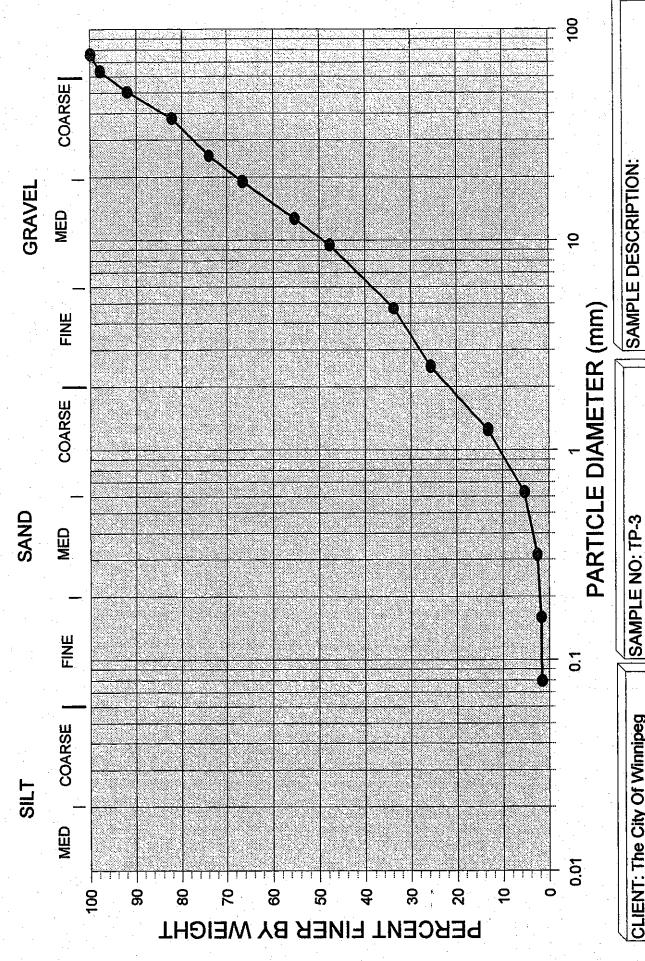


Cobbles (14%), Gravel (64%), Sand (20.3%), SAMPLE DESCRIPTION: Silt and Clay (1.7%) DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC

SAMPLE NO: TP-2

PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg

JOB No.: 0265-323-01-01



Cobbles (2%), Gravel (76%), Sand (20.4%),

Silt and Clay (1.6%)

DATE SAMPLED: September 22, 1998

CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit

JOB No.: 0265-323-01-01

SAMPLED BY: JLC

UMA ENGINEERING - GRADATION ANALYSIS COARSE GRAVEL MED FINE COARSE SAND MED FINE COARSE MED 9 20 9 8 8 8 PERCENT FINER BY WEIGHT

Cobbles (2%), Gravel (66%), Sand (30.1%), SAMPLE DESCRIPTION: Silt and Clay (1.9%) DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC SAMPLE NO: TP-4 PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg JOB No.: 0265-323-01-01

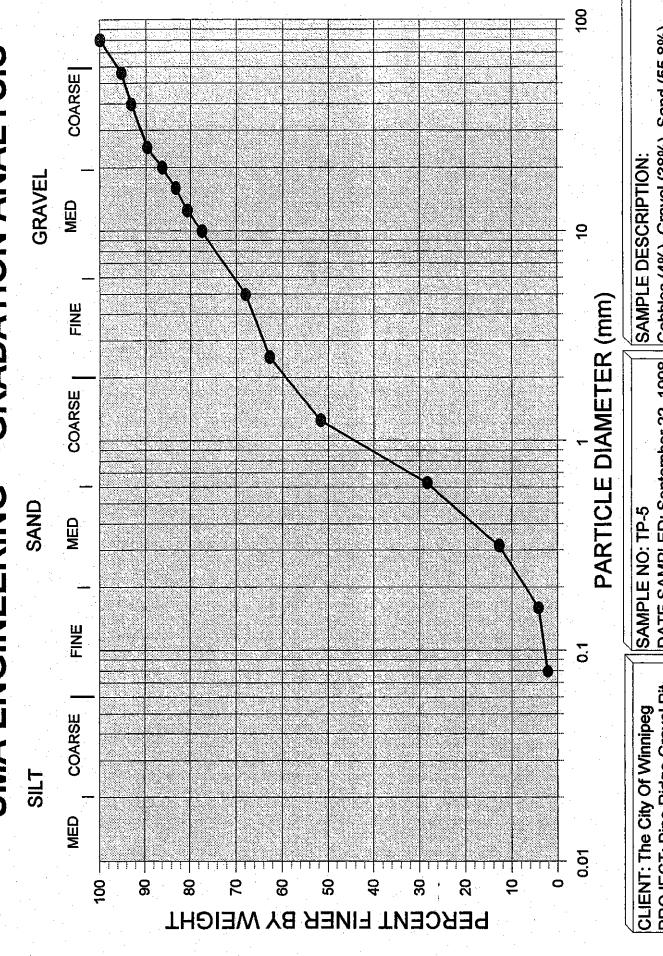
6

9

PARTICLE DIAMETER (mm)

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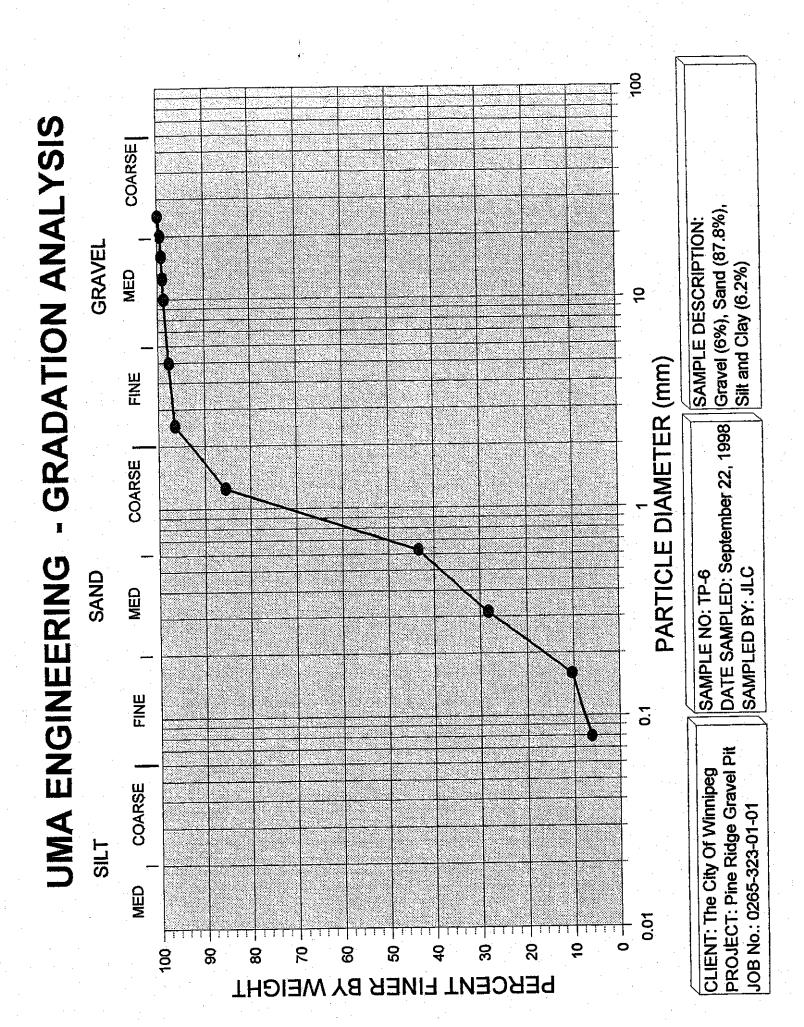
2

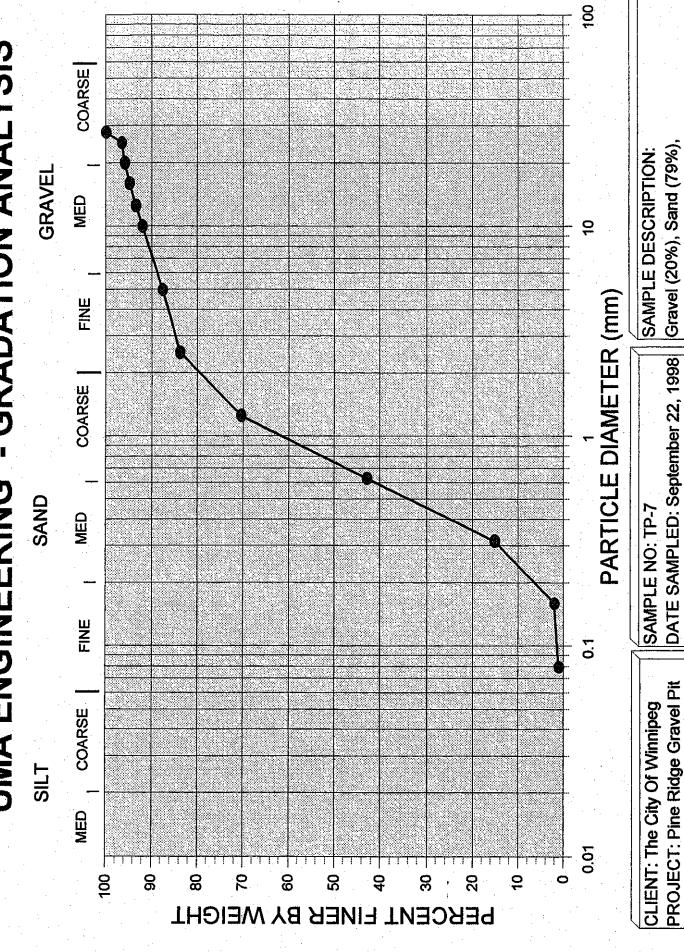


| Cobbles (4%), Gravel (38%), Sand (55.8%), Silt and Clay (2.2%)

DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC

CEIENT: The City Of Withinpeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01

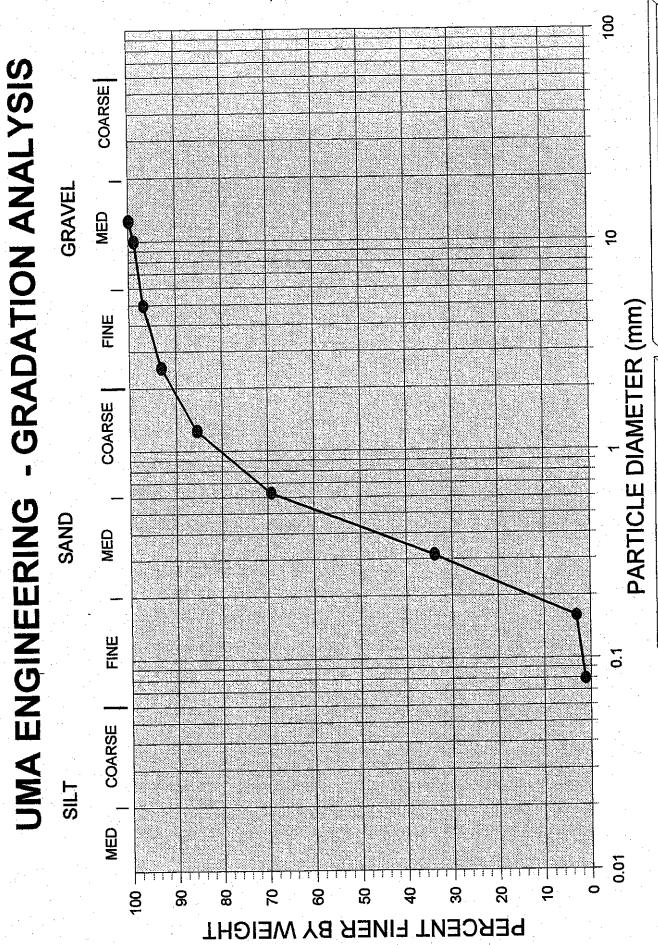




Silt and Clay (1%)

SAMPLED BY: JLC

JOB No.: 0265-323-01-01



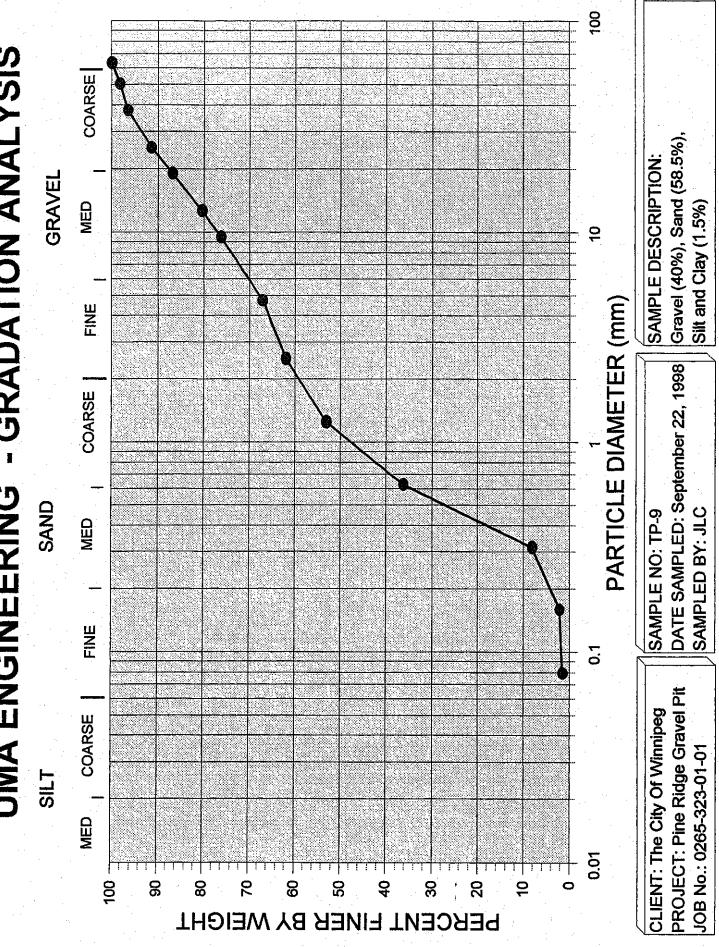
Gravel (10%), Sand (88.7%), SAMPLE DESCRIPTION: Silt and Clay (1.3%) DATE SAMPLED: September 22, 1998

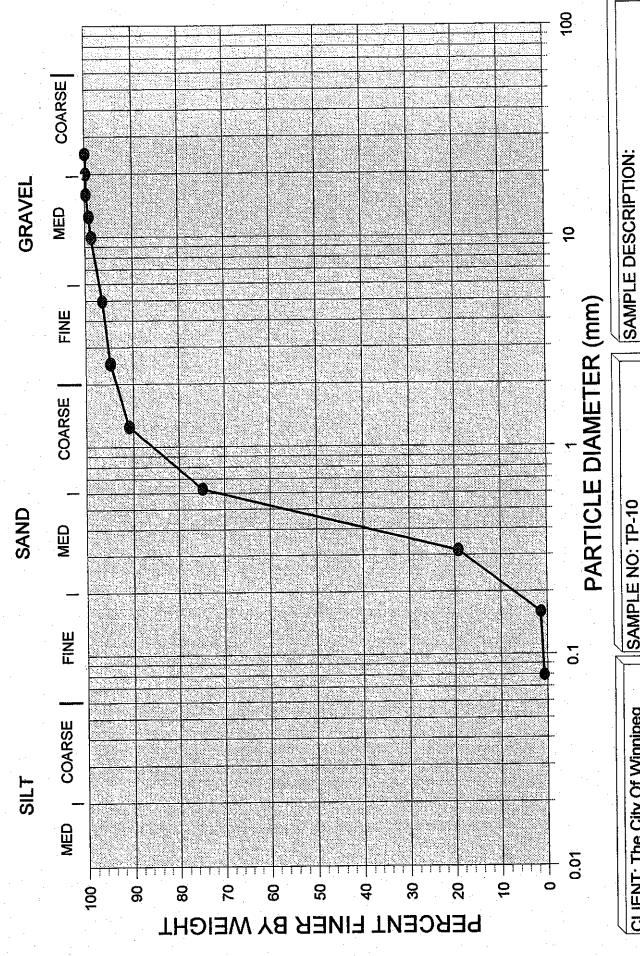
SAMPLED BY: JLC

PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg

JOB No.: 0265-323-01-01

SAMPLE NO: TP-8





Gravel (6%), Sand (93.2%), Silt and Clay (0.8%)

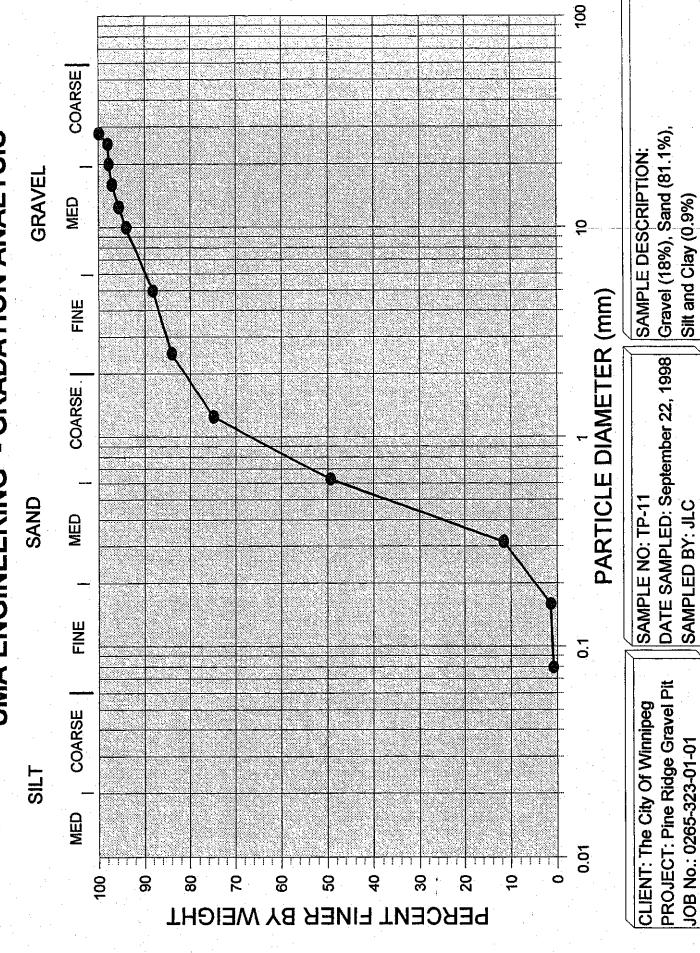
DATE SAMPLED: September 22, 1998

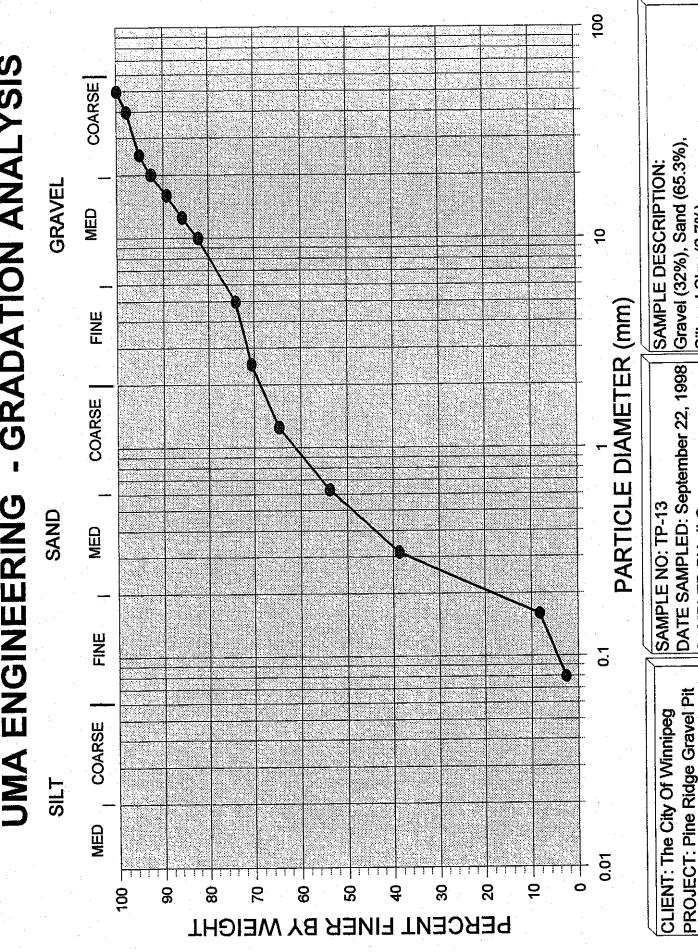
SAMPLED BY: JLC

PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg

JOB No.: 0265-323-01-01

SAMPLE NO: TP-10

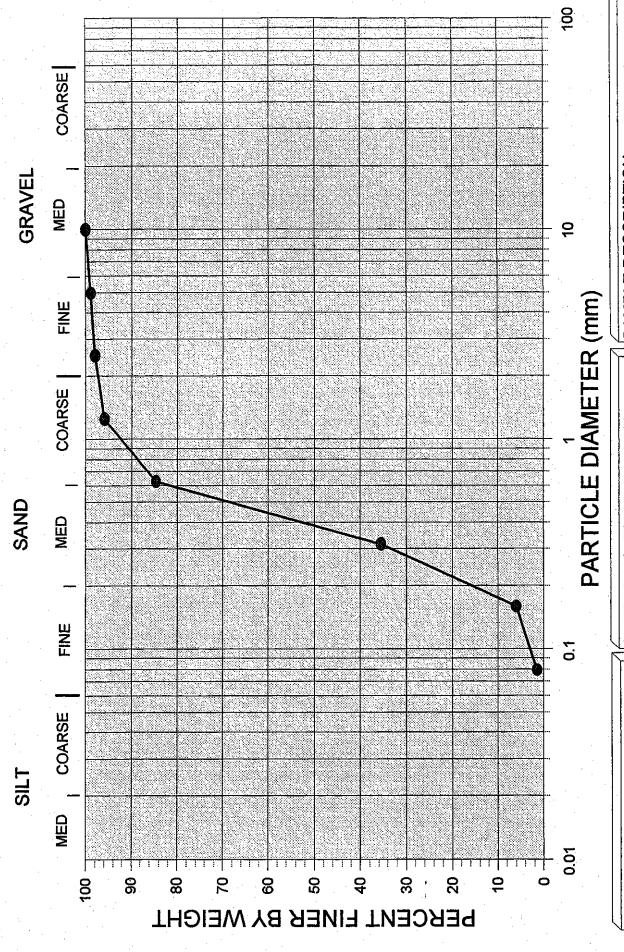




DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC

JOB No.: 0265-323-01-01

Silt and Clay (2.7%)



SAMPLE DESCRIPTION: Gravel (2%), Sand (96.5%), Silt and Clay (1.5%)

CLIENT: The City Of Winnipeg PROJECT: Pine Ridge Gravel Pit JOB No.: 0265-323-01-01

e Ridge Gravel Pit | DATE SAMPLE | SAMPLED BY:

SAMPLE NO: TP-15
DATE SAMPLED: September 22, 1998 | GrassAMPLED BY: JLC

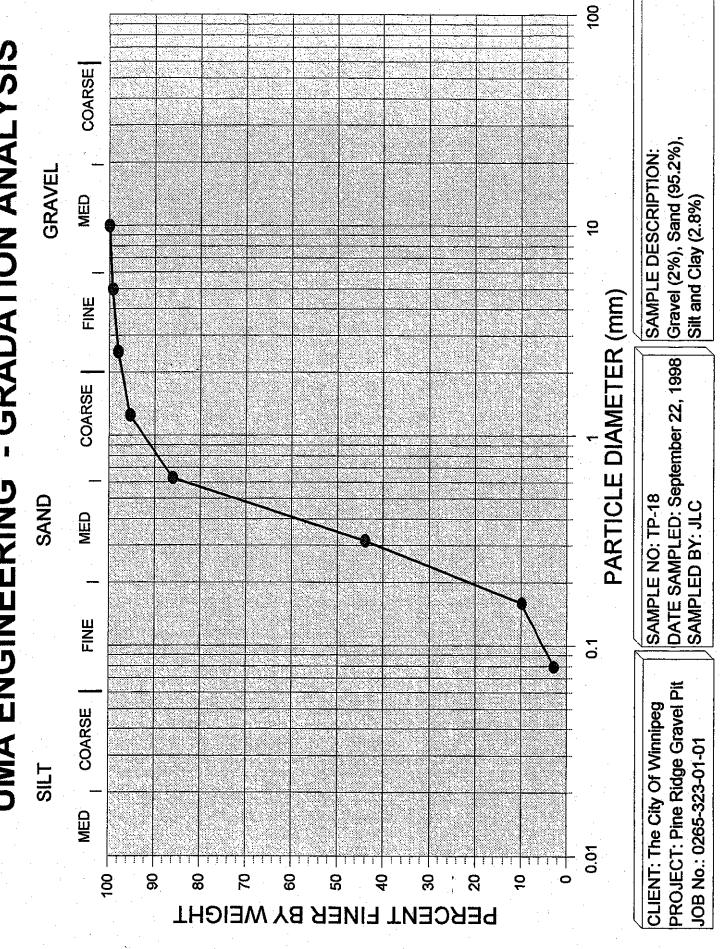
9 **UMA ENGINEERING - GRADATION ANALYSIS** COARSE GRAVEL MED 9 PARTICLE DIAMETER (mm) COARSE SAND MED FINE 0.7 COARSE MED 0.0 9 8 00 20 20 9 2 8 ဓ္ထ **FINER BY WEIGHT PERCENT**

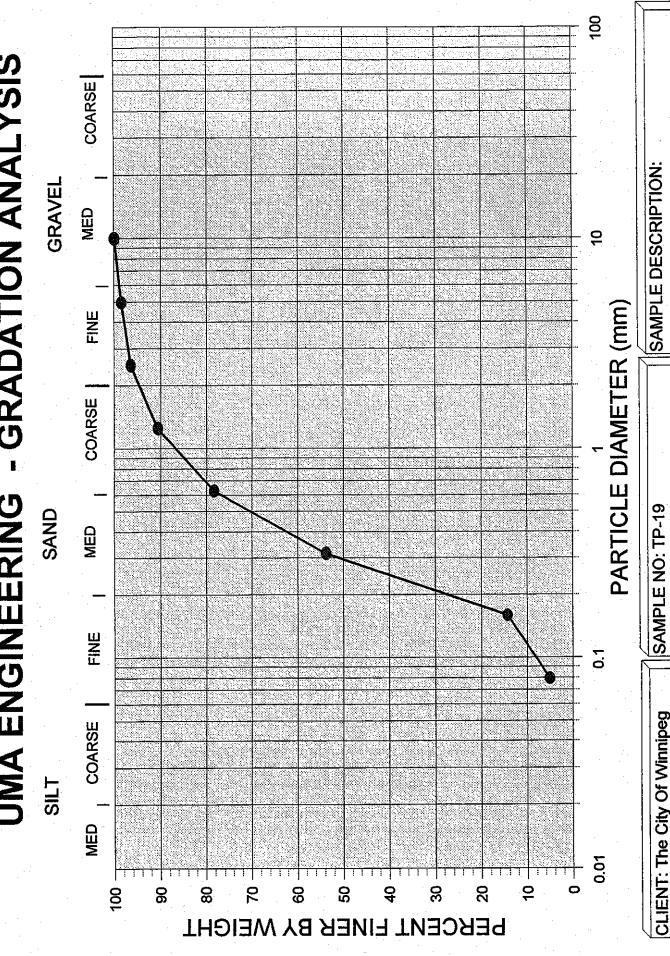
SAMPLE DESCRIPTION:

PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg JOB No.: 0265-323-01-01

DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC SAMPLE NO: TP-17

Gravel (0%), Sand (94.7%) Silt and Clay (5.3%)



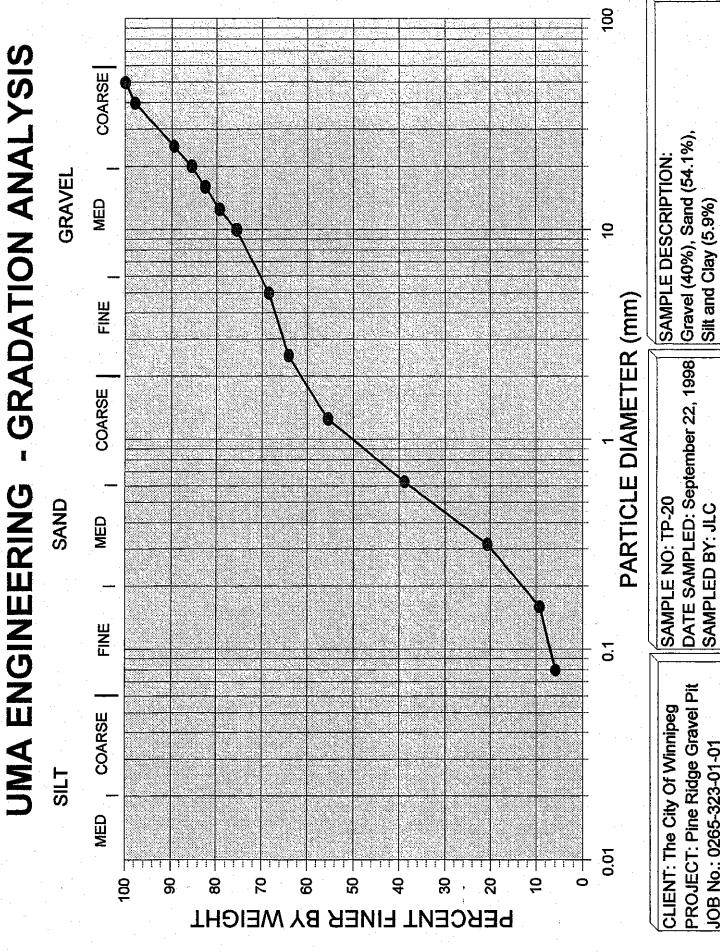


DATE SAMPLED: September 22, 1998 SAMPLED BY: JLC

PROJECT: Pine Ridge Gravel Pit

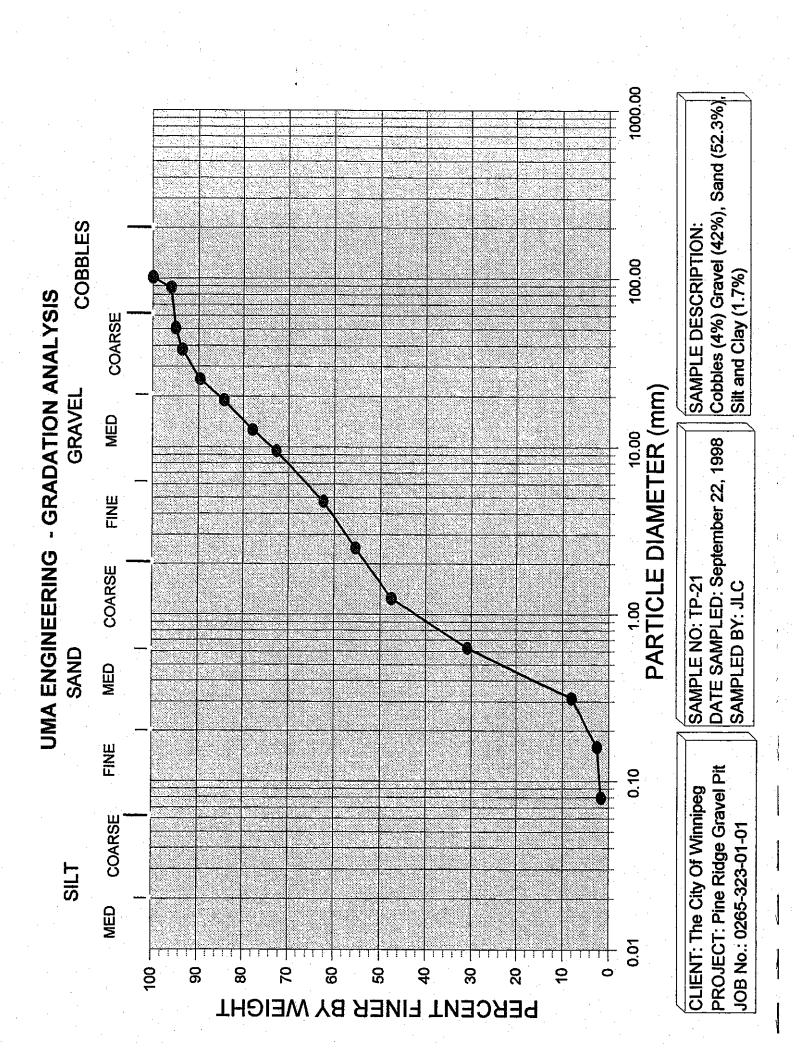
JOB No.: 0265-323-01-01

Gravel (4%), Sand (90.9%), Silt and Clay (5.1%)

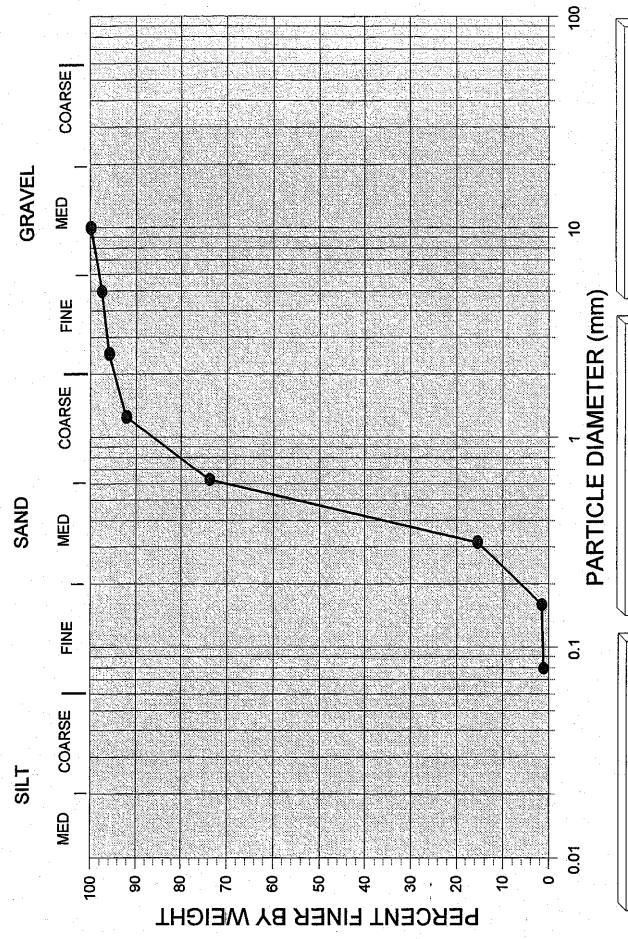


Silt and Clay (5.9%)

JOB No.: 0265-323-01-01



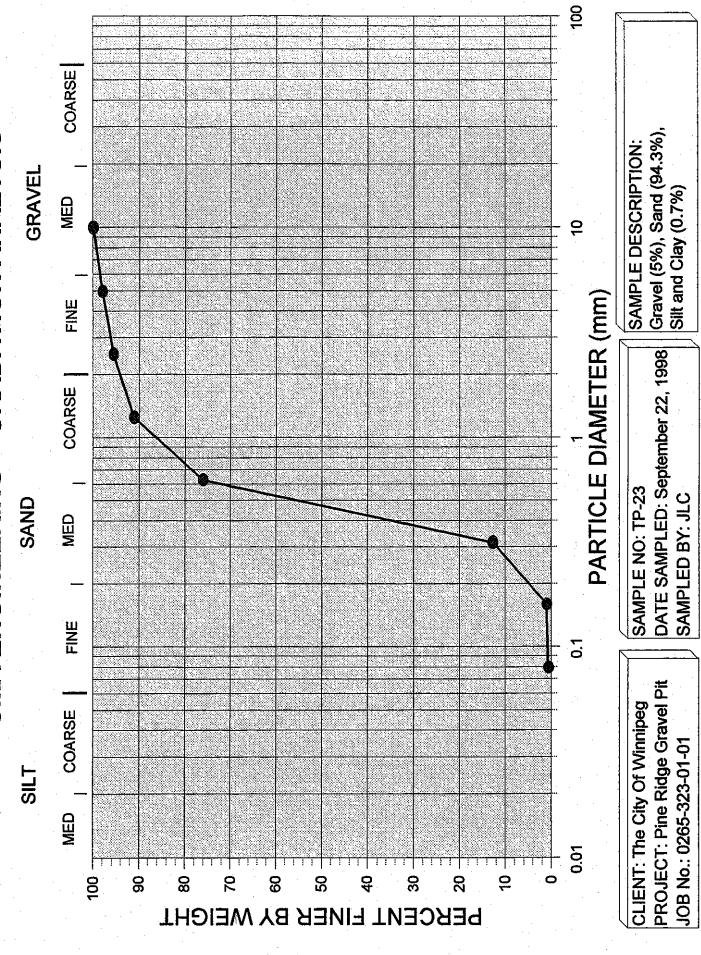
COARSE UMA ENGINEERING - GRADATION ANALYSIS GRAVEL MED COARSE SAND MED FINE COARSE SILT MED

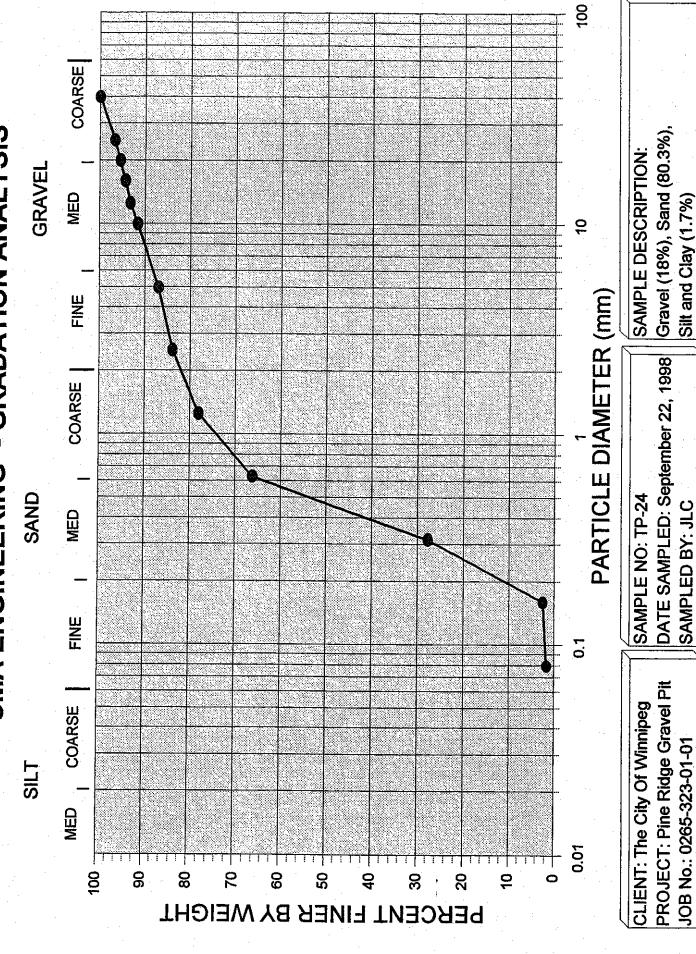


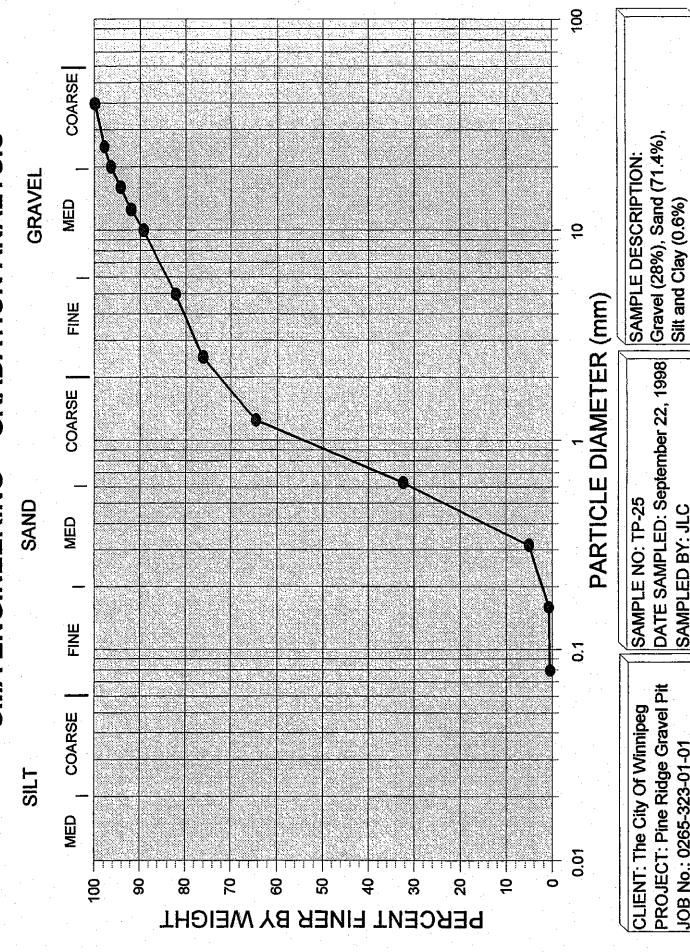
SAMPLE DESCRIPTION: Gravel (6%), Sand (93%), Silt and Clay (1%)

DATE SAMPLED: September 22, 1998 SAMPLE NO: TP-22 SAMPLED BY: JLC

PROJECT: Pine Ridge Gravel Pit CLIENT: The City Of Winnipeg JOB No.: 0265-323-01-01

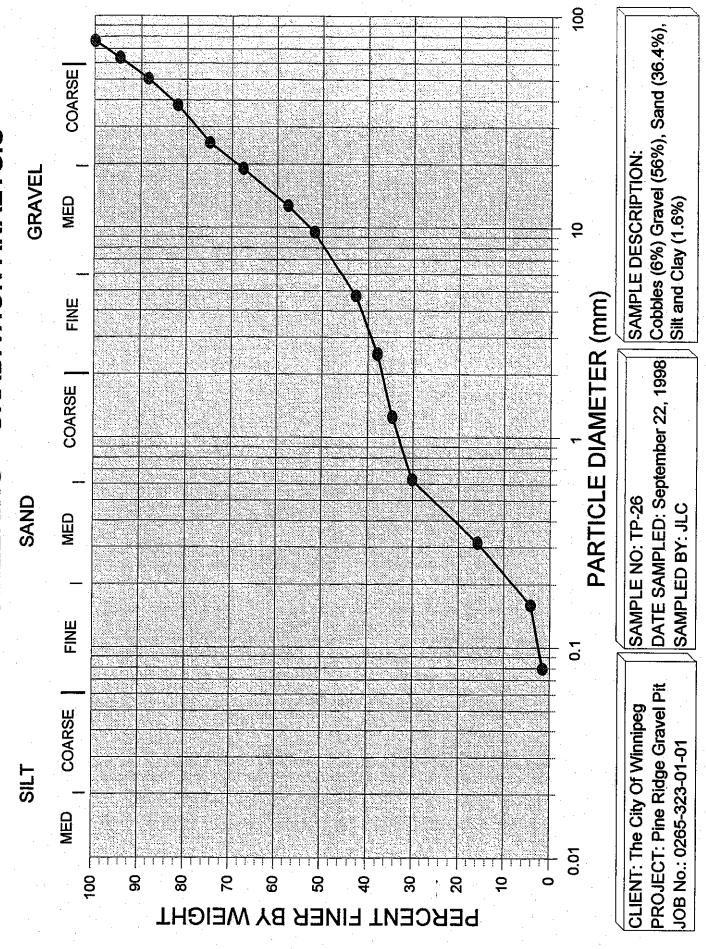


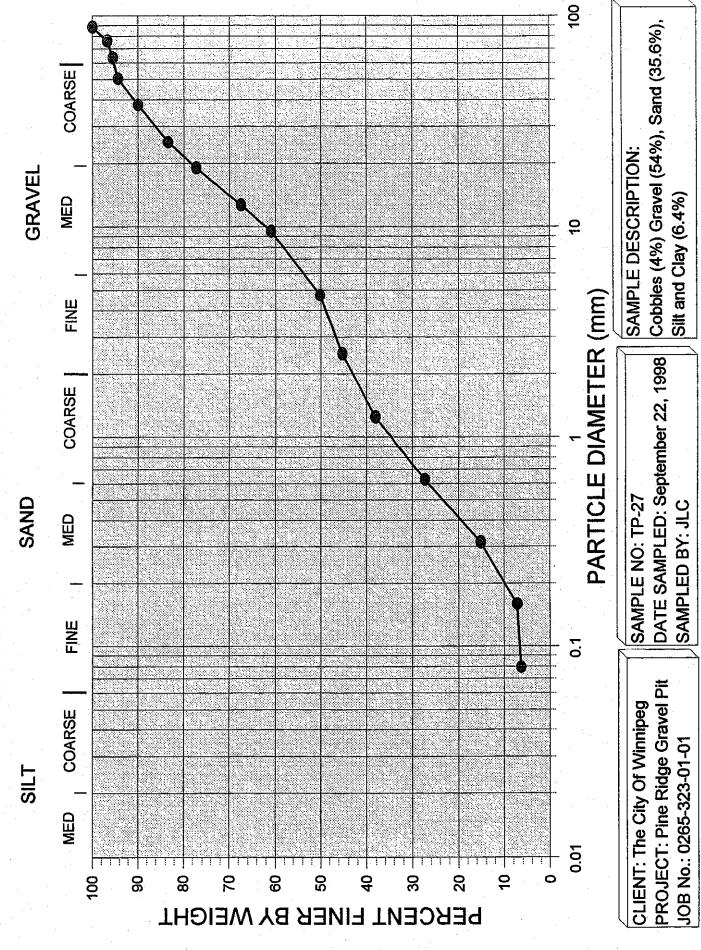


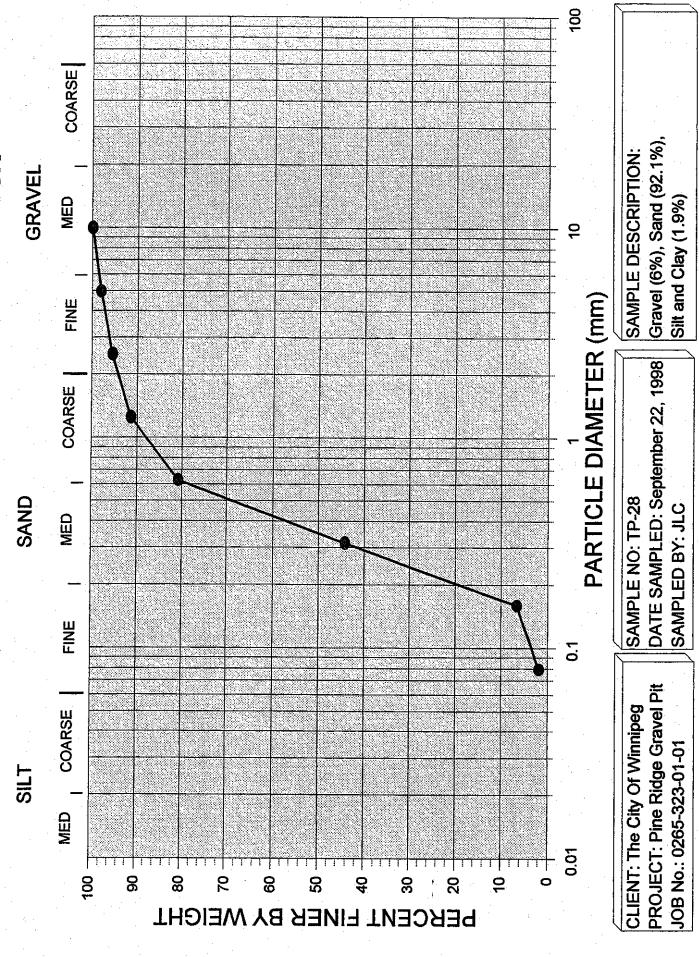


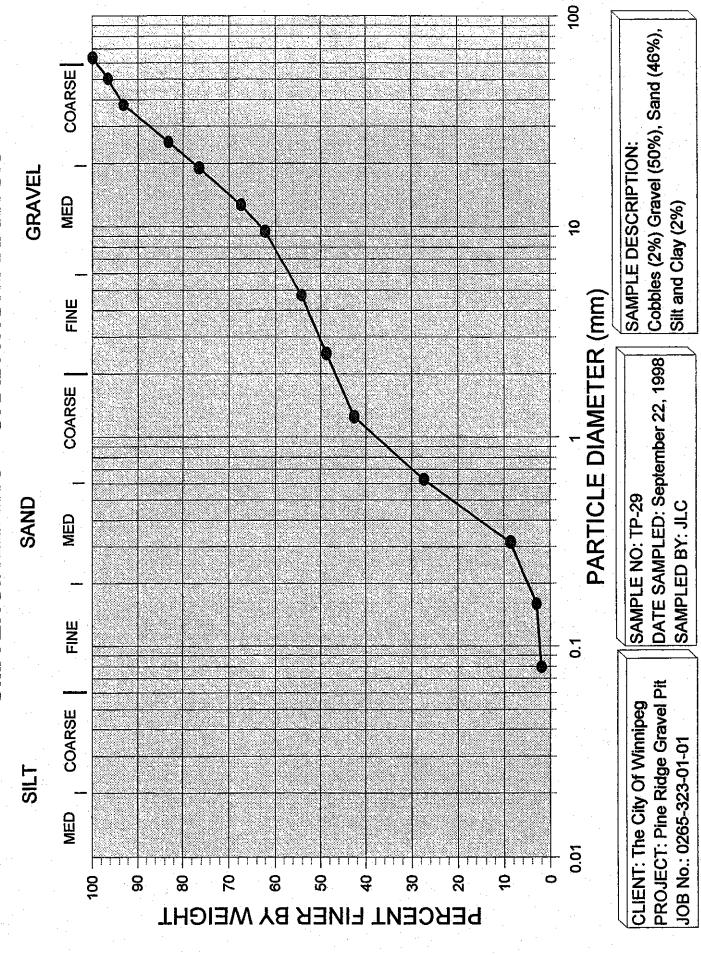
SAMPLED BY: JLC

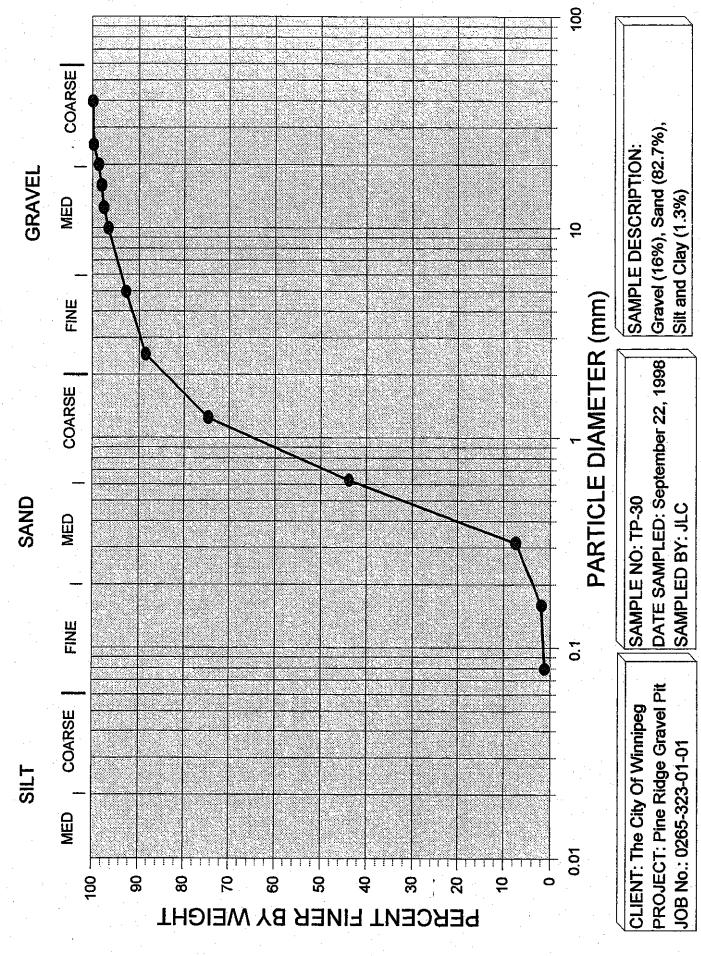
JOB No.: 0265-323-01-01











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Appendix C 2005/6 Test Pit/Test Hole Logs

			e Ridge Pit Aggregate Asse	ssment	CLIENT: Ci	y of Winnipeg		Ti	STF	PIT NO: TP-05-01	
			ntre of Pit B			- <u>, ,</u>		PI	ROJE	ECT NO.: 0265-381-0	0-02
			Borland Construction		METHOD: :	330B CAT				TION (m):	
SAMF	PLE T	YPE	GRAB	SHELBY TUBE	SPLIT SPO	ON BULK	∠N	RE	COVE	RY TCORE	
DEPTH (m)	OSO	SOIL SYMBOL			SCRIPTION			SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
	SA		SAND - clean, well graded, 4% - moist, wet with depth - trace (1-2%) gravel below 2.4		0.9-2.3 cm, frozen t	o 0.9 m			G1	Grain Size Analysis	2 -
-3 			End of holo at 4.3 m						G2		4
-5 -5			End of hole at 4.3 m								5-
			UMA AECOM			LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek	A.P.			ETION DEPTH: 4.27 m ETION DATE: 12/19/05	
			•			PROJECT ENGINEER: Steve	Niecek 🕆	1		Page	1 of

LOCATION: Southwest Corner of PRI B PROJECT NO. 0285-33-1-0		 Ridge Pit Aggregate Ass	sessment	CLIENT: C	ity of Winnipeg	Т	ESTF	PIT NO: TP-05-02	
SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON SULK NO RECOVERY COMMENTS SOIL DESCRIPTION									0-02
SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION LUGGED BY: Darryl Schmindt COMPLETION DEPTH: 2.44 m			MOUEL BY TUBE		330B CAT				
- Vary wet SRSA End of hole at 2.4 m - water seepsage and sloughing at 1.6 to 2.1 m LOGGED BY: Darryt Schmidt COMPLETION DEPTH: 2.44 m		Jord							DEPTH (m)
LOGGED BY: Darryl Schmidt COMPLETION DEPTH: 2.44 m	-1 GRSA	- very wet		ntent decreases wi					1- 2- 3- 5-
		UMA AECOM	I		REVIEWED BY: Steve Wiecek	CC		ETION DATE: 12/20/05	1 of '

PROJE	ECT:	Pine	Ridge Pit Aggregate Ass	sessment	CLIENT: City of	Winnipeg		TES	STPIT NO: TP-05	-03	
			ntre of Pit B					PR(DJECT NO.: 026	5-381-00-02	2
			Borland Construction		METHOD: 330E	CAT			VATION (m):		
SAMPI	LE T	YPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	NO F	RECO	OVERY CO	RE ,	
DEPTH (m)	osn	SOIL SYMBOL			SCRIPTION			SAMPLE TYPE	SAMPLE#	NTS E	DEPTH (m)
-3	GRSA		graded, moist	size 2.5 cm (1-2%), particle size		5-10% of 2.5-10.2 cm material), v	well		G4 Grain Size Analy	ysis	3-
6.1			 		1100	GED BY: Darryl Schmidt		2014	 IPLETION DEPTH:		6
			UMA AECOM	1		IEWED BY: Darryl Schmidt			IPLETION DEPTH: IPLETION DATE: 1		_
			MARY THE COLO	•		DJECT ENGINEER: Steve Wi		J J 11		Page 1 o	γĒ '

	e Ridge Pit Aggregate Asse	ssment	CLIENT: City of \	Vinnipeg	Т	EST	PIT NO: TP-05-04	
	rth-Central End of Pit B	···		· · · · · · · · · · · · · · · · · · ·	P	ROJI	ECT NO.: 0265-381-0	0-02
	Borland Construction		METHOD: 330B				ATION (m):	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	☑NO RE	COVE	RY CORE	-
DEPTH (m) USC SOIL SYMBOL		SOIL DES	SCRIPTION		SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
9 SA 3	- trace gravel (12%) - 2% gravel sizes >10 cm, sand End of hole at 4.3 m					G6	Grain Size Analysis	3
6.1	1		Logo	ED BY: D'arryl Schmidt	cc	MPLE	ETION DEPTH: 4.27 m	6
	UMA AECOM			WED BY: Steve Wiecek			ETION DATE: 12/20/05	
	l			ECT ENGINEER: Steve Wi				1 of

			Ridge Pit Aggregate Ass	essment	CLIENT: City	of Winnipeg		TE	STP	PIT NO: TP-05-05	
			th-Central End of Pit B					1		ECT NO.: 0265-381-0	0-02
			Borland Construction		METHOD: 33					TION (m):	
SAMP	LE T	/PE	GRAB	SHELBY TUBE	SPLIT SPOOM	BULK	∠N	RE	COVE	RY CORE	
DEPTH (m)	OSC	SOIL SYMBOL			SCRIPTION			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
-0 	SA		End of hole at 2.4 m due to side	oughing of very wet material	grained, maximum si	re 2 mm, moist to wet with dep	oth		G8		3 3 5
-6 6.1					117	OGGED BY: Darryl Schmid			MPI	ETION DEPTH: 2,44 m	
			UMA AECOM			EVIEWED BY: Steve Wiece				TION DATE: 12/20/05	
			1			ROJECT ENGINEER: Steve				Page	1 of

	Ridge Pit Aggregate Ass	essment	CLIENT: City of Winnipeg		TEST	PIT NO: TP-05-06	
LOCATION: No		 	<u> </u>			ECT NO.: 0265-381-0	0-02
CONTRACTOR: SAMPLE TYPE	Borland Construction GRAB	SHELBY TUBE	METHOD: 330B CAT SPLIT SPOON ■BULK	 ☑NO F		ATION (m): ERY TORE	
DEPTH (m) USC SOIL SYMBOL	- GNAB		SCRIPTION BOLK		SAMPLE TYPE SAMPLE #		DEPTH (m)
O SA	SAND - very clean, 1-2% < 0.0		timum size 2 mm, moist with depth		G9		
5							
<u>0.1 </u>	UMA AECOM		LOGGED BY: Darryl S REVIEWED BY: Steve PROJECT ENGINEER	e Wiecek C		ETION DEPTH: 3.05 m ETION DATE: 12/20/05 Page	

			Ridge Pit Aggregate Assessment	CLIENT:	City of Winnipeg		TI	ESTP	PIT NO: TP-05-07	
<u> </u>			st of Centre of Pit A				+		ECT NO.: 0265-381-0	0-02
			Borland Construction): 330B CAT				TION (m):	
SAMP	LE I	YPE	GRAB [[] SHELBY	TUBE SPLIT S	POON BULK	∠NC	RE	COVE	RY TORE	1
DEPTH (m)	nsc	SOILSYMBOL		L DESCRIPTI	NC		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0 - - -	OL SA		TOPSOIL - clay, with organics, black, trace roots SAND - clean, 0.425 - 2 mm sizes, moist to wet w	ith depth						
-	GR	4 4	GRAVEL - maximum size 0.6 m				1			
-	Oi.		SAND - fine to coarse grained, trace gravel, clean				+			
- - - - -								G10	Grain Size Analysis	1-
F										
-2		.: ::								2-
-	SA									
F										
-										,
-3										3-
-										
-										
-										
-4	•		End of hole at 4.0 m due to sloughing							4
-										
-] :
<u>.</u>										-
										:
<u> </u>										:
-5										5-
<u>}</u>										-
<u> </u>										:
										-
										-
5 - 5 - 5 6 - 1										-
6.1					LOGGED BY BY	• 11				6-
;			UMA AECOM		LOGGED BY: Darryl Sch REVIEWED BY: Steve W	ımıdt /iecek			ETION DEPTH: 3.96 m ETION DATE: 12/20/05	
			Virte Canada		PROJECT ENGINEER:					1 of 1

			Ridge Pit Aggregate Assessment	CLIENT: C	ty of Winnipeg				IT NO: TP-05-08	
_			st of Centre of Pit A	I					CT NO.: 0265-381-00)-02
SAMP			Borland Construction GRAB GRAB SHELBY TUBE	METHOD:	330B CAT ON ⊟BULK				TION (m): RY TORE	
SAIVIE	LE 1	165	GRAD III SAELDT TUBE	Martii aro	ON BULK	∑ IAC	T RE	JOVE	RT LEICORE	I
DEPTH (m)	nsc	SOIL SYMBOL	SOIL DES	CRIPTIO	N		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
_ 0 - -		•	TOPSOIL - trace rootlets, black, moist SAND - gravelly, maximum size 15 cm, gap graded							
-	GRSA	. 4 . ′	SAND - gravelly, maximum size 15 cm, gap graded SAND - clean, maximum size 2 mm, moist			······	-			- -
1	SA		CAND - Gean, maamum size 2 mm, most							1-
- -2 - - -			End of hole at 2.7 m due to sloughing							2-
-3 3 			End of note at 2.7 in due to stoughing							3-
-4	,									4
- 5 - 5 										5
			III.		LOGGED BY: D'arryl Schm				TION DEPTH: 2,74 m	
			UMA AECOM		REVIEWED BY: Steve Wie		CO	MPLE	ETION DATE: 12/20/05	1 of 1

LOG OF TEST PIT PINE RIDGE PIT.GPJ UMA.GDT 3/21/06

	OR: YPE TORWAS TIOS	rtheast of Pit B Borland Construction GRAB SAND - gravelly, maximum size 1.3		METHOD: 330B CAT ⊠SPLIT SPOON E	∃ BUŁK ⊠ NC	EL	EVA COVE	CT NO.: 0265-381-00 TION (m): RY TORE COMMENTS	D-02
SAMPLE TY (E) HLddd O GRSA 1 1 2 SA	PE ROIL SYMBOL T	GRAB	SOIL DES	SPLIT SPOON	BUŁK NC	REC	COVE	RY ① CORE	PTH (m)
O GRSA	SOIL SYMBOL		SOIL DES	·	BULK ⊠NC				PTH (m)
0 GRSA		SAND - gravelly, maximum size 1.		SCRIPTION		SAMPLE TYPE	SAMPLE#	COMMENTS	PTH (m)
- GRSA	4	SAND - gravelly, maximum size 1.	3-1.9 cm (2-3%)						DEI
		SAND - clean, welf graded, maximi	um size 2 mm, 2-3% <0.0	75 mm, moist					1-
		End of hole at 3.4 m							3-
-4									4 -
-5 -5 5 		UMA AECOM		LOGGED B REVIEWED	Y: Darryl Schmidt BY: Steve Wiecek			TION DEPTH: 3.35 m TION DATE: 12/20/05	6-

			e Ridge Pit Aggregate Assessment	CLIENT: Cit	y of Winnipeg		TE	STP	IT NO: TP-05-10		
	CONTRACTOR: Borland Construction METHOD: 330B CAT							PROJECT NO.: 0265-381-00-02			
-				METHOD: 3					TION (m):		
SAMP	LE T	YPE	GRAB SHELBY TUBE	SPLIT SPO	ON BULK	✓NO	RE	COVE	RY CORE		
DEPTH (m)	nsc	SOIL SYMBOL	SOIL DES	CRIPTION	I		SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)	
- 0			SAND - trace gravel, maximum size 5 cm (2-3%)							-	
- - -	SA									-	
-	SA		SAND - well graded, maximum size 2 mm, fairly clean							-	
			CAND	15 475 50					•		
—1 - - - -	SAND - gravelly, maximum size 10-15 cm (1-3%), gap graded from 4.75 - 50 mm, fairly clean, 2-4% <0.075 mm								ia.	1-	
-		• 1]	
-	l	∢ *									
- -2		*						G11	Grain Size Analysis	2	
_		∢. ⁴.								-	
-	GRSA	• •								1	
-		< `									
-		4 4]	
-		€*									
		.4									
-3 -		• •								3	
-		. 1								-	
-	'	· . •]	
-		4								-	
_			End of hole at 3.7 m						I	-	
-										1	
-4 -										4	
-											
-											
-	Ì									-	
										- 1	
-										=	
-5										5	
-							-			1	
·										\pm	
-]	
.										1	
-										+	
6.1									į	6-	
<u> </u>	LOGGED BY: Darryl Schmidt					co	MPLE	TION DEPTH: 3.66 m	$\neg \neg$		
	UMA AECOM REVIEWED BY: Steve Wie								TION DATE: 12/20/05		
			*	l F	PROJECT ENGINEER: Steve \	Wiecek			Page	1 of 1	

	e Ridge Pit Aggregate Ass	sessment	CLIENT: City of	Winnipeg		TEST	PIT NO: TP-05-11	
	FION: West Edge of Pit B						ECT NO.: 0265-381-0	0-02
	: Borland Construction	The state of the s	METHOD: 330E			ELEV	ATION (m):	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	☑NO F	RECOV	ERY CORE	
DEPTH (m) USC SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE SAMPLE#	COMMENTS	DEPTH (m)
-2 GRSA		% passing 150-200 mm, 95% p		material		G12	2 Grain Size Analysis	3-
6.1			1100	CED DV. Dår-4 0-5		LOMB!	ETION DEDTIL 4.05	6
	LOGGED BY: Dârryl Schmidt COMPLETION DEPTH: 4.27 m UMA AECOM REVIEWED BY: Steve Wiecek COMPLETION DATE: 12/20/05							
	CELTECT (CELLES)			JECT ENGINEER: Steve V		, UIVIT" L		1 of '

			Ridge Pit Aggregate Ass	essment	CLIENT: City	of Winnipeg		TE	STP	PIT NO: TP-05-12	
_		ON: East of South End of Pit A ACTOR: Borland Construction METHOD: 330B CAT								CT NO.: 0265-381-0	0-02
-					METHOD: 33					TION (m):	
SAMP	LET	YPE	GRAB	SHELBY TUBE	SPLIT SPOO	N BOLI	K No	RE	COVE	RY TORE	
DEPTH (m)	nsc	SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY - some gravel, maximur								
- - -			SAND - fairly clean, 2-3% <0.0	075 mm, well graded, maximu	ım size 2 mm, moist t	o wet					
- - -1 -											1-
-									G13		
_ 2 	SA										2-
-											
3 											3-
-			End of hole at 3.7 m								
- 4 -											4-
- - - -											
- - 5 -	:										5-
-5 5 											
- - - 6.1											6
			UMA AECOM		Ē	OGGED BY: Da EVIEWED BY: \ ROJECT ENGIN				ETION DEPTH: 3.66 m ETION DATE: 12/20/05 Page	1 of 1

	e Ridge Pit Aggregate Ass		CLIENT: City	of Winnipeg	T	EST	PIT NO: TP-05-13	
	outh-Eastern Edge of Pit A			ECT NO.: 0265-381-0	0-02			
	: Borland Construction	·····	METHOD: 33				ATION (m):	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPOOM	I BOLK	✓ NO RE	COVE	RY CORE	
DEPTH (m) USC SOIL SYMBOL			SCRIPTION		SAMPI F TYPE	SAMPLE #	COMMENTS	DEPTH (m)
GRSA	material, frozen to 1.0 m - moist GRAVEL - coarser with depth		5-10% of 10-15 cm n	of 10-20 cm material, 2-3% of 20-30 naterial, 5-10% of 5-10 cm material			Grain Size Analysis	3 3 6 6
	*			OGGED BY: Darryl Schmidt	C	MPL	ETION DEPTH: 4.57 m	
	UMA AECOM		R	EVIEWED BY: Steve Wiecek	CC		ETION DATE: 12/20/05	
	1		Pi	ROJECT ENGINEER: Steve Wied	cek		Page	1 of

	Pine Ridge Pit Aggregate Asse	ssment	CLIENT: City of Winnipeg			TPIT NO: TP-05-14	
	South-Eastern Edge of Pit A OR: Borland Construction					JECT NO.: 0265-381-0	00-02
SAMPLE TYP		SHELBY TUBE	METHOD: 330B CAT SPLIT SPOON ■BULK			/ATION (m): /ERY CORE	
USC			SCRIPTION		SAMPLE TYPE		
1 SA GR	SAND - some gravel, clean, may wet with depth GRAVEL - some sand, clean, with the same sand, clean, clean, with the same sand, clean, clea		2-4% of 5-10 cm material, 2-4% of 1.9-5 cm material,	moist to		5 Grain Size Analysis	
	UMA AECOM		LOGGED BY: Darryl Schmidt			ETION DEPTH: 4.27 m	
	WITH MECON		REVIEWED BY: Steve Wiecek PROJECT ENGINEER: Steve V	Miecek	JUIVIPI	LETION DATE: 12/20/05 Page	4 -

			Ridge Pit Aggregate As	sessment	CLIENT: 0	City of Winnipeg	Т	EST	PIT NO: TP-05-15	
			rth End of Pit A						ECT NO.: 0265-381-0	00-02
SAMP			Borland Construction GRAB	SHELBY TUBE		330B CAT			ATION (m):	
SAIVIE	LEI	IFE	GRAB	TTI SHEFRI TORE	SPLIT SP	DON BRITK]NO RE	COVE	ERY CORE	
DEPTH (m)	OSC	SOIL SYMBOL			SCRIPTIC		SAMPI F TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0		.4.4	GRAVEL - coarse grained, 5 5% of 5 cm material	% of 30 cm material, 3% of 25	cm material, 10-1	5% of 15 cm material, 5% of 10 cm material	al,			
-1	GR			h depth, maximum size 15 cm (1-2%) , 10% of 3.8	-10 cm material		G17	Grain Size Analysis	2
3	SA		SAND - gravelly, 35% gravel,	well graded						3
1										4
5			End of hole at 4.3 m							5
5.1						LOGGED BY: Darryl Schmidt	CC	MDL	TION DEPTH: 4.37	6
			UMA AECOM	I		REVIEWED BY: Steve Wiecek	CC		ETION DEPTH: 4.27 m ETION DATE: 12/20/05	
			PROJECT ENGINEER: Steve Wiecek							1 of

			e Ridge Pit Aggregate As		CLIENT: (ity of Winnipeg		TI	ESTF	PIT NO: TP-05-16	
			rth-Eastern Edge of Pit A	· · · · · · · · · · · · · · · · · · ·			·	P	ROJE	ECT NO.: 0265-381-0	0-02
			: Borland Construction		METHOD:	330B CAT				ATION (m):	
SAMP	LET	YPE	GRAB	SHELBY TUBE	SPLIT SP	OON BULK	N	O RE	COVE	RY CORE	1
DEPTH (m)	OSC	SOIL SYMBOL			SCRIPTIO	N		SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0		.44	GRAVEL - sandy, maximum	size 30 to 36 cm (1-2%)							
	GRSA	4 . *. 4 . *.	CAND AND COAVEL well	waadad 4 50/ -0.075 40	4504						
		*	SAND AND GRAVEL - well o	graded, 1-5% <0.075 mm, 10-	15% granite, maxin	um size 20 cm, fines dec	reasing with depth				
-1		1 ·	•								1
											'
		* * *							G18	Grain Size Analysis	
-2		•									2
	GRSA	4' `\ ∵ 4									
Ì	01100		- maximum size 5 cm below 2	2.4 m							
		. 4	- maximum size 5 cm below 2								
		. 1									
3		4									3
									G19		
		· •									
		4 ;									
İ		4									
4		: .	End of hole at 4.0 m					1			4-
										:	
	Ì										
5											5
ĝ. 1											6-
			UMA AECOM	[LOGGED BY: Darryl REVIEWED BY: Stev	Schmidt re Wiecek			TION DEPTH: 3.96 m TION DATE: 12/20/05	
			4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			PROJECT ENGINEER		+			1 of 1

	JECT: Pine Ridge Pit Aggregate Assessment CLIENT: City of Winnipeg							TE	STP	PIT NO: TP-05-17	
	ATION: East of North Fine Sand Hole							PF	ROJE	ECT NO.: 0265-381-0	0-02
			Borland Construction		METHOD: 330B	CAT				TION (m):	
SAMP	LE T	YPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	⊠NO	RE	COVE	RY ① CORE	· ·
DEPTH (m)	OSN	SOIL SYMBOL			SCRIPTION			SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0		4 4	GRAVEL - well graded 10-20	% granite, maximum size 20 cr	m (1-2%), 4-5% of 15 cm	material, frozen to 46 cm					
- - - - - - - 1 -			- wet with depth								1-
_ _ -		* *	- no 20 cm sizes, less 15 cm :	sizes clean with denth					G20		
-2 -	GR	* *	- 110 20 GH 31263, 1003 10 GH 3	nzes, dean war depar							2-
1 .			- increase in sand content from	n 2.4 to 2.6							
- -3 -		* * * * *							G21		3-
-		* * *									
- 4 -											4 -
- - -			End of hole at 4.3 m								
											5-
- - -	:										
- - - - - - - - -											6-
0.1			3		LOG	GED BY: Darryl Schmidt		CC	MPLI	ETION DEPTH: 4.27 m	<u> </u>
	UMA AECOM REVIEWED BY: Steve Wiecek						COMPLETION DATE: 12/21/05				
l					PRO.	JECT ENGINEER: Steve	Wiecek 1	l		Page	1 of 1

		ne Ridge Pit Aggregate Asse	essment	CLIENT: C	ity of Winnipeg		TE	STP	PIT NO: TP-05-18	
·		entre of Pit A							ECT NO.: 0265-381-0	0-02
		R: Borland Construction		METHOD:	330B CAT	F 71			ATION (m):	
SAMPLE	TYPE	GRAB	SHELBY TUBE	SPLIT SPC	ON BULK	NC	rec T	COVE	RY CORE	Τ
DEPTH (m)	SOIL SYMBOL			SCRIPTIO			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
- GF		- wet with depth	6 granite, 2-5% of 15 cm mate	erial, 1% of 61 cm	diameter boulders, frozen to 1.0 m			G22	Grain Size Analysis	1 - 2 - 3 - 4 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6
V- I		1			LOGGED BY: Darryl Schmidt		co	MPLE	ETION DEPTH: 3.66 m	I
		UMA AECOM			REVIEWED BY: Steve Wiecek				TION DATE: 12/21/05	
		Ŧ			PROJECT ENGINEER: Steve \	Viecek 🕛	ì		Page	1 of 1

		e Ridge Pit Aggregate Ass	essment	CLIENT: C	ity of Winnipeg		Ti	ESTF	PIT NO: TP-05-19	
	TION: West of Centre of Pit A FRACTOR: Borland Construction METHOD: 330B CAT						PI	ROJE	ECT NO.: 0265-381-0	0-02
				METHOD:	330B CAT				ATION (m):	
SAMPLE T	TYPE	GRAB	SHELBY TUBE	SPLIT SPC	ON BULK	∠ N(RE	COVE	RY CORE	
DEPTH (m)	SOIL SYMBOL		SOIL DES	SCRIPTIO	N		SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
-0 CL		SAND - well graded, fine grain - moist End of hole at 2.7 m due to slo	ied, frozen to 1.0 m, loose					G23	Grain Size Analysis	3.
-6.1										6-
		-			LOGGED BY: Darryl Sc	hmidt	CO	MPLE	ETION DEPTH: 2.74 m	
		UMA AECOM			REVIEWED BY: Steve		co	MPLE	T!ON DATE: 12/21/05	
					PROJECT ENGINEER:	Steve Wiecek			Page	1 of

			e Ridge Pit Aggregate Ass	essment	CLIENT: C	ty of Winnipeg		TI	STP	PIT NO: TP-05-20	
		TION: West of Centre of Pit A RACTOR: Borland Construction METHOD: 330B CAT								ECT NO.: 0265-381-0	0-02
				Marie DV Tube	METHOD:	330B CAT				TION (m):	
SAMP	<u>1</u>	TPE	GRAB	SHELBY TUBE	SPLIT SPC	ON BUL	< ∠N	O RE	COVE	RY TCORE	-i
DEPTH (m)	OSC	SOIL SYMBOL		SOIL DE	SCRIPTIO	N		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0	OL		TOPSOIL AND CLAY - sandy,	some rootlets, black							
			SAND - well graded, wet, loos	9							
-1	SA		- trace gravel layer, maximum	size 10 cm diameter				-			1
2			- boulders (1-2%)								2
3			End of hole at 2.4 m due to sio	ughing							3
4								,			4
5											5
3.1											6
J. I	J					LOGGED BY: Dar	ryl Schmidt	co	<u> </u>	ETION DEPTH: 2.44 m	
			UMA AECOM			REVIEWED BY: S	teve Wiecek			TION DATE: 12/21/05	
			, 1			PROJECT ENGINE	ER: Steve Wiecek	1		Page	1 of

			Ridge Pit Aggregate Assessment	CLIENT: C	City of Winnipeg		TE	STP	IT NO: TP-05-21	
	OCATION: West of Centre of Pit A ONTRACTOR: Borland Construction								ECT NO.: 0265-381-0	0-02
$\overline{}$					330B CAT				TION (m):	
SAMP	LE T	YPE	GRAB SHELBY TUBE	SPLIT SP	OON BULK	⊠NO	RE(COVE	RY CORE	
DЕРТН (m)	OSN	SOIL SYMBOL	SOIL DES	CRIPTIO	PN		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
	CL		SAND - well graded, moist, loose - small cobble layer 7.5 cm thick, 15 cm sizes End of hole at 3.4 m							3
			1		LOGGED BY: Darryl Schmid		COI	MPLE	TION DEPTH: 3.35 m	
			UMA AECOM		REVIEWED BY: Steve Wiec PROJECT ENGINEER: Steve	ek			TION DATE: 12/21/05	1 of 1

			Ridge Pit Aggregate Ass		CLIENT: City of V	Vinnipeg		TE	STP	IT NO: TP-05-22	
			th Edge of South Fine Sa	ind Hole						CT NO.: 0265-381-0	0-02
			Borland Construction	Maria presenta	METHOD: 330B					TION (m):	
SAMPLE	<u> </u>	PE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	NO	REC	OVE	RY TCORE	1
DEPTH (m)	nsc	SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
-1 -2	SA		SAND - trace clay, trace grave	el, frozen to 1.0 m					G24		1-
-3			End of hole at 2.4 m - seepage at 1.2 m					A.S., T. C. C. C. C. C. C. C. C. C. C. C. C. C.			3-
-4											4 -
-5 -6.1											5-
0.1			*		LOGG	ED BY: Darryl Schmidt		COV	IPLE	TION DEPTH: 2,44 m	
			UMA AECOM		REVIE	WED BY: Steve Wiecek				TION DATE: 12/21/05	
					PROJ	ECT ENGINEER: Steve W				Page	1 of '

			Ridge Pit Aggregate Ass		CLIENT: City	of Winnipeg		TE	STF	PIT NO: TP-05-23	
			thwestern Edge of South	Fine Sand Hole				_		ECT NO.: 0265-381-0	0-02
			Borland Construction		METHOD: 3					ATION (m):	
SAMP	LE TY	/PE	GRAB	SHELBY TUBE	SPLIT SPOC	N BULK	∠NC	RE	COVE	RY CORE	1
DEPTH (m)	OSO	SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
	SA		SAND - trace clay, frozen to 1	.0 m, wet, loose					G25		1
-2	СН		CLAY - trace silt inclusions, da	irk grey, high plasticity, moist, f	firm						2
-3			End of hole at 3.7 m - seepage at 1.8 m			,					3
-4											4
-5 -66.1								and the same of th			5
0.1			 1		L	OGGED BY: Darryl Schmidt		co	MPL	ETION DEPTH: 3.66 m	
			UMA AECOM		F	EVIEWED BY: Steve Wiecel				ETION DATE: 12/21/05	
					F	ROJECT ENGINEER: Steve	Wiecek ·			Page	1 of

			Ridge Pit Aggregate Ass		CLIENT: Ci	ty of Winnipe	g	Т	ESTP	PIT NO: TP-05-24	
			rthwestern Edge of South	Fine Sand Hole						ECT NO.: 0265-381-00	0-02
			Borland Construction		METHOD:					TION (m):	
SAMP	LET	YPE	GRAB	SHELBY TUBE	SPLIT SPO	ои 🗏	BULK	NO RE	COVE	RY CORE	
DEPTH (m)	OSC	SOIL SYMBOL		SOIL DES	SCRIPTIOI	N		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0	SA		SAND - trace gravel, poorly g	raded, frozen							
			SAND - clean to very clean w	ith depth, frozen to 1.0							
·1			- dry								1-
2	SA								G26		2
3											3
			End of hole at 3.4 m								
4											4
5											5
·6 6.1											6-
							Darryl Schmidt			ETION DEPTH: 3.35 m	
			UMA AECOM				BY: 'Steve Wiecek NGINEER: Steve Wi		JMPL	ETION DATE: 12/21/05 Page	1 of 1

	Pine Ridge Pit Aggregate As	sessment	CLIENT: City of Winnipeg		TI	ESTF	PIT NO: TP-05-25	
	East of Site Office						ECT NO.: 0265-381-0	0-02
	OR: Borland Construction	(TT)	METHOD: 330B CAT				TION (m):	
SAMPLE TY	PE GRAB	SHELBY TUBE	SPLIT SPOON BULK	N) RE	COVE	RY CORE	,
DEPTH (m) USC	SOIL SYMBOL	SOIL DES	CRIPTION		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
O CL.	CLAY - some gravel, trace s SAND - clean, moist to wet w	and, black/brown, low plasticity, f	rozen					
-1						G27		1
2 SA								
3								
4	End of hole at 4.0 m							4
5								ŧ
5.1	3		LOGGED BY: Darryl Schr	nidt	CO	MPI F	ETION DEPTH: 3.96 m	6
	UMA AECON	1	REVIEWED BY: Steve Wi				TION DATE: 12/21/05	
	<u> </u>		PROJECT ENGINEER: S				Page	1 of

LOCATION: North of Site Office CONTRACTOR: Borland Construction SAMPLE TYPE GRAB GRAB SOIL DESCRIPTION OL OL TOPSOIL AND CLAY - trace sand, some rooflets, black SAND - gravelly, poorly graded, maximum size 15 cm (2%)		ECOVE	ECT NO.: 0265-381-00 ATION (m): ERY CORE COMMENTS	0-02 DEPTH (m)
SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON BULK SOIL DESCRIPTION OL SAND - gravelly, poorly graded, maximum size 15 cm (2%) SAND - gravelly, poorly graded, maximum size 15 cm (2%)	☑NO RE	COVE	RY TCORE	DEPTH (m)
SOIL DESCRIPTION TOPSOIL AND CLAY - trace sand, some rootlets, black OL SAND - gravelly, poorly graded, maximum size 15 cm (2%)				DEPTH (m)
SAND - gravelly, poorly graded, maximum size 15 cm (2%)				
End of hole at 3.7 m		G28	Grain Size Analysis	3 3 5
6.1				6
LOGGED BY: Darryl			ETION DEPTH: 3.66 m	
UMA AECOM REVIEWED BY: Ster			ETION DATE: 12/21/05	

***************************************	e Ridge Pit Aggregate Asse	ssment	CLIENT: Ci	ty of Winn	ipeg		TE	ESTF	PIT NO: TP-05-27	
	st of North Fine Sand Hole								ECT NO.: 0265-381-0	00-02
	Borland Construction		METHOD:						ATION (m):	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPO	ON E	BULK	N	RE	COVE	RY CORE	
DEPTH (m) USC SOIL SYMBOL			SCRIPTION	N			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0 4.4	SAND - gravelly, maximum size	2.5 cm, frozen to 0.3 m								
-1 GRSA	- dry to moist with depth									1
2								G29	Grain Size Analysis	2
3 GR	GRAVEL - sandy, poorly graded	l, minimum size 0.25 mm, max	ximum size 15 cm	(3-5%)						3
4	End of hole at 4.6 m									4
5										5
3.1	·									6
· · · · · · · · · · · · · · · · · · ·					Y: Darryl Schmid				TION DEPTH: 4.57 m	
	UMA AECOM				BY: Steve Wiece Steve Steve Steve		CO	MPLĒ	TION DATE: 12/21/05	1 of

			Ridge Pit Aggregate Asse		CLIENT: City	of Winnipeg	-1	T	ESTF	PIT NO: TH-06-28	
			est of Centre of Pit A - Besid	le TP-05-19				Р	ROJE	ECT NO.: 0265-381-0	0-02
			Paddock Drilling Ltd.		METHOD: Br	at - 125 mm Solid Ster				ATION (m):	
SAMP	LE T	YPE	GRAB	SHELBY TUBE	SPLIT SPOO	I BULK	∠N	O RE	COVE	RY CORE	
DEPTH (m)	nsc	SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE	SAMPLE #	COMMENTS	
	GR	.4 . 4	GRAVEL - some cobbles, maxin	num size 50 mm, frozen	44			+			
			SAND - fine grained, moist, loos	se .				1			
	SA										
			 trace gravel, maximum size 20 trace clay to 5.8 m 	mm							
			CLAY - silty, low to medium plas	ticity, brown/grey, moist to w	/et, soft			+	<u> </u>		
	CI										
			- 4,								
İ			End of hole at 7.6 m								
	į										
İ											
		Ì									
ļ											
								l			
									İ		
									.		
		Ì									
			LINAN ATCOM			GGED BY: Darryl Schm				TION DEPTH: 32.00 m	
			uma Aecom			EVIEWED BY: Steve Wis		100	MIPLE	ETION DATE: 1/11/06 Page	1

PROJEC.	T: Pin	e Ridge Pit Aggregate Assessment	ty of Winnipeg		Т	EST	PIT NO: TH-06-29		
OCATIO	N: Bo	ottom of Pit A				PROJECT NO.: 0265-381-00-02			
CONTRA	CTOR	: Paddock Drilling Ltd.	METHOD:	Brat - 125 mm	Solid Stem Auger	E	LEVA	ATION (m):	
SAMPLE	TYPE	GRAB SHELBY TUBE	SPLIT SPO	ON 🗏 BL	JLK	☑NO RE	COVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DES	CRIPTION	N		SAMPI E TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0 GRS	SA	GRAVEL - sandy			,				
1 2 3 4 GF 6 7		GRAVEL - some sand, sand content increases with depth, well - rough drilling, estimated 7.6 to 10 cm diameter cobbles, dry	graded, maximi	im size 20 mm					1 · 2 · 3 · 4 · 5 · 6 · 7 · 7 ·
_		3 ,							
7	•	SAND - some gravel, maximum size 7.6 cm							7
		SAND - Some graver, maximum size 7.6 cm							8-
8 SA		SAND - trace gravel, maximum size 1.0 cm							9-
10		STATE THOSE STATES, INCAMINATION (SEC. 1.0 ON)							10 -
12									12 -
112 113 114 SA 115 116 117 118 119 120 120 120 130 1									
ı									13
14									14
SA		- wet, fines decreasing below 14.3 m							15 16
15		trans armial astimated 7.0.40 and discrete addition							15
45		- trace gravel, estimated 7.6-10 cm diameter cobbles							
16									16
17									17
									"
18									18
							i		
19									19
20	<u>.</u>								
				LOGGED BY: [ETION DEPTH: 15.24 m)
		UMA AECOM		REVIEWED BY:			OMPL	ETION DATE: 1/11/06	1 of 2
				FRUJEUT ENG	INEER: Steve Wiec	ek '		Page	1

	Pit Aggregate Assessment	CLIENT: City of Winnipeg			PIT NO: TH-06-29	
LOCATION: Bottom of F CONTRACTOR: Paddo			PROJECT NO.: 0265-381-00-02			
SAMPLE TYPE	GRAB SHELBY TUBE	METHOD: Brat - 125 mm Solid Stem Auger SPLIT SPOON ■BULK ✓ N			ATION (m): ERY CORE	
DEPTH (m) USC SOIL SYMBOL		ESCRIPTION	SAMPLE TYPE		COMMENTS	DEPTH (m)
25 26 27 28 SA 29 - grey 30 - grey	very clean, fine grained					27 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
0	UMA AECOM	LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek PROJECT ENGINEER: Steve Wiecek			ETION DEPTH: 15.24 m ETION DATE: 1/11/06 Page	

-			Ridge Pit Aggregate Ass	sessment	CLIENT: City	of Winnipeg		TE	STP	PIT NO: TH-06-30	
<u> </u>			tween Pit A and Pit B					PF	ROJE	ECT NO.: 0265-381-0	0-02
			Paddock Drilling Ltd.			at - 125 mm Solid Stem A				TION (m):	
SAMP	LE T	YPE	GRAB	SHELBY TUBE	SPLIT SPOON	BULK	∠NO	RE	COVE	RY CORE	
DЕРТН (m)	OSN	SOIL SYMBOL		SOIL DES	SCRIPTION			SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0	GRSA	4.4	SAND - gravelly, maximum s	ize 1.9 cm, frozen to 0.76 cm	·.···						=
3	GROA	4	~- dry								
<u></u> '			SAND - bedding sand, very fi	ne grained, dry, loose							171
2	0.4										2 -
	SA										- 7
3											3 =
		4 4	SAND - gravelly, less than 5%	6 gravel, dry							
4		4 . ⁴.						l			4-
		4 .									
5	İ	•									5
6		* *									1 3
		• •									6-1
7		.4									7-
		٠. '									'
8	GRSA										8-3
		* ``								!	
9		4 :									9-3
		٠. ;									
- 10		1									10 📲
		•									1
-11		1									11 =
12	İ										12 -
-		///	CLAY - sandy, wet, very soft						İ		"]
13	SACL										13 -
14			CLAY - trace till inclusions, m	edium plasticity, dark gray, moi	ist, very soft			İ			14-
-15	CI								İ		
15			F-1-61-1-1450			*					15 -
			End of hole at 15.2 m								16
-16											16 -
-17											17 =
"											1/ =
18											18-
											'
-19											19 -
20					١n	GGED BY: Darryl Schmidt		CO	MPI F	TION DEPTH: 15.24 m	4
			UMA AECOM			VIEWED BY: Steve Wiecel				TION DATE: 1/11/06	
			*		PR	OJECT ENGINEER: Steve					1 nf 1

			Ridge Pit Aggregate Assess	sment	CLIENT: C	ity of Winnipeg		TI	ESTF	PIT NO: TH-06-31	
			rth End of Pit A					 		ECT NO.: 0265-381-0	00-02
			Paddock Drilling Ltd.			Brat - 125 mm Solid Stem				ATION (m):	
SAMP	'LE 	YPE	GRAB	SHELBY TUBE	SPLIT SP	OON BULK	∠NC	RE	COVE	ERY CORE	
DEPTH (m)	nsc	SOIL SYMBOL		SOIL DES	SCRIPTIO	N		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
O	GRSA	.4 .	SAND AND GRAVEL - frozen								
1 2 3 	:	. 1	GRAVEL - well graded, very coan - moist	se grained, maximum size 3	3.8 cm, difficult di	illing, frozen to 0.76 m			i		1
2	GR	* · ·									2.
3											3 -
4		4	SAND - very fine grained, dry, loo	QA							4-
	SA		GRAVEL - some cobbles (5-7.6 ca		ed			-			
5		•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	······································						ļ	5-
6	GR	4									6-
7											7-
= -8		√ *	SAND - trace gravel, maximum siz	ze 0.9 cm, very fine grained	, dry						
= !											8-
- 9											9-
10											10 -
-11	SA										11-
											12 -
-13	•										13-
-14											14 -
-15	-		End of hole at 15.2 m								15 -
-16			- seepage at 14.6 m								16 -
-17											17-
											''-
-18											18 -
-19											19-
20						LOGGED BY: Darred Calanda			1 AD: 1	ETION DEPTH, 45.04	
			UMA AECOM			LOGGED BY: Darryl Schmid REVIEWED BY: Steve Wiece				ETION DEPTH: 15.24 m ETION DATE: 1/11/06	ı
			1			PROJECT ENGINEER: Stev					1 of 1

			Ridge Pit Aggregate As	ssessment	CLIENT: C	ty of Winnipeg	Т	ESTF	PIT NO: TH-06-32	
			est of Pit A						ECT NO.: 0265-381-0	0-02
			Paddock Drilling Ltd.	MOUSE DV TUDE		Brat - 125 mm Solid Stem Auger			ATION (m):	
SAMF	'LE I	YPE	GRAB	SHELBY TUBE	SPLIT SPC	ON BULK	NO RE	T	RY CORE	Т
DEPTH (m)	OSC	SOIL SYMBOL		SOIL DES	SCRIPTIO	V	SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0		4 . 4	SAND - with gravel, mostly	1.3-2.0 cm sizes, very coarse gr	ained, frozen to 0.	3 m				
եսվուստիուստիուստիուստիուստիուստուհուստուստուհուստուստուհուստուհուստուհուստուհուստուհուստուհուստուհուստուհուստու	GRSA									1- 2- 3-
E-4		4. `. 4								4-
5 1 1 1 1 1 1 1 1	SA		SAND - coarse grained, no	cobbles, damp, loose						5-
6										6-
E 7			SAND - some gravel (10-15	%)						7-
E ′			- some cobbles/boulders, di	ficult drilling, increasing gravel o	ontent with depth			ĺ		'
E-8										8
Ē.										
- 9 										10-
11	SA									11-
13										12 -
E 13										13 -
14										14-
E 15										
E 10		1	End of hole at 15.2 m due to	auger refusal on boulders			\dashv			15
15 15 16 17 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19										16 -
17										17-
18										18 - 19 -
19										19-
20					···············	LOCCED DV: D	-	N 4m.	ETION PERTIL 15 01	
			UMA AECO!	VI	ŀ	LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek			ETION DEPTH: 15.24 m ETION DATE: 1/11/06	<u> </u>
						PROJECT ENGINEER: Steve Wied				1 of 1

			Ridge Pit Aggregate As		CLIENT: C	ity of Winnip	eg	Т	EST	PIT NO: TH-06-33	
	CATION: East of North Fine Sand Hole							P	ROJ	ECT NO.: 0265-381-0	0-02
					METHOD:	Brat - 125 m	nm Solid Stem Auge	er E	LEV	ATION (m):	
SAMPL	LE T	YPE	GRAB	SHELBY TUBE	SPLIT SPO	DON =	BULK	☑NO RE	COVI	ERY CORE	
DEPTH (m)	OSU	SOIL SYMBOL		SOIL DES	SCRIPTIO	N		SAMPI F TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GC	Y / Y	GRAVEL AND CLAY (Fill)						<u> </u>		
1	SA		SAND - no gravel, very fine	grained, dry, loose				į			
											;
		· · ·	GRAVEL AND SAND - coars	se grained, coarser with depth							
		∢ ∢.		•							
G	GRSA	4									
		•									
		4	GRAVEL - sandy, some cob	bles (maximum size 7.6 cm), ver	y difficult drilling						,
ĺ		٠. ^٢ .									
		• • •									
		4 · · ·									
		4 ·									
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G	GRSA	₹. ₹.									'
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		1.1									
		4.									1
		•									1 1
		•						İ			'
	ļ	•									1
	}		End of hole at 15.2 m								
											1
											,
											1
											1,
									ĺ		
											1:
	1		ı				: Darryl Schmidt	co	MPL	ETION DEPTH: 15.24 m	l
2			UMA AECON	1			BY: Steve Wiecek		OMPL	ETION DATE: 1/11/06	
			ŧ			PROJECT E	NGINEER: Steve Wie	ecek		Page	1 of

	IECT: Pine Ridge Pit Aggregate Assessment CLIENT: City of Winnipeg ITION: North End of Pit A							PIT NO: TH-06-34	
		VOTOD MALE TO THE TOTAL						ECT NO.: 0265-381-0	0-02
SAMF): Canterra Drill Rig - Mud Rotary			ATION (m):	
SAIVIF	7LE 1	YME	GRAB SHELBY TUB	E SPLIT S	POON BULK	NO RE	COVE	RY CORE	
DEPTH (m)	OSO	SOIL SYMBOL	SOIL	DESCRIPTIO	ON	SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
0	GRS/	4	SAND AND GRAVEL - frozen						
0 -1 -2	GR	4	GRAVEL - well graded, very coarse grained, maximur - moist	n size 3.8 cm, difficult	drilling, frozen to 0.76 m				1
		4. *	- Moise						'
-2	GR								2
2		₹'' 							
-3		1 1							3
-4			SAND - very fine grained, dry, loose					i	4
	SA	· · ·	GRAVEL - some cobbles (5-7.6 cm sizes), very coarse	e grained			G30	Grain Size Analysis	
5		. <	,	9.1					5
-6	GR	. 1							6
-3 -4 -5 -6	31	٠٠,							"
7		• 1							7
		•	SAND - trace gravel, maximum size 0.9 cm, very fine g	grained, dry					
8				,					8
9									9
							G31		
10									10
11									11
	SA								''
12 13									12
13									
۱۵									13
14							G32		14
ĺ									
15		<u>.</u>	SAND - gravelly, maximum size 1.9 cm						15
6			graces, maximum ones no on						16
		. 1							10
7									17
10	GRSA								
10							G33		18 -
19	ŀ						- 70		19 -
15 16 17 18 18].								
.v	!	<u>· ·I</u>			LOGGED BY: Darryl Schmidt	co	MPLE	ETION DEPTH: 60.66 m	
			UMA AECOM		REVIEWED BY: Steve Wiecek	CO		TION DATE: 2/1/06	
			·		PROJECT ENGINEER: Steve Wiece	k 🖖		Page	1 of 4

	Ridge Pit Aggregate Assessn	nent	CLIENT: City of Winnipeg		TESTPIT NO: TH-06-34 PROJECT NO.: 0265-381-00-0				
LOCATION: No	rth End of Pit A Maple Leaf Enterprises Ltd.		T	-		-			0-02
SAMPLE TYPE		SHELBY TUBE	METHOD: ☐ SPLIT SPC	Canterra Drill Rig - Mud Rotar DON ⊟BULK	Y NO			ATION (m): ERY CORE	
DEPTH (m) USC SOIL SYMBOL		SOIL DES			<u> </u>	SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
20	- trace silt till GRAVEL (Till) - silty - hole open - very easy drilling, loose SAND AND GRAVEL						G34		21 22 23 24 25 26 27 28 29 30 31 32
34 GT 35 GT 36 SA 39 GM 40	GRAVEL (Till) - silty, white cemetacion	ous material, hard, hole s	staying open				G36		34 35 36
38 SA 39 GM	SAND - easy drilling for 0.6 m SILT (Till) - trace to some gravel								38 39
··· 174 PM	UMA AECOM			LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek				TION DEPTH: 60.66 m TION DATE: 2/1/06	
				PROJECT ENGINEER: Steve W	ecek			Page	2 of

	e Ridge Pit Aggregate	Assessment	CLIENT: City of Winnipeg	T	ESTF	PIT NO: TH-06-34	
LOCATION: No	·····			Р	ROJE	ECT NO.: 0265-381-00	0-02
·-···	: Maple Leaf Enterpris		METHOD: Canterra Drill Rig - Mud Rotary			ATION (m):	
SAMPLE TYPE	GRAB	SHELBY TUBE	SPLIT SPOON BULK	NO RE	COVE	RY CORE	V
DEPTH (m) USC SOIL SYMBOL		SOIL DES	SCRIPTION	SAMPLE TYPE	SAMPLE#	COMMENTS	DEOTU (m)
40 41 42 43 44 45 46 47 48 49 60 60 60 7	- denser below 47.5 m				G37		4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
			LOGOED DV Pt 10 LV				
	UMA AECO	M	LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek			ETION DEPTH: 60.66 m ETION DATE: 2/1/06	
			PROJECT ENGINEER: Steve Wiecek			Page 3	· ·

	PROJECT: Pine Ridge Pit Aggregate Assessment CLIENT: City of Winnipeg									IT NO: TH-06-34	
	LOCATION: North End of Pit A							PF	ROJE	CT NO.: 0265-381-00)-02
			Maple Leaf Enterprises Ltd.			Canterra Drill Rig - Mud I				TION (m):	
SAMP	LET	YPE	GRAB	SHELBY TUBE	SPLIT SPO	ON BULK	NO	RE	COVE	RY CORE	
DEPTH (m)	OSU	SOIL SYMBOL		SOIL DES	CRIPTION	I		SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
60	GM	11						\vdash			=
Ē	BE		BEDROCK - limestone End of hole at 60.7 m					-			
60 61 62 63 64 65			and or note at contain								61
Ė											1
<u>-</u> 62											62
Ē											
E 03			•								63
Ë ça											
2 4											64-
E 65											C =
E **											65
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66											
-67											67
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-76											75 - 76 - 1
<u>-</u> 77											77
-78									.		78 - 1
79									İ		79 =
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80					·	LOCCED BY: D'10-1-	ોતા		MDL	TION DEDTIL: 00.00	<u>=</u>
			UMA AECOM		H	LOGGED BY: Darryl Schm REVIEWED BY: Steve Wie	iiul ecek			ETION DEPTH: 60.66 m ETION DATE: 2/1/06	
			COPPLY TO THE CONTROL			PROJECT ENGINEER: St			.v. LL		4 of 4

PROJECT: Pine		- 	ment	CLIENT: Ci	y of Winnipeg			PIT NO: TH-06-35	
	ATION: West of Pit A Near Hydro Lines TRACTOR: Maple Leaf Enterprises Ltd. METHOD: Canterra Drill Rig - Mud Rotary							ECT NO.: 0265-381-00	0-02
SAMPLE TYPE	IVIADIE LEAT EN		SHELBY TUBE	METHOD: (SPLIT SPO		NO RE		TION (m): RY CORE	
DEPTH (m) USC SOIL SYMBOL	<u> </u>			SCRIPTION		SAMPLE TYPE		COMMENTS	DEPTH (m)
GR GR GR GR GR GR GR GR GR GR GR GR GR G	CLAY - trace grav	el, black trace gravel, fine	ay, topsoil, roots, black e grained, easy drilling	sand			G 39	Grain Size Analysis	1- 2- 3- 4- 5- 6-
12 9 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- no cobbles						G40		9
114 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	- increase in till co		and, difficult drilling			_	G42		16 - 17 - 18 -
- 44 1 1	ÚMA	AECOM			LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek PROJECT ENGINEER: Steve W	C		ETION DEPTH: 36.58 m ETION DATE: 2/2/06 Page	1 of 2

			Ridge Pit Aggregate Ass		CLIENT: C	ity of Winnipeg		EST	PIT NO: TH-06-35	
	TION: West of Pit A Near Hydro Lines RACTOR: Maple Leaf Enterprises Ltd. METHOD: Canterra Drill Rig - Mud Rotary								ECT NO.: 0265-381-00	0-02
SAMPLE			Maple Leaf Enterprises GRAB	Ltd. SHELBY TUBE	<u>METHOD:</u>		NO RE		ATION (m): ERY TORE	
DEPTH (m)		SOIL SYMBOL	GIVE		SCRIPTIO		SAMPI F TVDE		COMMENTS	DEPTH (m)
20 -21 -22 -23 -24 -25 -GI	* · · · · · · · · · · · · · · · · · · ·		- 30-40% granite					G43		2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2° 2
26 27 28 29	* * * * *		- gravel size 0.6-0.9 cm					G44		26 27 28 29
31 32 33	4	*	GRAVEL - trace till, finer part - trace cementacious material	icles with depth, hole staying op	pen			G45		3
GF 34 85	*	. ▼.								3:
4 5 6 7 8 9	4		End of hole at 36.6 m					G46		3 3
9						LOCOED BY: No-10 to 11			ETION DEDTIL 60 50	3
			UMA AECOM	I		LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek			ETION DEPTH: 36.58 m ETION DATE: 2/2/06	
			Service Character	•		PROJECT ENGINEER: Steve Wie		L	Page	2 0

COCATION: Northwest of FRA Noter Hydro Lines PROJECT NO. 0265-38:	1-06-36	PIT NO: TI	ESTF	Ţ	CLIENT: City of Winnipeg	Ridge Pit Aggregate Assessment				
SAMPLE TYPE GRAB GRAB SOIL DESCRIPTION SOIL DESCRIPTION GRAVEL - sandy, some cobbiles GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling CAP GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling CAP GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling CAP GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling	0265-381-00-0	ECT NO.:	ROJ	Р	1070					
SOIL DESCRIPTION SAND-some gravel, trace day SILT AND CLAY- dark black GRAVEL - sandy, some cobbles GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling										
SAND-some gravel, trace day SAND-some gravel, trace day SILT AND CLAY - dark black GRAVEL - sandy, some cobbles GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling	JCORE	RY 📗	:COVE	O RE	SPLIT SPOON BULK	GRAB WSHELBY TUBE	YPE	'LE	SAME	
SILT AND CLAY - dark black GRAVEL - sandy, some cobbles GRAVEL - no fine sand, coerse grained, some boulders, difficult drilling GRAVEL - no fine sand, coerse grained, some boulders, difficult drilling GRAVEL - no fine sand, coerse grained, some boulders, difficult drilling GRAVEL - no fine sand, coerse grained, some boulders, difficult drilling	MENTS	СОМІ	SAMPLE#	SAMPLE TYPE	CRIPTION	SOIL DES	SOIL SYMBOL	OSC	DEPTH (m)	
SILT AND CLAY - dark black GRAVEL - sandy, some cobbles GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling						SAND -some gravel, trace clay		QΔ	0	
GRAVEL - sandy, some cobbles GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling GRAVEL - no fine sand, coarse grained, some boulders, difficult drilling						SILT AND CLAY ded blad	724	ĺ	·1	
GR GAB							жи	SICL	n	
GR						GRAVEL - sandy, some coobles	.⊀ ⊀			
GR G48									}	
GR G48			ĺ			•				
GR G48							4	GRSA	•	
GR GAB	\nalysis	Grain Size A	G47				₹ •			
GR G48							4 . [‡]		,	
GR G48							٠. ^٠ .		i	
GR G48					ult drilling	GRAVEL - no fine sand, coarse grained, some boulders, diffi	4 - ? ∴ 4 -	-		
GR GAB							' }		'	
GR G48										
								ŀ		
							•			
			G48				• •	GR ·		
	'						' })	
							₹ .			
	,						· · ·			
GRSA GR SAND - gravelly, trace cobbles GR GRAVEL - 1.3-1.9 cm sizes, with boulders, 40% granite End of hole at 13.7 m - sloughing below 9.1 m							•			
GRAVEL - 1.3-1.9 cm sizes, with boulders, 40% granite End of hole at 13.7 m - sloughing below 9.1 m						SAND - gravelly, trace cobbles		42GS	l	
End of hole at 13.7 m - sloughing below 9.1 m				$\ \cdot \ $		GRAVEL - 1.3-1.9 cm sizes, with boulders, 40% granite	. 1 (·	
- sloughing below 9.1 m			G49					-	ļ	
	1					- sloughing below 9.1 m	-			
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	1								9	
)	
LOGGED BY: Darryl Schmidt COMPLETION DEPTH: 13.72						LIMA ACCOM				
UMA AECOM REVIEWED BY: Steve Wiecek COMPLETION DATE: 2/2/06 PROJECT ENGINEER: Steve Wiecek Page	2/2/06 Page 1 of	I ION DATE	MPLE	COI		UMA ACCOM				

			e Ridge Pit Aggregate As	sessment	CLIENT:	City of Winnipeg	T	ESTF	PIT NO: TH-06-37	**
		PACTOR: Maple Leaf Enterprises Ltd. METHOD: Canterra Drill Rig - Mud Rotary							ECT NO.: 0265-381-0	0-02
SAME			Maple Leaf Enterprises GRAB	Ltd. SHELBY TUBE	METHOD:	Canterra Drill Rig - Mud Rotary			ATION (m):	
SAIVIE		IFE	GRAB	IIII SUETRA 108E	⊠ SPLII SF	POON BULK	NO RE	COVE	RY TCORE	T
DEPTH (m)	OSC	SOIL SYMBOL		SOIL DES	SCRIPTIC	DN	SAMPI F TYPE	SAMPLE #	COMMENTS	DEPTH (m)
-1 -1 -2 -3 -4 -5 -6	SA	7 · · · · · · · · · · · · · · · · · · ·	SAND - clean, well graded SAND - gravelly, 40% granite					:	1	1
-2		 	orato gravany, 4070 granice	•						2-
-3 -4	GRSA		- trace silt				ļ			3 -
·5		*						G50	Grain Size Analysis	5
6			SAND - trace gravel pockets(10-15 cm in size), trace cobble	s, very easy drillin	ng				6
8										8
9								G51		9-
10 11	SA									10
										12
13			SAND - trace gravel		·			050		13 -
15			O THE Trace graves					G52		14 - 15 -
16										16 -
17 18	SA								į	17-
12 13 14 15 16 16 17 18			- trace siit tiil					G53		18 - 19 -
20			UMA AECOM			LOGGED BY: Darryl Schmidt REVIEWED BY: Steve Wiecek			ETION DEPTH: 22.86 m	
						PROJECT ENGINEER: Steve Wiecek				1 of 2

		Ridge Pit Aggregate Asses	sment	CLIENT: C	ity of Win	ınipeg		TE	STP	PIT NO: TH-06-37	
	CATION: Northeast of Pit A									ECT NO.: 0265-381-0	0-02
		Maple Leaf Enterprises Ltd				Drill Rig - Mud Rota	пу	El	_EVA	TION (m):	
SAMPLE :	TYPE	GRAB	SHELBY TUBE	SPLIT SPC	ON	BULK	NC	RE	COVE	RY TCORE	
DEPTH (m)	SOIL SYMBOL		SOIL DES	CRIPTIO	N			SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
20		- some gravel, some silt till						-			
-21 SA -22 GRS.	→ •	GRAVEL - sandy									21
-22 GRS	A 4										22
-23	-	End of hole at 22.9 m		 , •··•						·	23
-24											24
-25											25
-26											26
-27											27
-28											28
-29											29
-30											30
-31											31
-32											32
-33											33
-34											34
-35											
-36											35 36 37
27											30
-31											
-38											38
-32 -33 -34 -35 -36 -37 -38 -39 40											39
40		3		-	LOGGED	BY: Darryl Schmidt		CO	<u> </u>	 ETION DEPTH: 22.86 m	
		UMA AECOM			REVIEW	ED BY: Steve Wiecek				ETION DATE: 2/6/06	
		ı			PROJEC	T ENGINEER: Steve \	Viecek			Page	2 of

		e Ridge Pit Aggregate Asses	sment	CLIENT: C	city of Winnipeg		_		PIT NO: TH-06-38	
	FION: East of North Fine Sand Hole RACTOR: Maple Leaf Enterprises Ltd. METHOD: Canterra Drill Rig - Mud Rotary								ECT NO.: 0265-381-0	0-02
SAMPLE			SHELBY TUBE			Rotary			TION (m):	
DEPTH (m)	BOL			SCRIPTIO			SAMPLE TYPE		COMMENTS	DEPTH (m)
0 SA -1 SA -2 GRS -3 SA -4 -5 -6 -7 GR	SA .	SAND - clean, fine grained, beach GRAVEL - sandy, 30% granite, in SAND - fine grained GRAVEL - sandy, 30% granite, in - with coarse grained gravel, 2.5	naximum size 1.9 cm, no bo					G54	Grain Size Analysis	1 2 3 3 4 4 5 5 6 7 7 8 8
9 10 _{SA}		SAND GRAVEL - sandy						G55		10
2 3 4 5 GRS	A A	- trace silt till						G56		12 13 14 15
12 13 14 15 GRS 16 17 18 19 10 10 10 10 10 10 10		- gravel/cobble content increases	below 18.5 m					G57		17 18 18
	17 .	UMA AECOM			LOGGED BY: Darryl Sci REVIEWED BY: Steve V	/iecek			ETION DEPTH: 27.43 m ETION DATE: 2/6/06	
		1			PROJECT ENGINEER:	Steve Wiecek 🕛			Page	1 0

			Ridge Pit Aggregate Ass		CLIENT: City of Winnipeg		TESTPIT NO: TH-06-38 PROJECT NO.: 0265-381-00-02				
L			st of North Fine Sand Hole	··							0-02
			Maple Leaf Enterprises				ill Rig - Mud Rotary			TION (m):	
SAMF	'LE I	YPE	GRAB	SHELBY TUBE	SPLIT SP	OON =	BULK	NO RE	COVE	RY CORE	1
DEPTH (m)	DSN	SOIL SYMBOL		SOIL DE	SCRIPTIO	N		SAMPLE TYPE	SAMPLE#	COMMENTS	DEPTH (m)
22 22 22 23 23 24 25 26	GRSA		SAND - gravelly, 1.9 cm sizes	(rounded)					G58		21 - 22 - 23 -
	GR\$A	•	OAND - gravery, 1.3 on alzes	(rounded)					336		
E 24 E	GROA	***	- gravel content decreases bel	low 24.1 m							24
E-25		4 4	GRAVEL - some sand, maxim	um size 6 mm							25
26	GR	₹ .									26
27		* *							i		27
-28			End of hole at 27.4 m								28
-29											29
30											30
31											31
32											32
33											33
-34											34 =
35										;	35
36											36-
37											37
38											1
											38 -
39											39 -
40	Į		ì			LOGGED BY	': Darryl Schmidt	cc	MPLE	ETION DEPTH: 27.43 m	
			UMA AECOM			REVIEWED !	BY: Steve Wiecek	CC		TION DATE: 2/6/06	
			ŧ			I PROJECT EI	NGINEER: Steve Wie	ecek		Page	2 of 2

Appendix D 2005/6 Gradation Curves

UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project:

Pine Ridge Pit 0265-381-02

Job No: Date:

13-Jan-06

Contractor

Sample No.

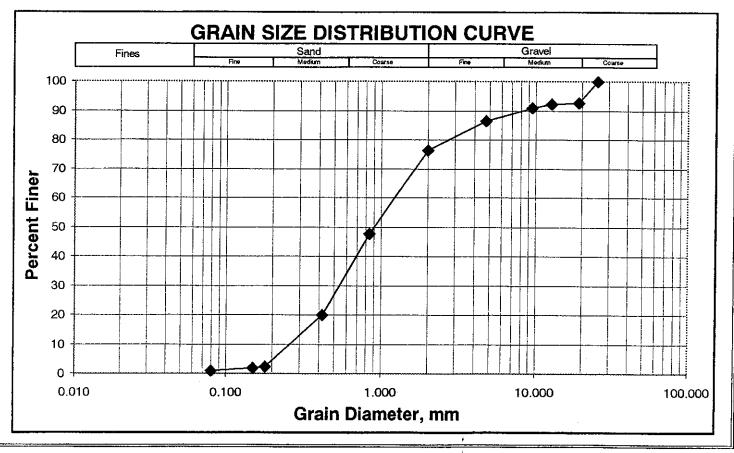
Depth:

SO5-162 12ft.

Sample Description:

TP 1, G2

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152,4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	92.8	
12.7	1/2"	92.4	
9.500	3/8"	91.0	
4.750	No. 4	86.5	
2.000	No. 10	76.4	
0.841	No. 20	47.7	
0.420	No. 40	20.0	
0.180	No. 80	2.4	
0.150	No. 100	1.9	
0.080	No. 200	1.0	



10-Jan-06

Date:

UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Suffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit
Job No: 0265-381-02

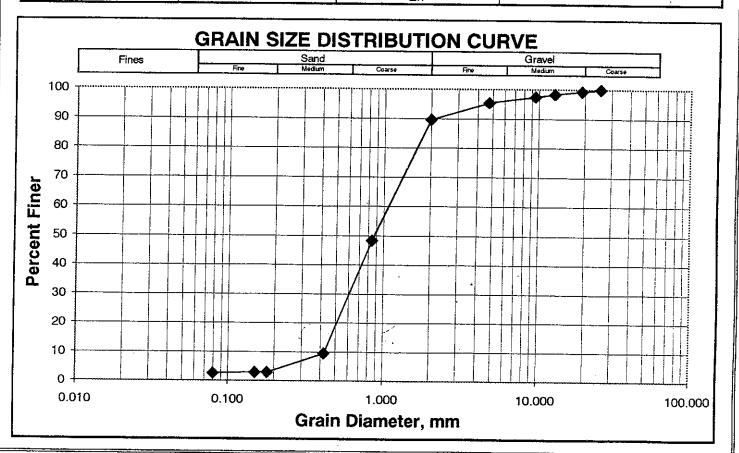
Contractor Sample No. Depth:

SO5-162 5ft.

Sample Description:

TP 2, G3

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		***
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	99.3	
12.7	1/2"	98.4	
9.500	3/8"	97.5	
4.750	No. 4	95.4	
2.000	No. 10	89.7	
0.841	No. 20	48.4	
0.420	No. 40	9.5	
0.180	No. 80	3.0	
0.150	No. 100	2.9	
0.080	No. 200	2.7	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg Project:

Pine Ridge Pit 0265-381-02

16-Jan-06

Job No:

Date:

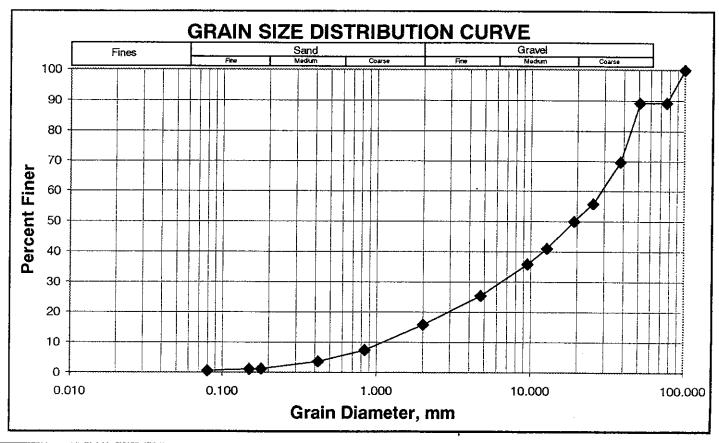
Contractor Sample No. Depth:

SO5-162 10ft.

Sample Description:

TP 3, G5

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6 ¹¹		
127.0	5"		
100.0	4"	100.0	
76.2	3"	89.2	
50.8	2"	89.2	
25.4	1"	55.8	
19.1	3/4"	50.0	
12.7	1/2"	41.0	
9.500	3/8"	35.9	
4.750	No. 4	25.5	
2.000	No. 10	15.9	
0.841	No. 20	7.5	
0.420	No. 40	3.7	
0.180	No. 80	1.3	
0.150	No. 100	1.2	
0.080	No. 200	0.7	



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MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: Job No:

Pine Ridge Pit 0265-381-02

Date:

10-Jan-06

Contractor

Sample No.

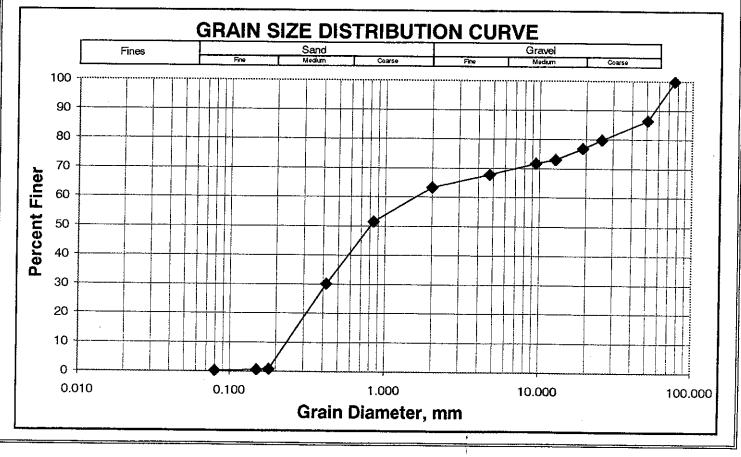
Depth:

SO5-162 13ft.

Sample Description:

TP 4, G7

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"	100.0	
50.8	2"	86.4	
25.4	1"	79.8	
19.1	3/4"	76.8	
12.7	1/2"	73.0	
9.500	3/8"	71.7	
4.750	No. 4	67.8	
2.000	No. 10	63.3	
0.841	No. 20	51.5	
0.420	No. 40	30.2	
0.180	No. 80	0.9	
0.150	No. 100	0.7	
0.080	No. 200	0.3	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: Job No: Pine Ridge Pit

Date:

0265-381-02 10-Jan-06

Contractor

Sample No.

Depth:

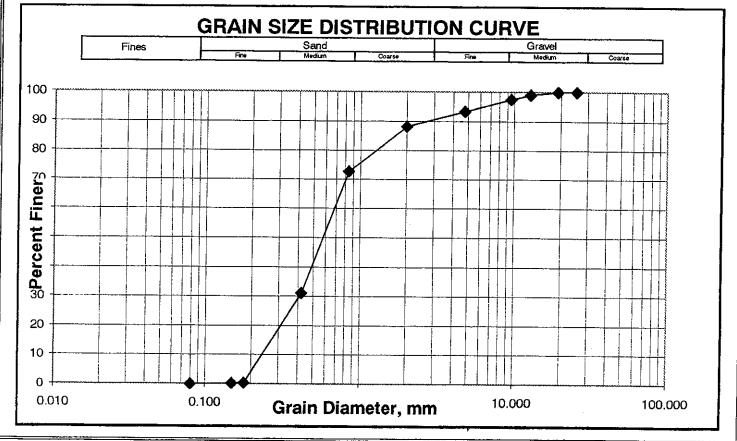
Sample Description:

SO5-162

5ft.

TP 7, G10

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	99.1	
9.500	3/8"	97.5	
4.750	No. 4	93.4	
2.000	No. 10	88.2	
0.841	No. 20	72.7	
0.420	No. 40	31.1	
0.180	No. 80	0.3	
0.150	No. 100	0.2	
0.080	No. 200	0.1	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

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Client:

City Of Winnipeg

Project: Job No: Pine Ridge Pit 0265-381-02

Date:

10-Jan-06

Contractor

Sample No.

Depth:

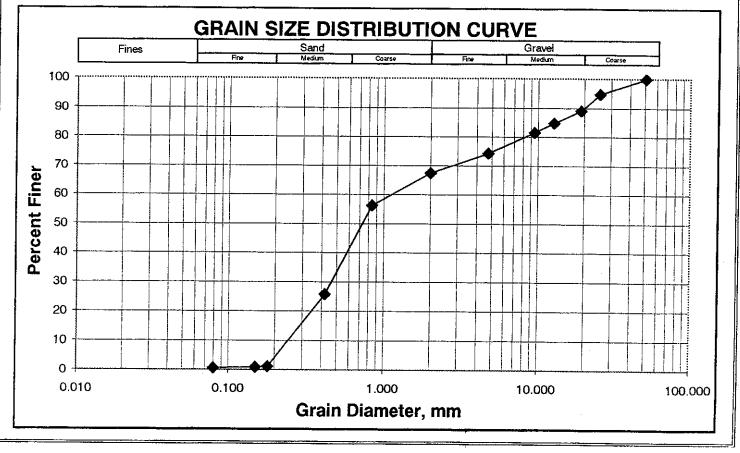
Sample Description:

SO5-162

6ft.

TP 10, G11

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	111	94.8	
19.1	3/4"	89.1	
12.7	1/2"	84.8	
9.500	3/8"	81.6	
4.750	No. 4	74.3	
2.000	No. 10	67.5	
0.841	No. 20	56.3	
0.420	No. 40	25.8	
0.180	No. 80	1.2	
0.150	No. 100	1.0	
0.080	No. 200	0.6	



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MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, M8 R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project:

Pine Ridge Pit 0265-381-02

Job No: Date:

13-Jan-06

Contractor

Sample No.

Depth:

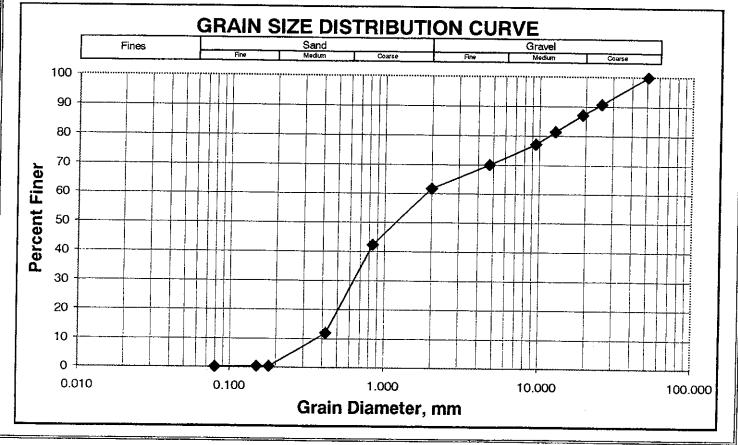
Sample Description:

SO5-162

4ft.

TP 11, G12

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	90.7	
19.1	3/4"	87.1	
12.7	1/2"	81.4	
9.500	3/8"	77.2	
4.750	No. 4	70.1	
2.000	No. 10	61.8	
0.841	No. 20	42.3	
0.420	No. 40	12.0	
0.180	No. 80	0.5	
0.150	No. 100	0.4	
0.080	No. 200	0.2	



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Client:

City Of Winnipeg

Project:

Pine Ridge Pit 0265-381-02

Job No: Date:

13-Jan-06

Contractor

Sample No.

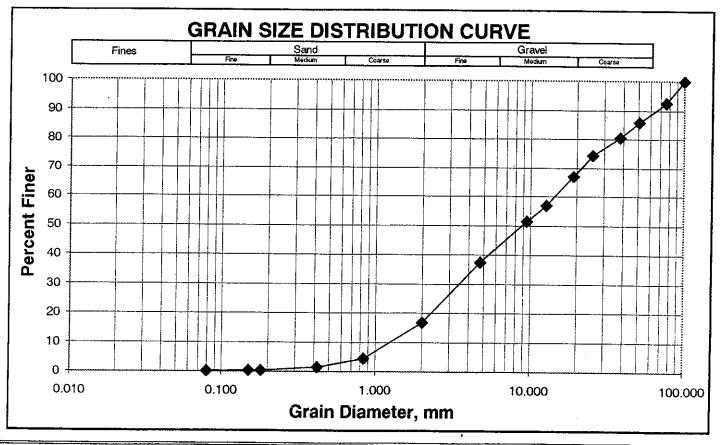
Depth:

SO5-162 10ft.

Sample Description:

TP 13, G14

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
100.0	4"	100.0	
76.2	3"	92.5	
50.8	2"	85.9	
25.4	1"	74.4	
19.1	3/4"	67.0	
12.7	1/2"	57.0	
9.500	3/8"	51.5	
4.750	No. 4	37.5	
2.000	No. 10	16.9	
0.841	No. 20	4.5	
0.420	No. 40	1.5	
0.180	No. 80	0.5	·
0.150	No. 100	0.4	
0.080	No. 200	0.3	



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MATERIALS LABORATORY

UMA Engineering Ltd.

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Client:

City Of Winnipeg

Project:

Pine Ridge Pit

Job No: Date:

0265-381-02 13-Jan-06

Contractor

Sample No.

Depth:

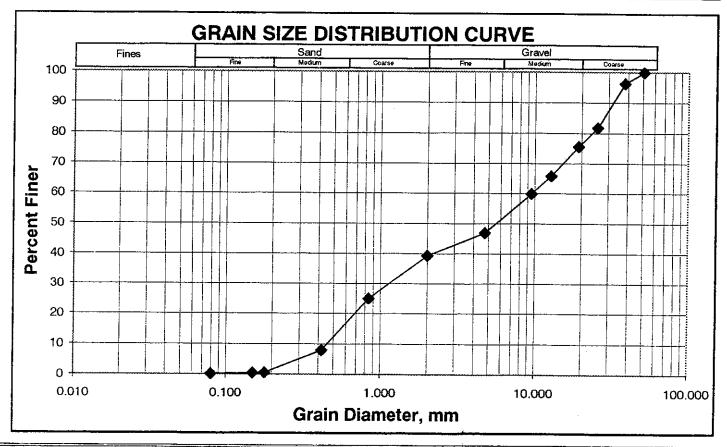
SO5-162

5ft.

Sample Description:

TP 14, G15

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	81.7	
19.1	3/4"	75.6	
12.7	1/2"	65.8	
9.500	3/8"	59.9	
4.750	No. 4	46.9	
2.000	No. 10	39.4	
0.841	No. 20	25.0	
0.420	No. 40	8.0	
0.180	No. 80	0.7	
0.150	No. 100	0.6	
0.080	No. 200	0.2	



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MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: P

Pine Ridge Pit

Job No: Date : 0265-381-02 16-Jan-06 Contractor

Sample No.

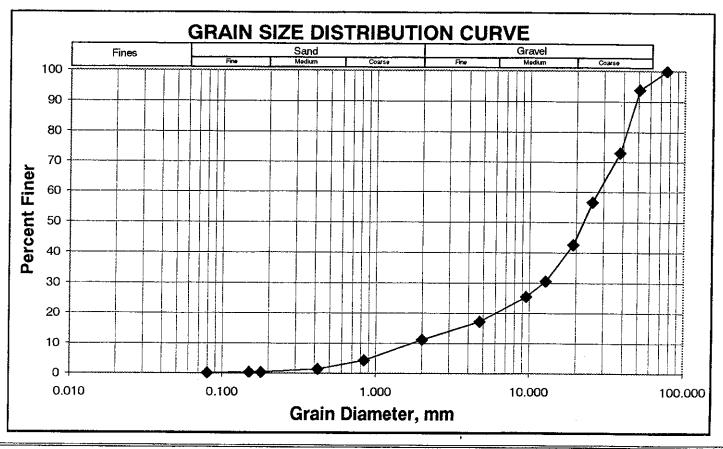
Depth:

SO5-162 10ft.

Sample Description:

TP 14, G16

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"	100.0	
50.8	2"	93.9	
25.4	1"	56.7	
19.1	3/4"	42.6	
12.7	1/2"	30.6	
9.500	3/8"	25.5	
4.750	No. 4	17.3	
2.000	No. 10	11.3	
0.841	No. 20	4.4	
0.420	No. 40	1.5	
0.180	No. 80	0.4	
0.150	No. 100	0.4	
0.080	No. 200	0.2	



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MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg

Project: Pine Ridge Pit
Job No: 0265-381-02

Job No: <u>0265-381-02</u> Date: <u>16-Jan-06</u> Contractor

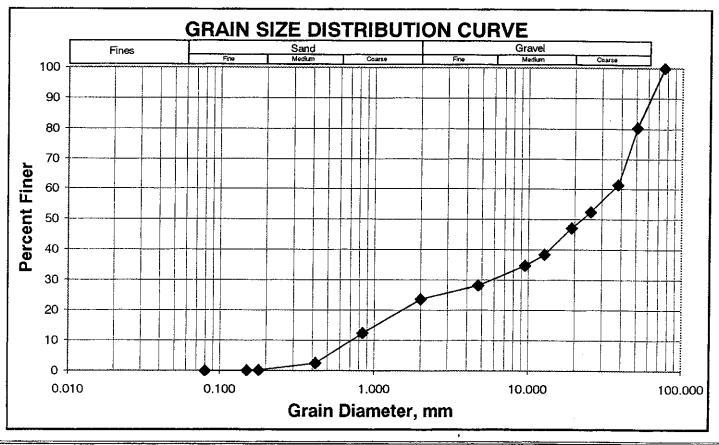
Sample No. Depth:

SO5-162 7ft.

Sample Description:

TP 15, G17

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
100.0	4"		
76.2	3"	100.0	,
50.8	2"	80.3	
25.4	1 11	52.5	
19.1	3/4"	47.1	, ,
12.7	1/2"	38.4	
9.500	3/8"	34.7	
4.750	No. 4	28.2	
2.000	No. 10	23.6	
0.841	No. 20	12.4	
0.420	No. 40	2.5	
0.180	No. 80	0.2	
0.150	No. 100	0.1	
0.080	No. 200	0.0	



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MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project:

Pine Ridge Pit

Job No: Date:

0265-381-02 13-Jan-06

Contractor

Sample No.

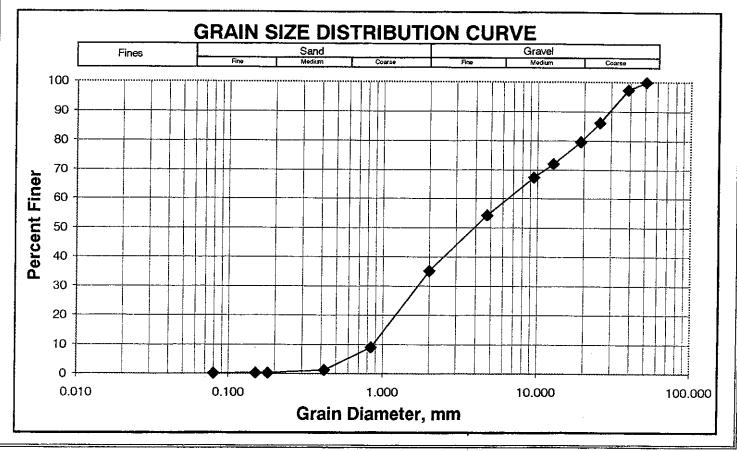
Depth:

Sample Description:

SO5-162 5ft.

TP 16, G18

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"	100.0	
25.4	1"	86.1	
19.1	3/4"	79.6	
12.7	1/2"	72.1	
9.500	3/8"	67.4	
4.750	No. 4	54.2	
2.000	No. 10	35.2	
0.841	No. 20	9.1	
0.420	No. 40	1.3	
0.180	No. 80	0.3	
0.150	No. 100	0.3	
0.080	No. 200	0.2	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: Job No:

Pine Ridge Pit

Date:

0265-381-02 16-Jan-06

Contractor

Sample No.

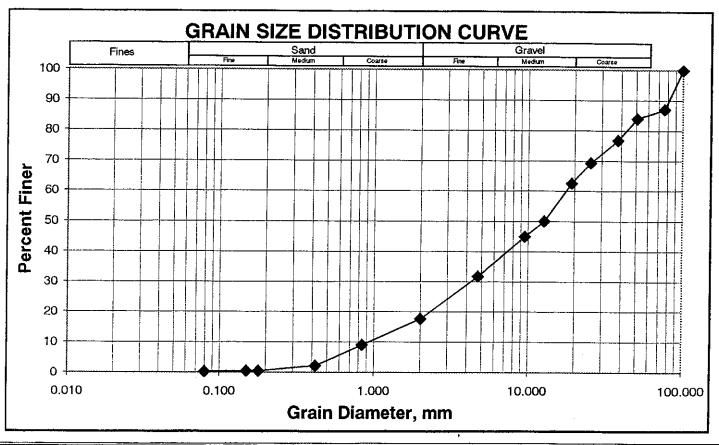
Depth:

SO5-162 5ft.

Sample Description:

TP 18, G22

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
100.0	4"	100.0	
76.2	3"	87.0	
50.8	2"	84.0	
25.4	1"	69.4	
19.1	3/4"	62.5	
12.7	1/2"	50.1	
9.500	3/8"	45.0	
4.750	No. 4	31.7	
2.000	No. 10	17.7	
0.841	No. 20	9.1	
0.420	No. 40	2.2	
0.180	No. 80	0.5	
0.150	No. 100	0.5	
0.080	No. 200	0.3	



Date:

UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

 Client:
 City Of Winnipeg

 Project:
 Pine Ridge Pit

 Job No:
 0265-381-02

Contractor Sample No.

SO5-162

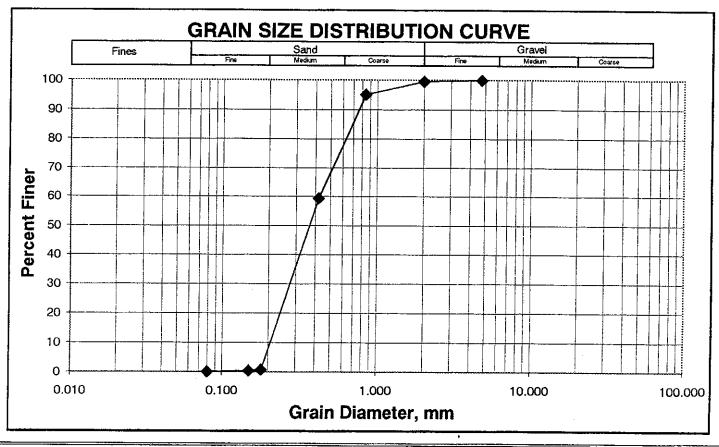
Depth:

5ft.

10-Jan-06

Sample Description: TP 19, G23

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"		
9.500	3/8"		
4.750	No. 4	100.0	
2.000	No. 10	99.5	
0.841	No. 20	95.1	
0.420	No. 40	59.4	
0.180	No. 80	0.8	
0.150	No. 100	0.5	
0.080	No. 200	0.1	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg
Project: Pine Ridge Pit

0265-381-02

13-Jan-06

Job No:

Date:

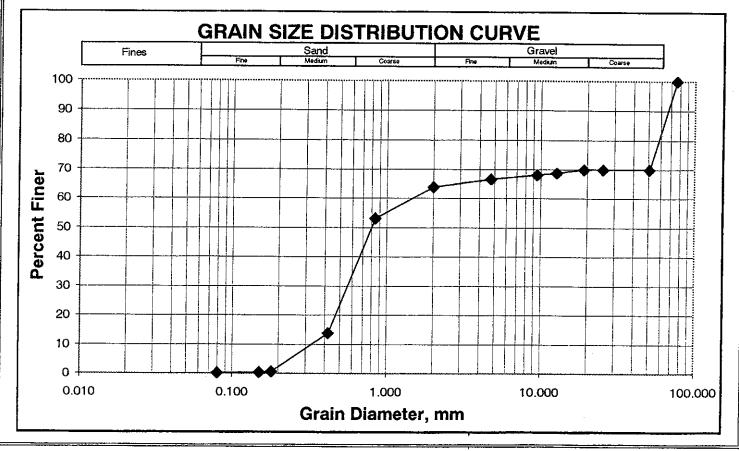
Contractor Sample No. Depth:

SO5-162 5ft.

Sample Description:

TP 26, G28

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"	100.0	
50.8	2"	69.9	
25.4	1"	69.9	
19.1	3/4"	69.9	
12.7	1/2"	68.8	
9.500	3/8"	68.1	
4.750	No. 4	66.6	
2.000	No. 10	63.8	
0.841	No. 20	53.1	
0.420	No. 40	13.9	
0.180	No. 80	0.6	
0.150	No. 100	0.5	
0.080	No. 200	0.2	



UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: Job No:

Pine Ridge Pit 0265-381-02

Date:

10-Jan-06

Contractor

Sample No.

Depth:

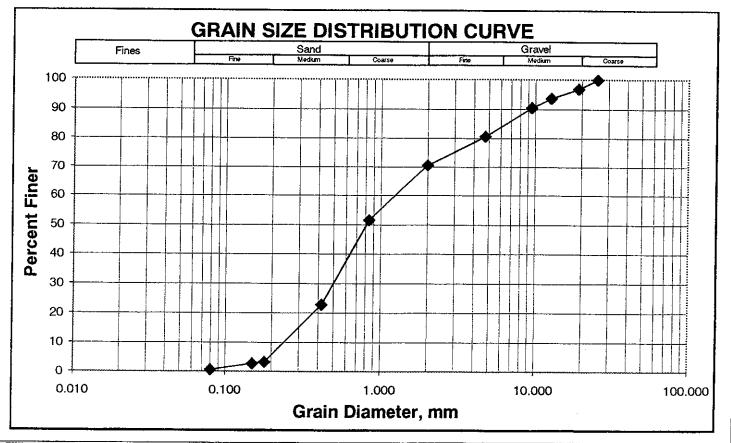
Sample Description:

SO5-162

5ft.

TP 27, G29

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		·
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"	100.0	
19.1	3/4"	96.8	
12.7	1/2"	93.6	
9.500	3/8"	90.5	
4.750	No. 4	80.7	
2.000	No. 10	70.6	
0.841	No. 20	51.6	
0.420	No. 40	22.8	
0.180	No. 80	3.3	
0.150	No. 100	2.7	
0.080	No. 200	0.7	



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MATERIALS LABORATORY

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1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tei (204) 284-0580 fax (204) 475-3646

Client:

City Of Winnipeg

Project: Job No: Pine Ridge Pit

Date:

0265-381-02 6-Mar-06

Mud Rotary Drilling

Sample No.

Depth:

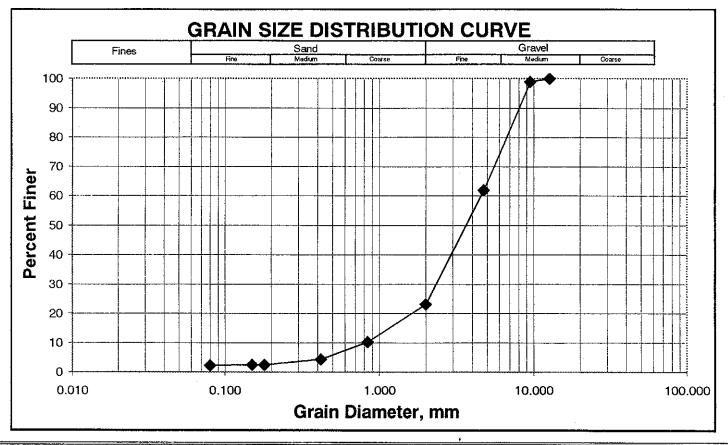
SO6-05

15ft.

Sample Description:

TH 34, G30

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"	100.0	
9.500	3/8"	98.9	
4.750	No. 4	61.9	
2.000	No. 10	23.2	
0.841	No. 20	10.3	
0.420	No. 40	4.4	
0.180	No. 80	2.6	
0.150	No. 100	2.5	
0.080	No. 200	2.3	



0265-381-02

UMA AECOM

MATERIALS LABORATORY

UMA Engineering Ltd.

1479 Buffalo Place, Winnipeg, MB R3T 1L7 Canada tel (204) 284-0580 fax (204) 475-3646

Client: City Of Winnipeg Project: Pine Ridge Pit

Job No:

Date:

Mud Rotary Drilling Sample No.

SO6-05

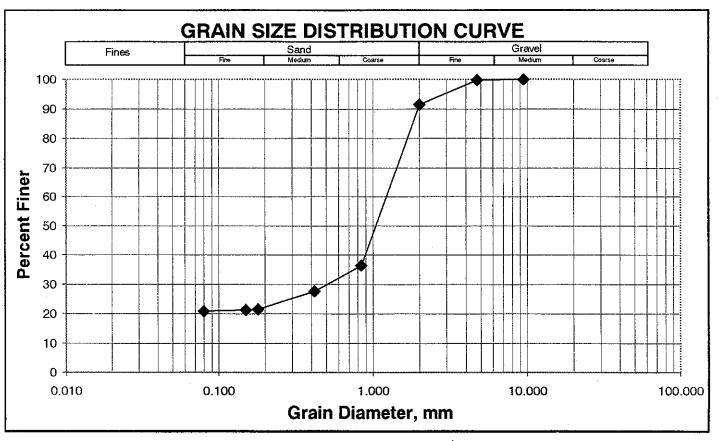
Depth:

10ft.

6-Mar-06

TH 35, G39 Sample Description:

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		P44*-
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"		
12.7	1/2"		
9.500	3/8"	100.0	
4.750	No. 4	99.8	·
2.000	No. 10	91.4	
0.841	No. 20	36.4	
0.420	No. 40	27.7	
0.180	No. 80	21.6	
0.150	No. 100	21.4	
0.080	No. 200	20.9	



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Client:

City Of Winnipeg

Project: Job No: Pine Ridge Pit 0265-381-02

Date: 6-Mar-06

Mud Rotary Drilling

Sample No.

Depth:

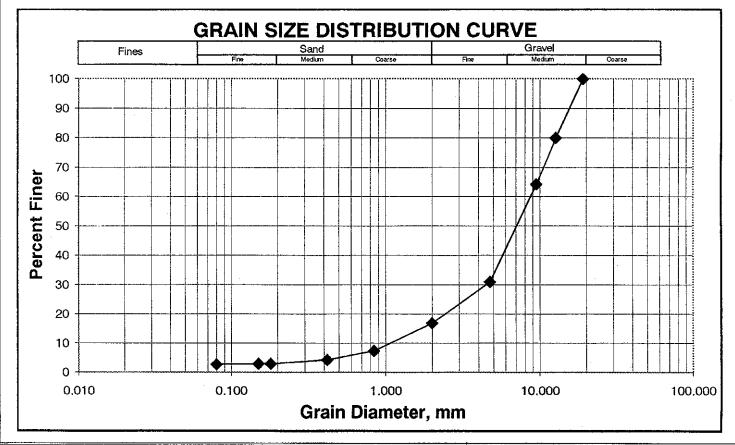
SO6-05

15ft.

Sample Description:

TH 36, G47

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	79.9	
9.500	3/8"	64.2	
4.750	No. 4	30.9	
2.000	No. 10	16.8	
0.841	No. 20	7.3	
0.420	No. 40	4.3	
0.180	No. 80	3.0	
0.150	No. 100	2.9	
0.080	No. 200	2.7	



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Client:

City Of Winnipeg

Project: Job No: Pine Ridge Pit 0265-381-02

Date:

6-Mar-06

Mud Rotary Drilling

Sample No.

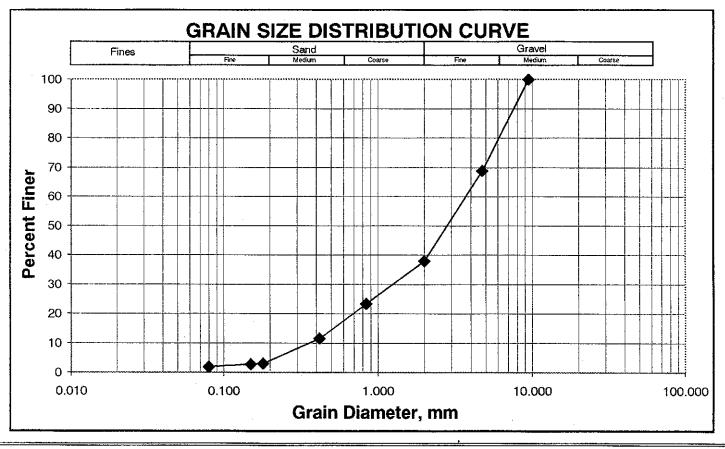
Depth:

SO6-05

15ft.

Sample Description: TH 37, G50

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min - max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1 11		
19.1	3/4"		
12.7	1/2"		
9,500	3/8"	100.0	
4.750	No. 4	68.8	
2.000	No. 10	37.9	
0.841	No. 20	23.4	
0.420	No. 40	11.5	
0.180	No. 80	3.1	
0.150	No. 100	2.8	
0.080	No. 200	1.9	



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Client:

City Of Winnipeg

Project: Job No:

Pine Ridge Pit 0265-381-02

Date: 6-Mar-06 **Mud Rotary Drilling**

Sample No.

Depth:

SO6-05

15ft.

Sample Description:

TH 38, G54

Sieve (mm.)	Sieve No.	Total Percent Passing	Specifaction (min max)
152.4	6"		
127.0	5"		
101.6	4"		
76.2	3"		
50.8	2"		
25.4	1"		
19.1	3/4"	100.0	
12.7	1/2"	99.2	,
9.500	3/8"	93.6	
4.750	No. 4	51.5	
2.000	No. 10	24.9	
0.841	No. 20	18.4	
0.420	No. 40	15.0	
0.180	No. 80	11.5	
0.150	No. 100	11.3	
0.080	No. 200	10.6	

