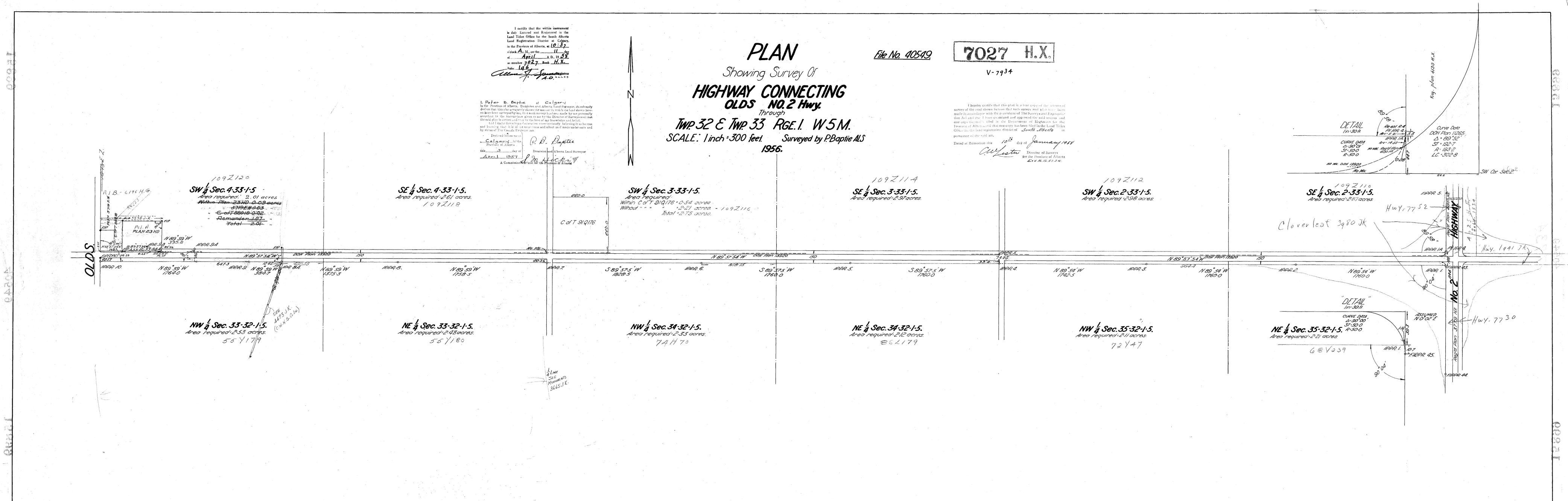
APPENDIX E2

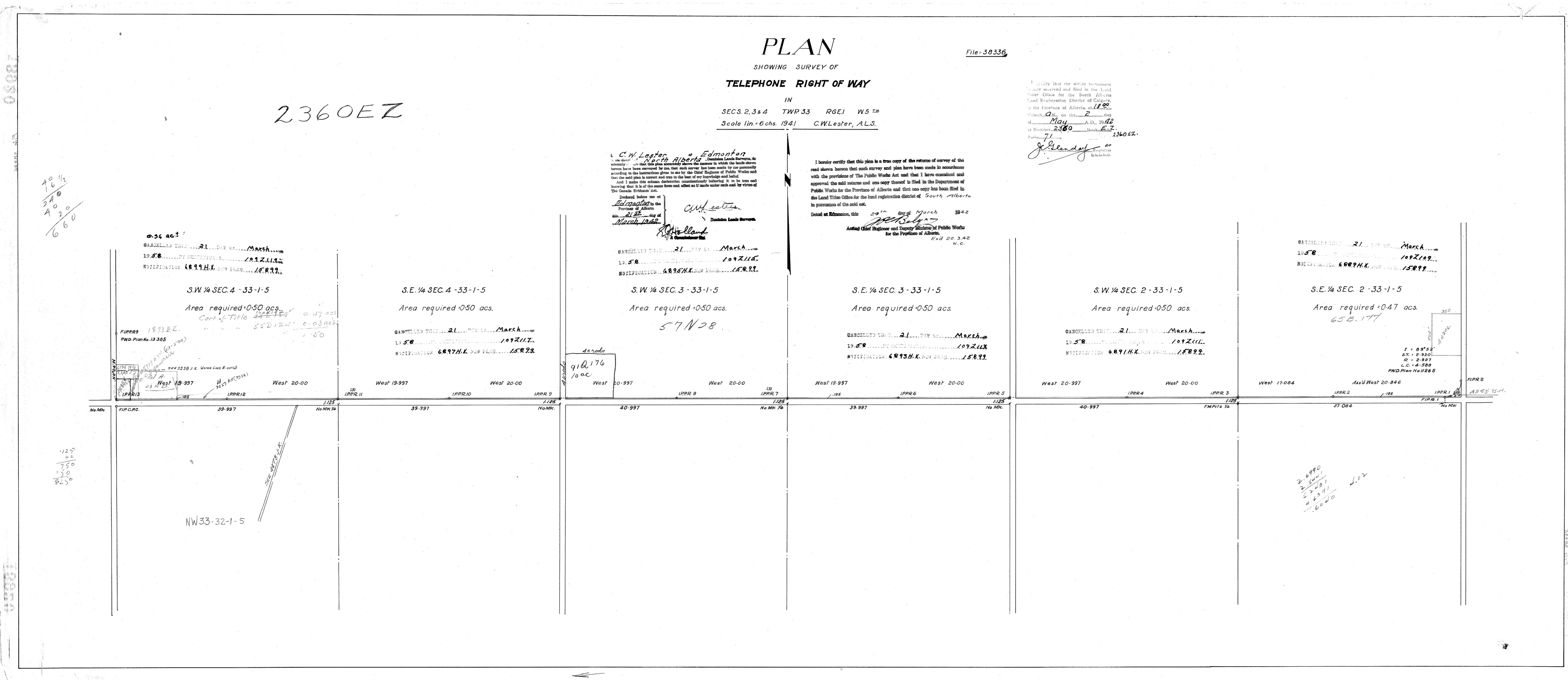
Land Titles –

Survey

Bifröst

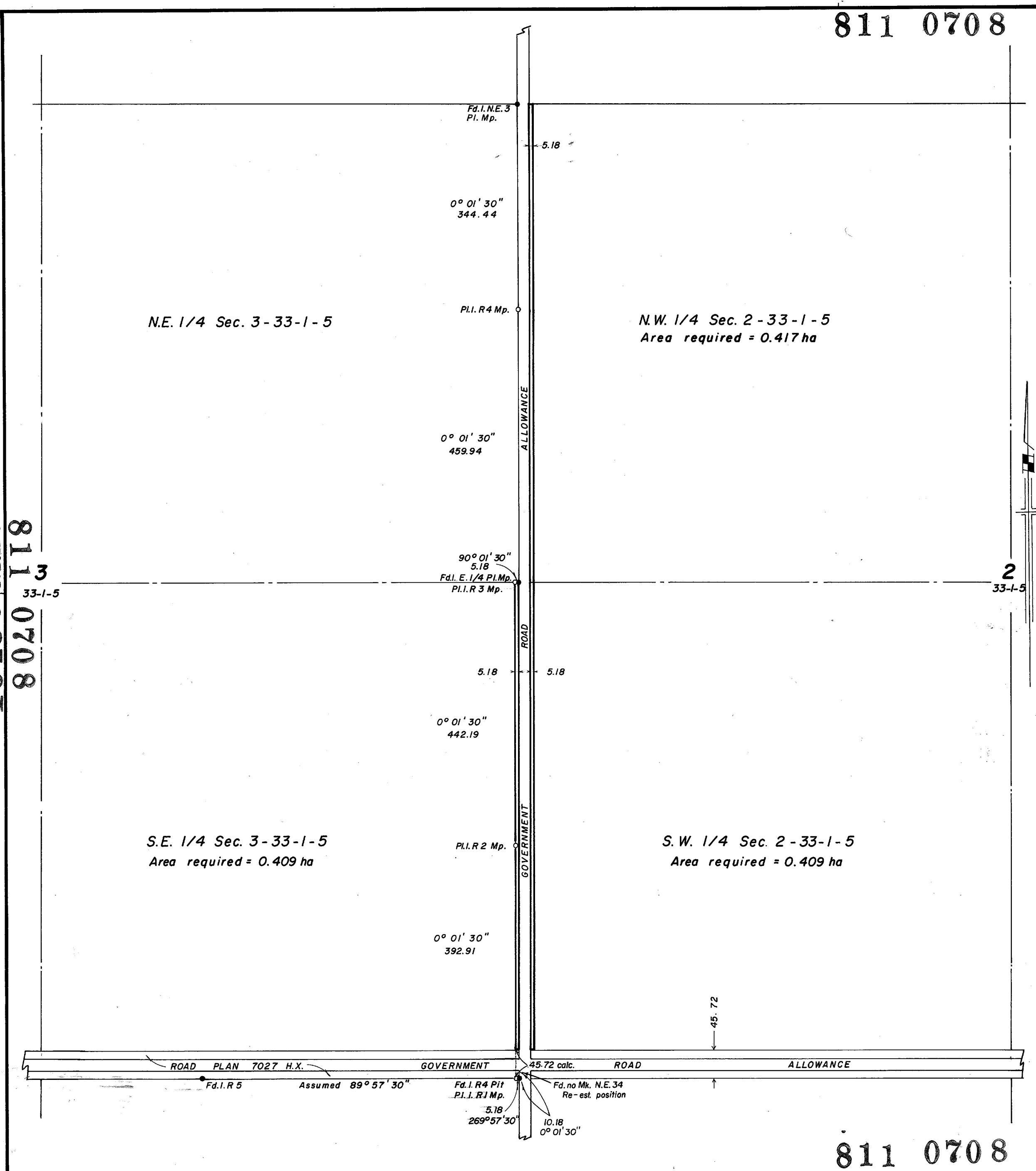
Environmental and Remediation Services Inc.




PLAN
SHOWING SURVEY OF
TELEPHONE RIGHT OF WAY
IN
SECS. 2, 3 & 4 TWP. 33 RGE. 1 W. 5 TH.
Scale 1in. = 6 chs. 1941 C. W. Lester, A.L.S.
File: 38336
2360EZ
I C. W. Lester of Edmonton in the district of North Alberta, Dominion Lands Surveyor, do solemnly declare that this plan accurately shows the manner in which the lands shown hereon have been surveyed by me, that such survey has been made by me personally according to the instructions given to me by the Chief Engineer of Public Works; and that the said plan is correct and true to the best of my knowledge and belief.
And I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of The Canada Evidence Act.
Declared before me at Edmonton in the Province of Alberta this 21st day of March, 1942
C. W. Lester
Dominion Lands Surveyor.
R. J. Holland
A Commissioner &c.
I hereby certify that this plan is a true copy of the returns of survey of the road shown hereon that such survey and plan have been made in accordance with the provisions of The Public Works Act and that I have examined and approved the said returns and one copy thereof is filed in the Department of Public Works for the Province of Alberta and that one copy has been filed in the Land Titles Office for the land registration district of South Alberta in pursuance of the said act.
Dated at Edmonton, this 24th day of March 1942
Acting Chief Engineer and Deputy Minister of Public Works for the Province of Alberta.
Exd 20.3.42 K.C.
I certify that the within instrument was duly received and filed in the Land Titles Office for the South Alberta Land Registration District of Calgary, in the Province of Alberta, at 11.00 o'clock a.M., on the 2 day of May A.D., 1942
as Number 2360 Book E.Z.
Folio 71
2360EZ.
J. C. Glenday
AO Registrar
S.W. 1/4 SEC. 4 - 33 - 1 - 5
Area required 0.50 acs.
S.E. 1/4 SEC. 4 - 33 - 1 - 5
Area required 0.50 acs.
S.W. 1/4 SEC. 3 - 33 - 1 - 5
Area required 0.50 acs.
57N28
S.E. 1/4 SEC. 3 - 33 - 1 - 5
Area required 0.50 acs.
S.W. 1/4 SEC. 2 - 33 - 1 - 5
Area required 0.50 acs.
S.E. 1/4 SEC. 2 - 33 - 1 - 5
Area required 0.47 acs.
65B.177
CANCELLED THIS 21 DAY OF March
1958 109Z115
NOTIFICATION 6895H.K. NEW PLAN 15899
PWD Plan No. 13385
PWD Plan No. 11265
91Q176
West 19.997
West 20.00
West 20.997
West 17.084
39.997
40.997
37.084
NW33-32-1-5

2m-13

811 0708



16486 M.D.

811 0708

DIRECTOR OF SURVEYS	REGISTRAR, SOUTH ALBERTA LAND REGISTRATION DISTRICT	PLAN NUMBER 811 0708

SURVEY APPROVED

DIRECTOR OF SURVEYS

DATE APPROVED 81-05-28

EX'D J.I. FILE 16486 M.D.

81/05/21

APPROVAL VALID FOR TWELVE MONTHS

FILE: 424-MD-80

PLAN NUMBER 8110708 IS HEREBY CERTIFIED AS DULY ENTERED AND REGISTERED IN THE LAND TITLES OFFICE FOR THE SOUTH ALBERTA LAND REGISTRATION DISTRICT.

JUN 15 1981

A.D. REGISTRAR

SOUTH ALBERTA LAND REGISTRATION DISTRICT LAND TITLES OFFICE

80-HW-454

I, J. MARIE SATRA, OF THE CITY OF EDMONTON, ALBERTA LAND SURVEYOR, MAKE OATH AND SAY:

1. THAT THE SURVEY REPRESENTED BY THIS PLAN WAS MADE UNDER MY PERSONAL SUPERVISION,
2. THAT THE SURVEY WAS MADE IN ACCORDANCE WITH GOOD SURVEYING PRACTICES AND IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYS ACT, AND
3. THAT THE SURVEY WAS PERFORMED BETWEEN THE DATES OF OCT. 22 AND NOV. 4, 1980, AND THAT THIS PLAN IS TRUE AND CORRECT, AND IS PREPARED IN ACCORDANCE WITH THE PROVISIONS OF THE LAND TITLES ACT.

SWORN BEFORE ME AT THE CITY OF EDMONTON IN THE PROVINCE OF ALBERTA, THIS 13 DAY OF NOV, 1980

ALBERTA LAND SURVEYOR

A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA. J.B. STEWART

LEGEND

STATUTORY SURVEY MONUMENTS FOUND SHOWN THUS: ●

STATUTORY IRON POSTS PLANTED SHOWN THUS: ○

DISTANCES ARE IN METRES AND DECIMALS THEREOF.

LANDS DEALT WITH BY THIS PLAN BOUNDED THUS:

Mp. STANDS FOR MARKER POST.

811 0708

16486 M.D.

UNDER SECTION 134 OF THE MUNICIPAL GOVERNMENT ACT

CANADA) I, F.J. DAWLEY

PROVINCE OF ALBERTA) OF DIDSBURY, ALBERTA

TO WIT) MAKE OATH AND SAY:

1. THAT I AM THE COUNTY COMMISSIONER OF THE COUNTY OF MOUNTAIN VIEW NO. 17
2. THAT AGREEMENTS HAVE BEEN REACHED WITH ALL THE OWNERS OF THE LANDS AFFECTED BY THIS PLAN AS TO TO THE AREA TO BE ACQUIRED AND THE PRICE TO BE PAID.
3. THAT THE LAND TO BE ACQUIRED IS FOR THE PURPOSE OF PUBLIC ROAD.

SWORN BEFORE ME AT THE Town OF DIDSBURY IN THE PROVINCE OF ALBERTA THIS 23 DAY OF DECEMBER, 1980

COUNTY COMMISSIONER

A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA.

I HEREBY CERTIFY THAT THE SURVEY REPRESENTED BY THIS PLAN HAS BEEN MADE IN ACCORDANCE WITH THE INSTRUCTIONS OF THE COUNCIL OF THE COUNTY OF MOUNTAIN VIEW NO. 17 UNDER THE PROVISIONS OF THE MUNICIPAL GOVERNMENT ACT.

COUNTY COMMISSIONER "Seal"

5 32 33

COUNTY OF MOUNTAIN VIEW NO. 17

PLAN

SHOWING SURVEY OF

ROAD WIDENING

IN

W. 1/2 SEC. 2 - TP. 33 - R.1 - W.5M.

AND

S.E. 1/4 SEC. 3 - TP. 33 - R.1 - W.5M.

1980

SCALE 1:5000 J.M. SATRA, A.L.S.

0 100 200 300 metres

Stewart · Weir · Stewart Watson · Heinrichs · Dixon

PLAN NUMBER

FILE No. 80-9786 | A.A.M.M. | B.

811 0708

Nov 17/80

120447

8710934

PLAN SHOWING SURVEY of PUBLIC WORK (ROAD)

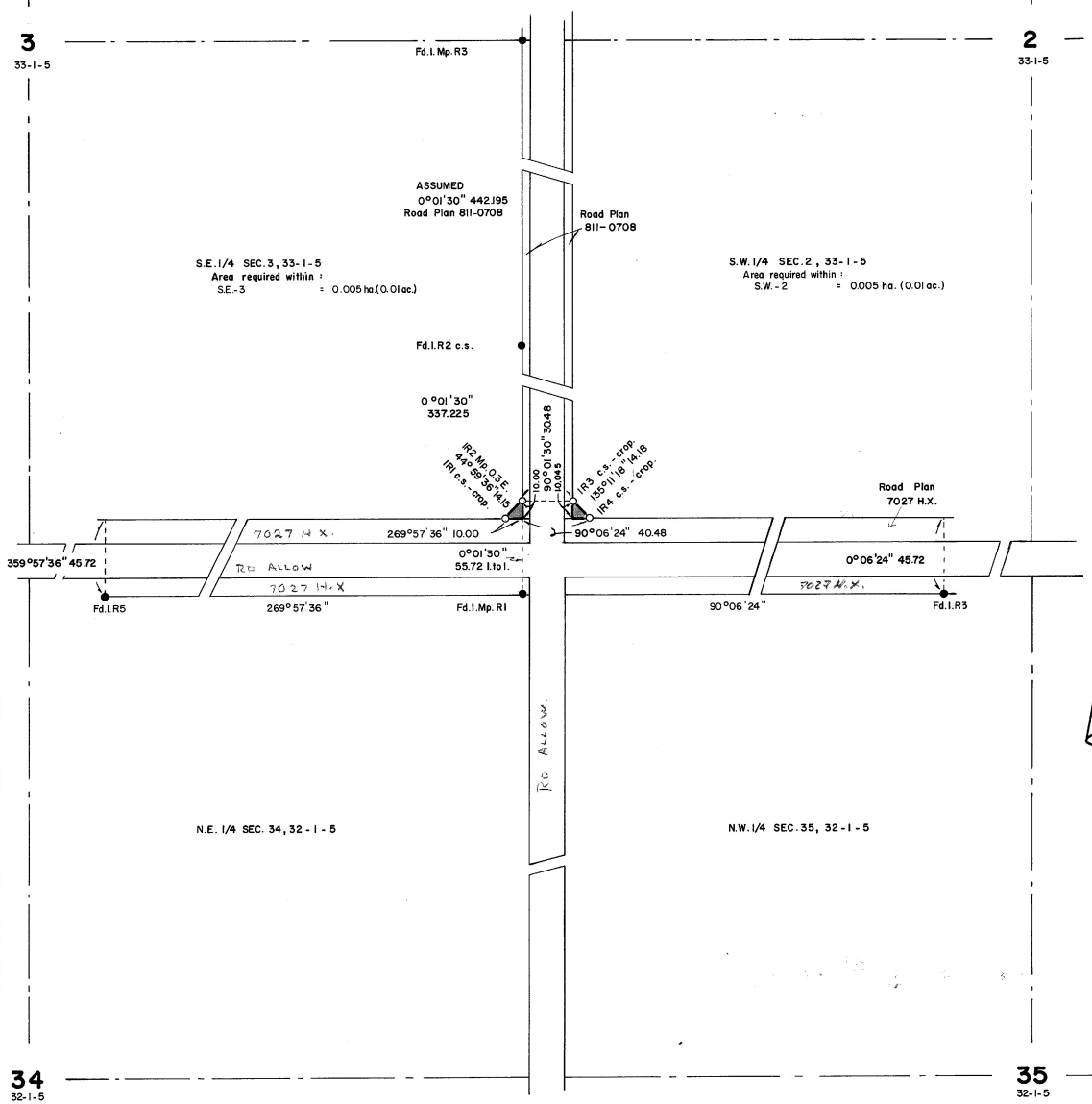
IN

S.W.1/4 SEC.2, TWP.33, RGE.1, W.5M.
S.E.1/4 SEC.3, TWP.33, RGE.1, W.5M.

SCALE : 1:2000 1986 G.R. MOORE, A.L.S.

SURVEY APPROVED
DIRECTOR OF SURVEYS
DATE APPROVED 87-06-05
EXD. MCR FILE 120447
APPROVAL VALID FOR TWELVE MONTHS.

P



0 50 100 150 metres.

LEGEND:

Statutory iron posts found shown thus ———●
Statutory iron posts placed and marked 301 shown thus ———○
" Mp. " Stands for marker post placed as indicated.
" Pl. " Stands for placed.
" c.s. " Stands for countersunk.
Distances are in metres and decimals thereof.
Area to be registered inlined or shaded in red.

I, G.R. Moore of the City of Red Deer, Alberta Land Surveyor, make oath and say:

1. That the survey represented by this plan was made under my personal supervision,
2. That the survey was made in accordance with good surveying practices and in accordance with the provisions of the Surveys Act, and
3. That the survey was performed July 15th. 1986, and that this plan is true and correct, and is prepared in accordance with the provisions of the Land Titles Act.

Sworn before me at the City of Red Deer, in the Province of Alberta this 17th day of MARCH 1987.

G.R. Moore.
Alberta Land Surveyor

R.A. Bollinger
R.A. Bollinger B-07-87
A Commissioner For Oaths in and for the Province of Alberta.

I hereby certify that this plan represents a survey of land required for a public work pursuant to the Public Works Act and that the land covered by this plan was acquired by agreement with the owners thereof.

Dated 17th June 1987

Director of Property Services.

8710934

SOUTH ALBERTA LAND REGISTRATION DISTRICT LAND TITLES OFFICE

JUL 13 1987

I certify that the within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

Registrar
SALRD

8711200091

File : 27-MH-84 Plan No. 1
Property Service Branch.
Alberta Transportation.

R.A.B.

5 12 19 50 56.

5821-82

121643

8910798

DIRECTOR OF SURVEYS

SURVEY APPROVED
for DIRECTOR OF SURVEYS
DATE APPROVED 89-06-28
EX'D. O.S. FILE 121643
APPROVAL VALID FOR TWELVE MONTHS.

LAND TITLES OFFICE

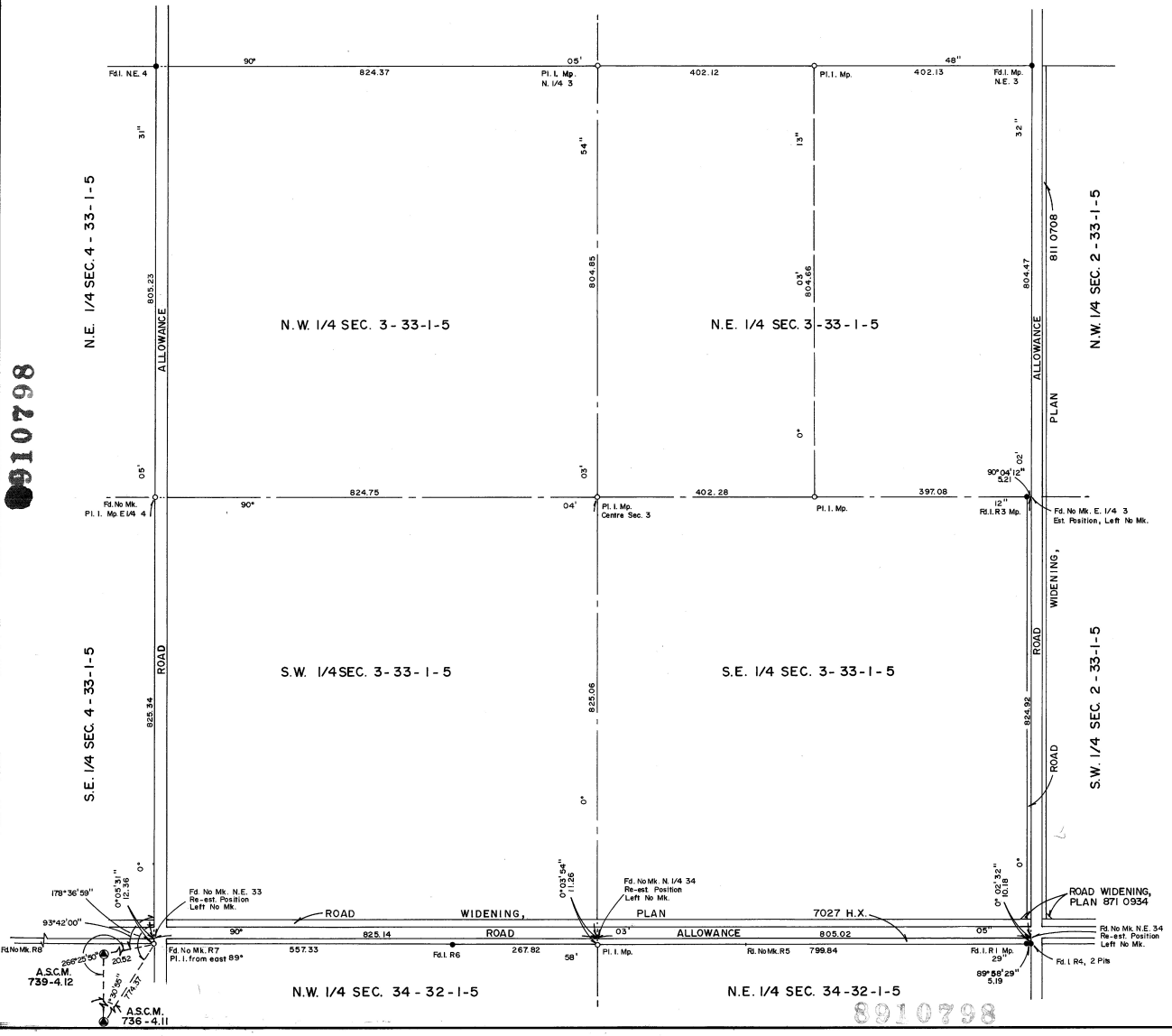
8910798

I certify that this within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

A.D. Registrar SALRD

JE 14 1989

891110142



8910798

COUNTY OF MOUNTAIN VIEW No. 17

PLAN SHOWING

MONUMENT SURVEY

AFFECTING

SEC. 3, TWP. 33, RGE. 1, W. 5 M.

SCALE: 1:5000 0 50 100 200 300 400 500 METRES

BY: D. L. TRONNES, A.L.S., 1988

LEGEND:

Distances shown are in metres and decimals thereof.
Statutory Iron Posts are shown thus; ● found, ○ planted and marked 'P 078'.
Alberta Survey Control Monuments shown thus; ⛰
Bearings are Grid and derived from a line joining A.S.C.M.'s 739-4.12 & 736-4.11

SURVEYORS AFFIDAVIT:

I, DARRYL L. TRONNES, of the City of Calgary, Alberta Land Surveyor, make oath and say:
1. that the survey represented by this plan was made under my personal supervision,
2. that the survey was made in accordance with good surveying practices and in accordance with the provisions of The Surveys Act,
3. that the survey was performed on the dates of December 7th and December 8th, 1988, and that this plan is true and correct and is prepared in accordance with the provisions of The Land Titles Act.

Sworn before me at the City of Calgary in the Province of Alberta this 20 th. day of December, 1988.

KARIM LADHA JUMA (Expires May 14th. 1989)
A Commissioner for Oaths in and for the Province of Alberta.

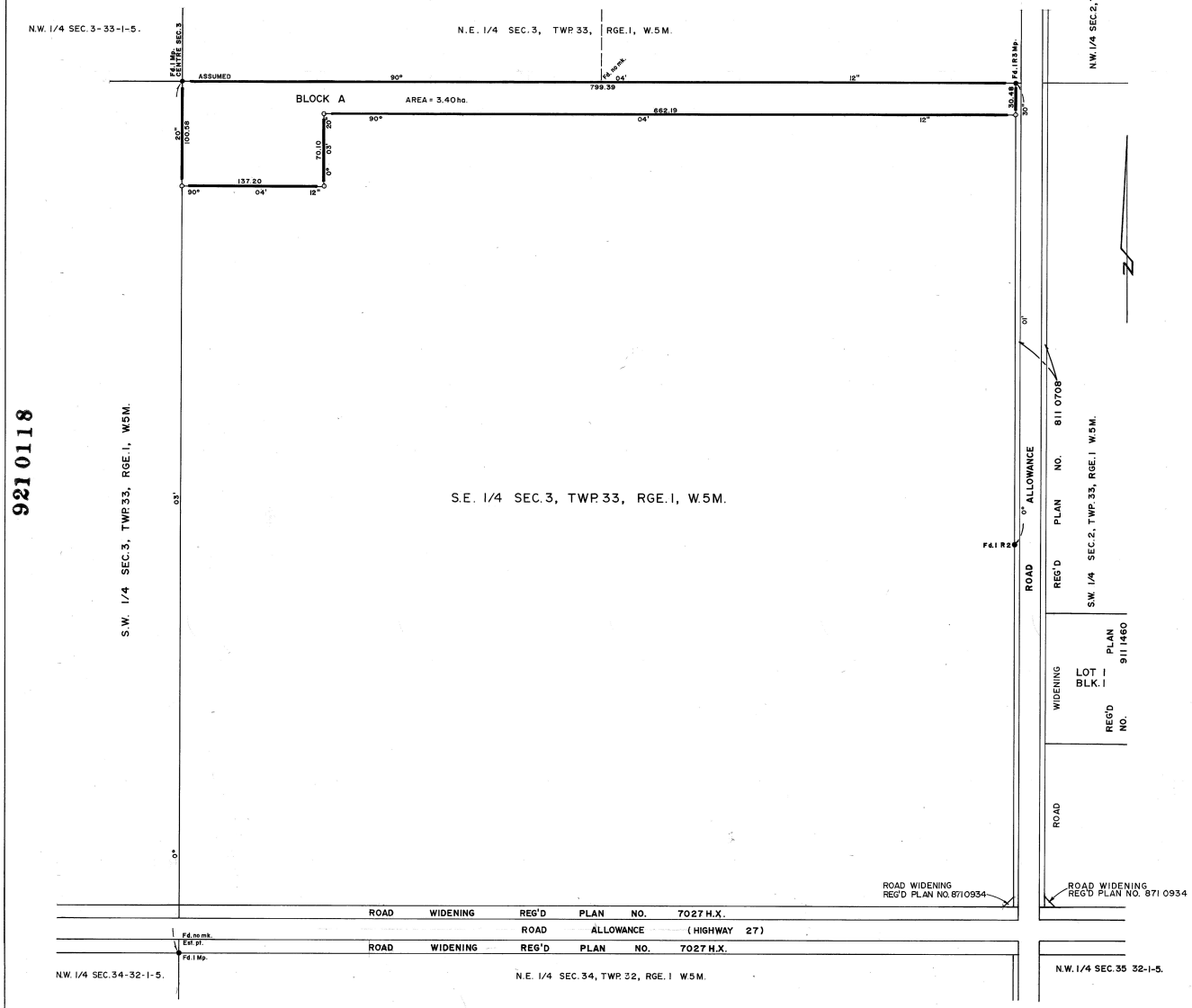
D. L. Tronnes
Alberta Land Surveyor

ALBERTA LAND SURVEYORS' ASSOCIATION PERMIT NUMBER P 078 TRONNES SURVEYS (1976) LTD.

TRONNES SURVEYS (1976) LTD. 1002 Edmonton Trail N.E., Calgary, Alberta T2E 3K2, Tel. 230-9040, File 88-0070

8910798

9210118



9210118

9210118

PLANNING

APPROVED
JAN 03 1992
THE COUNTY OF MOUNTAIN VIEW NO. 17
Sec'y.

Reserves not required pursuant to section 97 of the Planning Act
The County of Mountain View No. 17.

LAND TITLES

9210118

I certify that the within instrument is duly Entered and Registered in the Land Titles Office for the South Alberta Land Registration District at Calgary.

A.R. Registrar

JAN. 21/1992
9210138 13

SOUTH ALBERTA LAND REGISTRATION DISTRICT — LAND TITLES OFFICE

COUNTY OF MOUNTAIN VIEW NO. 17

PLAN SHOWING
SUBDIVISION
OF PART OF THE
SE1/4 SEC. 3, TWP.33, RGE.1, W5M
SCALE = 1:2000
R.M. POLLOCK, ALS
1991

0 10 20 30 50 100 150 200 250
METRES

NOTE:

ALL LINEAR MEASUREMENTS ARE IN METRES AND DECIMALS THEREOF.
AREA REGISTERED BY THIS PLAN SHOWN OUTLINED THUS
AND CONTAINS 1 BLOCK AND 3.40 ha.
STATUTORY IRON POST FOUND SHOWN THUS ●
STATUTORY IRON POST PLANTED SHOWN THUS ○
STATUTORY IRON POSTS PLANTED ARE MARKED 266

I, ROBERT M. POLLOCK OF THE TOWN OF OLDS, IN THE PROVINCE OF ALBERTA, ALBERTA LAND SURVEYOR, MAKE OATH AND SAY:

1. THAT THE SURVEY REPRESENTED BY THIS PLAN WAS MADE UNDER MY PERSONAL SUPERVISION.
2. THAT THE SURVEY WAS MADE IN ACCORDANCE WITH GOOD SURVEYING PRACTICES AND IN ACCORDANCE WITH THE PROVISIONS OF THE SURVEYS ACT, AND
3. THAT THE SURVEY WAS PERFORMED BETWEEN THE DATES OF SEPTEMBER 24 AND OCTOBER 3, 1991 AND THAT THIS PLAN IS TRUE AND CORRECT, AND IS PREPARED IN ACCORDANCE WITH THE PROVISIONS OF THE LAND TITLES ACT.

Robert M. Pollock
ALBERTA LAND SURVEYOR

SWORN BEFORE ME AT THE TOWN OF OLDS, IN THE PROVINCE OF ALBERTA THIS 16 DAY OF OCTOBER, 1991

A COMMISSIONER FOR OATHS IN AND FOR THE PROVINCE OF ALBERTA
DONALD V. LOWRY
MY COMMISSION EXPIRES ON THE 2nd DAY OF MAY, 1992

RICHARDSON BROS. (OLDS) LTD.

(SEAL)

ROBERT M. POLLOCK ALS
BOX 2235, OLDS, AB.
T0M 1P0
9 084-90

9210118

APPENDIX F

Company Records

Bifröst

Environmental and Remediation Services Inc.

APPENDIX F1

Macintosh –

Geotechnical Report

Bifröst

Environmental and Remediation Services Inc.

McINTOSH • LALANI ENGINEERING LTD.

GEOTECHNICAL EVALUATION
MOUNTAIN VIEW MEADOWS BUSINESS PARK AND RESIDENTIAL COMMUNITY
MOUNTAIN VIEW COUNTY- ALBERTA

April, 2008

M•L 3899

GEOTECHNICAL EVALUATION
MOUNTAIN VIEW MEADOWS BUSINESS PARK AND RESIDENTIAL COMMUNITY
MOUNTAIN VIEW COUNTY, ALBERTA

SUBMITTED TO:

MMM Group Limited
Calgary, Alberta

PREPARED BY:

McIntosh•Lalani Engineering Ltd.
Calgary, Alberta

April, 2008

M•L 3899

TABLE of CONTENTS

		Page
1.0	INTRODUCTION	1
2.0	PROJECT DETAILS	1
3.0	SITE DESCRIPTION AND TOPOGRAPHY	2
4.0	FIELD AND LABORATORY WORK	2
5.0	SURFICIAL GEOLOGY AND GROUNDWATER CONDITIONS	2
	5.1 Soils	2
	5.2 Groundwater	3
6.0	DISCUSSIONS AND RECOMMENDATIONS	4
	6.1 Construction Excavation and Temporary Dewatering	4
	6.2 Site Grading	5
	6.3 Pipe Support	5
	6.4 Foundations	5
	6.5 Weeping Tile Subdrains	6
	6.6 Concrete Type	7
7.0	DESIGN AND CONSTRUCTION GUIDELINES	7
8.0	LIMITATIONS	7
9.0	CLOSURE	7

LIST of FIGURES
TABLES
APPENDIX A - BOREHOLE LOGS
APPENDIX B - DESIGN AND CONSTRUCTION GUIDELINES

1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation conducted by McIntosh•Lalani Engineering Ltd. (M•L) for the proposed Mountain View Meadows development in Mountain View County, Alberta. This evaluation was undertaken at the request of Mr. John Berry, P.Eng. of MMM Group Ltd. The objective of this evaluation was to assess the general subsurface soil conditions within the site and provide geotechnical construction guidelines for the development. The scope of work is summarized as follows:

- Drill thirty five (35) boreholes to a depth of 9 metres on an approximate 250 m grid and install PVC standpipes in each to allow future monitoring of groundwater conditions across the site.
- Drill six (6) boreholes to a depth of up to 3.0 metres across the two S.E. quarters for assement of the suitability of the site for weeping tile fields.
- Measure groundwater elevations in the monitoring wells, approximately 1 week after drilling.
- Undertake laboratory testing, as necessary, to aid in determining the geotechnical engineering properties of the soils.
- Prepare a geotechnical evaluation report providing the findings of the site investigation, analysis and geotechnical recommendations for the design and construction of the development.

The following sections present our understanding of the project and the results and recommendations of the geotechnical investigation.

2.0 PROJECT DETAILS

It is our understanding that the project is composed of the development of approximately four contiguous quarter sections of land immediately northwest of Highway 2 and Highway 27, east of Olds, Alberta, into a business park and residential community. Based on conceptual drawings supplied by MMM group, the land is understood to be partitioned into approximately 500 residential lots and 190 acres of commercial and light industrial lots,

As such, development of the land is understood to involve stripping and grading of the site and construction of the underground utilities and roadways. This report serves to present the results of the field drilling program, laboratory testing and recommendations with regard to the above noted construction issues.

3.0 SITE DESCRIPTION AND TOPOGRAPHY

The subject lands are composed of portions of Sections 2 and 3, Township 33, Range 1, west of the 5th meridian, which lie immediately to the northwest of Highways 2 and 27.

The lands are presently utilized for mainly agricultural and grazing purposes, with several acreage style houses. Topographically, the lands are flat to rolling, with little overall vertical relief and several small potholes and sloughs.

4.0 FIELD AND LABORATORY WORK

The fieldwork consisted of drilling forty one (41) subsurface investigation boreholes from February 15 to February 25, 2008, using a solid stem auger drill rig contracted from Beck Drilling & Environmental Services Inc. of Calgary. Standard Penetration Testing (SPT) and Pocket Penetrometer measurements were taken at select depths in the boreholes to aid in classifying the soil strengths and disturbed soil samples were collected for laboratory testing Slotted PVC standpipes were installed in all boreholes to allow for future monitoring of groundwater levels.

The boreholes were drilled on an approximate 250 m grid spaced more or less evenly across the lands. The borehole locations were surveyed and marked prior to drilling by MMM Group Ltd, on the grid pattern noted above. It should be noted, however, that BH's 36 to 41, representing the percolation field testholes, were not drilled in their surveyed locations. The approximate location of the boreholes are shown on the attached Figure No. 1, and the borehole logs are presented in Appendix A.

The laboratory test program included natural moisture contents, soluble sulphate concentrations, Atterberg Limits and grain size distribution determination on select soil samples. The result of these tests are discussed throughout the text of this report and are shown on the attached borehole logs.

5.0 SURFICIAL GEOLOGY AND GROUNDWATER CONDITIONS

5.1 Soils

The general subsurface soil stratigraphy of the site consists of surficial organic topsoils overlying glacial till soils atop sedimentary bedrock. In addition, shallow deposits of sandy sediments were encountered in several boreholes, which may be a relic of historic wetland or sloughy areas.

Organic topsoil was encountered in all forty one boreholes, ranging in thickness from 75 mm to 405 mm. The average depth of organic topsoil encountered during drilling was approximately 165 mm. Only negligible depths of organic browns were encountered, and the topsoil was composed almost entirely of black loam, which is typical for tilled fields. Organic browns may be encountered in the undisturbed treed areas of the northern quarter.

Underlying the topsoil, glacial tills composed of silts and silty clays were encountered in the majority of the boreholes. In six of the forty one boreholes, silt and sand deposits were encountered beneath the topsoil, which may either be a glacial deposit or possibly sediments from historic wetland or slough areas. Where encountered, the sandy sediments were described as compact and dry to damp, and typically extended to a depth of 1.5 m to 2.5 m below existing grade.

Underlying these sandy deposits, or directly underlying the topsoil, glacial till was typically encountered. The till was generally composed of a compact and dry to damp silt at the surface, underlain by a silty clay till. The silt till extended to a depth of 1 to 2 metres below existing grade, although in many cases the silt material was absent and the silty clay till was encountered directly underlying the topsoil. The silty clay till was stiff in consistency, being damp and medium plastic with traces of sand and gravel throughout. Lenses and pockets of sand and silt were also encountered throughout the silty clay till body. The glacial material extended to either sedimentary bedrock or beyond the depth of drilling in all boreholes.

Sedimentary bedrock was encountered in only four boreholes, at depths ranging from 7 to 8 metres below existing grade. In addition, bedrock was encountered at a depth of only 3 metres below grade in BH-3, which may represent a piece of rafted sandstone or boulder. Auger refusal was met, and the exact nature of the shallow bedrock in this area was not determined. Where encountered, the bedrock was composed of hard sandstone and siltstone.

A more detailed soil description of each borehole is presented in the borehole logs in Appendix A.

At the time this report was prepared, information regarding the subsurface stratigraphy was available only at discrete borehole locations. Conditions were extrapolated and interpolated from the borehole locations to develop the following recommendations. Adequate monitoring should be provided during construction to confirm that these assumptions are reasonable. If conditions are encountered during construction that do not agree with the borehole information, M•L should be allowed to revise our recommendations.

5.2 Groundwater

Groundwater seepage was only encountered during drilling in one of the forty one boreholes, BH-23, in a deep sand lense encountered at a depth of 8.7 m below grade. The remainder of the boreholes were largely dry upon completion.

Groundwater measurements were taken on March 7, 2008, at which point the groundwater depth ranged from 2.9 m below grade to dry to a depth of 9.1 m below grade. This corresponds to a groundwater elevation ranging from 1015.1 m to 1006.2 m ASL.

The groundwater measurements are presented on Table No. 1, attached.

6.0 DISCUSSION AND RECOMMENDATIONS

Design recommendations presented in this report are based on the assumption that an adequate level of inspection will be provided during construction and that construction will be carried out by a suitably qualified contractor, experienced in underground utility installation and earthworks. An adequate level of inspection is considered to be:

- for earthworks - full time monitoring and compaction testing.
- for underground utility installation and backfilling - full time monitoring and compaction testing.
- for foundation bearing inspections - inspection by qualified geotechnical engineering personnel.

Inspection should be carried out by suitably qualified persons, independent of the contractor. The purpose of providing an adequate level of inspection is to check that recommendations, based on the data obtained at discrete borehole, are relevant to other areas of the site.

6.1 Construction Excavation and Temporary Dewatering

The composition and consistency of the site soils are such that conventional hydraulic excavators should be suitable to remove the majority of the site soils. Relatively shallow bedrock was encountered in some boreholes, at depths as shallow as 3 m in BH-3. This may represent a piece of rafted bedrock or an isolated boulder; however, if encountered during deep utility construction it may pose difficulties. Use of rippers or pneumatic chipping tolls may be required in such an instance.

All excavations should have no more than 1.5 m of vertical wall before backsloping at a maximum gradient of 1H:1V is required. Deeper excavations encountering the sand or silt seams may require additional backsloping or shoring if excessive seepage is noted during construction. Excavations should be inspected by a geotechnical engineer if such conditions are encountered during utility construction.

Due to the shallow groundwater encountered in areas of the site, excavations may encounter groundwater infiltration and require dewatering. The volume of seepage is anticipated to be relatively limited, and sumps equipped with submersible pumps would be considered a feasible method of dewatering in these instances.

6.2 Site Grading

Some cuts and fills may be required within the proposed development. All organic topsoil and vegetation should be removed from areas to be filled. The backfill should be placed in uniform lifts compacted to a minimum of 98 percent of Standard Proctor Density at a moisture content in the range of optimum to 3 percent above optimum. For the most part, conventional methods of site grading using scrapers are considered to be feasible on this site.

The building footprint of large commercial or light industrial facilities may include most, if not all, of the available lot space. Therefore, we recommend that the entire lot be treated as a building envelope. Alternatively, the commercial lots should be left ungraded.

6.3 Pipe Support

Over the majority of the site, we do not anticipate any difficulties with regard to the pipe support. Conventional methods for pipe support are considered feasible.

Clay plugs should be used around utilities founded in predominately silt or sand soils. The frequency and locations of plugs should be determined once utility and site grades have been finalized.

6.4 Foundations

Based on the results of the geotechnical investigation, conventional shallow foundations in conjunction with slabs-on-grade are considered feasible for residential structures.

All foundations placed on fill soils should be protected by installation of weeping tile subdrains around all footings. This should include the rear frost wall of any walkout units. In addition, all backfill placed around foundation walls should be properly moisture conditioned and compacted to a minimum of 95 percent Standard Proctor Density.

We recommend that residential footings be designed for a soil bearing capacity of 100 kPa. Bearing certificates should be prepared for all footings placed on fill by qualified geotechnical engineering personnel.

Footings within heated structures should be founded at a depth of 1.4 m below grade and for unheated structures at a depth of 2.1 metres grade to protect against the effects of frost heaving.

Both conventional shallow strip and spread footing and deep pile foundation systems are considered feasible for commercial or industrial buildings in the area. However, due to the wide variance in potential building types, sizes and loads, we recommend that independent geotechnical investigations be performed for each lot by the owner prior to construction.

6.5 Weeping Tile Fields

Six additional boreholes (BH's 36 to 41) were advanced across the middle of the Phase 1 area, which is comprised of the south half of Section 2. The final location and layout of the weeping tile fields has not yet been determined, therefore, these boreholes are only intended to give a general idea of the suitability of the site for weeping tile fields.

Soil conditions in the six boreholes noted above consisted of the surficial organic topsoils overlying 1 to 2 metres of silt till atop silty clay glacial till. Groundwater was not encountered during drilling, or within 3 m of the surface during subsequent monitoring.

Soil Index Properties

Hydrometer Testing (BH's 36-4)

	Maximum	Minimum	Average
Clay Fraction	27 %	13 %	17.6 %
Silt Fraction	51 %	40 %	45.8 %
Sand Fraction	47 %	31 %	36.5 %

Atterberg Limit Testing (Across Whole Site)

	Maximum	Minimum	Average
Plastic Limit	13.3	10.1	10.5
Liquid Limit	39.0	25.5	36.2
Plasticity Index	26.7	13.6	24.4

Based on these tests, on average, the site soils consist of a low to medium plastic sandy silt with some clay, with a wide variation in sand content. Given these results, the site soils appearsuitable for construction of weeping tile fields. Percolation testing should be conducted across the site during the late spring or summer, once the field layouts have been determined to confirm these results.

6.6 Concrete Type

Laboratory testing of select soil samples has shown the concentration of water soluble sulphates to be up to 1.1 percent. Therefore, all concrete elements in contact with the site soils should be designed for a S-2 exposure class.

7.0 DESIGN AND CONSTRUCTION GUIDELINES

Recommended general design and construction guidelines are provided in Appendix B, under the following headings:

- Backfill Materials and Compaction
- Construction Excavations
- Shallow Foundations

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to present detailed specifications for the work, although they prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix B, the main text should govern.

8.0 LIMITATIONS

Recommendations presented herein are based on a geotechnical evaluation of the findings in forty one (41) boreholes. The conditions encountered during the fieldwork are considered to be reasonably representative of the site. If, however, conditions other than those reported are noted during subsequent phases of the project, M•L should be given the opportunity to review our current recommendations in light of new findings.

This report has been prepared for the exclusive use of MMM Group Ltd. and their agents for specific application to the development described in this report. It has been prepared in accordance with generally accepted soil and foundation engineering practices. No warranty is expressed or implied.

9.0 CLOSURE

We trust information presented herein meets with your present requirements. If you have questions or require additional geotechnical services please contact our office.

McIntosh•Lalani Engineering Ltd.

Lee Martin, E.I.T.

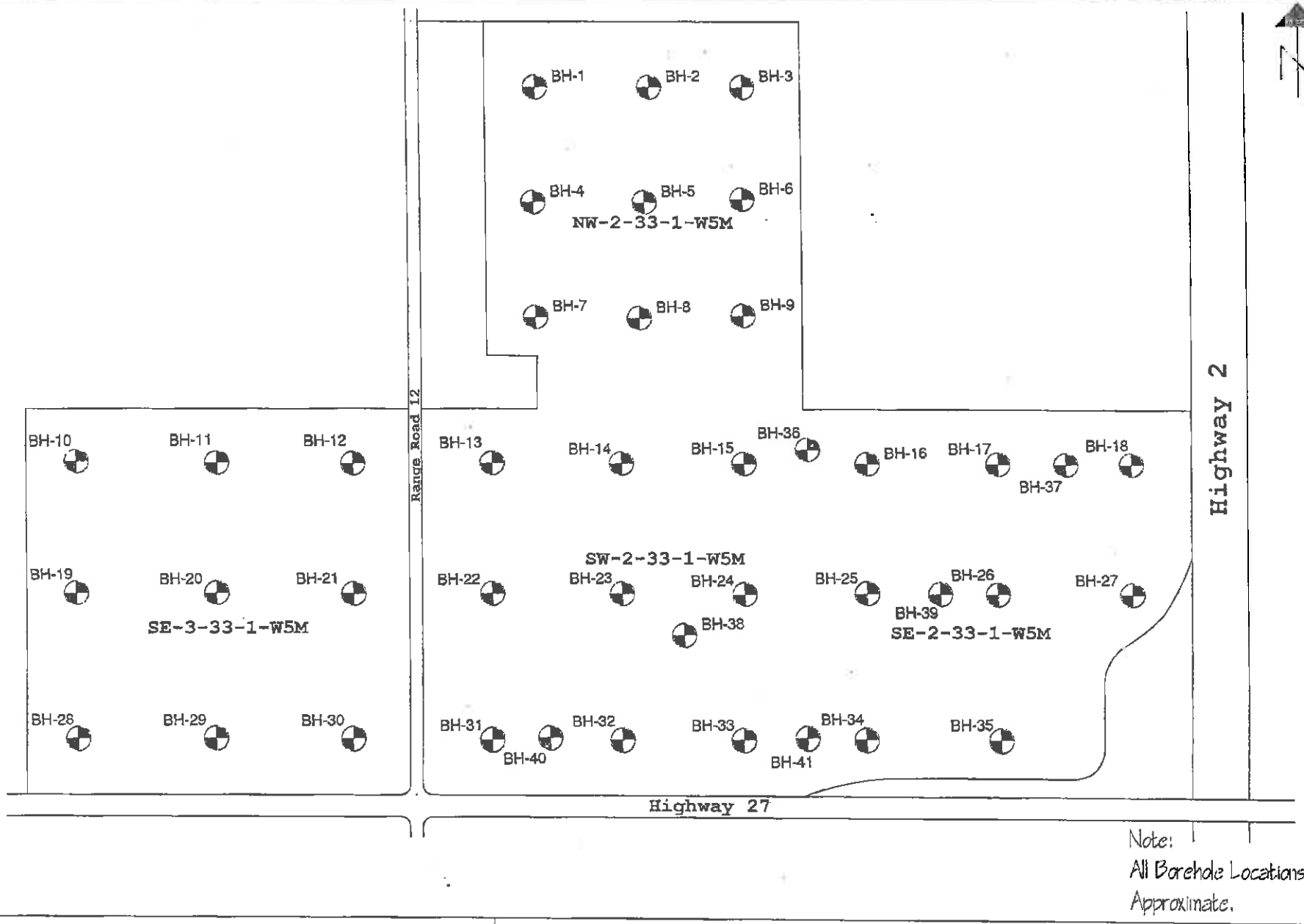
A.W. McIntosh, P.Eng.
Senior Project Engineer

/clc

PERMIT TO PRACTICE
McINTOSH LALANI ENGINEERING LTD.
Signature
Date April 28/08
PERMIT NUMBER: P 6482
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

LIST of FIGURES

LIST of FIGURES



Client: MMM GROUP	McIntosh Lalani Engineering Ltd.		
Project: OLDS MOUNTAIN VIEW SUBDIVISION			
Title: BOREHOLE LOCATIONS	Scale: N.T.S	Date: 26 FEBRUARY 2008	Job#: ML-3899	Figure: FIGURE NO. 1

TABLES

Mclntosh Lalani

GROUNDWATER SUMMARY SHEET

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

DATE 4/14/2008

Borehole	Surface Elevation	Date of Reading	Depth to Groundwater	Groundwater Elevation
1	1017.16	3/7/2008	7.05	1010.11
		4/2/2008	5.09	1012.07
2	1015.60	3/7/2008	3.42	1012.18
		4/2/2008	3.46	1012.14
3	1015.45	3/7/2008	2.96	1012.49
		4/2/2008	2.98	1012.47
4	1016.98	3/7/2008	6.8	1010.18
		4/2/2008	3.98	1013
5	1014.55	3/7/2008	2.93	1011.62
		4/2/2008	2.95	1011.6
6	1015.44	3/7/2008	4.64	1010.8
		4/2/2008	3.64	1011.8
7	1017.34	3/7/2008	2.86	1014.48
		4/2/2008	2.78	1014.56
8	1014.49	3/7/2008	4.15	1010.34
		4/2/2008	3.02	1011.47
9	1015.10	3/7/2008	3.69	1011.41
		4/2/2008	3.24	1011.86
10	1018.42	3/7/2008	3.35	1015.07
		4/2/2008	3.45	1014.97
11	1018.20	3/7/2008	3.64	1014.56
		4/2/2008	3.76	1014.44
12	1020.11	3/7/2008	7.78	1012.33
		4/2/2008	7.15	1012.96
13	1016.90	3/7/2008	7.09	1009.81
		4/2/2008	5.82	1011.08
14	1015.46	4/2/2008	8	1007.46
16	1014.34	3/7/2008	4.8	1009.54
		4/2/2008	3.52	1010.82
17	1015.81	3/7/2008	4.44	1011.37
		4/2/2008	3.92	1011.89
18	1010.77	3/7/2008	2.51	1008.26
		4/2/2008	2.65	1008.12
19	1020.28	3/7/2008	8.01	1012.27
		4/2/2008	6.84	1013.44
20	1018.75	3/7/2008	5.57	1013.18
		4/2/2008	4.93	1013.82
21	1020.06	3/7/2008	8.03	1012.03
		4/2/2008	7.8	1012.26
23	1014.75	3/7/2008	8.01	1006.74
		4/2/2008	7.45	1007.3
24	1014.29	3/7/2008	7.8	1006.49

Mcintosh Lalani

GROUNDWATER SUMMARY SHEET

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

DATE 4/14/2008

Borehole	Surface Elevation	Date of Reading	Depth to Groundwater	Groundwater Elevation
24	1014.29	4/2/2008	5.28	1009.01
25	1013.98	3/7/2008	6.83	1007.15
		4/2/2008	4.14	1009.84
27	1010.62	3/7/2008	3.61	1007.01
		4/2/2008	3.77	1006.85
28	1019.36	3/7/2008	5.3	1014.06
		4/2/2008	5.35	1014.01
29	1018.68	3/7/2008	5.53	1013.15
		4/2/2008	5.34	1013.34
32	1015.21	3/7/2008	8.98	1006.23
		4/2/2008	8.93	1006.28
33	1013.57	4/2/2008	5.82	1007.75
34	1014.53	3/7/2008	7.66	1006.87
		4/2/2008	6.34	1008.19
35	1013.00	4/2/2008	6.29	1006.71

LAB TESTING

ATTERBERG LIMITS' RESULTS

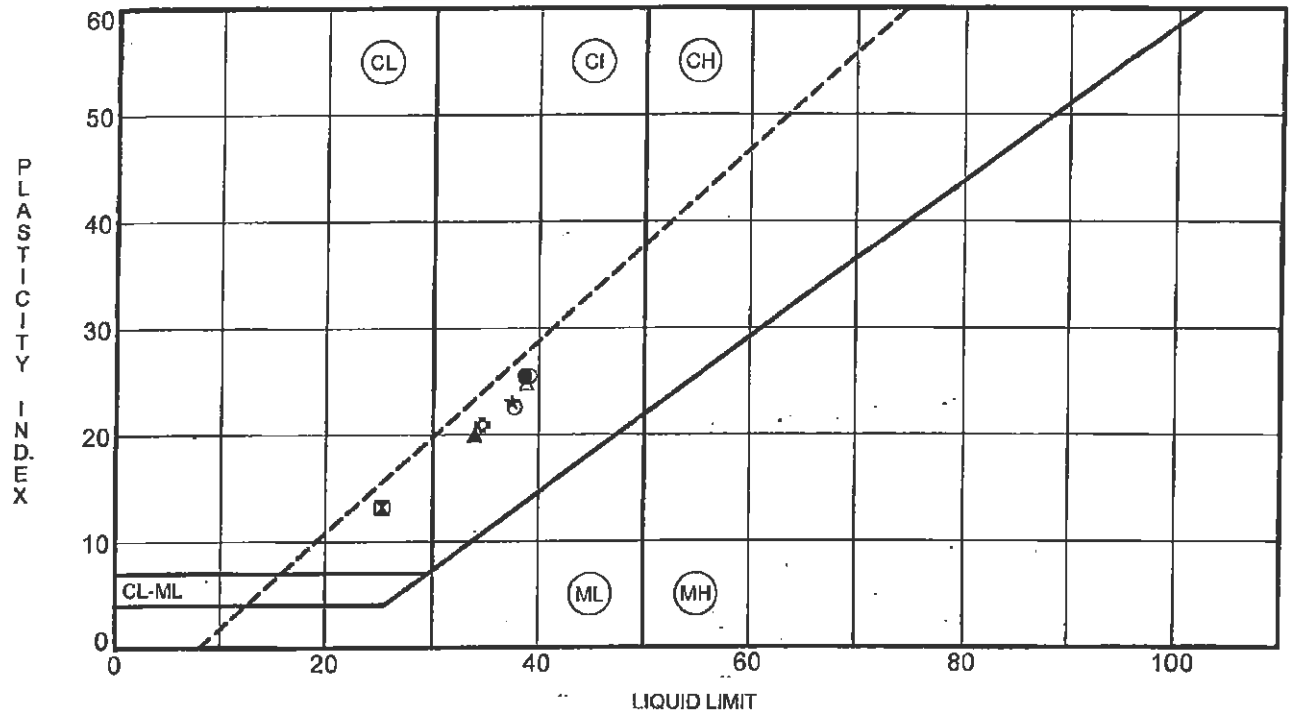
McIntosh Lalani

CLIENT MMM Group

PROJECT NAME Olds Mountain View Subdivision

PROJECT NUMBER 3899

PROJECT LOCATION Olds, AB



	Specimen Identification		LL	PL	PI	Fines	Classification
●	BH-3	0.8 (m)	39	13	26		
⊠	BH-7	0.8 (m)	25	12	13		
▲	BH-12	3.8 (m)	34	14	20		
★	BH-15	3.2 (m)	37	14	23		
⊙	BH-18	2.3 (m)	39	14	25		
✿	BH-29	7.8 (m)	35	14	21		
○	BH-31	4.7 (m)	38	15	23		
△	BH-34	3.8 (m)	39	14	25		

ATTERBERG LIMITS 3099 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/24/08

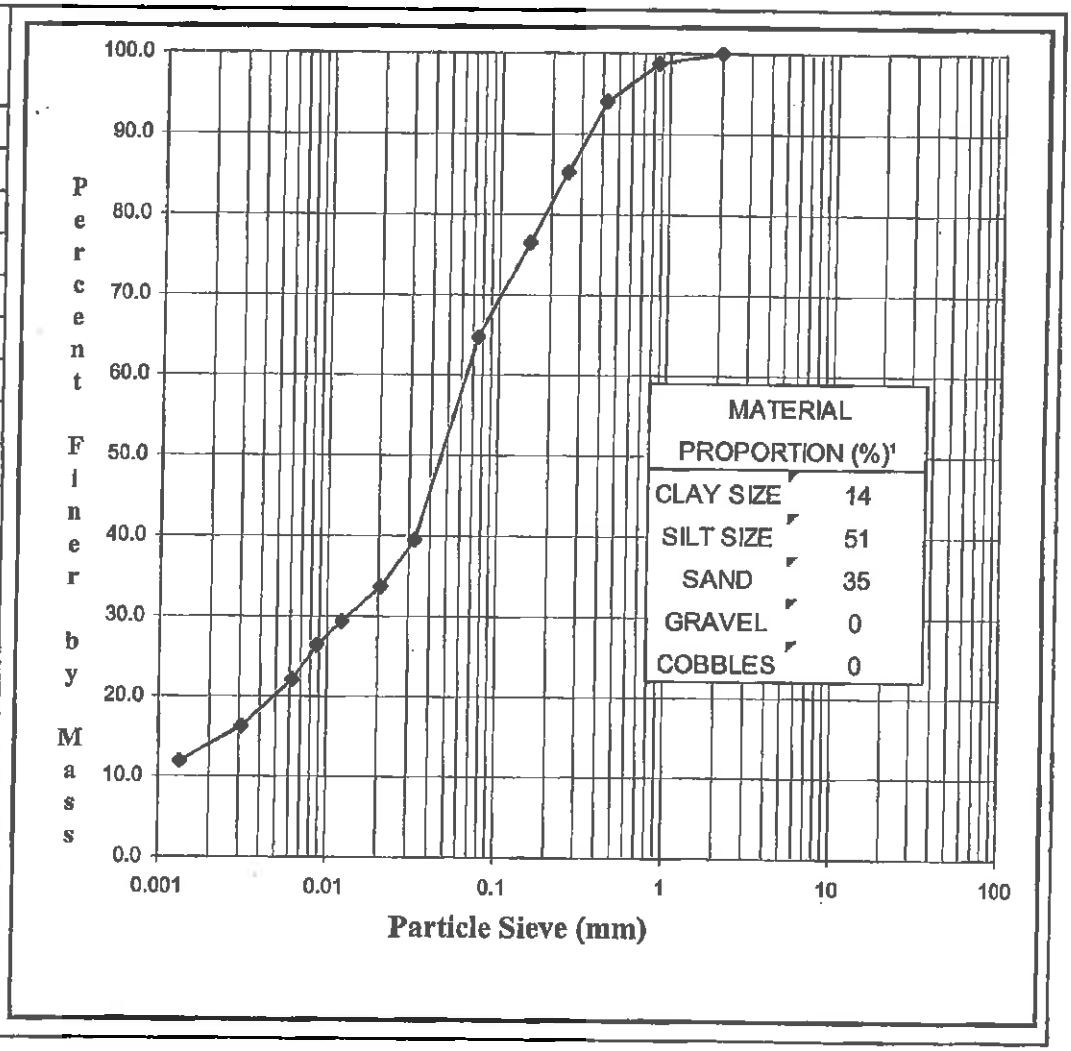
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 36-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.7
425 µm	94.0
250 µm	85.2
150 µm	76.5
75 µm	64.8
32 µm	39.5
21 µm	33.7
12 µm	29.3
9 µm	26.4
6 µm	22.1
3 µm	16.3
1 µm	11.9



Reviewed by: _____ EIT ~~P.Eng.~~

Note 1: Classified by the Modified Unified Soil Classification System

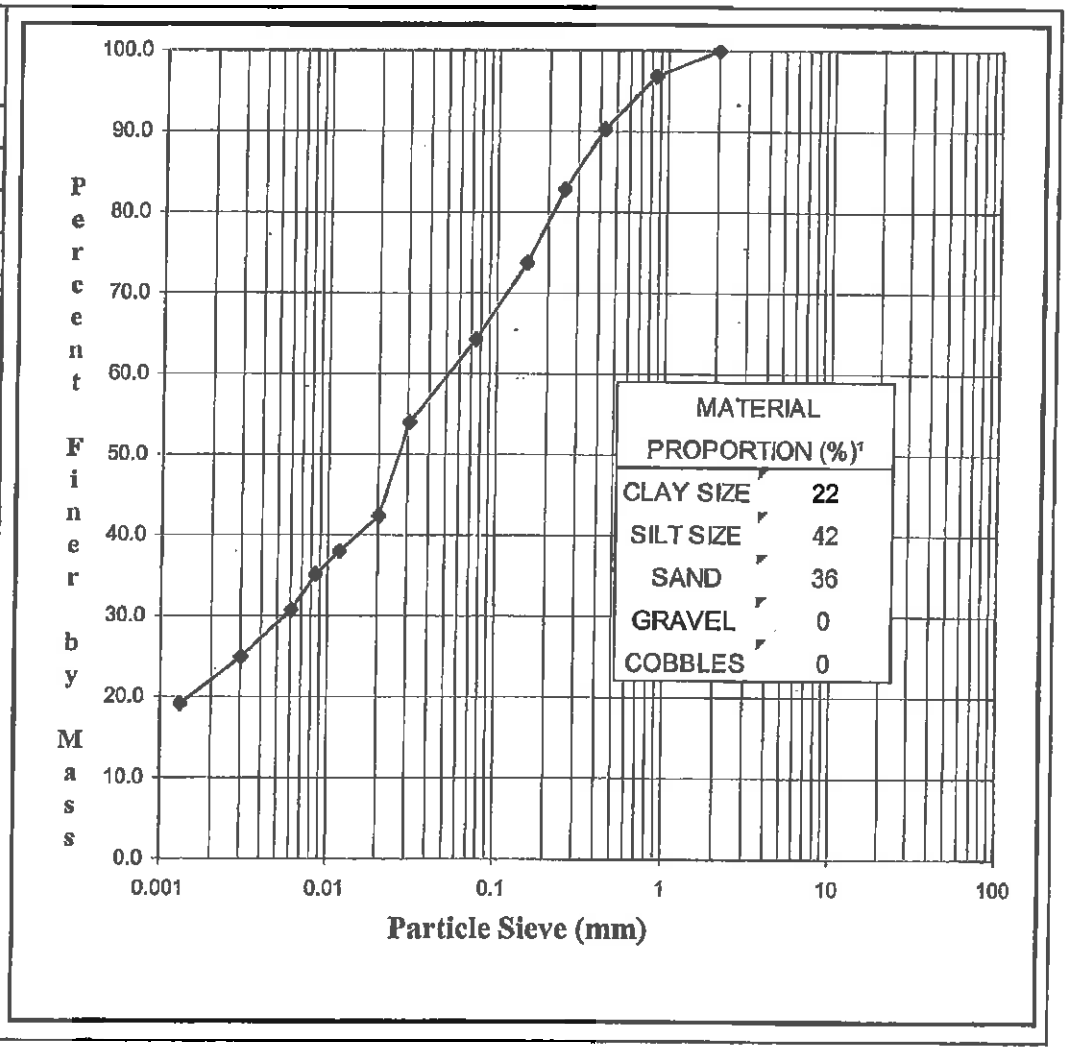
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 37-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	96.9
425 µm	90.2
250 µm	82.8
150 µm	73.7
75 µm	64.2
31 µm	54.0
20 µm	42.4
12 µm	38.0
8 µm	35.1
6 µm	30.8
3 µm	25.0
1 µm	19.2



Reviewed by: _____ EIT P.Eng.

Note 1: Classified by the Modified Unified Soil Classification System

ML

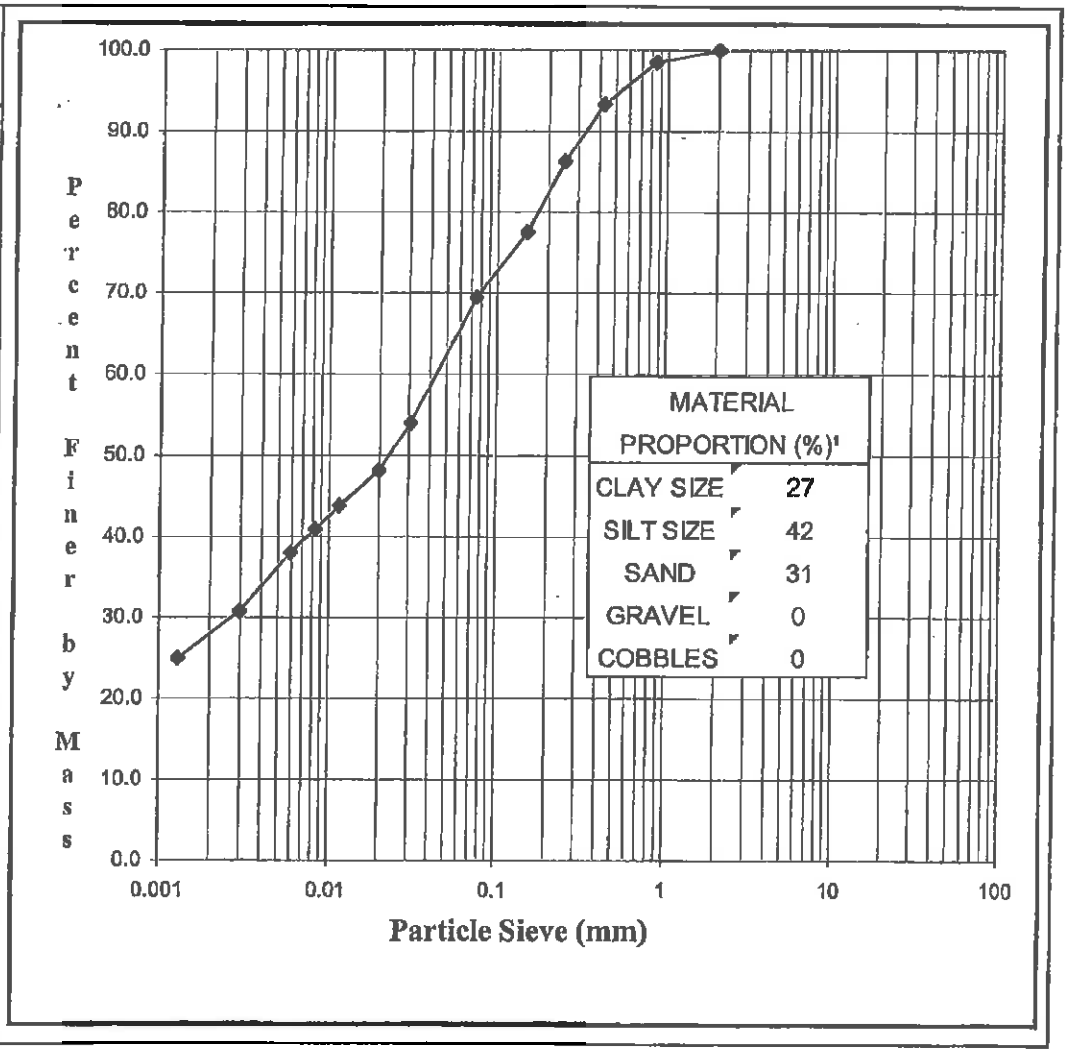
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 38-2
SAMPLE NO.: 11164
DEPTH: 7.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.5
425 µm	93.4
250 µm	86.3
150 µm	77.5
75 µm	69.4
31 µm	54.0
20 µm	48.2
12 µm	43.8
8 µm	40.9
6 µm	38.0
3 µm	30.8
1 µm	25.0



Reviewed by: _____ EIT ~~P.Eng.~~

Note 1: Classified by the Modified Unified Soil Classification System

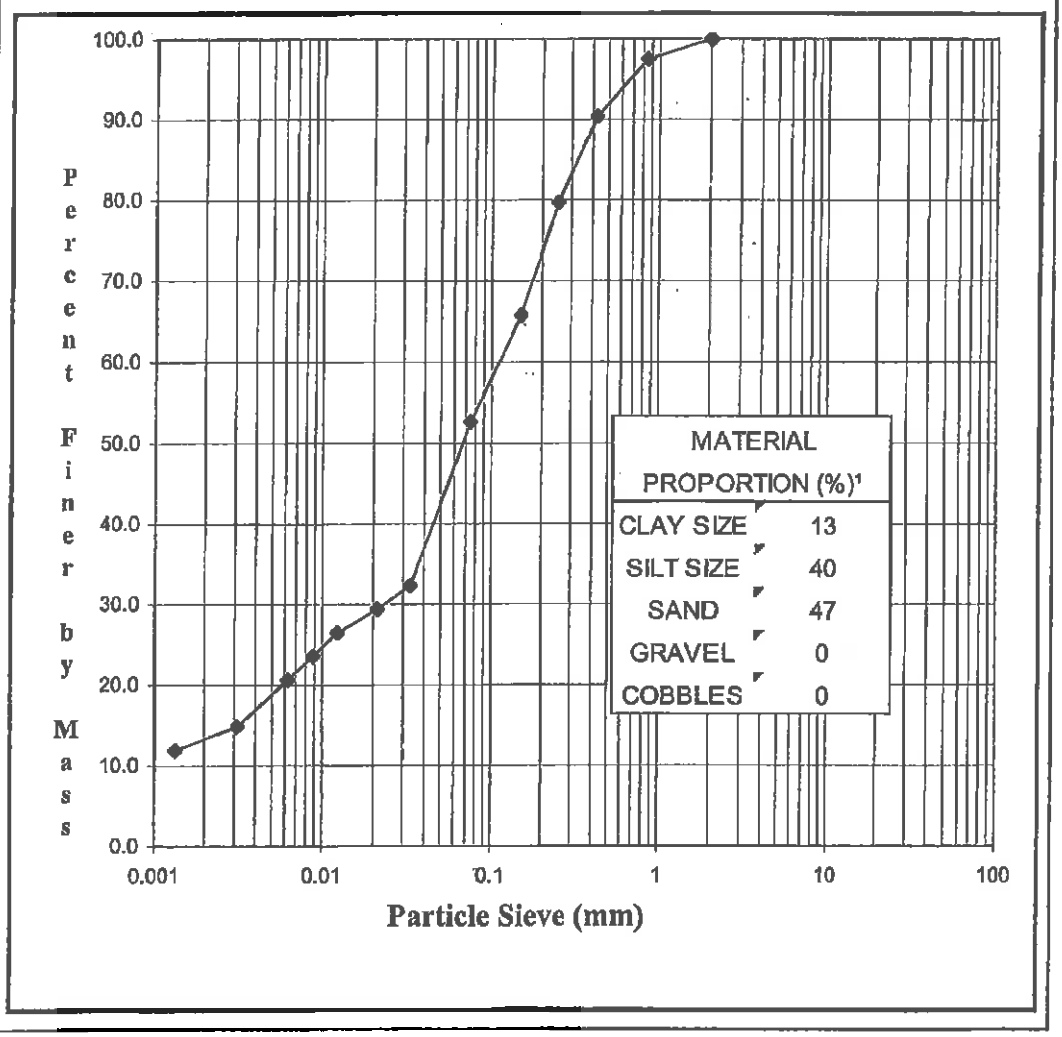
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 39-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Silty Sand some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	97.5
425 µm	90.3
250 µm	79.7
150 µm	65.8
75 µm	52.6
33 µm	32.3
21 µm	29.4
12 µm	26.5
9 µm	23.6
6 µm	20.7
3 µm	14.8
1 µm	11.9



Reviewed by: _____ EIT P.Eng.

Note 1: Classified by the Modified Unified Soil Classification System

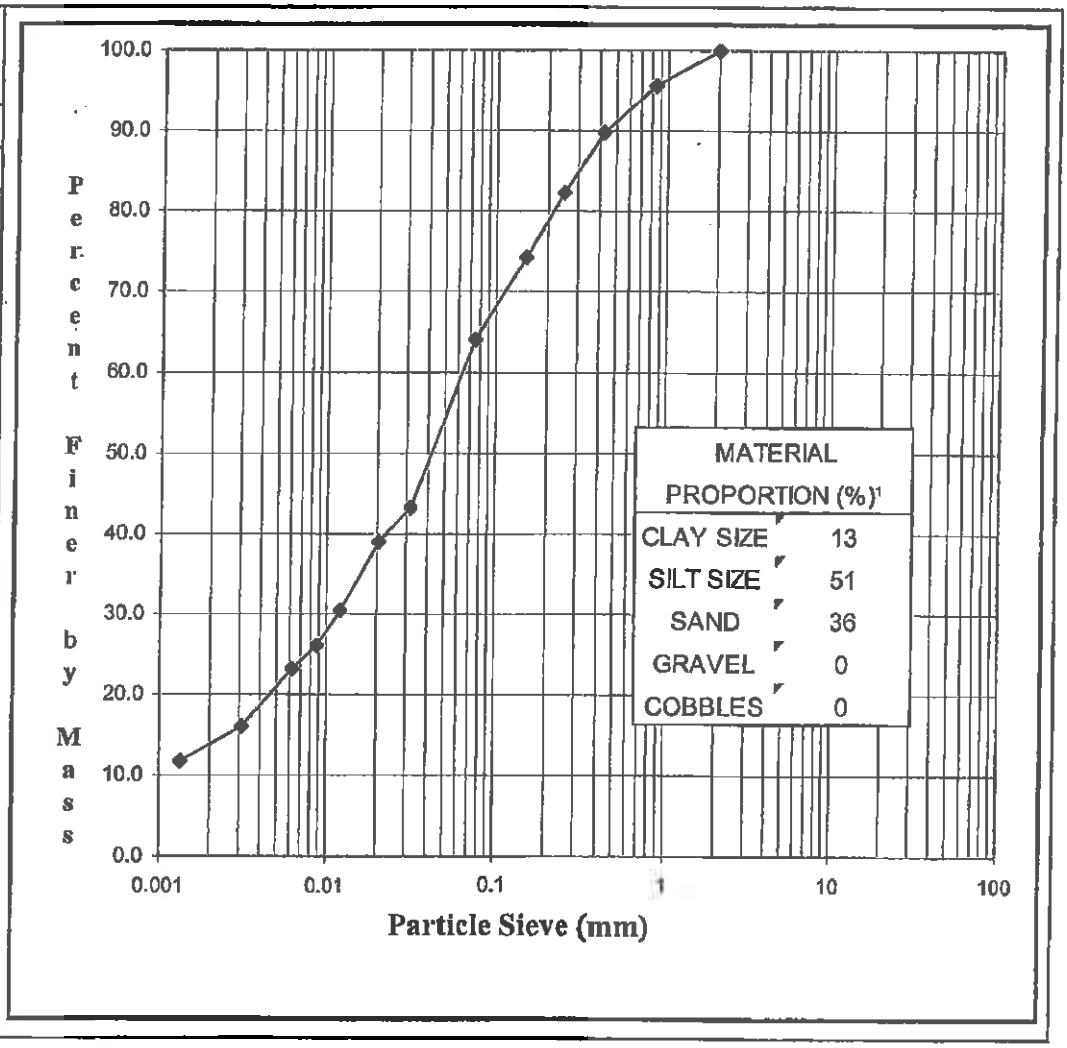
McINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: **Olds Mountian View Subdivision**
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 40-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	95.6
425 µm	89.8
250 µm	82.3
150 µm	74.2
75 µm	64.0
32 µm	43.3
20 µm	39.0
12 µm	30.4
9 µm	26.1
6 µm	23.2
3 µm	16.1
1 µm	11.8



Reviewed by: _____ EIT ~~P.Eng.~~

Note 1: Classified by the Modified Unified Soil Classification System

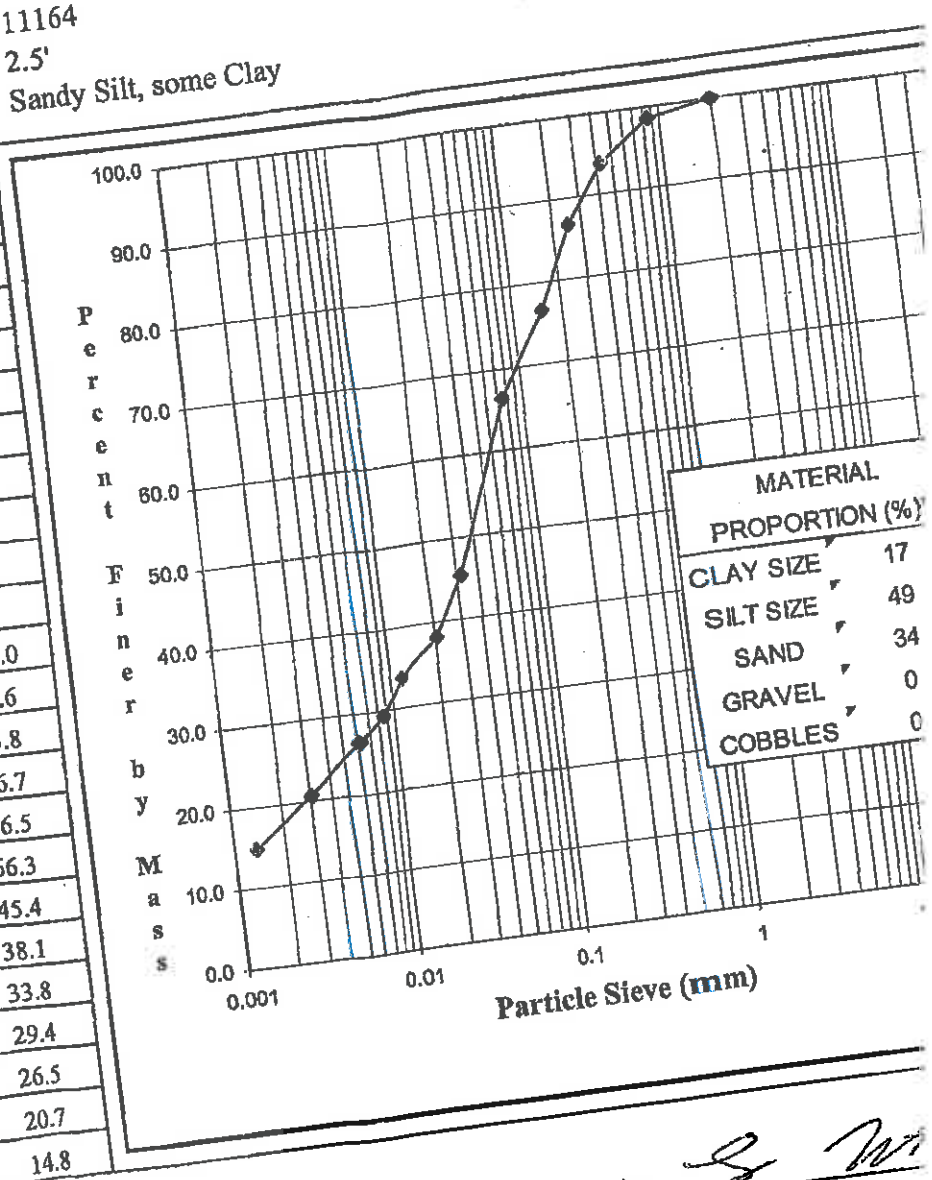
MCINTOSH LALANI ENGINEERING LTD.

STANDARD TEST METHOD FOR PARTICLE SIZE

(Test Method ASTM D422)

PROJECT: Olds Mountian View Subdivision
CLIENT: MMM Group
PROJECT NO.: ML-3899
LOCATION: 41-1
SAMPLE NO.: 11164
DEPTH: 2.5'
DESCRIPTION: Sandy Silt, some Clay

PARTICLE SIZE	PERCENT PASSING
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
12.5 mm	
10 mm	
5 mm	
2 mm	100.0
850 µm	98.6
425 µm	93.8
250 µm	86.7
150 µm	76.5
75 µm	66.3
53 µm	45.4
38 µm	38.1
12 µm	33.8
9 µm	29.4
6 µm	26.5
3 µm	20.7
1 µm	14.8



Reviewed by: _____

Classified by the Modified Unified Soil Classification System

Presented hereon is for the sole use of (Name) client. ML is not responsible, and not held liable, for use made of this report by any other party, with or without the knowledge of ML.

The testing services reported are in accordance with recognized industry standards. These data do not include or imply compliance or material suitability. ML will provide it upon written request.

performed [illegible] noted. No [illegible] ation [illegible]

APPENDIX A

BOREHOLE LOGS

APPENDIX A

BOREHOLE LOGS

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:1
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.16

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1017
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace coal, light brown.		1-1			9.6		$[SO_4]$ = 0.03%		
1		- cobbles. - trace sand, medium brown.									1016
2				1-2			9.0				1015
3					CI						1014
		- trace oxides.		1-3			12.5				
4											1013
5 ▼				1-4			11.3				1012
6		Silt - dense, damp, weathered, some siltstone, medium grey.									1011
				1-5	ML						
7											1010
8		Silty Clay (Till) - stiff, damp, trace gravel, medium plastic, medium grey.									1009
				1-6	CI						
9											1008
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 7.05 M April 02, 2008 - 5.09 M									1007

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 5.09 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:2
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.60

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1015
		Sandy Silt (Till) - compact, damp, trace clay and gravel, light brown.		2-1	MLS		11.2				
1											1014
				2-2		9-10-18	9.7				
2											1013
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace coal and oxides, medium brown.		2-3							
3											1012
		- trace sandstone.		2-4		4-10-13	11.4				
		- sand lenses throughout.		2-5							
4											1011
		- poor recovery, rock in spoon.		2-6	CI	8-16-18	6.8				
5				2-7							1010
6		- medium grey.		2-8		4-14-15	11.6				
				2-9							1009
7											1008
8		Bedrock (Siltstone) - strong, dry, platey, medium grey.		2-10		2-8-9					
		- hard drilling.		2-11	BE						1007
9											1006
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 3.42 M April 02, 2008 - 3.46 M									1005

M/L STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.42 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:3
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.45

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1015
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides and coal, medium brown.		3-1			10.9				
1							PI = 25.5				1014
					CI						
2		- sand lense.		3-2			12.7				1013
3		Bedrock (Sandstone) - strong, dry, light brown.									1012
					BE						
4				3-3							1011
		END OF HOLE at a depth of 4.3m. 25mm PVC standpipe installed to a depth of 4.3m with 2.4m slotted. Dry upon completion.									
5		Water Levels: March 07, 2008 - 2.96 M April 02, 2008 - 2.98 M									1010
6											1009
7											1008
8											1007
9											1006
10											1005

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/24/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Dominik Ken	Completion Depth: 14 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.96 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:4
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1016.98

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick			TPSL						1016
		Silty Clay (Till) - firm, damp, some sand, trace gravel, low to medium plastic, trace oxides, light brown.		4-1			10.2				
1											
		- trace sand and coal, spoon bouncing on a cobble.		4-2		bouncing	10.0				1015
2		- stiff.		4-3							
											1014
3				4-4		6-10-16	12.5				
				4-5	CI						1013
4	▼										
				4-6		4-9-13	13.8				1012
5				4-7							
											1011
6		- medium grey.		4-8		3-4-7	13.8				
				4-9							1010
7											
				4-10		3-5-10					1009
8		REFUSAL on a boulder at a depth of 7.9m. 25mm PVC standpipe installed to a depth of 7.9m with 6.1m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - 6.80 M April 02, 2008 - 3.98 M									1008
9											
											1007
10											

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/24/08

McIntosh Lalani Engineering
Calgary, AB
(403) 291-2345

Logged By: Cominik Ken	Completion Depth: 26 ft
Reviewed By Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.98 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:5
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.55

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1014
		Silty Clay (Till) - firm, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		5-1			11.9		$[SO_4]$ = 0.02%		
1		- trace sand.			CI						1013
		- stiff.									
2		- trace sandstone, low plastic.		5-2			11.3				1012
		- low to medium plastic.									
3											1011
				5-3			13.1				
4					CL-ML						1010
5		- trace free water, sand lense, medium grey.		5-4			14.0				1009
6		Silt - dense, dry, medium grey.			ML						1008
		Silty Clay (Till) - stiff, damp, trace gravel, medium plastic, trace oxides, medium grey.		5-5			12.6				
7											1007
8		- moist.			CI						1006
				5-6							
9											1005
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 2.93 M April 02, 2008 - 2.95 M									1004

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:6
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.44

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1015
1		Sandy Silt (Till) - dense, damp, trace gravel, light brown.		6-1	MLS		10.1				1014
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		6-2		5-15-7					1013
				6-3			12.4				
3				6-4		6-8-9					1012
				6-5	CI		14.9				
4		- spoon on a rock.		6-6		7@4"					1011
5				6-7							1010
6		REFUSAL on a boulder at a depth of 5.5m. 25mm PVC standpipe installed to a depth of 5.5m with 3.0m slotted. Dry upon completion.									1009
7		Water Levels: March 07, 2008 - 4.64 M April 02, 2008 - 3.64 M									1008
8											1007
9											1006
10											1005

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Logged By: Dominik Ken	Completion Depth: 18 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.64 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:7
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.34

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1017
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		7-1			11.0 PI = 13.2				
1											
		- trace sand and coal.									1016
2				7-2			11.7				1015
3											
				7-3			11.3				1014
4					CI						
											1013
5				7-4			11.6				
6		- medium grey.									1012
				7-5			14.6				1011
7											
											1010
8											
				7-6							1009
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1008
10		Water Levels: March 07, 2008 - 2.86 M April 02, 2008 - 2.78 M									1007

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Logged By: Cominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 2.78 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:8
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.49

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						1014
1		Silt (Till) - compact, moist, trace sand, clay and gravel, trace oxides, medium brown.		8-1	ML		15.4				1013
2				8-2		2-5-6	11.9				1012
				8-3							
3		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		8-4		5-7-16	14.1				1011
4				8-5							1010
5		- trace siltstone.		8-6		6-13-14	11.5				1009
		- medium grey.		8-7	CI						
6				8-8		3-7-11	12.1				1008
7				8-9							1007
8		- trace fine grain sand lenses throughout.		8-10		3-6-8					1006
		- no sand lenses.		8-11							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Level: March 07, 2008 - 4.15 M April 02, 2008 - 3.02 M									1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Marlin	Drilled on: 2/20/2008
Groundwater Depth: 3.02 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:9
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.10

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1015
		Silty Clay (Till) - stiff, damp, some sand, trace gravel, medium plastic, trace oxides, medium brown.		9-1			19.5		$[SO_4]$ = 0.02%		
1		- trace sand.									1014
2		- gravel lense.		9-2			19.1				1013
3											1012
				9-3			11.3				
4		- medium grey.			CI						1011
5				9-4			13.2				1010
6											1009
7				9-5							1008
8											1007
				9-6							
9											1006
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 6.1m with 4.6m slotted. 3.0m of slough in hole. Dry upon completion.									1005
		Water Levels: March 07, 2008 - 3.69 M April 02, 2008 -3.24 M									

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: 3.24 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:10
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.42

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1018
		Sandy Silt - compact, damp, light brown.		10-1	MLS		9.6				
1											1017
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		10-2			12.5				1016
3											
		- medium grey.		10-3			16.5				1015
4											1014
5				10-4	CI		11.2				1013
6											1012
7				10-5							1011
8											1010
				10-6							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 3.35 M April 02, 2008 - 3.45 M									1008

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 3.35 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:11
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.20

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1018
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		11-1	ML		7.4				
1											1017
		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		11-2		3-5-8	11.8				
2				11-3							1016
3				11-4		2-7-9	13.4				1015
		- medium grey.		11-5							
4											1014
				11-6	CI	1-7-8	12.9				
5				11-7							1013
6				11-8		2-3-7					1012
				11-9							
7											1011
				11-10		3-4-7					
8				11-11							1010
		Silt (Till) - compact, damp, trace sand and siltstone, medium grey.			ML						
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
		Water Levels: March 07, 2008 - 3.64 M April 02, 2008 - 3.76 M									
10											1008

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 3.64 m	Page 1 of 1

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:12
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.11

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1020
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		12-1			6.9				
1											1019
		- damp, some clay, medium brown.			ML						
2		- sand lense approx. 75mm thick, dry, fine to medium grain.		12-2			10.1				1018
		- trace clay.									
		- some clay.									
3		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.									1017
				12-3			10.1 PI = 19.9				
4											1016
5				12-4			12.1				1015
6		- trace sandstone, greyish brown.			α						1014
				12-5			10.1				
7											1013
8				12-6							1012
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1011
10		Water Levels: March 07, 2008 - 7.78 M April 02, 2008 - 7.15 M									1010

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/24/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: 7.15 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:13
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1016.90

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, medium brown.		13-1	ML		108		$[SO_4]$ = 0.147%		1016
1		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		13-2		4-5-8	127				1015
2				13-3							
3		- dark brown.		13-4		4-8-10	133				1014
				13-5							1013
4											
				13-6		5-8-10	135				1012
5		- trace siltstone, no gravel, medium grey.		13-7	CI						
6				13-8		4-8-10					1011
		- trace gravel, greyish brown.		13-9							1010
7											
		- trace sandstone, trace free water in spoon, medium grey.		13-10		5-5-8					1009
8				13-11							1008
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1007
10		Water Levels: March 07, 2008 - 7.09 M April 02, 2008 - 5.82 M									1006

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 5.82 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:14
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.46

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1015
1		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		14-1	ML		5.5				1014
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		14-2			12.8				1013
3											1012
4				14-3			13.1				1011
5					CI						1010
6		- trace siltstone, medium grey.		14-4			13.0				1009
7				14-5							1008
8 ▼											1007
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.		14-6							1006
10		Water Levels: March 07, 2008 - Dry at 8.74m April 02, 2008 - 8.0m									1005

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 8 m	Page 1 of 1

Project: Old's Mountain View Subdivision	Drilling Information:	Borehole No.:15
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.29

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1014
		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		15-1			2.5				
1					ML						1013
		- spoon on a rock.		15-2		bouncing					
2											1012
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		15-3			8.8				
3		- very stiff, trace precipitates in spoon.		15-4		4-7-11	11.1 PI = 23.1		$[SO_4]$ = 1.070%		1011
				15-5							
4											1010
				15-6		4-8-11	12.0				
5		- trace sandstone, medium grey.		15-7							1009
					CI						
6		- poor sample recovery.		15-8		5-8-9					1008
				15-9							
7											1007
				15-10		5-7-10					
8				15-11							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - Dry to 9.07m April 02, 2008 - Dry to 9.03m									1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:16
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.34

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 150 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 305mm thick.			TPSL						1014
1		Silt (Till) - compact, damp, trace sand and gravel, trace oxides and coal, medium brown. - trace clay.		16-1	ML		10.8				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown. - medium plastic.		16-2	CL-ML		12.2				1012
3											1011
4				16-3			12.2				1010
5		- dark brown.		16-4	CI		11.5				1009
6		- moist, dark grey.									1008
7				16-5							1007
8				16-6							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - 4.80 M April 02, 2008 - 3.52 M									1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.52 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:17
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.81

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1015
1		Sill (Till) - compact, damp, trace sand, clay and gravel, trace oxides, medium brown.		17-1	ML		9.4				
		- some clay.									
2		Silty Clay (Till) - very stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		17-2		9-11-14	16.4				1014
				17-3							
3				17-4		2-8-9	12.9				1013
4				17-5							1012
5				17-6		5-14-12	13.2				1011
		- dark greyish brown.		17-7	CI						
6				17-8		3-10-14					1010
7				17-9							1009
8		- trace sandstone, medium grey.		17-10		4-7-9					1008
				17-11							
9											1007
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1006
		Water Levels: March 07, 2008 - 4.44 M April 02, 2008 - 3.92 M									1005

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.92 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:18
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1010.77

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 305mm thick.			TPSL						1010
		Silt - compact, damp, trace sand, dark grey.					11.9				
1		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.		18-1	ML						1009
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		18-2			18.4 Pl = 25.5				1008
3											
4				18-3	CI		13.6				1007
5		- greyish brown.		18-4			12.9				1006
6											1005
7		Bedrock (Sandstone) - very strong, damp, medium grey. REFUSAL in bedrock at a depth of 6.8m. 25mm PVC standpipe installed to a depth of 6.8m with 4.6m slotted. Dry upon completion. Water Levels: March 07, 2008 - 2.51 M April 02, 2008 - 2.65 M		18-5	BE						1004
8											1003
9											1002
10											1001
											1000

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Logged By: Scott Bryan	Completion Depth: 22.3 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 2.51 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:19
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.28

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0			Topsoil - approx. 150mm thick.			TPSL						1020
			Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		19-1			15.2				
1			- damp, trace sand and clay, medium brown.			ML						1019
					19-2		6-8-11		■			
2			Silty Sand - compact, damp, fine to medium grain, medium brown.		19-3			7.2				1018
						SM						
3			Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		19-4		4-11-14@4"	32.7				1017
			- spoon on a rock.		19-5				●			
4												1016
					19-6		3-9-16	13.3	■			
5					19-7				●			1015
			- dark brownish grey.									
6			- spoon on a rock, medium grey.			CI						1014
	▼				19-8			11.4	●			
7												1013
					19-9		2-4-8		■			
8					19-10				●			1012
9			END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1011
			Water Levels: March 07, 2008 - 8.01 M April 02, 2008 - 6.84 M									
10												1010

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 6.84 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:20
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.75

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						
		Sandy Silt (Till) - compact, dry, trace gravel and oxides, light brown.		20-1			31				1018
1					MLS						
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		20-2			12.2		$[SO_4]$ = 0.017%		1017
3		- dark brownish grey.									1016
4				20-3			12.1				1015
		- medium grey.									1014
5				20-4	CI		12.7				1013
6											
7				20-5							1012
8											1011
				20-6							1010
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 5.57 M April 02, 2008 - 4.93 M									1008

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/1/408

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 4.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:21
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1020.06

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						1020
		Silt (Till) - compact, dry, trace sand and gravel, light brown.		21-1	ML		4.5				
1											1019
		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		21-2		14-10-10	9.9				
2				21-3							1018
3				21-4		4-7-11	13.0				1017
				21-5							
4											1016
				21-6		4-8-12	13.1				
5											1015
				21-7	CI						
6		- dark grey.		21-8		4-6-10	12.6				1014
				21-9							
7											1013
				21-10		3-4-7					
8		- trace sandstone.									1012
				21-11							
9											1011
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									
10		Water Levels: March 07, 2008 - 8.03 M April 02, 2008 - 7.80 M									1010

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: 7.8 m	Page 1 of 1

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:22
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.48

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKET PEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		22-1	ML		5.2				1017
1											
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		22-2			10.7				1016
3											1015
4				22-3			12.7				1014
		- moist.									1013
5				22-4	CI		13.6				1012
6		- damp to moist, medium grey.									1011
7				22-5							1010
8		- some sand, lense throughout.									1009
		- trace siltstone, light grey.		22-6							1008
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1007
10		Water Levels: March 07, 2008 - Dry to 8.78m April 02, 2008 - Dry to 8.79m									

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:23
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.75

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						1014
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		23-1			8.2		$[SO_4]$ = 0.130%		
1		- trace clay.			ML						
				23-2		3-7-9	11.1				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		23-3							
3				23-4		4-5-9	12.6				1012
		- moist.		23-5							
4											1011
				23-6		3-7-10	12.2				
5		- medium grey.		23-7	CI						1010
6				23-8		3-6-9					1009
				23-9							
7											1008
				23-10		2-4-8					
8											1007
9		Silty Sand - compact, damp, medium grain, medium grey.		23-11	SM						1006
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Wet upon completion.									
10		Water Levels: March 07, 2008 - 8.01 M April 02, 2008 - 7.45 M									1005
											1004

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 7.45 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:24
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.29

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 200mm thick.			TPSL						1014
1		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, medium brown. - some clay.		24-1	ML		8.1				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		24-2			12.6				1012
3		- dark brown.									1011
4				24-3			13.4				1010
5		- moist, medium grey.									1009
6				24-4	CI		13.6				1008
7		- trace siltstone.		24-5							1007
8				24-6							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - 7.80 M April 02, 2008 - 5.28 M									1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 5.28 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:25
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.98

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						
1		Sill (Till) - compact, damp, some clay, trace sand and gravel, trace oxides, medium brown. - trace clay, light brown.		25-1	ML		7.5				1013
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		25-2		3-7-8	12.3				1012
3				25-3							1011
4		- dark brown.		25-4		3-6-10	13.4				1010
5		- dark grey.		25-5							1009
6				25-6	CI	4-10-10	12.8				1008
7				25-7							1007
8				25-8		4-7-8	12.5				1006
9				25-9							1005
10		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - 6.83 M April 02, 2008 - 4.14 M		25-10		2-6-9					1004
				25-1							

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 4.14 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:26
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.52

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1014
		Sandy Silt - dense, damp, trace gravel and oxides, light brown.		26-1	MLS		18		$[SO_4]$ = 0.02%		
1											1013
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.									
2				26-2			130				1012
3											
				26-3			131				1011
4											
5				26-4	CI		123				1009
6		- gravel lense.									
		- medium grey.		26-5							1008
7											1007
8											
				26-6							1006
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1005
10		Water Levels: March 07, 2008 - Dry to 9.03m April 02, 2008 - Dry to 9.02m									1004

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML STANDARD.GDT 4/14/08

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Logged By: Dominik Ken	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/25/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:27
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1010.62

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						1010
1		Silty Clay (Till) - very stiff, damp, trace sand and gravel, low plastic, trace oxides and coal, medium brown.		27-1	CL-ML		10.7				
2		- medium plastic.		27-2		7-10-13	12.5				1009
		- sandstone cobble.		27-3							
3				27-4	CI	6-10-13	12.1				1008
4				27-5							1007
5				27-6		12-13-18	13.2				1006
		Silt - compact, damp, trace sand, olive brown.		27-7	ML						
6		Silty Clay (Till) - hard, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		27-8		7-11-19	13.0				1005
7				27-9	CI						1004
				27-10		4/9-bouncing					1003
8		Bedrock (Sandstone) - very strong, dry, light brown.		27-11	BE						
		END OF HOLE at a depth of 8.2m. 25mm PVC standpipe installed to a depth of 8.2m with 6.1m slotted. Dry upon completion.									1002
9		Water Levels: March 07, 2008 - 3.61 M April 02, 2008 - 3.77 M									1001
10											1000

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Logged By: Scott Bryan	Completion Depth: 27 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 3.61 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:28
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1019.36

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (60 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 75mm thick.			TPSL						1019
		Silty Sand - compact, dry, medium grain, light brown.		28-1			6.2				
1					SM						1018
				28-2			7.3				
2											1017
		Silt (Till) - compact, damp, trace sand, medium brown.									
3											1016
				28-3	ML		10.8				
4											1015
		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.									
5		- medium grey with trace medium brown.		28-4			13.4				1014
6											1013
		- trace free water.		28-5	CI						
7											1012
8				28-6							1011
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1010
10		Water Levels: March 07, 2008 -5.30 M April 02, 2008 - 5.35 M									1009

ML STANDARD AUGER 3899, OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 5.3 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:29
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1018.68

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | CRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSL						1018
		Sandy Silt - compact, dry, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		29-1	MLS		3.8				
1											
				29-2		7-9-9					1017
2		Silty Clay (Till) - very stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		29-3			11.2				1016
3		- dark brown.		29-4		3-7-11	12.4				
				29-5							1015
4											
				29-6		3-8-10					1014
5				29-7	CI						
											1013
6		- dark brownish grey.		29-8		3-8-10	13.4				
		- dark grey.									1012
7				29-9							
		- stiff.		29-10		2-4-7	14.6 PI = 20.9				1011
8											
				29-11							1010
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1009
10		Water Levels: March 07, 2008 - 5.53 M April 02, 2008 - 5.34 M									1008

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: 5.34 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:30
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1019.11

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 100mm thick.			TPSC						1019
		Silt (Till) - compact, dry, trace clay, sand and gravel, trace oxides and coal, medium brown.		30-1	ML		9.7		$[SO_4]$ = 0.02%		
1		- some sand.									1018
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		30-2			11.6				
2											1017
3		- moist.									1016
				30-3			13.4				
4											1015
		- dark brownish grey.									
5				30-4	CI		13.2				1014
		- dark grey.									
6											1013
				30-5							
7		- trace sandstone.									1012
8											1011
				30-6							
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1010
		Water Levels : March 07, 2008 - Dry to 8.74m April 02, 2008 - Dry to 8.75m									
10											1009

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/15/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:31
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1017.59

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE NO	USCS	BLOWS /150 mm	Elevation (m)
0	Topsoil - approx. 150mm thick.		TPSL		1017
	Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.	31-1	ML		
1					1016
		31-2		8-9-13	
2	Silty Clay (Till) - very stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.	31-3			1015
3		31-4		3-7-13	
		31-5			1014
4					
	- medium grey.	31-6		3-6-14	1013
5		31-7	CI		
					1012
6	- no spoon, rock in hole.				
		31-8			1011
7					
		31-9		2-4-10	1010
8					
		31-10			1009
9	END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.				1008
10	Water Levels March 07, 2008 - Dry to 8.60m April 02, 2008 - Dry to 8.58m				1007

PLASTIC M.C. LIQUID (10 20 30 40)

BLOW COUNT (10 20 30 40)

POCKETPEN (kPa) (80 160 240 320)

OTHER DATA

SLOTTED PIEZOMETER

3.9 | 10.1 | 11.6 | 12.7 | PI = 22.6 | 13.1

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/19/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:32
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1015.21

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 200mm thick.			TPSL						1015
		Silt (Till) - compact, dry, trace sand and gravel, trace oxides, light brown.		32-1			7.5				
1		- some gravel.			ML						1014
2		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		32-2			8.6				1013
3											1012
4				32-3			12.6				
5											1011
6		- trace siltstone, medium grey.		32-4	CI		13.2				1010
7				32-5							1009
8											1008
9				32-6							1007
		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1006
10		Water Levels: March 07, 2008 - 8.98 M April 02, 2008 - 8.93 M									1005

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: 8.93 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:33
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.57

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) / Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm
0		Topsoil - approx. 330mm thick.			TPSL	
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides and coal, medium brown.		33-1		
1		- trace clay.			ML	
				33-2		4-7-7
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown.		33-3	CL-ML	
3		- medium plastic.		33-4		3-6-7
				33-5		
4						
		- dark brown.		33-6		3-6-9
5				33-7		
	▼	- dark grey.				
6				33-8	CI	3-7-8
				33-9		
7						
				33-10		2-6-9
8				33-11		
9		END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.				
10		Water Levels: March 07, 2008 - Dry to 8.96m April 02, 2008 - 5.82m				

PLASTIC — M.C. — LIQUID (10 20 30 40)

BLOW COUNT (10 20 30 40)

POCKET PEN (kPa) (80 160 240 320)

OTHER DATA: $[SO_4]$ = 0.03%

SLOTTED PIEZOMETER

Elevation (m): 1013 1012 1011 1010 1009 1008 1007 1006 1005 1004 1003

ML STANDARD AUGER 3899 OLDS MOUNTAIN VIEW SUBDIVISION.GPJ M-L STANDARD.GDT 4/1/408

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 5.82 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:34
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1014.53

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 225mm thick.			TPSL						1014
1		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, dark brown.		34-1			21.8				1013
2		- some clay.		34-2	ML		10.9				1012
3		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, dark brown.		34-3			14.1 PI = 24.8				1011
4											1010
5				34-4	CI		12.6				1009
6 ▼											1008
7		Silt - compact, damp, trace siltstone, olive brown.		34-5	ML		13.3				1007
8		Silty Clay (Till) - stiff, moist, trace sand, gravel and siltstone, medium plastic, trac oxides and coal, dark brown with trace light grey.		34-6	CI		13.7				1006
9											1005
10		END OF HOLE at a depth of 9.1m 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion. Water Levels: March 07, 2008 - 7.66 M April 02, 2008 - 6.34 M									1004

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 6.34 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:35
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:1013.00

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	SLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0			Topsoil - approx. 175mm thick.			TPSL						1013
			Silt (Till) - compact, damp, trace sand and gravel, trace oxides, light brown.		35-1	ML		11.0				
1												1012
					35-2		4-8-9	11.9		$[SO_4]$ = 0.02%		
2												1011
			Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		35-3							
3					35-4		3-5-9	11.0				1010
			- very stiff.		35-5							
4												1009
					35-6		3-10-12	9.2				
5			- dark grey.									1008
					35-7	CI						
6	▼											1007
					35-8		2-8-9					
7					35-9							1006
8					35-10		2-6-9					1005
					35-11							
9			END OF HOLE at a depth of 9.1m. 25mm PVC standpipe installed to a depth of 9.1m with 6.1m slotted. Dry upon completion.									1004
10			Water Levels: March 07, 2008 - Dry at 8.81 M April 02, 2008 - 6.29 M									1003

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Logged By: Scott Bryan	Completion Depth: 30 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: 6.29 m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:36
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 405mm thick.			TPSL						
1		Silt (Till) - compact, damp to moist, trace sand, clay and gravel, trace oxides, medium brown.		44-1	ML		8.2		Clay % = 14, Silt % = 51, Sand % = 35		
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		44-2	CI		13.9				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion. Water Levels: March 07, 2008 -Dry to 2.94m April 02, 2008 - Dry to 2.93m									
4											
5											
6											
7											
8											
9											
10											

ML STANDARD AUGER 3899. OLDS MOUNTAIN VIEW SUBDIVISION.GPJ ML_STANDARD.GDT 4/14/08

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:37
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.		37-1	ML		8.6		Clay % = 22, Silt % = 42, Sand % = 36		
1		- trace clay.									
		Silty Clay (Till) - stiff, damp, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		37-2	CI		12.8				
2											
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 3.0m April 02, 2008 - Dry to 3.0m									
4											
5											
6											
7											
8											
9											
10											

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:38
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick			TPSL						
		Silt (Till) - compact, damp, trace clay, sand and gravel, trace oxides, medium brown.		38-1	ML		9.0				
1		- some clay.									
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.			CI						
2		- trace precipitates.		38-2			13.9		Clay % = 27, Silt % = 42, Sand % = 31		
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.8m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 3.0m April 02, 2008 - Dry to 2.98m									
4											
5											
6											
7											
8											
9											
10											

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:39
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CCRE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC M.C. LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 150mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand, clay and gravel, trace oxides, medium brown. - some clay.		39-1	ML		B4		Clay % = 13, Silt % = 40, Sand % = 47		
1											
		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, low plastic, trace oxides and coal, medium brown.			CL-ML						
2		- medium plastic.		39-2	CI		B2	●			
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion. Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.94m									
4											
5											
6											
7											
8											
9											
10											

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:40
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 125mm thick.			TPSL						
		Silt (Till) - compact, dry, some sand, trace gravel, trace oxides, light brown.		40-1	ML		3.8		Clay % = 13, Silt % = 51, Sand % = 36		
2		Silty Clay (Till) - stiff, moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		40-2	CI		11.8	●			
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.93m									
4											
5											
6											
7											
8											
9											
10											

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/20/2008
Groundwater Depth: m	Page 1 of 1

Project: Olds Mountain View Subdivision	Drilling Information:	Borehole No.:41
	Beck Drilling & Environmental Services	Project No.:3899
Client: MMM Group	CME 55 SS-Auger	Elevation:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | AUGER SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	USCS	BLOWS /150 mm	PLASTIC / M.C. / LIQUID (10 20 30 40)	BLOW COUNT (10 20 30 40) / POCKETPEN (kPa) (80 160 240 320)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil - approx. 175mm thick.			TPSL						
		Silt (Till) - compact, damp, trace sand and gravel, trace oxides, medium brown.		41-1	ML		11.8		Clay % = 17, Silt % = 49, Sand % = 34		
2		Silty Clay (Till) - stiff, damp to moist, trace sand and gravel, medium plastic, trace oxides and coal, medium brown.		41-2	CL		13.1				
3		END OF HOLE at a depth of 3.0m. 25mm PVC standpipe installed to a depth of 3.0m with 1.5m slotted. Dry upon completion.									
		Water Levels: March 07, 2008 - Dry to 2.92m April 02, 2008 - Dry to 2.92m									
4											
5											
6											
7											
8											
9											
10											

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Logged By: Scott Bryan	Completion Depth: 10 ft
Reviewed By: Lee Martin	Drilled on: 2/21/2008
Groundwater Depth: m	Page 1 of 1

APPENDIX B

DESIGN AND CONSTRUCTION GUIDELINES

BACKFILL MATERIALS AND COMPACTION

Maximum density, as used in this section, means Standard Proctor Maximum Dry Density (ASTM Test D698) unless specified noted otherwise. Optimum moisture content is as defined in this text.

"General engineered fill" materials should comprise clean, well-graded granular soils or inorganic, low-plastic cohesive soils. Such material should be placed in compacted lifts not exceeding 200 mm and compacted to not less than 98 percent of maximum density, at a moisture content at or slightly above optimum.

"Structural fill" materials should comprise clean, well-graded inorganic granular soils. Such fill should be placed in compacted lifts not exceeding 150 mm and compacted to not less than 98 percent of maximum density, at a moisture content at or slightly (0 to 3 percent) above optimum.

"Landscape fill" material may comprise soils without regard to engineering quality. Such soils should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of maximum density.

Backfill adjacent to and above footings, abutment walls, basement walls, grade beams and pile caps or below highway, street or parking lot pavement sections should comprise general engineered fill materials as defined above.

Backfill supporting structural loads should comprise structural fill materials as defined above.

Backfill adjacent to exterior footings, foundation walls, grade beams and pile caps and within 300 mm of final grade should comprise low-plastic cohesive general engineered fill as defined above. Such backfill should provide a relatively impervious surface layer to reduce seepage in the sub-soil.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflection is apparent, the compactive effort should be reduced accordingly. In order to reduce potential compaction induced stresses, only hand held compaction equipment should be used in the compaction of fill within 500 mm of retaining walls or basement walls.

Backfill materials should not be placed in a frozen state or placed on a frozen subgrade. All lumps of materials should be broken down during placement.

Where the maximum-sized particles in any backfill material exceed 50 percent of the lift thickness or minimum dimension of the cross-section to be backfilled, such particles should be removed and placed at other more suitable locations on site or screened-off to delivery to site.

Bonding should be provided between backfill lifts, if the previous life has become desiccated. For fine-grained materials, the previous lift should be scarified to 75 mm in depth followed by proper moisture conditioning and recompaction.

Recommendations for the specifications for various backfill types are presented below.

"Clean, well-graded inorganic granular soils" should conform to the following grading:

SIEVE SIZES (SQUARE OPENINGS)	PERCENT PASSING BY WEIGHT
200 mm	100 of Total Sample
150 mm	96 - 100 of Total Sample
75 mm	60 - 80 of Total Sample
25 mm	70 - 100 of Material Passing 75 mm Sieve
4.75 mm	25 - 63 of Material Passing 75 mm Sieve
1.18 mm	14 - 41 of Material Passing 75 mm Sieve
0.60 mm	7 - 30 of Material Passing 75 mm Sieve
0.15 mm	3 - 18 of Material Passing 75 mm Sieve
0.075 mm	2 - 9 of Material Passing 75 mm Sieve

Any grading variation from the above should be at the discretion of the Engineer; however, the percent of material passing the 0.075 mm sieve size should not exceed ⅔ of the material passing the 0.6 mm sieve. The pit-run gravel should be free of any form of coating and any gravel containing clay, loam or other deleterious materials should be rejected. No oversized material should be tolerated.

"Crushed gravel", should conform to the following grading:

PERCENT PASSING BY WEIGHT
NOMINAL GRAVEL SIZE

SIEVE SIZES (SQUARE OPENINGS)	100 mm	50 mm	25 mm
100 mm	100	---	---
75 mm	90 - 100	---	---
50 mm	---	100	---
40 mm	60 - 80	90 - 100	---
25 mm	---	---	100
20 mm	40 - 66	50 - 75	95 - 100
10 mm	25 - 54	25 - 52	60 - 80
4.75 mm	15 - 43	15 - 40	40 - 60
2.36 mm	10 - 35	10 - 33	28 - 48
0.60 mm	5 - 23	5 - 23	13 - 29
0.30 mm	---	---	9 - 21
0.15 mm	3 - 12	2 - 14	6 - 15
0.075 mm	2 - 10	1 - 10	4 - 10

Gravel:

100 mm Crushed Gravel: At least 13 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

50 mm Crushed Gravel: At least 13 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

25 mm Crushed Gravel: At least 50 percent by weight of the material retained on the 4.75 mm sieve should have two more fractured faces.

Any gravel containing deleterious material should be rejected.

"Coarse gravel" for bedding and drainage should conform to the following grading:

	PERCENT PASSING BY WEIGHT (NOMINAL GRAVEL SIZE)	
SIEVE SIZES (SQUARE OPENINGS)	50 mm	40 mm
50 mm	100	---
40 mm	90 - 100	100
25 mm	---	95 - 100
20 mm	35 - 70	---
15 mm	---	25 - 60
10 mm	10 - 30	---
4.75 mm	0 - 5	0 - 10
2.36 mm	---	0 - 5

"Coarse sand" for bedding and drainage should conform to the following grading:

SIEVE SIZES (SQUARE OPENINGS)	PERCENT PASSING BY WEIGHT
10 mm	100
4.75 mm	95 - 100
2.36 mm	80 - 100
1.18 mm	50 - 85
0.60 mm	25 - 60
0.30 mm	10 - 30
0.15 mm	2 - 10

"Lean-mix concrete" should be low strength concrete having a minimum 28 days compressive strength of 3.5 MPa.

CONSTRUCTION EXCAVATIONS

Construction should be in accordance with good practice and comply with the requirements of the responsible agencies.

All excavations greater than 1.5 m deep should be sloped or shored for work protection.

Shallow excavations up to 3 m depth may use temporary side slopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3 m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to McIntosh•Lalani Engineering Ltd. for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. McIntosh•Lalani Engineering Ltd. can provide further information on monitoring and testing procedures, if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down at 45^0 from a horizontal, from the base of foundations of adjacent structures, intersects the extent of the proposed excavation, then these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

SHALLOW FOUNDATIONS

Design and construction of shallow foundations should comply with relevant Building Code requirements.

The term "shallow foundations" includes strip and spread footings, mat slab and raft foundations.

Minimum footing dimensions in plan should be 0.45 m and 0.9 m for strip and square footings, respectively.

No loose, disturbed or sloughed material should be allowed to remain in open foundation excavations. Hand cleaning should be undertaken to prepare an acceptable bearing surface. Recompaction of disturbed or loosened bearing surface may be required.

Foundation excavation and bearing surfaces should be protected from rain, snow, freezing temperatures, drying and the ingress of free water, during and after footing construction.

Footing excavations should be carried down into the designated bearing stratum.

After the bearing surface is approved, a mud slab should be poured to protect the soil and provide a working surface for construction, should immediate foundation construction not be intended.

All constructed foundations should be placed on unfrozen soils, which should be at all times protected from frost penetration.

All foundation excavations and bearing surface should be observed by a qualified geotechnical engineer to confirm that the recommendations contained in this report have been followed and that soil conditions are consistent with those assumed in the design.

Where over-excavation has been carried out through a weak or unsuitable stratum to reach into a suitable bearing stratum or where a foundation pad is to be placed above stripped natural ground surface, such over-excavation may be backfilled to subgrade elevation utilizing either structural fill or lean-mix concrete. These materials are defined under the separate heading "Backfill Materials and Compaction."

APPENDIX F2

2024 Watt –

Geotechnical Report

Bifröst

Environmental and Remediation Services Inc.

NETOOK CROSSING

Geotechnical Assessment

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TABLE OF CONTENTS

1.0 INTRODUCTION 3

2.0 PROJECT BACKGROUND 3

3.0 GEOTECHNICAL INVESTIGATION 3

3.1 Investigation Methodology 3

3.2 Subsurface Ground Conditions 4

3.3 Subsurface Groundwater Conditions 6

4.0 GEOTECHNICAL COMMENTS AND RECOMMENDATIONS 8

4.1 General Geotechnical Commentary 8

4.2 Site Preparation 8

4.3 Backfill and Compaction 9

4.4 Strip and Spread Footings 9

4.5 Non-Structural Floor Slabs-on-Grade 10

4.6 Lateral Earth Pressures 11

4.7 Seismic Considerations 12

4.8 Frost Protection 12

4.9 Temporary Excavation and Dewatering 13

4.10 Site Grading and Drainage 14

4.11 Pavement Design Considerations 14

4.12 Concrete Exposure Class 15

4.13 Review, Testing and Field Inspection 15

5.0 LIMITATIONS 16

6.0 CLOSURE 16

LIST OF TABLES

Table 1: Soils Index Test Results – Silty Clay Till 5

Table 2: Water Level Readings – Summary to Date 6

Table 3: Recommended Asphaltic Concrete Pavement Structure 14

APPENDICES

APPENDIX A: Figure 1 – Borehole Location Plan

APPENDIX B: Borehole Records

APPENDIX C: Laboratory Test Results

1.0 INTRODUCTION

Watt Consulting Group (WATT) was retained by B&A Planning Group to complete a geotechnical assessment to support development within the Netook Crossing subdivision. The objective of the geotechnical assessment was to determine the subsurface ground and groundwater conditions at the project site, and to provide geotechnical comments and recommendations pertinent to project design and construction.

2.0 PROJECT BACKGROUND

The project site is located east of Olds, Alberta, North of Highway 27, West of Range Road 12, and South of the Olds Golf Club. The site is a currently undeveloped quarter section, used for agriculture activities.

Based on a review of published geological data and our local experience, the subsurface ground conditions at the project site are anticipated to comprise of clay till, underlain by completely to highly weathered bedrock.

A geotechnical investigation is required to support development and building permit applications, and to provide comments and recommendations for foundation design and other development features.

3.0 GEOTECHNICAL INVESTIGATION

3.1 Investigation Methodology

During a previous Geotechnical Investigation by MacIntosh Lalani in 2008, nine boreholes were drilled within the project area. To comply with the County spacing requirements, an additional twenty seven boreholes were completed, representing a total of thirty six boreholes on the subject property. On December 1 and 2, 2023, WATT staff oversaw the drilling of twenty seven geotechnical boreholes at the approximate locations shown on Figure 1 – Borehole Location Plan, attached in Appendix A. Borehole locations were selected based on site access and locations of underground and overhead utilities at time of drilling. Drilling was carried out by Venom Drilling of Blackfalds, Alberta, using a truck mounted solid stem auger drill rig. All boreholes were advanced to the design depth of 6 meters below ground surface (mbgs), with the exception of BH23-04 which reached early refusal. Standard penetration Tests (SPTs) were completed at select intervals, and soil samples were taken from the split spoon sampler and from the auger flight.

The subsurface ground and groundwater conditions were logged in the field by WATT staff as drilling proceeded. The subsurface stratigraphy encountered is shown on the

Borehole Records attached in Appendix B. 25 mm diameter standpipe piezometers were installed in each of the boreholes.

Soil samples obtained during drilling were submitted to Solum Consultants Ltd. Geotechnical and Materials Testing Laboratory in Calgary, Alberta. The following soil index tests were completed on select soil samples:

- Moisture content determination (ASTM D2216) – 159 tests;
- Particle size analysis (ASTM D422) – 5 tests;
- Atterberg limits (ASTM D4318) – 6 tests;
- Water soluble sulphate concentrations (CSA A23.1) – 4 tests; and
- California Bearing Ratio (CBR) – 1 test.

The soils laboratory test results are shown on the Borehole Records, are attached in Appendix C, and are discussed in Section 3.2.

3.2 Subsurface Ground Conditions

The subsurface stratigraphy encountered at the discrete borehole locations generally comprised of topsoil and fill, underlain by silty clay till and completely to highly weathered bedrock. The Borehole Records attached to this report present WATT's interpretation of the materials encountered. It is noted that the subsurface stratigraphy may be variable between borehole locations. A description of the subsurface soil strata encountered is provided in the following sections.

3.2.1 Topsoil

Topsoil was encountered in all 27 holes, ranging in depth from 0.2 to 0.3 metres.

3.2.2 Silty Clay Till

Silty clay till was the predominant material encountered in all boreholes. The till was light brown to grey in color, contained some sand and trace gravel. Field records indicate the silty clay is low to medium plasticity and was damp to moist. Oxidized stains were observed at variable depths, indicating groundwater influence or infiltration of surface water.

SPTs completed within the silty clay till stratum resulted in N-values ranging from 7 to 32 blows per 300 mm of penetration, indicating the material is firm to hard. Moisture content tests completed within the silty clay till ranged from 9% to 19%, indicating damp to wet sample conditions. A summary of particle size distribution and Atterberg Limits Test (plasticity) are shown below:

Table 1: Soils Index Test Results – Silty Clay Till

Borehole ID	Depth (m)	Atterberg Limits			Particle Size			
		Liquid Limit	Plastic Limit	Plasticity Index	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH23-03	2.0	26	17	9	-	-	-	-
BH23-04	2.0	32	17	15	-	-	-	-
BH23-06	2.0	38	15	23				
BH23-08	3.0	-	-	-	0	34	48	18
BH23-11	2.0	37	15	22				
BH23-11	3.0	-	-	-	2	31	47	21
BH23-15	2.0	34	14	20	-	-	-	-
BH23-16	1.0	-	-	-	2	36	41	21
BH23-18	2.0	-	-	-	0	32	42	26
BH23-19	2.0	34	14	20	-	-	-	-
BH23-24	3.0	-	-	-	1	34	42	24

3.2.3 Silty Sand (Completely Weathered Bedrock)

Silty sand was observed in 12 of the 27 boreholes, typically underlying the topsoil. The silty sand was noted to contain traces of clay and gravel and described as light brown, still and low plasticity.

Three SPTs completed within the silty sand stratum resulted in N-values ranging from 10 to 13 blows per 150 mm, indicating the material is stiff. Moisture content tests completed on SPT and auger samples ranged from 9% to 13%, indicating dry to damp sample conditions.

3.3 Subsurface Groundwater Conditions

During the subsurface investigation on December 1 and 2, 2023, standpipe piezometers were installed in each borehole to monitor groundwater levels. The piezometers were subsequently damaged and unable to be read. To allow determination of the stabilized groundwater elevation, the 27 piezometers were re-installed on February 8, 2024.

Very little groundwater seepage was observed in all boreholes and each borehole was noted to be dry upon the completion of drilling. It should be recognized that groundwater levels vary seasonally and from year to year, and are dependent on many factors including surface drainage, precipitation and the hydrology of the area. Groundwater conditions may also change over time due to site development, such as new building construction or site re-grading.

The installed standpipes will continue to be read to determine the stabilized groundwater elevation and a follow-up report with this information will be provided. For preliminary purposes, the coefficient of permeability of the silty clay till may be taken as $k \sim 1*10^{-7}$ m/s.

Since standpipe piezometers were re-installed on February 8, 2024, they have continued to be read frequently to determine the groundwater elevation at each location. The below table summarizes the groundwater readings to date, indicating the highest groundwater recorded and corresponding elevation for each borehole:

Table 2: Water Level Readings – Summary to Date

Borehole ID	Surface Elevation (masl)	Highest Depth to Water Recorded (m)	Maximum Groundwater Elevation (masl)
BH23-01	1018.8	2.5	1016.3
BH23-02	1019.0	2.7	1016.3
BH23-03	1019.3	4.4	1014.9
BH23-04	1018.3	2.0	1016.3
BH23-05	1020.3	Dry	N/A
BH23-06	1018.6	3.1	1015.5
BH23-07	1018.5	3.5	1015.0
BH23-08	1018.1	2.2	1015.9

Borehole ID	Surface Elevation (masl)	Highest Depth to Water Recorded (m)	Maximum Groundwater Elevation (masl)
BH23-09	1019.4	Dry	N/A
BH23-10	1019.6	4.1	1015.5
BH23-11	1019.5	4.4	1015.1
BH23-12	1018.9	Dry	N/A
BH23-13	1018.7	4.6	1014.1
BH23-14	1020.4	Dry	N/A
BH23-15	1019.5	Dry	N/A
BH23-16	1019.6	5.6	1014.0
BH23-17	1018.8	Dry	N/A
BH23-18	1019.5	Dry	N/A
BH23-19	1018.3	3.9	1014.4
BH23-20	1019.9	5.0	1014.9
BH23-21	1019.4	5.0	1014.4
BH23-22	1018.2	Dry	N/A
BH23-23	1018.9	Dry	N/A
BH23-24	1019.3	Dry	N/A
BH23-25	1018.5	4.7	1013.8
BH23-26	1018.0	Dry	N/A
BH23-27	1019.0	Dry	N/A

4.0 GEOTECHNICAL COMMENTS AND RECOMMENDATIONS

4.1 General Geotechnical Commentary

Design and construction recommendations pertaining to the geotechnical aspects of the proposed development are provided in this report section based on the results of the geotechnical evaluation fieldwork, the laboratory testing carried out, and WATT's understanding of the proposed development at time of report preparation. These recommendations are intended to provide support for various project concepts and specifications as well as insight to determine the most appropriate site-specific construction methodologies. As well, WATT should be retained to review applicable geotechnical aspects of the final design (drawings and specifications) and provide all necessary field reviews.

The subsurface ground and groundwater conditions encountered at the project site are considered suitable for the proposed development. Geotechnical considerations for the project site are summarized as follows:

- Competent foundation materials in form of silty clay till were encountered at the project site. The materials are suitable to support shallow foundations in form of spread and strip footings.
- Discussions and recommendations regarding groundwater will be provided in the follow-up report once stabilized groundwater elevations are available.

Detailed design and construction comments and recommendations for the proposed development are provided in the following Sections.

4.2 Site Preparation

All deleterious material such as, but not limited to, surface vegetation and organic soils as well as all fill soils should be sub-excavated to competent, minimum stiff silty clay till subgrade material.

Prior to any development activities, all exposed subgrade surfaces subject to site development should be proof-rolled using heavy equipment such as a loaded tandem dump truck. All loose or soft areas must be sub-excavated to competent material and replaced with approved engineered fill. Further recommendations for backfill materials (types, re-use of site soils) and compaction requirements are provided in Section 4.3. The final subgrade surface should be carefully graded to prevent ponding and to direct water away from the building area.

It is recommended to carry out construction during the spring, summer and fall months. If construction is carried out during winter conditions, the subgrade should be protected from freezing. In addition, the subgrade should be protected from wetting or drying, both before and after the placement of engineered fill, granular base material, or concrete. Subgrade surfaces that are allowed to dry or become wet should be scarified, moisture conditioned, and re-compacted.

4.3 Backfill and Compaction

The native silty clay till soils encountered at the project site are generally suitable for re-use as engineered fill. All engineered fill should be placed in lifts not exceeding 200 mm thickness (loose measure) and should be compacted to minimum 98% of Standard Proctor maximum dry density (SPMDD), at a moisture content of 0 to +2% of its optimum moisture content (OMC) for compaction purposes. The maximum lift thickness may vary depending on the compaction equipment used and should be verified through field density testing at time of construction. It is noted that underlying completely weathered silty sand bedrock is likely not suitable for re-use as engineered fill, due to the high silt content and associated difficulty to achieve optimum moisture content for compaction purposes.

Structural fill should comprise of well graded, 25 mm minus crushed gravel. It should be placed in lifts not exceeding 200 mm thickness (loose measure) and should be compacted to minimum 100% of SPMDD, at a moisture content of ±3% of OMC.

All fill must be free from topsoil, organics, fill and otherwise deleterious material, and must not be frozen at time of placement.

4.4 Strip and Spread Footings

This Section provides geotechnical design parameters in Limit States Design format as per National Building Code of Canada – 2019 Alberta Edition. As outlined above, conventional spread and strip footings are considered suitable for the proposed building. It is anticipated that footings will be within the silty clay till material.

The following geotechnical foundation design recommendations are based on the foundation dimensions ranging from 0.5 to 2.0 m widths, and a minimum embedment depth of 0.5 m below ground level (measured from ground surface or top of slab-on-grade, whichever is less). Increased embedment depths will be needed to provide adequate soil cover for frost protection purposes (see Section 4.8).

Values for the factored Ultimate Limit States (ULS) and Serviceability Limit States (SLS) geotechnical bearing resistances for bearing capacities for shallow foundations with

above noted dimensions may be taken as 250 kPa and 150 kPa respectively. A resistance factor of 0.5 as per Canadian Building Code has been applied to determine the factored bearing resistance at ULS conditions. SLS bearing capacities were determined based on typical tolerable total and differential settlement of 25 mm and 20 mm, respectively.

For larger footings, the geotechnical bearing resistance would generally increase. However, settlement of the footings would also increase and add to the high risk of excessive total and differential settlement for the building structure. WATT would be pleased to complete additional analysis and provide further geotechnical input should footings with more than 2.0 m width be required.

The values presented above are for vertical, concentric loading, as described in the CFEM (2006). For footings subjected to eccentric loads, the following equivalent footing width should be used to calculate the bearing pressure of the footing:

$$B' = B - 2e$$

$$L' = L - 2e$$

Where B' is the equivalent footing width; B is the actual footing width; L' is the equivalent footing length, L is the actual footing length, and e is the eccentricity of the load. Effects of inclined loads, if any, should also be considered as discussed in the CFEM (2006).

The subgrade surfaces beneath building foundations must be free from frozen, loose or soft materials. The base of all footings must be inspected by qualified geotechnical personnel prior to placing concrete to confirm the above design bearing pressures and to ensure there are no disturbances or deleterious materials present.

4.5 Non-Structural Floor Slabs-on-Grade

Non-structural cast-in-place concrete slabs-on-grade, placed on approved subgrade soils, are typically used as floor systems. A 150 mm thick levelling course comprising of 25 mm minus crushed gravel (similar to structural fill, see Section 4.3) should be placed below non-structural slab-on-grades. The crushed gravel levelling course should be placed within ±3% of its optimum moisture content for compaction purposes (OMC) and compacted to minimum 100% of its Standard Proctor maximum dry density (SPMDD). It is recommended to place a non-woven geotextile separation membrane between cohesive engineered fill and granular fill.

Vertical differential movements between non-structural floor slabs-on-grade and structural building elements are inevitable and considered to be acceptable as per the current standard of practice. Slabs should float on the subgrade and only be tied into the foundation walls or grade beams at doorways. To reduce the effects of vertical slab

movement (e.g. potential slab cracking, partition wall distortion, cracking of brittle finishing surfaces), the following provisions should be implemented to allow the slab to move independently of the structural components of the building:

- Partition and non-bearing walls should not be rigidly connected to bearing walls or columns;
- Reinforce the concrete and articulate the slab at regular intervals to control cracking;
- Heating ducts placed beneath the floor slab should be insulated to minimize drying and shrinkage of clay fill/till soils; and
- Piping and electrical conduits should permit flexibility and some movement.

Non-structural slabs-on-grade supported by fill (i.e. backfill placed surrounding basement walls) are not recommended as consolidation settlement of fill may occur. These areas should be design as suspended slabs, supported by basement walls and surrounding footings.

It is noted that the basement floor slab may also be designed as a structural (raft) slab-on-grade, which would reduce effort for detail footing excavations underneath a non-structural slab-on grade. WATT would be pleased to provide parameters for raft foundation design should this option be considered for this project.

4.6 Lateral Earth Pressures

Lateral pressures are to be considered acting on below-grade building perimeter walls. The earth pressures will be induced by new fill placed within basement excavation, which is anticipated to comprise of local silty clay till, or imported soil of similar nature.

Active earth pressure conditions should be used in establishing earth pressures acting on the underground structure walls. The lateral pressure applied to subgrade walls is calculated using the following formula:

$$P = K\ (\gamma bH + q)$$

Where:

P = lateral earth pressure (kPa)

K = earth pressure coefficient

γ_b = soil unit weight

H = Height of wall (m)

q = surcharge load (if applicable)

An earth pressure coefficient of K_a = 0.40 may be used for active earth pressure conditions. The soil unit weights for the re-worked silty clay till may be taken as 19 kN/m^3 above the groundwater table.

The equation for lateral earth pressure assumes a horizontal ground surface behind the buried wall. If the ground surface slopes away from the wall, design pressure should be re-evaluated. Hydrostatic pressures acting on below grade walls may also be considered in design, depending on the selected waterproofing/dewatering method (see Section **Error! Reference source not found.**).

4.7 Seismic Considerations

Seismic design for residential structures is based on the National Building Code of Canada (NBCC). The primary objective of the NBCC earthquake resistant design requirements is to protect the life and safety of the building occupants as the building responds to strong ground shaking. Structures designed in conformance with the NBCC provisions may undergo extensive structural damage during strong ground shaking but should not collapse. Collapse is defined to be a state where occupants can no longer exit the building because of structural failure. This implies that supporting foundations necessary to ensure the building's post-earthquake stability must be protected against excessive movement under strong ground shaking.

Based on the results of the field investigation, it is appropriate to classify the ground conditions at the project site as a Class C Site for seismic site response. Liquefaction of the silty clay till soils or completely to highly weathered bedrock encountered at the project site is unlikely.

4.8 Frost Protection

Minimum soil cover of 1.5 and 2.0 m should be provided for heated and unheated structures, respectively. Alternatively, rigid insulation may be used to provide equivalent frost protection. Grade beams that do not have adequate soil cover for frost protection should be constructed with a minimum 100 mm void space below the grade beam. It is noted that the frost penetration depths provided above are based on the native, cohesive soils at the project site. Greater frost depths are to be considered if native materials are being replaced, e.g. if granular fill is used to backfill temporary excavations or utility trenches.

Concrete flatwork should be designed with anticipation of some frost heave occurring. Concrete sidewalks should be dowelled into footings or grade beams in threshold areas where heave of concrete panels would obstruct the proper opening of doors and present tripping hazards. As the outside of edge of these panels will still heave, the panel should

either be properly jointed to control crack locations or reinforced by placement of adequate reinforcing steel. Alternatively, rigid insulation may be placed below flatwork to prevent frost formation in the underlying subgrade. WATT can provide detailed recommendations for such insulation if required.

4.9 Temporary Excavation and Dewatering

Temporary excavations (estimated duration of less than 6 months) will be required to construct the basement and for utility trenches. The excavations for this project site are anticipated to be primarily within native silty clay till soil.

All excavations should follow Alberta Occupational Health and Safety Code Standards, Chapter 32 “Excavation and Tunneling”. The subsurface soils encountered at the project site are to be classified as “likely to crack or crumble soil”. Excavations of up to 1.5 m depth may be cut vertically into the soil strata. Excavations with greater depth may be sloped to within 1.5 m of the bottom of the excavation at an angle of not less than 45º measured from the vertical. It is anticipated that excavation depths will not exceed approximately 4.0 mbgs. Excavations of greater depth should be subject to a slope stability assessment.

Seepage into the excavation at the project site may occur, depending on the groundwater conditions encountered during construction. Although the boreholes were noted to be dry during drilling, the stabilized groundwater elevation may help to determine the risk of seepage during excavations.

Due to the fine-grained nature of the water bearing ground stratum, temporary excavation side slopes may not be stable without prior lowering of the groundwater level. A suitable dewatering method for the subsurface ground conditions at the project site comprises of a series of vacuum-assisted wellpoints. The wellpoint system should be designed by a qualified dewatering designer/contractor, who may also provide dewatering alternatives based on local experience.

Prior to allowing workers to enter the construction excavations, a thorough inspection should be undertaken for evidence of instability (cracks, bulging, sloughing, seepage, or else). Any loose/unstable soils or cobbles should be scaled from the excavations prior to worker entry. All unsupported excavations should be monitored on a daily basis for evidence of slope movements such as slumping, bulging, or else. Any such movements should be reported to WATT and remedial stability measures undertaken immediately.

Stockpiles of construction materials, excavated soil, construction equipment, or traffic should be kept away from the slope crest/edge by a distance equal to the depth of excavation. The vibration created from heavy machinery operations or compaction

processes can destabilize a slope; hence, use of heavy machinery within close proximity to excavated slopes should be minimized.

Temporary shoring will be required if the aforementioned excavation geometry cannot be facilitated, or deeper excavations are required for construction aspects. A qualified shoring consultant/contractor should be retained to design a suitable shoring system for the project site, if required.

4.10 Site Grading and Drainage

To provide proper drainage for the proposed development and to direct surface water to areas away from proposed structures, final site landscaping grades should be sloped away from building perimeter walls to mitigate the potential of surficial water ponding in localized areas adjacent to structures. Minimum final site grades draining away from building structures of 1.0% in paved areas, 1.5% in non-paved areas, and 3.0% within 2.0 m laterally of structures adjacent to landscaped areas are recommended.

All downspouts should be directed away from the building structure to a site gradient that promotes positive surficial drainage away from the attached building. Downspouts should not be directed into the perimeter drain or weeping tile system (if constructed).

4.11 Pavement Design Considerations

Recommendations for asphaltic concrete structures placed on suitably prepared subgrade soils as outlined in Section 4.2 are provided in the following table:

Table 3: Recommended Asphaltic Concrete Pavement Structure

Material	Minimum Design Thickness (mm)			
	Paved Lane	Residential Local		Residential Collector
Asphalt Concrete	75	75*	90	100
25 mm Crushed Gravel Base	100	150	150	175
80 mm Crushed Granular Subbase	300	300	200	300

*Red Deer County Specifications require a minimum depth of asphaltic concrete on local roads and primary access lanes with deep utility services of 90mm.

Minimum thicknesses have been designed based on a soaked CBR of 3.1%.

All materials used to construct asphaltic concrete pavement structures should comply with the Mountain View County Standard Specifications (current edition). Test results verifying materials properties should be provided to WATT to confirm compliance with the specifications prior to use and placement on site.

4.12 Concrete Exposure Class

Four sulphate (SO_4) in groundwater samples, mg/L resulted in sulphate concentrations ranging from 521 to 918 mg/L. The test result indicated negligible exposure to concrete in contact with the subsurface soils. Accordingly, concrete placed in contact with the soil can comprise of Type GU cement. In addition, all concrete must be designed in accordance with CSA A23.1-04 i.e. air-entraining agents are required in freeze/thaw zones. Any imported fill to be placed in contact with concrete should also be tested for water-soluble sulphate content and the above recommendations re-evaluated.

4.13 Review, Testing and Field Inspection

WATT should be given the opportunity to review details of the design and specifications related to geotechnical aspects of this project prior to construction. The recommendations provided in this report should be supported by an adequate scope of field review during construction. All construction should be undertaken by an experienced contractor for the foundation and earthworks construction. As a minimum, an adequate scope of field review is as follows:

- Shallow Foundations → Observation of all bearing surfaces prior to fill or concrete placement;
- Floor Slab-on-Grades → Observation of all subgrades prior to fill or concrete placement;
- Engineered Fill Placement → Full-time monitoring and compaction testing during fill placement;

All geotechnical field reviews must be carried out by a qualified geotechnical engineer or technician independent of the contractor. Failure to provide an adequate level of field review for construction of the foundations may be in contradiction of the Alberta Building Code requirements.

5.0 LIMITATIONS

The recommendations provided in this geotechnical evaluation report are based on the interpreted findings encountered within three (3) geotechnical boreholes drilled across the project site. The subsurface soil and groundwater conditions observed during borehole drilling are anticipated to be reasonably representative of the project site; however, it should be noted that innate variable conditions may be encountered at the time of various construction aspects. WATT should be notified and given the opportunity to re-evaluate current information, if required, should geotechnical conditions other than those reported herein be identified at any stage of development.

This report has been prepared with accepted geotechnical soil and foundation engineering practices/principles for the project details specified within this report. The recommendations presented herein are subject to an adequate level of inspection during construction and any relevant Alberta Building Code requirements, or their validity may be jeopardized. No other warranty is expressed or implied.

6.0 CLOSURE

We trust that the information contained in this report meets your present requirements. Please do not hesitate to contact the undersigned with any questions, or should you require further geotechnical input on this project.

Sincerely,

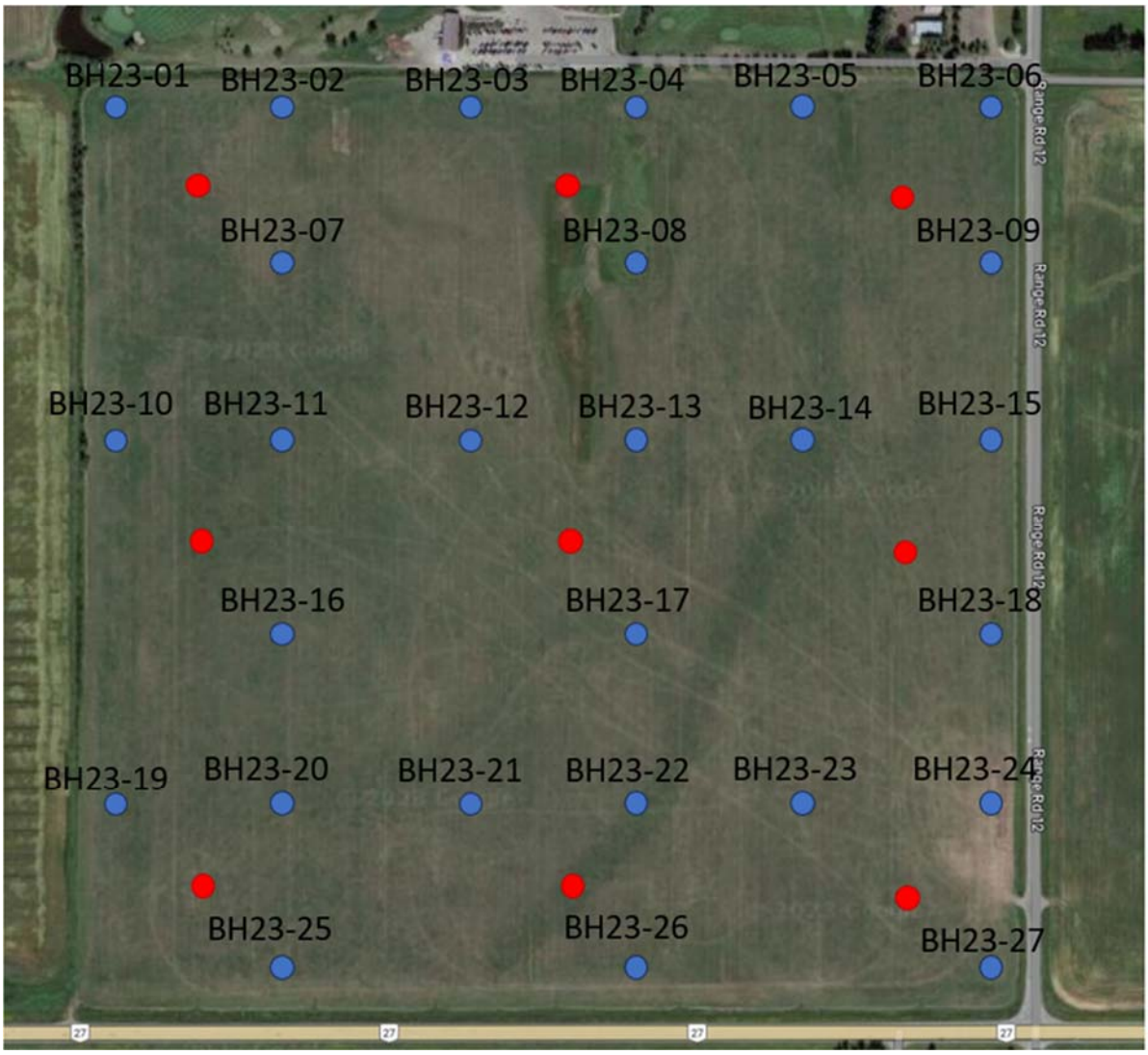
WATT Consulting Group

Joel Rombough, *P.Eng.*

Geotechnical Lead

T 403-462-0718

APPENDIX A:
FIGURE 1 – BOREHOLE LOCATION PLAN



APPENDIX B:
BOREHOLE RECORDS

WELL NUMBER BH23-01

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.8 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.50 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.55	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity. 1.50 / 1017.30	
2	SPT 1	3-5-7 (12)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown, damp, stiff to very stiff.	
3						3.00 / 1015.80	
	SPT 2	3-6-9 (15)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
4			MC = 16%				
5	SPT 3	3-6-11 (17)	MC = 16%				
6							
	SPT 4	3-9-10 (19)	MC = 16%			6.45 / 1012.35	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-02

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.70 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.80	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%			(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 16%				
3							
4	SPT 2	3-4-6 (10)	MC = 16%	CL-ML			
5	SPT 3	3-6-7 (13)	MC = 14% MC = 13%				
6	SPT 4	3-5-9 (14)	MC = 15%			6.45 1012.55	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-03

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.40 m / Elev 1014.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.10	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 14%				
3	SPT 2	3-5-7 (12)	MC = 15%				
4			MC = 17%				
5	SPT 3	4-6-9 (15)	MC = 16%				
6	SPT 4	4-6-12 (18)	MC = 16%			6.45 1012.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-04

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.00 m / Elev 1016.30 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff. Auger refusal due to rock or large boulder.	
2	SPT 1	4-6-9 (15)	MC = 17%				
3						3.00 / 1015.30	

Bottom of hole at 3.00 m.

WELL NUMBER BH23-05

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1020.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.25						1020.05	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 14%				
	SPT 1	4-6-8 (14)					
2			MC = 15%				
3							
	SPT 2	5-8-11 (19)	MC = 15%	CL-ML			
4			MC = 15%				
	SPT 3	5-8-10 (18)					
5			MC = 16%				
6							
	SPT 4	5-7-13 (20)	MC = 15%				
6.45						1013.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-06

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.10 m / Elev 1015.50 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1018.30	Casing Type: 1" PVC
1			MC = 14%			(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	4-7-9 (16)	MC = 16%				
3							
	SPT 2	3-6-7 (13)	MC = 16%	CL-ML			
4			MC = 15%				
5	SPT 3	4-8-15 (23)	MC = 16%				
6							
	SPT 4	5-8-12 (20)	MC = 16%			6.45 / 1012.15	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-07

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.50 m / Elev 1015.00 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.30	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%			(CL-ML) Silty clay till, trace sand. Medium plastic, light brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-4-5 (9)	MC = 16%				
3							
4	SPT 2	3-6-9 (15)	MC = 16%	CL-ML			
5	SPT 3	3-5-7 (12)	MC = 16%				
6							
	SPT 4	3-6-11 (17)	MC = 16%			6.45 1012.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-08

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.1 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.20 m / Elev 1015.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1017.80	Casing Type: 1" PVC
1			MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, dark grey, damp, stiff to very stiff.	
2	SPT 1	3-4-6 (10)	MC = 18%				
3							
4	SPT 2	3-5-7 (12)	MC = 17%				
5	SPT 3	4-6-9 (15)	MC = 16%				
6			MC = 16%				
	SPT 4	5-8-10 (18)	MC = 16%			6.45 / 1011.65	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-09

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 1019.10	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 11%				
2	SPT 1	4-6-9 (15)					
3							
	SPT 2	4-6-10 (16)		CL-ML			
4			MC = 15%				
	SPT 3	4-8-9 (17)					
5			MC = 15%				
6							
	SPT 4	4-8-10 (18)	MC = 16%			6.45 1012.95	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-10

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.10 m / Elev 1015.50 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.35	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 10%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-4-7 (11)	MC = 14%				
3							
4	SPT 2	4-6-7 (13)	MC = 12%				
5	SPT 3	3-5-9 (14)	MC = 14%				
6			MC = 13%				
	SPT 4	3-6-11 (17)	MC = 14%			6.45 / 1013.15	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-11

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.40 m / Elev 1015.10 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.30	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-6 (9)	MC = 15%				
3							
	SPT 2	3-5-8 (13)	MC = 16%				
4			MC = 16%				
5	SPT 3	4-5-7 (12)	MC = 16%				
6							
	SPT 4	4-7-10 (17)	MC = 16%			6.45 1013.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-12

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 14%			(CL-ML) Silty clay till, trace sand. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-4 (7)	MC = 14%				
3							
	SPT 2	3-6-10 (16)	MC = 15%	CL-ML			
4			MC = 15%				
5	SPT 3	4-6-8 (14)	MC = 14%				
6							
	SPT 4	4-8-11 (19)	MC = 14%			6.45 1012.45	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-13

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.7 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.60 m / Elev 1014.10 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.45	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-3-7 (10)	MC = 16%				
3							
4	SPT 2	3-5-7 (12)	MC = 16%				
5	SPT 3	4-7-8 (15)	MC = 15%				
6			MC = 14%				
	SPT 4	5-8-12 (20)	MC = 16%			6.45 / 1012.25	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-14

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1020.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1020.20	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity.	
2	SPT 1	3-4-6 (10)	MC = 12%				
3						3.00 1017.40	
	SPT 2	3-5-7 (12)	MC = 11%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, very stiff.	
4			MC = 12%				
5	SPT 3	4-7-9 (16)	MC = 12%				
6							
	SPT 4	5-8-12 (20)	MC = 14%			6.45 1013.95	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-15

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.30 / 1019.20	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 14%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low plasticity. 1.50 / 1018.00	
2	SPT 1	4-8-10 (18)	MC = 13%				
3	SPT 2	3-7-10 (17)	MC = 15%			(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, very stiff.	
4			MC = 14%	CL-ML			
5	SPT 3	4-8-9 (17)	MC = 15%				
6	SPT 4	5-9-14 (23)	MC = 15%			6.45 / 1013.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-16

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.6 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.60 m / Elev 1014.00 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.35	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 10%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
2	SPT 1	3-5-6 (11)	MC = 13%				
3							
	SPT 2	3-6-7 (13)	MC = 14%				
4			MC = 14%				
	SPT 3	3-6-11 (17)					
5			MC = 14%				
6							
	SPT 4	3-6-11 (17)	MC = 14%			6.45 / 1013.15	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-17

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.8 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 1018.50	Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Brown, damp, compact, low to medium plasticity.	
2	SPT 1	3-6-7 (13)	MC = 15%				
3						3.00 1015.80	
	SPT 2	4-5-8 (13)	MC = 15%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
4			MC = 15%				
5	SPT 3	4-8-10 (18)	MC = 14%				
6							
	SPT 4	5-7-12 (19)	MC = 16%			6.45 1012.35	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-18

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.30 / 1019.20	Casing Type: 1" PVC
1			MC = 12%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity.	
						1.50 / 1018.00	
2	SPT 1	4-8-10 (18)		CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, light grey, damp, very stiff.	
			MC = 14%				
3							
	SPT 2	5-8-9 (17)	MC = 15%				
4			MC = 14%				
	SPT 3	5-8-10 (18)					
5			MC = 15%				
6							
	SPT 4	5-8-11 (19)	MC = 14%			6.45 / 1013.05	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-19

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 3.90 m / Elev 1014.40 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1018.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity. 1.50 / 1016.80	
2	SPT 1	4-6-9 (15)	MC = 10%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, light grey, damp, very stiff.	
3							
4	SPT 2	3-5-7 (12)	MC = 11%				
5	SPT 3	3-5-13 (18)	MC = 11%				
6			MC = 11%				
	SPT 4	3-6-10 (16)	MC = 14%			6.45 / 1011.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-20

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1019.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.00 m / Elev 1014.90 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1019.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 9%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity. 1.50 1018.40	
2	SPT 1	3-5-7 (12)	MC = 13%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3							
	SPT 2	4-7-9 (16)	MC = 12%				
4			MC = 9%				
	SPT 3	4-8-10 (18)					
5			MC = 9%				
6							
	SPT 4	10-16-16 (32)	MC = 6%			6.45 1013.45	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-21

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.4 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 5.00 m / Elev 1014.40 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.15	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 11%	ML		(ML) Silty sand, some gravel, trace clay. Brown, damp, compact, low plasticity. 1.50 / 1017.90	
2	SPT 1	3-3-7 (10)	MC = 11%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, brown, damp, stiff to very stiff.	
3							
	SPT 2	3-5-11 (16)	MC = 17%				
4			MC = 12%				
	SPT 3	4-6-9 (15)					
5			MC = 13%				
6							
	SPT 4	3-8-11 (19)	MC = 19%			6.45 / 1012.95	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-22

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.2 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0.25						1017.95	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace gravel and sand. Medium plastic, brown, damp, stiff to very stiff.	
1			MC = 15%				
	SPT 1	3-4-5 (9)					
2			MC = 16%				
3							
	SPT 2	4-6-7 (13)	MC = 17%	CL-ML			
4			MC = 16%				
	SPT 3	3-5-8 (13)					
5			MC = 14%				
6							
	SPT 4	3-7-8 (15)	MC = 16%				
6.45						1011.75	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-23

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018.9 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1018.70	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 12%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity. 1.50 1017.40	
2	SPT 1	3-3-7 (10)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3	SPT 2	3-5-10 (15)	MC = 16%				
4			MC = 16%				
5	SPT 3	4-8-9 (17)	MC = 16%				
6	SPT 4	5-8-13 (21)	MC = 17%			6.45 1012.45	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-24

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019.3 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil 0.25 / 1019.05	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 14%	ML		(ML) Silty sand, trace clay. Brown, damp, stiff, low plasticity. 1.50 / 1017.80	
2	SPT 1	4-5-7 (12)	MC = 14%	CL-ML		(CL-ML) Silty clay till, trace gravel. Low to medium plastic, brown to grey, damp, stiff to very stiff.	
3							
	SPT 2	4-6-9 (15)	MC = 15%				
4			MC = 15%				
	SPT 3	5-6-8 (14)					
5			MC = 15%				
6							
	SPT 4	8-8-10 (18)	MC = 15%			6.45 / 1012.85	

Bottom of hole at 6.45 m.

WELL NUMBER BH23-25

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 2/12/23 **COMPLETED** 2/12/23
GROUND ELEVATION 1018.5 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING 4.70 m / Elev 1013.80 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
0						0.30 1018.20	Casing Type: 1" PVC
						(CL-ML) Silty clay till, trace sand. Medium plastic, brown to grey, damp, stiff to very stiff.	
1			MC = 13%				
	SPT 1	4-6-8 (14)					
2			MC = 12%				
3							
	SPT 2	4-5-6 (11)	MC = 15%	CL-ML			
4			MC = 15%				
	SPT 3	3-6-11 (17)					
5			MC = 15%				
6							
	SPT 4	3-6-10 (16)	MC = 15%			6.45 1012.05	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-26

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1018 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		0.20 (OH) Topsoil 1017.80	Casing Top Elev: (m) Casing Type: 1" PVC
1			MC = 15%	ML		(ML) Silty sand, trace clay. Brown, damp, loose to compact, low plasticity. 1.50 1016.50	
2	SPT 1	3-4-6 (10)	MC = 16%	CL-ML		(CL-ML) Silty clay till, trace sand and gravel. Low to medium plastic, dark grey, damp, stiff to very stiff.	
3							
	SPT 2	3-5-8 (13)	MC = 16%				
4			MC = 16%				
	SPT 3	4-6-8 (14)					
5			MC = 16%				
6							
	SPT 4	5-8-9 (17)	MC = 16%			6.45 1011.55	

Bottom of hole at 6.45 m.

GENERAL BH / TP / WELL NETOOK CROSSING.GPJ GINT STD CANADA LAB.GDT 19/3/24

WELL NUMBER BH23-27

WATT Consulting Group

CLIENT B&A Planning
PROJECT NAME Netook Crossing
PROJECT NUMBER 3903.T01
PROJECT LOCATION Netook
DATE STARTED 1/12/23 **COMPLETED** 1/12/23
GROUND ELEVATION 1019 m **HOLE SIZE** 6" Auger
DRILLING CONTRACTOR Venom Environmental Drilling
GROUND WATER LEVELS:
DRILLING METHOD Truck Mounted Auger
AT TIME OF DRILLING ---
LOGGED BY GS **CHECKED BY** JR
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
				OH		(OH) Topsoil	Casing Top Elev: (m)
						0.25 1018.75	Casing Type: 1" PVC
1			MC = 13%	ML		(ML) Silty sand, trace clay and gravel. Light brown, damp, stiff, low plasticity.	
						1.50 1017.50	
2	SPT 1	3-4-6 (10)	MC = 14%	CL-ML		(CL-ML) Silty clay till, trace sand. Low to medium plastic, dark grey, damp, stiff to very stiff.	
3							
	SPT 2	3-6-8 (14)	MC = 16%				
4			MC = 16%				
	SPT 3	4-7-9 (16)					
5			MC = 16%				
6							
	SPT 4	5-8-11 (19)	MC = 15%			6.45 1012.55	

Bottom of hole at 6.45 m.