



Terraprobe

*Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing*

HYDROGEOLOGICAL ASSESSMENT ENGLISH CHURCH ROAD MOUNT HOPE, ONTARIO

Prepared For:

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° **Terraprobe Limited**

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HYDROGEOLOGICAL ASSESSMENT ENGLISH CHURCH ROAD MOUNT HOPE, ONTARIO

1.0 INTRODUCTION

Terraprobe Limited is pleased to provide you with our hydrogeological assessment report on the proposed residential lot severances west of Highway 6 South and fronting onto English Church Road. The subject lands lie in the north part of Lot 7, Concession IV, Geographic Township of Glanford, City of Hamilton. Figure 1 is a key map that shows the location of the site.

The proposed severances will create five new lots but only permit the development of three new homes. The severances consist of two blocks of a western block with three proposed lots, two of which already have homes on them (2371 and 2283 English Church Road) and an eastern block containing two lots on undeveloped land.

Figure 2 is an aerial photo showing both blocks of land to be severed and Figure 3 is an enlargement of the aerial photo showing the west block of three lots and the locations of two existing wells on that parcel of land.

2.0 INVESTIGATION PROCEDURES

Investigation procedures included site visits to view the site and adjacent lands, collect groundwater samples from two on-site wells and to observed the excavation of two test pits.

Available geologic maps reports and water well records were reviewed to obtain an understanding of the hydrogeologic setting. Water wells were plotted on a 1:10,000 scale map (Figure 4) and the records are provided in Appendix A. Not all of the wells along Hwy 6 are shown as there are too many for the scale of the map. There were not many well records along English Church Road. More wells exist along English Church Road than are on record with the Ministry of the Environment (MOE). Two geologic cross sections were drawn using the well record information. Cross Section A-A' (Figure5) runs along English Church Road and cross section B-B' (Figure 6) runs along Hwy 6.



3.0 PHYSICAL SETTING

3.1 Location

The site is located about 700 m east of Hwy 6, on the south side of English Church Road. The proposed severances are about 1.5 km northeast of the center of the Village of Mount Hope, and about 2 km east of the John Munro Air Port.

3.2 Land Use

Existing land use in the area consists of rural residential housing primarily along Hwy. 6 and English Church Road; agriculture to the north and east; commercial development along Hwy. 6 and recreation in the form of Willow Valley Golf Course to the immediate south.

3.3 Topography and Drainage

The site lies in the northern part of the physiographic region known as the “Haldimand Clay Plain” Topographically the land surface of the Haldimand Clay Plain is relatively smooth with a gentle slope to the southeast. However, in the area of the proposed severances, Three Mile Creek and its intermittent tributary streams have cut valleys into the generally level ground surface.

Surface water drains from the lands to be severed to a tributary stream of Three Mile Creek which in turn drains north east to Twenty Mile Creek. The main branch of Three Mile Creek passes through Willow Valley Golf Course and is about 200 m south of the lands to be severed.

3.4 Geology

The following information was obtained through a review of water well records and existing geologic maps of the “Grimsby” map area.

Quaternary geology map P993, indicates that surficial soils consist of glaciolacustrine silts. These fine grained silt soils are underlain by Halton Till, a clayey silt to clay till.

Ontario Division of Mines Map P536 indicates that the overburden thickness decreases to the



northeast from about 30 m in Mount Hope to 8 m in the valley of Twenty Mile Creek.

Geologic cross sections A-A' and B-B' (Figures 5 and 6 respectively) show the geologic conditions in the study area. Figure 4 shows the location of the cross sections. Overburden thickness beneath English Church Road varies from 28 m near Hwy. 6, to 20 m east of the lots to be severed. Beneath the lots to be severed the overburden is about 25 m in thickness. Cross section B-B' indicates that the overburden is about 32 m thick in the Village of Mount Hope and thins northward to about 25 m at the north end of cross section B-B'.

Brown dolostone of the Guelph Formation forms the upper unit of the bedrock. This bedrock unit ranges from 1.5 m to 3.7 m in thickness and conformably overlies dark, blackish cherty dolostone of the Eramosa member of the Lockport Formation. Most local water wells are completed in the bedrock.

The bedrock surface is slightly irregular in the Mount Hope area, but generally slopes to the south at a grade of approximately 15 m/km.

4.0 HYDROGEOLOGY

The general stratigraphy along English Church Road consists of about 10 m of clayey soils over of silty clay or fine silty sand overlying blue clay (probably till) in turn overlying dolostone bedrock.

The surficial silt soils have low infiltration capacity and protect the deeper aquifer zones from contamination from surface sources.

Review of the water well records indicates that both drilled wells and large diameter bored or dug wells exist in the Mount Hope Area. The majority of wells are drilled wells which usually terminate in the upper few metres of the bedrock. Yields from these bedrock wells are generally sufficient for domestic supplies. However, the water is often very hard and quite mineralized. The high sulphate content of the water can impart a strong taste and sometimes odour to the water.

Two drilled wells currently exist on the lands to be severed. These wells are located on 8271 (well No. 1) and 8321 (well No. 2) English Church Road as shown on Figure 3. Well No 1 currently serves an older home and used to serve a barn and dairy cows. Well No. 2 is a newer well which



serves the fairly new house at 2321 English Church Road.

Bored or dug wells are usually shallow in depth (less than 20 m) and yields are often quite low and may not be sufficient for domestic requirements. These wells are also susceptible to contamination from surface sources because it is difficult to seal the outside of the concrete ring tiles to prevent water from flowing from surface down the outside of the well.

Several bored wells are completed in a fine to medium grained sand aquifer above the bedrock. These wells occur most frequently to the north and east of English Church Road.

The City of Hamilton has published a few maps in draft form, from the "City Of Hamilton Groundwater Resources Characterization and Well Head Protection Study". These maps can be viewed on the City of Hamilton's web site.

The "Water Table Elevation" map indicates that the direction of groundwater flow in the English Church Road area is to the southeast.

The map "Potential Recharge Areas" indicates that the area of the proposed lot severances has low recharge potential and that Three Mile Creek is a groundwater discharge area.

Some of the water that infiltrates to the water table contributes to the local shallow groundwater flow system which discharges to a tributary stream of Three Mile Creek adjacent to the proposed severances. Some of the infiltration moves downward to the bedrock aquifer and becomes part of a longer intermediate groundwater flow system which discharges to the main branch of Three Mile Creek about 200 m to the south of the proposed severances.



5.0 PRIVATE SERVICING

5.1 Water Supply

Review of the local water well records indicates that drilled wells completed in the bedrock aquifer supply sufficient water for residential uses. Reported well yields typically exceed 18 L/min. Water level interference between neighbouring wells is not anticipated to be an issue because the bedrock aquifer has good transmissive capability and because typical domestic water demands are very small compared to the aquifer yield capability.

The water is very hard and may contain elevated concentrations of sulphate which can impart a distinct taste and odour to the water. Water samples were collected from the two wells on the lands to be severed. The samples were analyzed for anions and Total Dissolved Solids (TDS). The results are summarized in Table 1 and the laboratory report is presented in Appendix C.

TABLE 1 Groundwater Chemistry

Parameter	Units	Well No.1 # 8271	Well No.2 #8321	Ontario Drinking Water Standard
TDS	mg/L	664	568	
Flouride	mg/L	0.7	0.7	1.5
Chloride	mg/L	2.9	2.3	250
Nitrate	mg/L	<0.2	<0.2	10.0
Nitrite	mg/L	<0.2	<0.2	1.0
Bromide	mg/L	<0.5	<0.5	
Phosphate	mg/L	<1	<1	
Sulphate	mg/L	454	362	500

Notes: < indicates "less than"
mg/L - milligrams per litre

The water quality from both wells met the Ontario Drinking Water Standards for the parameters



tested. In particular the nitrate and nitrite concentrations were very low, at less than the laboratory method detection limit.

Any new wells constructed on the lots to be severed, should be constructed as drilled wells completed in the upper few metres of the bedrock. If a sand aquifer is present, it may be possible to construct a drilled well in the overburden.

A licenced water well contractor must be retained to construct any new wells. Well construction must meet Ont. Reg 903 (revised as Ont Reg 128) standards for well construction.

5.2 On-Site Septic Sewage Disposal

Two test pits were excavated on the lands to be severed for the purpose of examining the soils and to obtain soil samples for grain size analysis. The test pit locations are shown on Figure 2 and the grain size analyses are provided in Appendix B.

The test pits extended to depths of 2.7 m and 3.05 m. Dark brown clayey silt top soil was encountered in both test pits to depths of 0.45 m. Beneath the top soil, sandy silt to clayey silt soils were encountered to the bottom of the test pits. The soils were brown in colour in the upper 1.6 m and gradually became grey with depth below 1.6 m.

The estimated percolation rate "T" time of the native soils is 50 min/cm.

The soils were moist and water was observed trickling into Test Pit No 1 from about 1.5 m depth. It is possible that the water table may be within 0.9 m of ground surface during the spring snow melt, but otherwise the water table is more than 1 m below ground surface.

Raised tile beds constructed of sand of appropriate permeability will be required to meet building code specifications for raised tile beds constructed on silty or clayey soils.

Prior to final design, test pits should be excavated at the location of each new sewage disposal tile bed to confirm soil and groundwater conditions.



6.0 LOT SIZE CONSIDERATIONS

Two of the five proposed new lots will be occupied by existing homes. Therefore, the proposed severances will permit the development of only three new homes.

The evaluation of acceptable minimum lot size for new residential developments is conducted as a measure to protect groundwater resources from unacceptable impacts by on-site septic sewage disposal systems.

The MOE nitrate loading calculation is one tool typically used to assess the minimum lot size based on the potential impact of nitrate in sewage effluent on groundwater. However, the direction of groundwater flow and potential down gradient groundwater users can also be considered in the nitrate impact assessment and lot size.

6.1 Nitrate Loading Calculation

Minimum average lot sizes were evaluated using the Ministry of the Environment guidelines based on nitrate loading to groundwater. These guidelines factor in the infiltration rate of the surficial soils, background nitrate concentrations in groundwater.

The MOE's suggested infiltration rate of the surficial sit and clayey silt soils is about 0.125 m/yr.

The MOE nitrate loading assessment criteria assumes a nitrate loading from each house of 40 g/day (40 mg/L/day and 1000 L/day of sewage effluent).

The background nitrate concentration in the water samples collected from two on-site wells contained less than 0.2 mg/L of nitrate.

Based upon the background nitrate concentration, the permissible increase in nitrate concentration beneath each lot is $10 \text{ mg/L} - 0.2 \text{ mg/L} = 9.8 \text{ mg/L}$.

The volume of infiltration required to dilute the 40g/day of nitrate loading to 9.8 mg/L in groundwater is:

$$\text{Nitrate loading} = 40\text{g/day} \times 1000 \text{ mg/g} \times 365 \text{ days} = 14,600,000 \text{ mg/yr}$$



$$\begin{aligned}\text{Volume of dilution water required} &= 14,600,000 \text{ mg/yr} \div 9.8 \text{ mg/L} \\ &= 1,489,800 \text{ L/yr} \\ &= 1,489.8 \text{ m}^3/\text{yr}\end{aligned}$$

$$\text{Volume of water contributed as effluent} = 1 \text{ m}^3/\text{day} \times 365 \text{ days} = 365 \text{ m}^3/\text{yr}$$

$$\begin{aligned}\text{Volume of water required from infiltration} &= 1,489.8 \text{ m}^3/\text{yr} - 365 \text{ m}^3/\text{yr} \\ &= 1,124.8 \text{ m}^3/\text{yr}\end{aligned}$$

$$\begin{aligned}\text{Lot size required to infiltrate } 1,124.8 \text{ m}^3/\text{yr} &= 1,124.8 \text{ m}^3/\text{yr} \div 0.125 \text{ m/yr} \\ &= 8,998 \text{ m}^2 \text{ (0.9 ha)}\end{aligned}$$

Based upon these calculations the minimum lot size required to infiltrate sufficient water to dilute nitrate in sewage effluent to an acceptable concentration is 0.9 ha. The calculated minimum average lot size of 0.9 ha is greater than proposed average lot size of 0.41 ha.

6.2 Direction of Groundwater Flow

The City of Hamilton Groundwater Resource Characterization and Well Head Protection Study contains a map of the "Water Table Elevation" which indicates the direction of groundwater flow to be to the southeast, parallel to Three Mile Creek. This flow path would carry nitrate impacted groundwater south of and parallel to English Church Road.

The map "potential Recharge Areas" indicates that Three Mile Creek is a groundwater discharge area and that the adjacent lands are "poor" recharge areas. This information also indicates that infiltrated sewage effluent from the new lots will flow toward Three Mile Creek. The creek acts as a down gradient or discharge boundary of the local and intermediate groundwater flow systems.

Based upon the information presented on the maps from the City of Hamilton Groundwater Resource Characterization and Well Head Protection Study, groundwater from beneath the proposed severances flows southeastward beneath the golf course and eventually discharges to Three Mile Creek. No water wells or residential lots exist now, nor in the future, down gradient of the proposed severances. For this reason the any potential increase in nitrate concentration in groundwater from beneath the proposed severances will not affect any existing or future users of groundwater down gradient of the subject lands.



6.3 Existing Evidence

An existing older well on the subject lands, at 8271 English Church Road, provides evidence that the overburden soils protect groundwater quality from potential impact from septic sewage disposal systems. This well is located adjacent to two historical sources of nitrate (cow manure) at an old barn (now demolished) used for dairy cows the house septic system. A water sample collected from this well in March 2005 revealed that the nitrate concentration was less than 0.2 mg/L. This indicates that, in the area of the proposed severances, groundwater quality is very well protected by the fine grained clayey silt soils and natural biological processes.

It is our opinion that the proposed average lot size of 0.41 ha is acceptable in this hydrogeologic setting because there are no, and will not be any groundwater users down gradient of English Church Road.

Based upon the water quality evidence from the old well at 8217 English Church Road, groundwater quality is not susceptible to nitrate and nitrite impact from surface sources. Groundwater quality is protected by soil conditions and natural biological processes in the area of the proposed severances.



7.0 CONCLUSIONS AND RECOMMENDATIONS

- The proposed severances will create five new lots but only permit the development of three new homes.
- Review of the local water well records indicates that drilled wells completed in the bedrock aquifer supply sufficient water for residential uses. Reported well yields typically exceed 18 L/min.
- Water level interference between neighbouring wells will not affect domestic supplies.
- New wells constructed on the lots to be severed, should be constructed as drilled wells completed either in the bedrock, or the sand aquifer if present.
- Any new wells must be constructed by a licenced water well contractor. Well construction must meet Ont. Reg 903 (revised as Ont Reg 128/03) standards for well construction.
- Raised sewage disposal tile beds constructed of sand of appropriate permeability will be required to meet building code specifications for raised tile beds constructed on the silty or clayey soils.
- Prior to final design, test pits should be excavated at the location of each new sewage disposal tile bed to confirm soil and groundwater conditions.
- It is our opinion that the proposed average lot size of 0.41 ha is acceptable in this hydrogeologic setting because there are no, and will not be any groundwater users down gradient of the proposed severances along English Church Road.
- Based upon the water quality evidence from the old well at 8217 English Church Road, groundwater quality is not susceptible to nitrate and nitrite impact from surface sources. Groundwater quality is protected by soil conditions and natural biological processes in the area of the proposed severances



8.0 LIMITATIONS AND USE OF THIS REPORT

This report has been prepared for Mr. Schiedel. Any uses which a third party makes of this report, any reliance on the report, or decision based upon the report, are the responsibility of those third parties unless authorized by Mr. Schiedel to do so. Terraprobe Limited accepts no responsibility for damages suffered by an unauthorized third party as a result of decisions made or actions taken based upon this report.

We trust that this report is sufficient for your present requirements. If there is any point requiring further clarification, please contact the undersigned. Thank you for retaining Terraprobe for this assignment.

Yours Truly,

Terraprobe Limited

Paul Puodziunas, P. Geo
Hydrogeologist

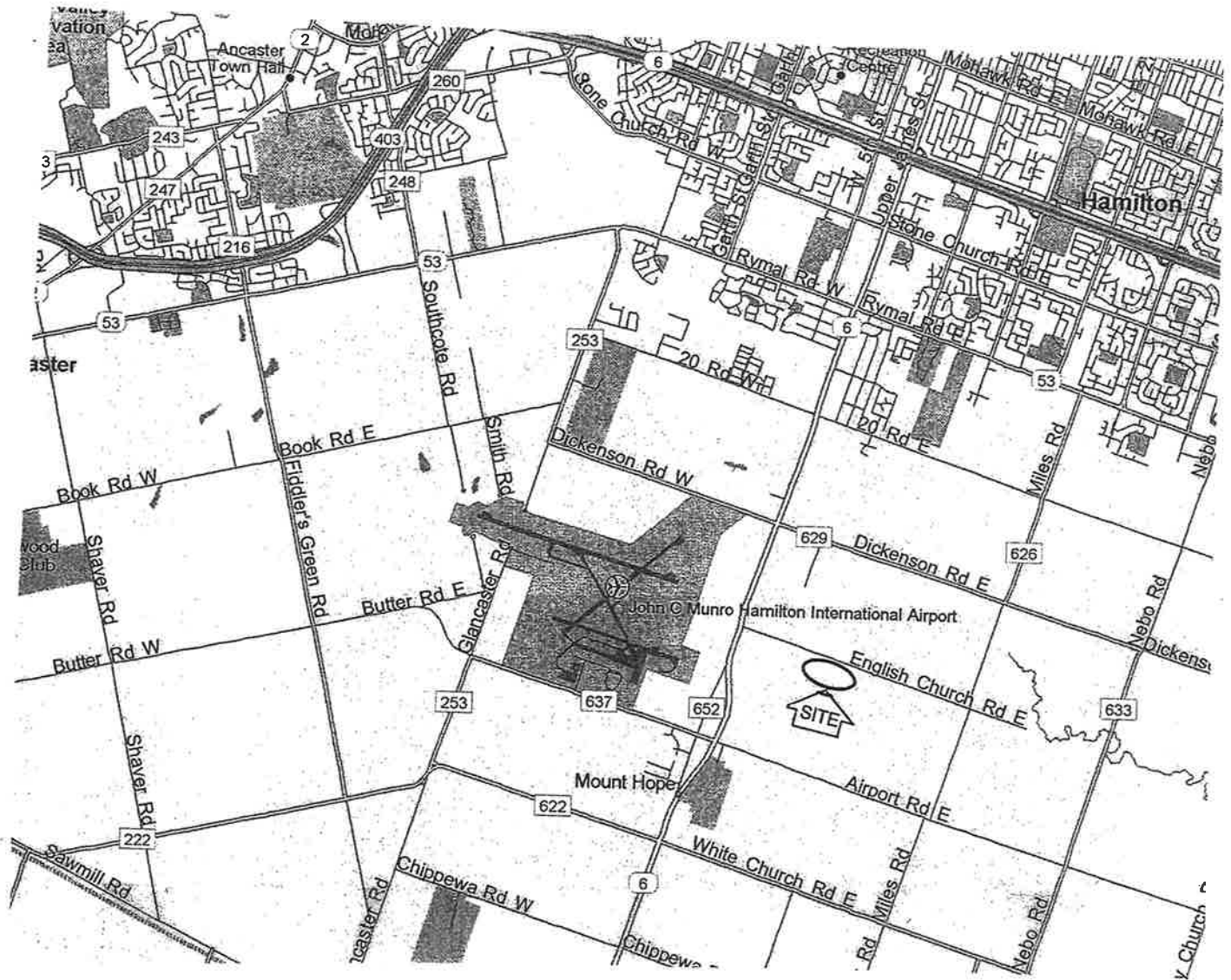
PP/pp



FIGURES

Terraprobe Limited





LEGEND:
 ● 226 location of Water well and Record No.

↑ ↑ Cross Section A-A'

NOTES:
 All locations and scales are approximate.

**KEY PLAN
 MOUNT HOPE, ONTARIO**



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903 Barton Street, Unit 22
 Stoney Creek, Ontario, L8E 5P5
 (905) 643-7560 / Fax (905) 643-7559

Drawn By:	A.C.	Scale:	1:75,000	Project No.:	7-05-0032
Checked By:	P.P.	Date:	MAR, 2005	Figure No.:	1



LOCATION OF PROPOSED SEVERANCES

Location of Proposed Severances
Mount Hope, Ontario

TerraProbe
803 Barton Street, Unit 22
Stoney Creek, Ontario, L8E 5P5
(905) 643-7550 / Fax (905) 643-7559



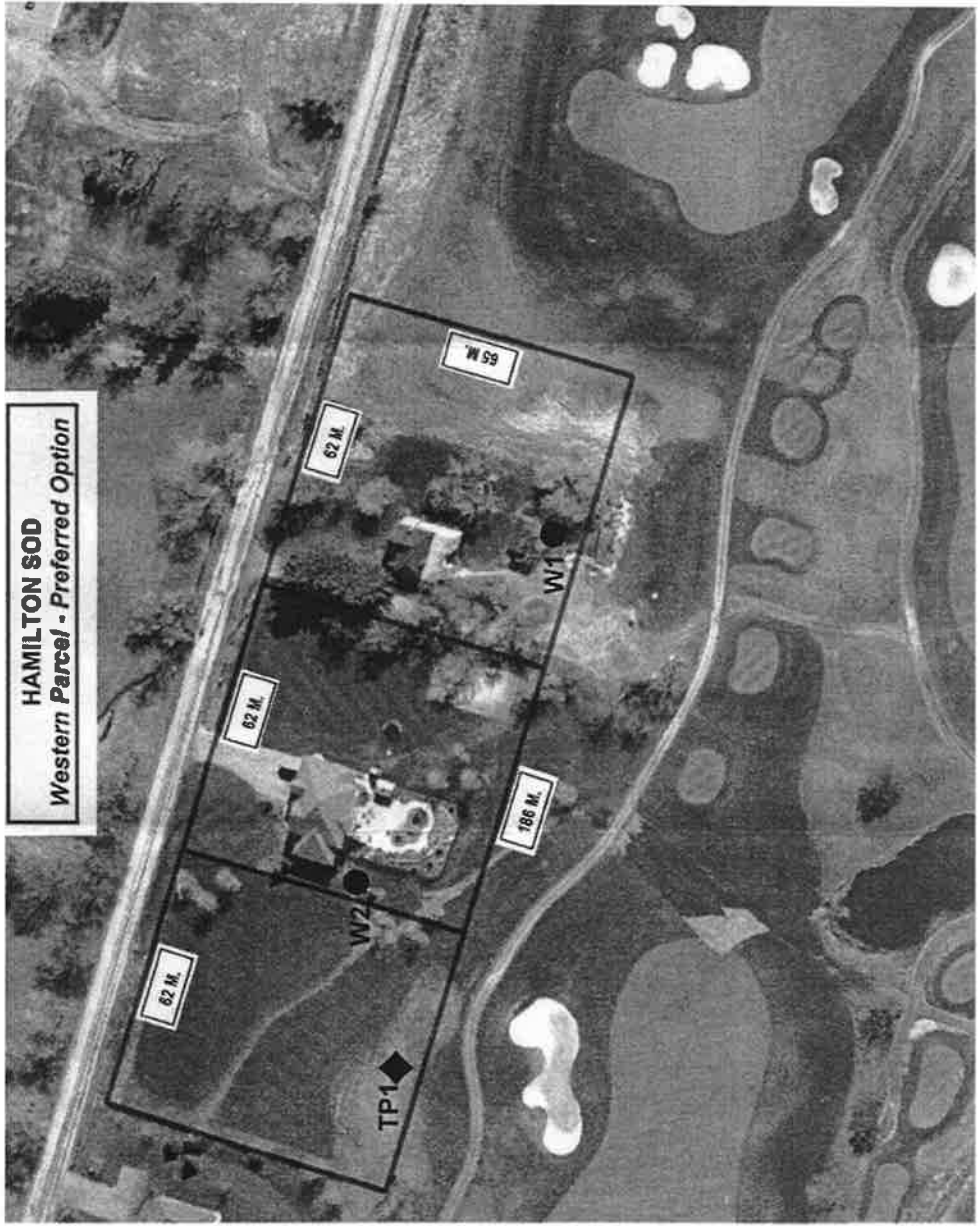
Drawn By:	A.C.	Scale:	1:10,000	Project No.:	7-05-0032
Checked By:	P.P.	Date:	MAR.2005	Figure No.:	2



LEGEND:
 location of best pit
 NOTES:
 All locations and scales are approximate.



HAMILTON SOD
Western Parcel - Preferred Option



Proposed Severances - Western Parcel
Mount Hope, Ontario

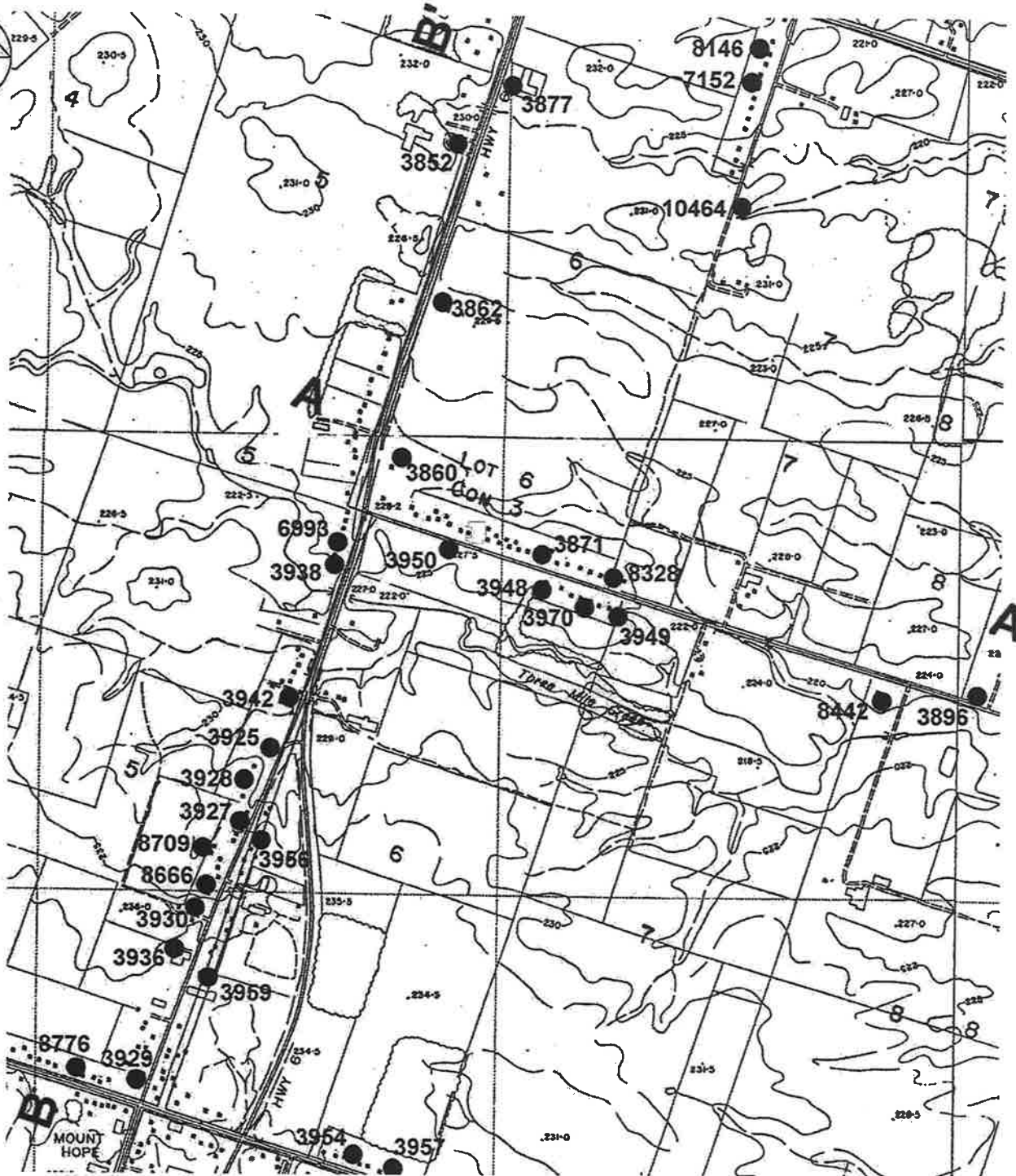
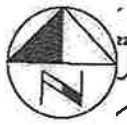


Terraprobe
803 Berton Street, Unit 22
Stoney Creek, Ontario, L8E 5P5
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Drawn By: A.C.	Scale: 1:1,700	Project No.: 7-05-0032
Checked By: P.P.	Date: MAR.2005	Figure No.: 3

LEGEND:

◆	Test Pit No. 1
●	Existing Water Well



**Water Well Location Map
MOUNT HOPE, ONTARIO**


Terraprobe
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 Stoney Creek, Ontario, L8E 5P5
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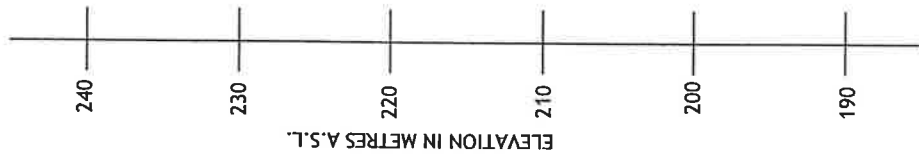
Drawn By:	A.C.	Scale:	1:13,500	Project No.:	7-05-0032
Checked By:	P.P.	Date:	MAR, 2005	Figure No.:	4

LEGEND:
 location of Water well and Record No.

 Cross Section A-A'

NOTES:
 All locations and scales are approximate.

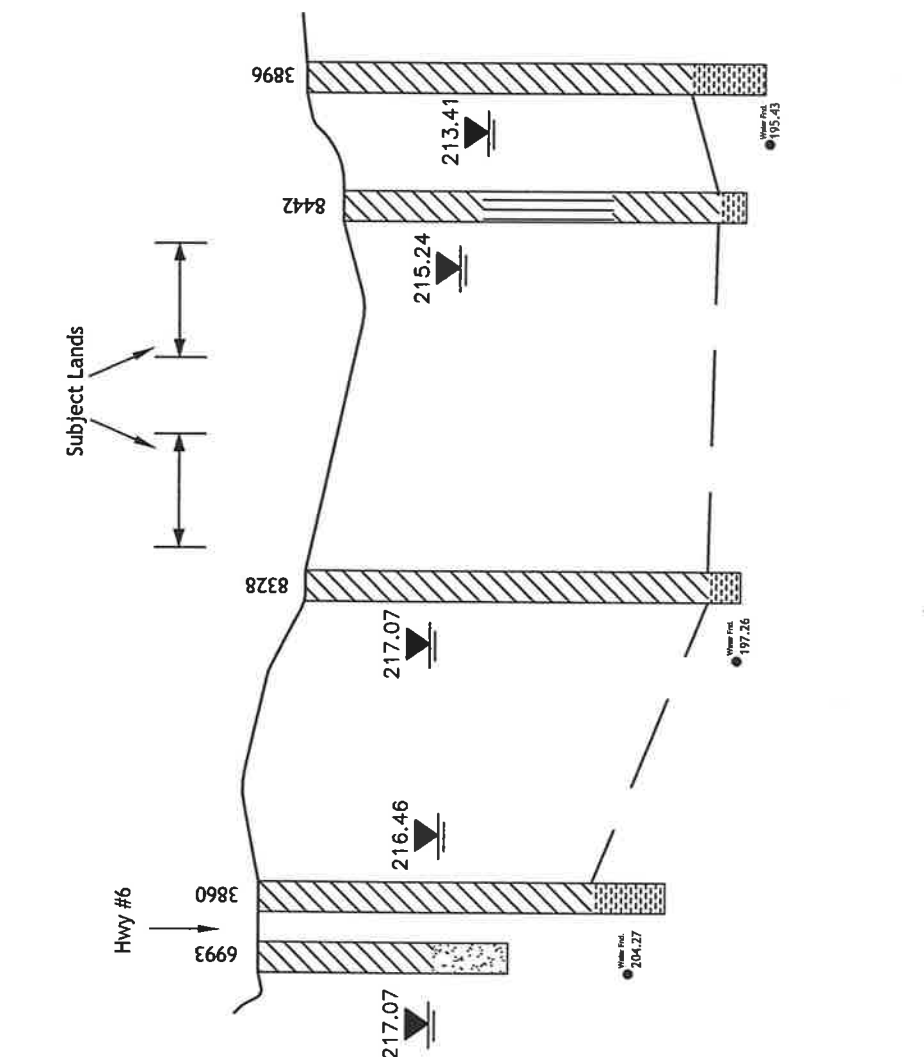
A
WEST



ELEVATION IN METRES A.S.L.

Subject Lands

Hwy #6



A'
WEST



LEGEND

MOE Well Record No.

3925

210.37

Static Water Level and Elevation

Water Found and Elevation

Water Fnd.

SILT

CLAY

SAND

OVERBURDEN BEDROCK

INFERED BEDROCK SURFACE

NOTES:

All locations and scales are approximate.

SECTION A - A'
MOUNT HOPE, ONTARIO



903 Barton Street, Unit 22
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(905) 643-7560 / Fax (905) 643-7559

Drawn By: A.C.

Scale: H: 1:500
V: 1:12.250

Project No.: 7-05-0032

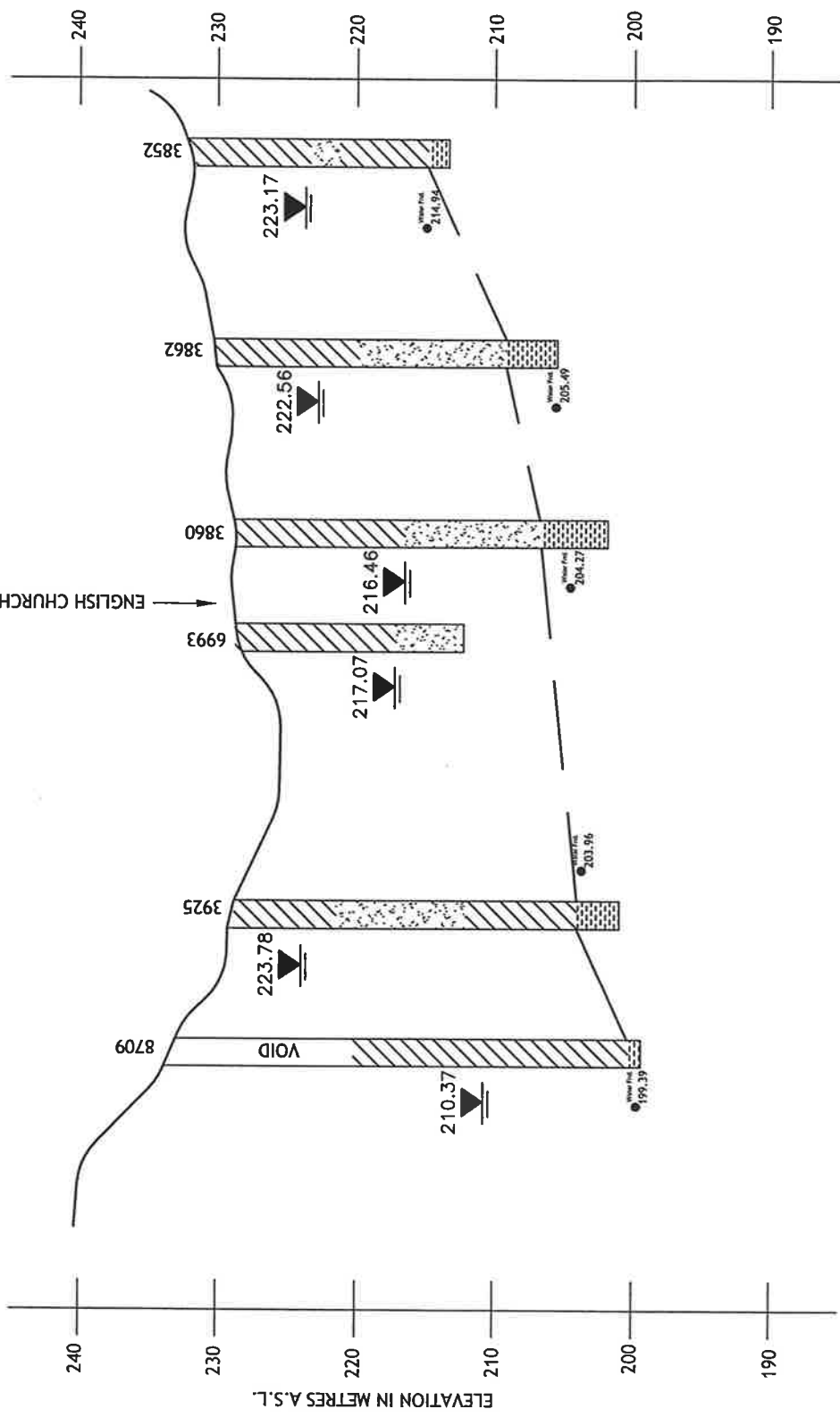
Checked By: P.P.

Date: MAR.2005

Figure No.: 5

B SOUTH

B' SOUTH



LEGEND

- MOE Well Record No.
- Static Water Level and Elevation
- Water Found and Elevation
- CLAY
- SAND
- OVERBURDEN BEDROCK
- INFERRED BEDROCK SURFACE

NOTES:
All locations and scales are approximate.

SECTION B - B'
MOUNT HOPE, ONTARIO



903 Barton Street, Unit 22
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Drawn By: A.C.	Scale: H: 1:500 V: 1:12,250	Project No.: 7-05-0032
Checked By: P.P.	Date: MAR.2005	Figure No.: 6

**Ministry of the Environment
Water Well Records**

APPENDIX A

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Explanation of Terms Used in the Ministry of Environment Water Well Record Summaries

WELL NO.	(Well Number) This is a unique number identifying each well within the province.								
UTM EASTING NORTHING	(Universal Transverse Mercator Co-ordinates in Metres) This location system makes use of a square grid, 1,000 metres x 1,000 metres, which is superimposed on maps of the National Topographic System. The vertical grid lines are called Eastings and the horizontal lines Northings. The UTM co-ordinates were calculated after the well locations were plotted on topographic maps, using the locational diagrams submitted by the drillers. If the location of a well is uncertain, then the UTM co-ordinate spaces are filled completely with 9's.								
ELEV FEET	(Elevation in Feet) This represents the ground elevation at the well site in feet above mean sea level. The elevations were determined from plotted locations on the National Topographic maps and are therefore related to the accuracy of the locations and the scale of the maps.								
DATE	The month and year of well completion are shown in this column.								
DRILLER	The drilling firm's licence number is given for each well.								
CSG DIA INS	(Casing Diameter in Inches) Casing diameters are shown to the nearest inch. Where several sizes of casings are used, the diameter of the upper casing only is given.								
KIND OF WATER	After the construction of each well, the driller evaluates the water quality with a taste and smell test. The kind of water is shown by the following abbreviations: <table border="0" style="margin-left: 40px;"> <tr> <td>FR</td> <td>Fresh</td> </tr> <tr> <td>SA</td> <td>Salty</td> </tr> <tr> <td>SU</td> <td>Sulphur</td> </tr> <tr> <td>MN</td> <td>Mineral</td> </tr> </table>	FR	Fresh	SA	Salty	SU	Sulphur	MN	Mineral
FR	Fresh								
SA	Salty								
SU	Sulphur								
MN	Mineral								
WATER FOUND FEET	This is the distance or distances in feet below ground level at which the driller reports the occurrence(s) of water.								
STAT LVL FEET	(Static Level in Feet) This is the distance below ground level to the water surface when the well is not being pumped. Static levels above ground are not given; the notation FLW, meaning a flowing well, is given for this condition.								
PUMP LVL FEET	(Pumping level in Feet) This is the distance in feet below ground level to the water surface at the end of the pumping test or the start of a recovery test.								
TEST RATE GPM	(Pumping Test Rate in Imperial Gallons per Minute) This is the rate at which the well was test-pumped. In some cases the stated rate is a recovery rate, or the flow rate of a flowing well. The reported pumping-test rates are usually the results of short-term pumping tests. They do not necessarily represent the rates at which the wells could continue to supply water for prolonged periods of pumping. Continuous pumping at the stated rates could have resulted in some of the wells being pumped dry, while others may have been capable of being pumped steadily at much higher rates than those reported during the pumping tests.								
TEST TIME HR/MIN	(Test Time in Hours and Minutes) This is the length of time during which the pumping or recovery test was conducted. Test times of 100 hours or greater are shown as 99 hours 59 minutes.								

Colour Abbreviations

BLCK	black
BLGY	blue-grey
BLUE	blue
BRWN	brown
GRN	green
GREY	grey
RED	red
WHIT	white
YELLOW	yellow

Descriptive Terms Abbreviations

CGRD	Coarse-grained	FOSS	Fossiliferous	SHRP	Sharp
CLN	Clean	GVLY	(shelly)	SLTY	Silty
CLYY	Clayey	HARD	Gravelly	SNDY	Sandy
CMTD	Cemented	LIMY	Hard Limy	SOFT	Soft
CRYS	Crystalline	LOOS	Loose	STKY	Sticky
DKCL	Dark-coloured	LTCL	Light-coloured	STNY THIK	Stony Thick
DNSE	Dense	LYRD	Layered (streaked)	THIN	Thin
DRTY	Dirty	MGRD	Medium-grained	VERY	Very
DRY	Dry	PCKD	Packed	WBRG	Water-bearing
FCRD	Fractured (broken)	PORS	Porous	WTHD	Weathered
FGRD	Fine-grained	SHLY	Shaly		

Each formation is followed by a number which indicates the distance to the bottom of the formation. The last number generally indicates the total depth of the well. If a screen is installed in the well, this information is shown in brackets immediately following the formation in which the screen is set. The brackets contain an S for screen, followed by two numbers signifying the depth to the top of the screen and the screen length, respectively.

GROUND WATER BULLETIN REPORT

WATER WELL DATA SYSTEM AUG 13 1998 PAGE: 335 COUNTY: WENTWORTH

MUNICIPALITY UTM

CONCESSION WELL EASTING ELEV

ETC LOT NO NORTHING FEET DATE DRILLER INS WATER FEET FEET PUMP TEST TEST

CSG KIND WATER STAT PUMP TEST SCREEN

DIA OF FOUND LVL LVL RATE TIME WATER DEPTH LENGTH DEPTHS IN FEET TO WHICH

DRILLER INS WATER FEET FEET FEET GPM HR:MN USE FEET FEET FORMATIONS EXTEND

OWNER

FORMATIONS EXTEND

FORMATIONS EXTEND

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CONTINUING... GLANFORD TOWNSHIP

CON	03	003	68-	587540	774	1972/06	3030	36	FR	0050	23	:	DO	ARMS L
			08129	4781540										BRWN LOAM 0001 BRWN CLAY SAND 0009 GREY SILT SAND
														0045 GREY SAND 0050
CON	03	005	68-	588300	750	1965/11	2519	28	FR	0036	12	:	DO	POWELL BRUCE
			03853	4780288										LOAM 0002 BRWN CLAY 0012 BRWN MSND 0019 BLUE CLAY
CON	03	005	68-	588714	760	1967/08	2519	30	FR	0018	8	:	DO	LOAM 0001 BRWN CLAY MSND 0009 GREY MSND 0014 BLUE Y
			03854	4780451										MAIR W
CON	03	005	68-	588801	760	1965/08	2519	30	FR	0055	27	:	IR	CLAY 0018 BLUE MSND 0035
			03852	4780815										GOLF ENTERPRISES
CON	03	005	68-	588614	750	1963/07	1620	06	SU	0146	10	:	IR	GREY CLAY 0028 MSND 0034 GREY CLAY 0055 MSND 0060
			03851	4780205										MT HOPE GOLF CLUB
CON	03	005	68-	588706	760	1962/04	2519	30	FR	0044	34	:	IR	LOAM 0001 BRWN CLAY 0023 BLUE CLAY 0040 QSNND 0049
			03850	4780454										BLUE CLAY 0056 LMSN 0147
CON	03	005	68-	588699	750	1954/11	1214	06	FR	0083	20	:	DO	MT HOPE GOLF CLUB
			03848	4780364										LOAM 0001 BRWN CLAY 0017 BLUE MSND 0022 BLUE CLAY
CON	03	005	68-	588639	750	1952/10	1643	06	FR	0085	30	:	DO	0035 BLUE MSND 0054
			03847	4780155										LEES H
CON	03	005	68-	588611	750	1952/05	1532	06	FR	0085	14	:	DO	CLAY 0040 MSND 0068 LMSN 0084
			03846	4780042										BOOKER H
CON	03	005	68-	588951	760	1951/09	2115	06	FR	0077	14	:	DO	YLLW CLAY 0083DGREY LMSN 0097
			03845	4781134										CHENOWETH WRAY
CON	03	005	68-	588666	750	1951/05	2115	06	FR	0080	14	:	DO	CLAY 0050 CLAY SILT 0069 LMSN 0088
			03843	4780218										DEWILLE LYLE
CON	03	005	68-	588594	750	1955/07	1643	06	FR	0090	30	:	PS	YLLW CLAY 0011 BLUE CLAY 0021 MSND 0030 BLUE CLAY
			03849	4780035										MSND 0040 QSNND 0060 HPAN STNS 0067 BRWN LMSN 0075
CON	03	005	68-	588694	760	1967/08	2519	30	FR	0018	4	:	DO	GREY LMSN 0084 WHIT LMSN 0086
			03855	4780456										SMITH G
CON	03	005	68-	588581	760	1951/08	2115	06	FR	0074	15	:	DO	YLLW CLAY 0014 BLUE CLAY 0020 MSND 0045 HPAN 0055
			03844	4780035										QSNND 0070 HPAN STNS 0073 GREY LMSN 0080 WHIT LMSN
CON	03	005	68-	588754	756	1975/06	3030	36	FR	0012	28	:	DO	0087
			09183	4780189										BOOKER HOWARD
CON	03	006	68-	588700	750	1969/09	5417	06	FR	0085	32	:	DO	BLUE CLAY 0082 LMSN 0100
			07254	4779840										DEWILLE LYLE
CON	03	005	68-	589560	752	1969/05	2803	06	FR	0115	35	:	DO	LOAM 0001 BRWN CLAY 0012 BLUE CLAY 0018 BLUE CLAY
			07152	4780780										MSND 0034
CON	03	006	68-	588974	750	1967/05	1620	06	FR	0086	32	:	DO	HALL G
			03877	4780929										YLLW CLAY 0010 BLUE CLAY 0018 BLUE CLAY MSND 0035
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	QSNND 0065 HPAN 0070 BRWN LMSN 0078 GREY LMSN 0085
			03870	4781140										WHIT LMSN 0091
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	EWART NORM
			03870	4781140										BRWN SAND 0012 GREY SILT STNS 0032 GREY SAND 0040
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	BELL TELEPHONE CO
			03870	4781140										BRWN CLAY 0011 GREY MSND SILT CLAY 0062 GREY CLAY
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	0074 GREY LMSN 0088
			03870	4781140										BALOG F
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	BRWN CLAY 0018 BLUE CLAY 0066 LMSN 0123
			03870	4781140										MARADIN KARL
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	BRWN CLAY 0024 BLUE CLAY 0036 QSNND 0070 FSNND 0074
			03870	4781140										LMSN 0088
CON	03	006	68-	589348	750	1962/07	4727	06	FR	0093	40	:	DO	HUIZIGA JAKE
			03870	4781140										LOAM 0002 BRWN CLAY 0040 BLUE CLAY 0059 LMSN 0093

GROUND WATER BULLETIN REPORT

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WATER WELL DATA SYSTEM Aug 13 1998

MUNICIPALITY CONCESSION ETC	LOT	WELL EASTING NO	ELEV NORTHING	FEET	DATE	DRILLER	INS	WATER FEET	STAT FEET	PUMP LVL	TEST RATE	TIME GPM	SCREEN DEPTH	LENGTH FEET	WATER USE	DEPTH FEET	TO WHICH FORMATIONS EXTEND
CONTINUING... GLANFORD TOWNSHIP																	
CON	03	013	68-	593357	698	1953/09	06	FR	0040	18	25	13	1	0	DO		ARMS JOE PRDG 0022 CLAY SILT 0038 LMSN 0045 HARLMUTH B GREY CLAY 0041 GREY LMSN 0050 KOSTER LAWRENCE LOAM 0003 BLUE CLAY 0039 LMSN 0064 WOJNOWITZ S BRWN CLAY 0033 LMSN 0039 WOJNOWITZ S CLAY 0032 LMSN 0040 WOJNOWITZ MICKEY LOAM 0002 BRWN CLAY 0020 BLUE CLAY 0038 LMSN 0041 BROWN L LOAM 0001 BLUE CLAY 0038 LMSN 0060 FRENCH ED LOAM 0003 BRWN CLAY 0015 BLUE CLAY 0030 GREY LMSN 0034 LOAM 0001 BRWN CLAY SLTY 0017 GREY CLAY SLTY 0060
CON	03	013	68-	593240	690	1982/07	06	FR	0045	18	50	30	1	0	ST		
CON	03	014	68-	593406	690	1961/04	06	FR	0050	15	18	5	1	0	DO		
CON	03	014	68-	593309	700	1959/09	06	SU	0037	7	10	6	0	:30	NU		
CON	03	014	68-	593432	680	1959/06	06	SU	0034	14	30	1	1	0	DO		
CON	03	014	68-	593302	697	1959/12	06	SU	0041	20	38	10	0	:20	ST DO		
CON	03	014	68-	593414	690	1959/07	06	FR	0040	20	60	1	1	0	DO		
CON	03	014	68-	593353	680	1974/09	06	FR	0034	14	34	2	1	0	DO		
CON	04	001	68-	999999	11821	999999		FR	0053	17					DO		
CON	04	001	68-	585680	750	1971/12	06	FR	0035	26					DO		
CON	04	001	68-	585671	770	1957/06	06	FR	0120	45	90	1			DO		
CON	04	001	68-	585780	758	1973/05	06	FR	0035	24	50	0			DO		
CON	04	001	68-	585785	756	1974/07	06	FR	0040						DO		
CON	04	004	68-	999999	11750	999999		FR	0090	40	111	1	2	:0	DO		
CON	04	004	68-	587780	762	1968/09	06	FR	0111	55	70	10	2	:0	DO		
CON	04	004	68-	587567	740	1966/11	06	FR	0110	60	90	3	2	:0	DO		
CON	04	004	68-	587537	740	1966/06	06	FR	0106	60	90	5	1	:0	DO		
CON	04	004	68-	587564	740	1966/06	06	FR	0115	55	85	8	2	:0	DO		
CON	04	004	68-	587564	740	1966/03	06	FR	0105	60	90	5	2	:0	DO		
CON	04	004	68-	587539	740	1963/08	06	FR	0108	35	70	15	1	:0	DO		

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GLANFORD TOWNSHIP

CON	LOT	NO	NORTHING	ELEV	DATE	DRILLER	INS	WATER	FEET	FEET	GPM	HR:	MIN	USE	FEET	FEET	FORMATIONS	EXTEND		
								DIA OF	FOUND	LVL	STAT	PUMP	TEST	TIME	WATER	DEPTH	LENGTH	IN FEET	TO WHICH	
								DRILLER	INS	WATER	FEET	FEET	GPM	HR:	MIN	USE	FEET	FEET	FORMATIONS	EXTEND
CON	04	005	68-	586289	740	1955/10	1214	06	FR	0100	40	40	6	:	DO			VANSICKLE L	CLAY 0040 CLAY MSND 0090 MSND 0105 GRVL 0108	
CON	04	005	68-	586249	740	1956/12	4208	06	FR	0120	20	100	1	1:0	DO			STEWART LORNE	CLAY 0025 CLAY SILT 0100 LMSN 0130	
CON	04	005	68-	588389	750	1956/12	1643	06	FR	0105	40	110	2	:	DO			HELTROY R	CLAY 0096 LMSN 0133	
CON	04	005	68-	588187	740	1957/06	4208	06	FR	0108	30	35	17	1:0	DO			GIBBARD H	CLAY 0060 CLAY SILT 0105 LMSN 0109	
CON	04	005	68-	587790	745	1960/07	5417	06	FR	0107	55	98	14	0:40	DO			JACOBS AL	BRWN CLAY 0010 GREY CLAY SILT 0062 GREY CLAY 0103	
CON	04	005	68-	588374	750	1958/07	2803	06	FR	0097	35	97	1	1:30	DO			GREY LMSN 0108		
CON	04	005	68-	588214	740	1952/05	4208	06	FR	0112	35	40	17	1:0	CO DO			SAUHL ALBERT	LOAM 0004 BLUE CLAY 0082 LMSN 0097	
CON	04	005	68-	4778883	762	1973/09	2803	06	FR	0105	80	80	10	1:0	DO			BOYCHUK STEVE	GREY CLAY 0060 MSND CLAY 0109 GREY LMSN 0115	
CON	04	005	68-	4778580	760	1980/05	2803	06	FR	0107	68	82	20	1:0	DO			KOOCHER B	LOAM 0004 BRWN CLAY 0026 BLUE CLAY 0104 GREY SHLE 0105	
CON	04	006	68-	999999	762	1973/09	1620	06	FR	0109	76	86	25	1:0	DO			BRAITHWAITE T	BRWN CLAY 0015 GREY CLAY 0108 LMSN 0109	
CON	04	005	68-	588395	766	1973/09	1620	06	FR	0112	76	90	20	1:0	DO			RIDGE J W R W	PRDG 0044 GREY CLAY 0109 LMSN 0112	
CON	04	005	68-	4778909	760	1980/05	2803	06	FR	0107	68	82	20	1:0	DO			STEWART C	LOAM 0005 BRWN CLAY 0020 BLUE CLAY 0106 GREY SHLE 0108	
CON	04	006	68-	999999	12319	1993/01	2123	06	FR	0088	51	90	8	1:0	DO			H. VYN CONST.	BRWN CLAY 0010 BRWN CLAY STMS 0023 BRWN SAND 0045	
CON	04	006	68-	589169	740	1954/12	1907	06	FR	0088	38	56	20	1:0	DO			SEYMOUR FRED H	BRWN FILL CLAY 0001 LOAM 0002 BRWN CLAY 0021 GREY	
CON	04	006	68-	4778600	740	1965/10	2803	06	FR	0111	70	110	8	2:0	ST DO			CLAY STMS 0035 BRWN MSND CLAY SILT 0045 BRWN MSND		
CON	04	006	68-	4778557	740	1965/10	2803	06	FR	0122	50	100	4	1:0	DO			SILT 0068 BLUE CLAY STMS 0080 BLUE CLAY MSND 0082		
CON	04	006	68-	588628	740	1965/06	1620	06	FR	0122	40	100	4	2:0	DO			BLUE CLAY LMSN 0084 GREY LMSN 0090		
CON	04	006	68-	4778592	740	1965/06	1620	06	FR	0122	40	100	4	2:0	DO			DICKENSON A	BRWN CLAY 0008 BLUE CLAY 0110 SHLE 0111 LMSN 0121	
CON	04	006	68-	588437	740	1965/06	2803	06	FR	0135	50	136	1	2:0	DO			HAGAN K	BRWN CLAY 0010 BLUE CLAY 0115 LMSN 0123	
CON	04	006	68-	4779350	740	1964/04	2803	06	FR	0120	60	108	8	1:0	DO			CUMMINS C	BRWN CLAY 0025 GREY CLAY 0048 QSND 0085 BLUE CLAY	
CON	04	006	68-	588538	740	1964/04	2803	06	FR	0120	60	108	8	1:0	DO			TUBA S	0118 LMSN 0122	
CON	04	006	68-	4778607	740	1963/09	4208	06	SU	0110	60	85	25	0:30	DO			BRWN CLAY 0015 BLUE CLAY 0104 LMSN 0136		
CON	04	006	68-	588412	740	1963/03	4208	06	FR	0112	55	60	20	1:0	DO			DETELDER J D	BRWN CLAY 0006 BLUE CLAY 0115 LMSN 0122	
CON	04	006	68-	588257	740	1958/08	2803	06	FR	0113	30	50	13	:	DO			BRIGHAM WM	CLAY 0108 SHLE 0110	
CON	04	006	68-	4778813	750	1958/08	2803	06	FR	0113	30	50	13	:	DO			RIDGE HARRY	PRDG 0007 CLAY 0108 SHLE 0110 LMSN 0114	
CON	04	006	68-	4779940	740	1967/02	1620	06	FR	0112	40	80	8	2:0	DO			DOW G F	LOAM 0004 BLUE CLAY 0111 SHLE 0113	
CON	04	006	68-	588299	740	1967/02	1620	06	FR	0112	40	80	8	2:0	DO			ETHERIDGE DAVID	BRWN CLAY 0018 GREY CLAY 0038 QSND 0070 BLUE CLAY	
CON	04	006	68-	4778996	740	1967/02	1620	06	FR	0112	40	80	8	2:0	DO			0110 LMSN 0112		

MUNICIPALITY CONCESSION ETC	LOT	NO	WELL EASTING NORTHING	ELEV FEET	DATE	DRILLER	INS FEET	WATER FEET	STAT FEET	PUMP FEET	TEST GPM	TIME HR:MM	TEST USE	SCREEN DEPTH FEET	WATER LENGTH FEET	DEPTH IN FEET	TO WHICH FORMATIONS EXTEND	OWNER
CONTINUING... GLANFORD TOWNSHIP																		
CON	04	016	68- 09422	594618 4774478	702	1976/02	2120	06	FR	0047	5	48	20	2 : 0	DO			PARTICIPATION HOUSE
																		BRWN LOAM 0001 BRWN CLAY SNDY 0018 BLUE CLAY FGVL STKY 0035 BRWN ROCK HARD 0054
CON	04	016	68- 09419	594488 4777068	708	1976/05	5417	06	FR	0042	14	28	20	1 : 0	DO			R BRAIVO
																		BRWN CLAY 0018 GREY CLAY 0042 GREY LMSN FCRD 0043
CON	04	016	68- 09657	594640 4777480	702	1977/05	2120	06	FR	0049	10	35	15	2 : 0	DO			PARTICIPATION HOUSE
																		BRWN LOAM 0002 BRWN CLAY LTCL STKY 0014 BLUE CLAY GRVL STKY 0031 GREY ROCK LTCL HARD 0055
CON	04	016	68- 09856	594640 4777440	690	1978/04	4208		DRY									PARTICIPATION HOUSE
																		GREY CLAY 0036 GREY LMSN 0060
CON	05		68- 11749	999999 9999999		1989/07	2803	06	FR	0079	37	72	5	3 : 0	DO			BARKELL, H.
																		LOAM 0003 BRWN CLAY 0019 BLUE CLAY 0078 GREY SHLE ROCK 0079
CON	05	001	68- 11867	999999 9999999		1988/09	3604	07	FR	0102	56	70	10	1 : 30	DO			HAMILTON, WAYNE
																		BRWN LOAM 0002 BRWN CLAY 0018 GREY CLAY 0093 BRWN LMSN 0103
CON	05	001	68- 03996	999999 9999999	752	1954/08	1214	06	FR	0158	130	158	1	0 : 20	ST DO			GIBSON J
																		CLAY 0040 MSND 0080 CLAY MSND 0103 LMSN 0158
CON	05	001	68- 09997	585420 4778980	740	1979/08	3030	36	FR	0045	15				DO			GIBSON L
																		BRWN CLAY SNDY 0015 GREY SILT 0025 BLUE CLAY 0040 GREY SILT 0050 BLUE CLAY 0055
CON	05	003	68- 03997	586340 4777730	710	1960/01	4208	07	SU	0092	29	75	7	1 : 0	ST			PEARCE H
																		GREY CLAY 0040 GREY CLAY MSND 0078 GREY LMSN 0094
CON	05	003	68- 03998	586680 4777620	715	1962/11	3608	06	SU	0072	30	75	1	2 : 0	ST DO			BENEDICT W
																		BLUE CLAY 0071 GREY LMSN 0076
CON	05	004	68- 07849	587598 4778688	762	1971/08	2803	06	FR	0114	84	89	15		DO			THOMPSON S
																		LOAM 0004 BRWN CLAY 0027 BLUE CLAY 0105 GREY LMSN 0115
CON	05	004	68- 06887	587620 4778680	762	1968/11	1620	06	FR	0110	55	90	10	1 : 0	DO			VANBEEK L
																		BRWN CLAY 0020 GREY CLAY 0105 LMSN 0111
CON	05	004	68- 06891	587645 4778660	562	1968/09	2803	06	FR	0113	50	80	15	2 : 0	DO			TOALS LUMBER
																		BRWN CLAY 0015 BLUE CLAY 0103 LMSN 0113
CON	05	004	68- 03999	587680 4778600	762	1952/06	1620	06	FR	0104	40				DO			OLIVER L
																		CLAY 0040 MSND 0060 HPAN 0101 GRVL 0104 RIDGE J
CON	05	004	68- 04000	587280 4778760	762	1953/12	1620	06	FR	0106	46	46	4	2 : 0	DO			YLLW CLAY 0104 GREY LMSN 0109
																		ADAMS R
CON	05	004	68- 04001	587460 4778720	762	1954/02	1643	06	FR	0110	30	31	15	0 : 30	DO			BRWN CLAY 0108 LMSN 0110
																		VANDERPOL S
CON	05	004	68- 08663	587610 4778680	762	1973/10	1620	06	FR	0109	76	90	10	1 : 0	DO			BRWN CLAY 0020 GREY CLAY 0106 LMSN 0109
																		BARD, WIC
CON	05	005	68- 12646	999999 9999999		1995/07	2803	06	SU	0122	75	126	1	2 : 0	DO			LOAM 0004 BRWN CLAY 0016 BLUE CLAY 0100 GREY LMSN ROCK 0130
																		GUYER J G
CON	05	005	68- 07997	588185 4778510	762	1971/08	2803	06	FR	0114	75	106	10	1 : 0	DO			LOAM 0006 BRWN CLAY 0024 BLUE CLAY 0108 GREY LMSN 0115
																		MAYS G
CON	05	005	68- 07293	587740 4778050	745	1969/09	2803	06	FR	0095	43	105	1	1 : 0	DO			LOAM 0004 BRWN CLAY 0024 GREY CLAY 0084 GREY LMSN 0105
																		RICHARDSON G
CON	05	005	68- 07084	587940 4777800	732	1969/04	4208	06	FR	0093	32	70	30	0 : 30	DO			CLAY 0090 GRVL 0093

GROUND WATER BULLETIN REPORT

WATER WELL DATA SYSTEM Aug 13 1998 PAGE: 347 COUNTY: WENTWORTH

MUNICIPALITY CONCESSION ETC	LOT	WELL NO	UTM EASTING NORTHING	ELEV FEET	DATE	DRILLER	INS FEET	WATER FEET	CSG KIND DIA OF	WATER STAT FOUND LVL	WATER FEET	STAT LVL	PUMP RATE	TEST TIME	SCREEN DEPTH	LENGTH FEET	TO WHICH FORMATIONS EXTEND	OWNER
													HR:MN	USE	FEET			
CON	05	005	68- 588103	753	1964/08	4208	06	FR	0105	57	90	20	2	:0	DO			SMITH RONALD L CLAY 0099 LMSN 0108
CON	05	005	04056 4778287	763	1965/02	2803	06	SU	0112	55	105	10	1	:0	CO			LESLIE A BRWN CLAY 0015 BLUE CLAY 0109 LMSN 0114
CON	05	005	04057 4778506	761	1966/08	2803	06	FR	0100	60	70	20	1	:0	DO			FRENCH J BRWN CLAY 0015 BLUE CLAY 0100 SHLE 0101
CON	05	005	04058 4778396	743	1962/10	2803	06	FR	0094	35	80	8	2	:0	DO			ALDERSON A BRWN CLAY 0006 BLUE CLAY 0082 LMSN 0096
CON	05	005	04051 4777971	755	1953/04	1620	06	FR	0108	18	25	3	2	:0	DO			CLARK A YLLW CLAY 0106 GREY LMSN 0109
CON	05	005	04007 4778358	762	1947/04	1208	06	FR		40					DO			BREWER ALEX CLAY 0020 QSND 0106 LMSN 0108
CON	05	005	04002 4778505	762	1949/07	1715	06	FR	0100	25	100	17	0	:30	DO			YOUNG ALEX BRWN CLAY 0040 BLUE CLAY 0050 GREY QSND 0100
CON	05	005	04003 4778438	762	1951/05	2107	05	FR	0106	27					DO			WILSON A W YLLW CLAY 0014 BLUE CLAY STNS 0026 BLUE CLAY 0042
CON	05	005	04004 4778513	743	1958/10	1643	06	FR	0100	30	80	10	1	:0	DO			BLUE CLAY MSND STNS 0067 BLUE CLAY MSND 0105 GRVL 0106 BLUE SHLE 0107
CON	05	005	68- 587994	743	1953/06	1620	06	FR	0100	16	20	4	2	:0	DO			ELZINGA AND DEKKER CLAY 0095 LMSN 0100
CON	05	005	04032 4777986	758	1953/01	1620	06	FR	0112	12	12	5	2	:0	DO			LASLETT G YLLW CLAY 0104 GREY LMSN 0114
CON	05	005	04006 4778358	748	1958/08	2803	06	FR	0097	30	60	13	0	:30	DO			MARK G LOAM 0004 BLUE CLAY 0095 SHLE 0097
CON	05	005	04029 4778120	747	1953/06	1620	06	FR	0100	16	20	4	2	:0	DO			WARK D YLLW CLAY 0098 GREY LMSN 0100
CON	05	005	04008 4778124	754	1953/08	1620	06	FR	0110	10	10	5	4	:0	DO			WATERS A YLLW CLAY 0108 LMSN 0114
CON	05	005	04009 4778282	763	1954/05	1643	06	FR	0110	40	50	8	0	:30	DO			BOOMHOWER R YLLW CLAY 0107 LMSN 0112
CON	05	005	04010 4778523	743	1954/08	1643	06	FR	0100	35	36	10	0	:30	DO			LEE JACK LOAM 0002 CLAY 0055 CLAY MSND 0096 LMSN 0101
CON	05	005	68- 587959	743	1954/09	1643	06	FR	0111	18	19	5	0	:30	DO			MCBRIDE L LOAM 0002 CLAY 0060 CLAY MSND 0100 LMSN 0112
CON	05	005	04012 4778357	758	1955/06	4208	06	FR	0108	25	90	13	1	:0	DO			HIND WILLION CLAY 0040 CLAY MSND 0104 LMSN 0109
CON	05	005	04013 4777953	763	1955/10	4208	06	FR	0105	22	60	10	1	:0	DO			GRABHAM K F CLAY 0025 CLAY SILT 0098 LMSN 0109
CON	05	005	04014 4777957	742	1955/10	4208	06	FR	0107	27	45	20	1	:0	DO			CANADA UNITED CHURCH CLAY 0070 CLAY MSND 0104 LMSN 0109
CON	05	005	68- 587988	733	1958/05	4208	06	FR	0112	12					DO			SMITH A WILLARD E J CLAY 0106 LMSN 0112
CON	05	005	04026 4777823	758	1951/07	4827	06	FR	0101	25	25	10	1	:0	DO			GUYATT C LOAM 0002 CLAY MSND STNS 0101 GRVL 0103
CON	05	005	68- 588159	742	1956/03	1214	06	FR	0106	30	60	5	1	:0	DO			ZWART E CLAY 0104 LMSN 0106
CON	05	005	04015 4777957	742	1958/05	1643	06	FR	0108	40	60	8			DO			BOOKER H AND KETT W CLAY 0105 LMSN 0109
CON	05	005	68- 587924	764	1957/08	1643	06	FR	0108	40	60	8			DO			HIND W LOAM 0004 BLUE CLAY 0097 LMSN 0100
CON	05	005	68- 588070	762	1957/05	2803	06	FR	0100	40	100	3			DO			BETHUNE J CLAY 0095 LMSN 0105
CON	05	005	04025 4778560	746	1957/01	1643	06	FR	0105	45	55	20			DO			
CON	05	005	68- 587892	742	1957/01	1643	06	FR	0105	45	55	20			DO			
CON	05	005	04024 4778056	742	1957/01	1643	06	FR	0105	45	55	20			DO			
CON	05	005	68- 587942	742	1957/01	1643	06	FR	0105	45	55	20			DO			
CON	05	005	04023 4777950	742	1957/01	1643	06	FR	0105	45	55	20			DO			

CONTINUING... GLANFORD TOWNSHIP

MUNICIPALITY CONCESSION ETC		LOT NO	WELL EASTING	UTM	ELEV	DATE	DRILLER	INS WATER FEET	DIA OF	CSG KIND	WATER STAT PUMP TEST	TEST	TIME	WATER DEPTH	LENGTH	SCREEN	OWNER	DEPTHS IN FEET TO WHICH FORMATIONS EXTEND	
			NO	NORTHING	FEET	FOUNDED	INS WATER FEET	FEET	LVL	FOUND	LVL	TEST	HR:MN	FEET	FEET				
CONTINUING... GLANFORD TOWNSHIP																			
CON	05	006	68- 588741	760	1967/01	2803	06	FR	0130	83	130	3	1:0	DO			POELMAN HENRY		
			04078 4778303														PRDG 0021	BLUE CLAY 0121	LMSN 0133
CON	05	006	68- 588348	720	1964/09	2309	06	FR	0102	35	80	10	1:0	DO			KOPPELAAR N		
			04076 4777114														BRWN CLAY 0020	BLUE CLAY 0040	GREY CLAY MSND 0080
CON	05	006	68- 588233	760	1960/03	4208	07	FR	0105	28	60	48	1:0	CO DO			SILT 0101	GRVL 0102	LMSN 0105
			04069 4777157														TWEEDLE A		
CON	05	006	68- 588415	760	1958/03	1643	06	FR	0111	35	60	10	1:0	DO			GREY CLAY 0090	CLAY SILT 0104	LMSN 0108
			04068 4778439														MURPHY RON		
CON	05	006	68- 588176	750	1955/10	4208	06	FR	0108	24	35	25	1:0	DO			CLAY 0110	GREY LMSN 0112	
			04067 4778256														LAUSCH R		
CON	05	006	68- 587993	730	1955/06	1643	06	FR	0100	20	40	6	1:0	ST DO			CLAY 0030	CLAY SILT 0085	LMSN 0110
			04066 4777541														RICHARDSON F		
CON	05	006	68- 588028	730	1955/06	1643	06	FR	0110	100	105	2	0:30	NU			BRWN CLAY 0093	LMSN 0108	
			04065 4777531														RICHARDSON F		
CON	05	006	68- 588012	720	1955/05	1643	06	FR	0110	35	40	5	0:30	DO			BRWN CLAY 0096	LMSN 0115	
			04064 4777213														RICHARDSON B		
CON	05	006	68- 588045	730	1953/06	1208	06	FR	0100	30	60	10	:	DO			BRWN CLAY 0100	LMSN 0120	
			04062 4777732														EARTON L		
CON	05	006	68- 588206	750	1949/04	1715	06	FR	0110	30	30		0:30	DO			LOAM CLAY 0097	GRVL 0100	
			04059 4778366														GARRETT		
CON	05	006	68- 588174	750	1953/10	4208	06	FR	0106	23	35	17	1:0	DO			BRWN CLAY 0040	BLUE CLAY 0050	GREY QSND 0099
			04063 4778246														WOODCRAFT RODGER		LMSN
CON	05	006	68- 588211	750	1950/06	3526	05	FR	0098	23	40	10	1:30	DO			CLAY 0040	CLAY MSND 0099	LMSN 0108
			04060 4778366														CARTWRIGHT ALBERT		
CON	05	006	68- 588169	752	1975/10	2803	06	SU	0106	50	65	15	1:0	DO			CLAY 0015	CLAY MSND 0050	QSND 0060
			09339 4778212														SHLE GRVL 0097	GRVL CLAY 0100	LMSN 0102
CON	05	006	68- 588040	722	1976/03	2803	06	FR	0109	45	100	10	1:0	DO			CORSEBIE R-LEACH		
			09560 4777200														LOAM 0004	BRWN CLAY 0028	BLUE CLAY 0104
CON	05	006	68- 588140	724	1973/01	3608	06	FR	0125	50	120	4	2:15	DO			DI BATTISTA CARMEN		
			08435 4777180														LOAM 0006	BRWN CLAY 0022	BLUE CLAY 0108
CON	05	006	68- 588280	760	1972/03	2803	06	FR	0112	64	67	20	1:0	DO			BERTON E		
			08326 4778440														BRWN CLAY 0034	GREY CLAY Bldr	0095
CON	05	006	68- 588800	760	1972/05	2803	06	FR	0130	45	138	2	2:0	DO			GREY CLAY	GREY CLAY	GRVL
			08175 4778370														0115	GREY LMSN 0126	
CON	05	006	68- 587920	714	1976/07	2803	06	FR	0108	49	108	1	5:0	DO			VAIVIL C		
			09565 4777240														LOAM 0004	BRWN CLAY 0026	BLUE CLAY 0110
CON	05	006	68- 588340	712	1976/11	2803	06	FR	0110	40	100	10	1:0	DO			NOSS T		
			09577 4777120														LOAM 0006	BRWN CLAY 0024	BLUE CLAY 0124
CON	05	007	68- 588979	760	1956/05	1208	06	FR	0124	40	100	1	1:0	DO			LOAM 0006	BRWN CLAY 0028	BLUE CLAY 0107
			04079 4778253														GRIFT WM		
CON	05	007	68- 588900	730	1956/07	4208	06	FR	0082	10	20	17	1:0	ST DO			LOAM 0006	BRWN CLAY 0028	BLUE CLAY 0107
			04080 4776956														LOAM 0108		
																	WESTON S		
																	LOAM 0004	BRWN CLAY 0027	BLUE CLAY 0108
																	0110		
																	MCINTYRE RAY		
																	CLAY MSND 0060	QSND 0100	CLAY 0118
																	LMSN 0124		
																	MCMAHON J D		
																	CLAY 0040	CLAY SILT 0080	LMSN 0084

**Test Pit Logs
and Soil Grain Size Analyses**

APPENDIX B

Terraprobe Limited





Terraprobe

PROJECT No: 7-05-0032

CLIENT: Hamilton Sod

LOCATION: Mount Hope, Ontario

LOG OF TEST PIT 1

EXCAVATION DATE: March 24, 2005

ELEVATION : Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES		SHEAR STRENGTH kPa Cu, kPa Vane Test + Penetrometer ● 20 40 60 80	WATER CONTENT (%) WP — w — WL 10 20 30	ADDITIONAL LAB TESTING	ADDITIONAL INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE				
0	GROUND SURFACE							
	Moist, dark brown; CLAYEY SILT TOPSOIL		0.00	1 CS				
1	Moist, brown; CLAYEY SILT, varved, trace sand		0.45					
			1.52	2 CS				
2	Moist to wet, brown to grey; CLAYEY SILT, varved, trace sand			3 CS				
3	END OF TEST PIT		2.74					
4								
5								
6								
7								
8								
9								

Backhoe

A. CUMMINGS

7-05-0032-1.DWG

NOTES:
Minor water seepage at
approximately 1.5m depth.



Terraprobe

PROJECT No: 7-05-0032

CLIENT: Hamilton Sod

LOCATION: Mount Hope, Ontario

LOG OF TEST PIT 2

EXCAVATION DATE: March 24, 2005

ELEVATION : Geodetic

BORING METHOD	SOIL PROFILE			SAMPLES		SHEAR STRENGTH kPa Cu, kPa	WATER CONTENT (%)	ADDITIONAL LAB TESTING	ADDITIONAL INFORMATION
	DEPTH SCALE IN METRES	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER				
Backhoe	0	GROUND SURFACE							
		Moist to wet, dark brown; CLAYEY SILT TOPSOIL , trace rootlets and organic matter		0.00	1	CS			
	1	Moist, brown to grey; SANDY SILT , varved, trace clay		0.45					
				1.52	2	CS			
	2	Brown to grey; CLAYEY SILT , varved, trace sand and occasional gravel							
	3				3	CS			
		END OF TEST PIT		3.05					
	4								
	5								
	6								
	7								
	8								
	9								

NOTES:
Test pit dry to depth
of excavation.

7-05-0032-2.DWG A.CUMMINGS



Terraprobe

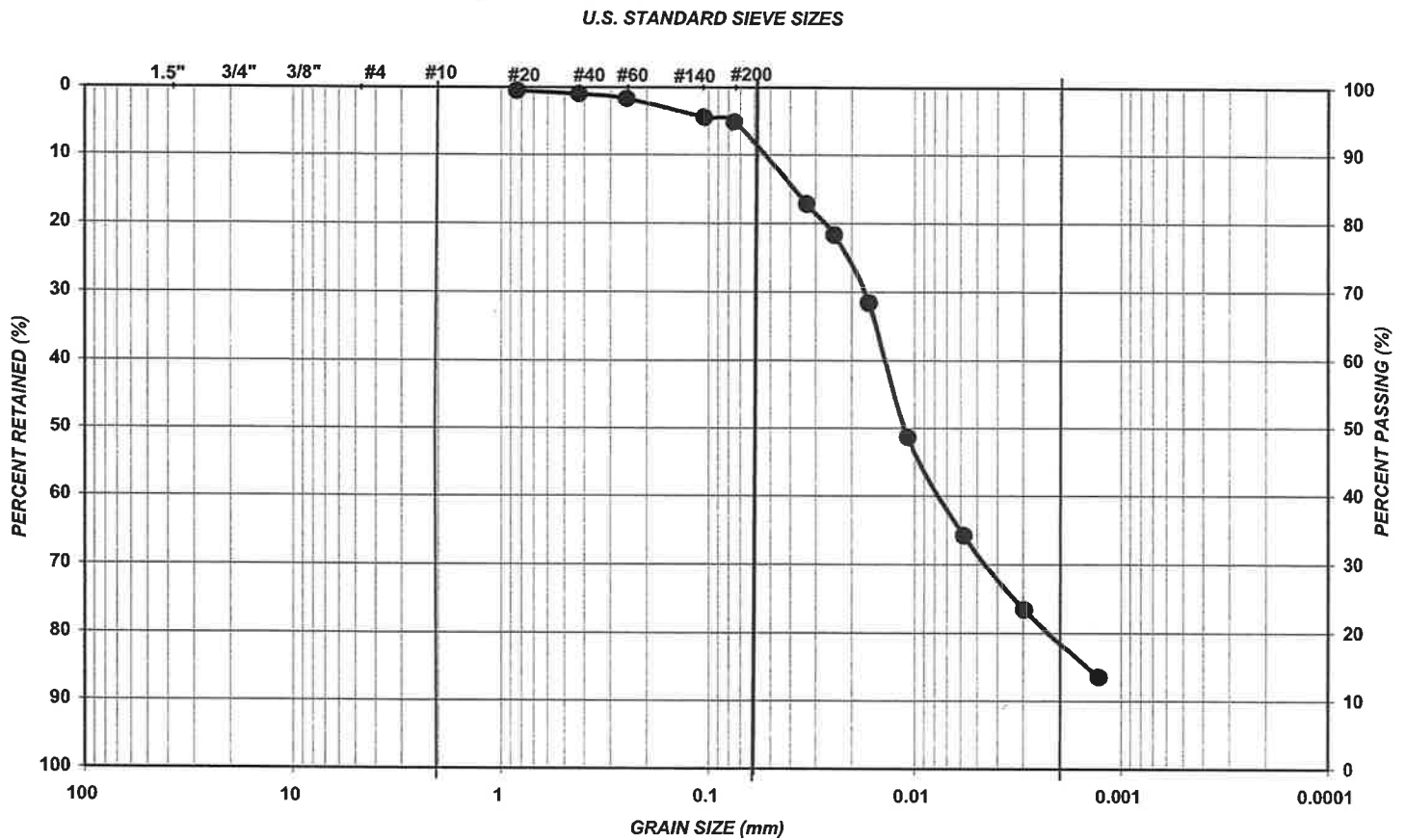
**SIEVE AND HYDROMETER ANALYSIS
TEST REPORT**

PROJECT: Hamilton Sod
 LOCATION: TP 1 Sa 1
 CLIENT: Hamilton Sod

FILE NO.: 7-05-0032
 LAB NO.: 2304
 SAMPLE DATE: March 23 2005
 SAMPLED BY: JV

SAMPLE DESCRIPTION: Clayey Silt with traces of Sand

GRAIN SIZE DISTRIBUTION



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

Figure 10



Tetraprobe

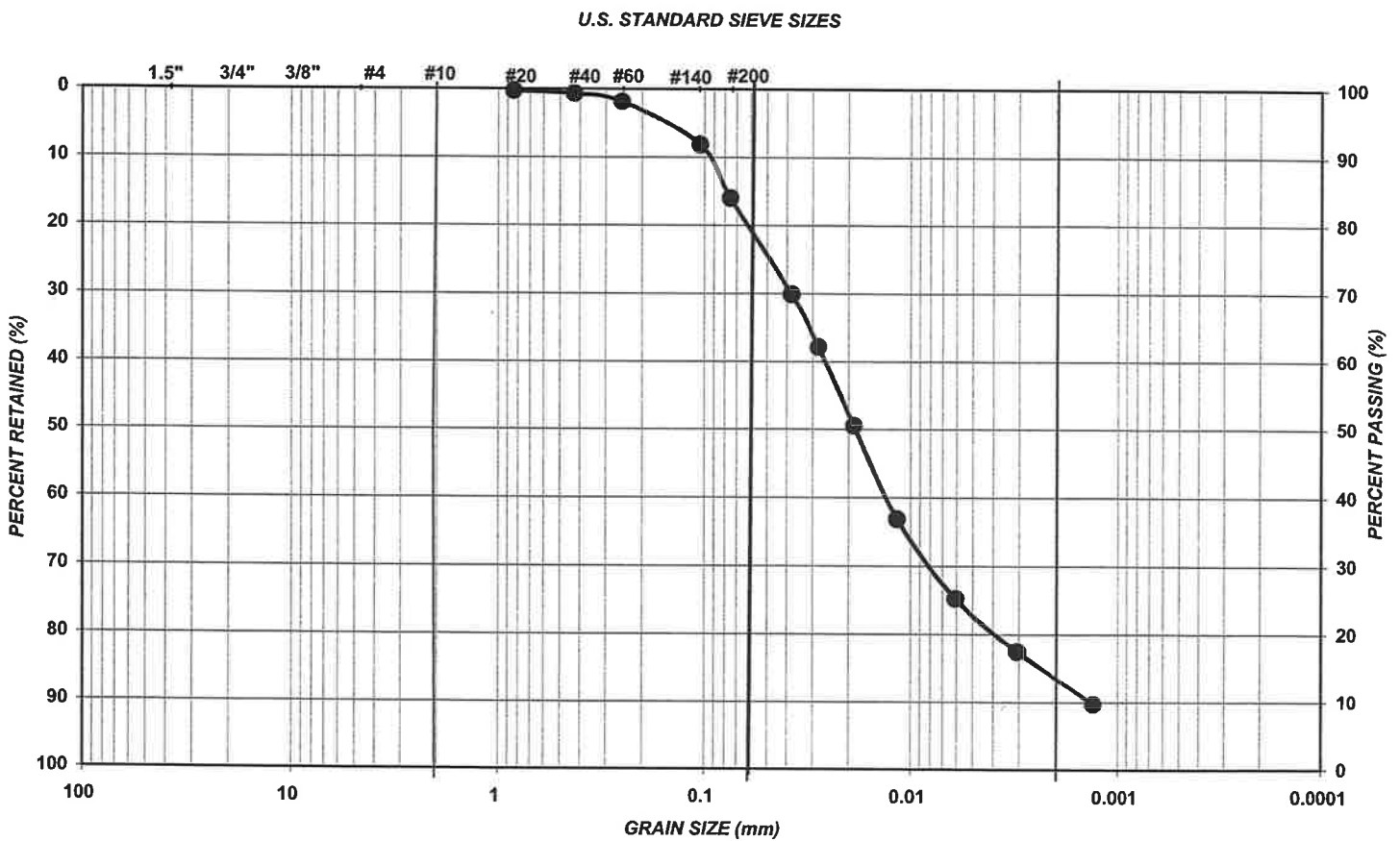
**SIEVE AND HYDROMETER ANALYSIS
TEST REPORT**

PROJECT: Hamilton Sod
LOCATION: TP 2 Sa 1
CLIENT: Hamilton Sod

FILE NO.: 7-05-0032
LAB NO.: 2305
SAMPLE DATE: March 23 2005
SAMPLED BY: JV

SAMPLE DESCRIPTION: Sandy Silt with trace Clay

GRAIN SIZE DISTRIBUTION



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

Figure 10

**Certificates of Analysis
Groundwater**

APPENDIX C

Terraprobe Limited



29-Mar-2005

TERRAPROBE LIMITED
903 Barton Street, Unit 22
Stoney Creek, ON
L8E 5P5

Page: 1
Copy: 1 of 2

Attn: Paul Puodziunas
Project: 7-05-0032

Received: 22-Mar-2005 12:09
PO #: 7-05-0032

Job: 2551687

Status: Final

Water Samples

Sample Id	TDS mg/L	F- SM 4500F mg/L	Cl- SM 4110B mg/L	NO2-N SM 4110B mg/L	Br- SM 4110B mg/L	NO3-N SM 4110B mg/L	PO4-3 SM 4110B mg/L	SO4= SM 4110B mg/L
SA1 8271	664	0.7	2.9	<0.2	<0.5	<0.2	<1	454.
SA2 8321	568	0.7	2.3	<0.2	<0.5	<0.2	<1	362.
Blank	<2	<0.1	<0.5	<0.2	<0.5	<0.2	<1	<0.5
QC Standard (found)	242	2.0	2.0	1.0	2.0	1.0	5	4.9
QC Standard (expected)	250	2.0	2.0	1.0	2.0	1.0	5	5.0
Repeat SA1 8271	694	0.7	2.8	<0.2	<0.5	<0.2	<1	455.

