HYDROGEOLOGICAL ASSESSMENT
AND PRIVATE SERVICING REPORT

- QSRP DEVELOPMENTS INC. -

309 Zephyr Road
Part Lot 25, Concession 3, Former Scott Township
Hamlet of Zephyr, Township of Uxbridge, Ontario

August 7, 2012

Reference No.: R12-510.3

Prepared for
The Regional Municipality of Durham
The Corporation of the Township of Uxbridge

On Behalf of
Mr. Ken Sherwood, QSRP Developments Inc.

GRACE & ASSOCIATES INC.
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TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

HYDROGEOLOGICAL ASSESSMENT AND PRIVATE SERVICING REPORT

- QSRP DEVELOPMENTS INC. -

309 Zephyr Road
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Hamlet of Zephyr, Township of Uxbridge, Ontario

1.0 INTRODUCTION

This hydrogeological and soil assessment report has been prepared at the request of Mr. Ken Sherwood, on behalf of QSRP Developments Inc, owner of the subject property situated at 309 Zephyr Road, Part Lot 25, Concession 3, Hamlet of Zephyr, Township of Uxbridge, Ontario (Refer to Figure 1, Location Map and Appendix A, Survey Map).

The proposed development involves the creation of a seven (7) lot residential subdivision with access to Zephyr Road (Regional Road 13). The total development area is 2.96 hectares (7.31 acres). The proposed residential lots will range in size from 0.27 to 0.47 hectares (0.67 to 1.16 acres), are compatible with other residential lots in the hamlet, and will be privately serviced for water and sewage disposal (Refer to Figure 2, Proposed Development).

The proposed development is currently zoned Rural Zone (RU) and Hamlet Residential Exception No. 19 (HR-19) Zone. Applications for Hamlet Plan Amendment and Zoning By-Law Amendment will be submitted as part of the applications for Plan of Subdivision and Site Plan.

This report has been prepared in accordance with the MoEE *Hydrogeological Technical Information Requirements for Land Development Applications* (MoEE, 1995) for review by the Region of Durham - Planning and Economic Development Department and by the Township of Uxbridge Development Services - Planning Division. This report presents (i) the findings of the hydrogeological and soils investigations, (ii) an assessment of the potential impact on groundwater quality, (iii) proposed layout of each lot for private servicing with a drilled well and sewage disposal system, (iv) the results of pumping tests conducted on three on-site wells, (v) the water quality analyses results of groundwater samples collected during the pumping tests and door-to-door well survey, and (vi) conclusions and recommendations for the development of the plan of subdivision.

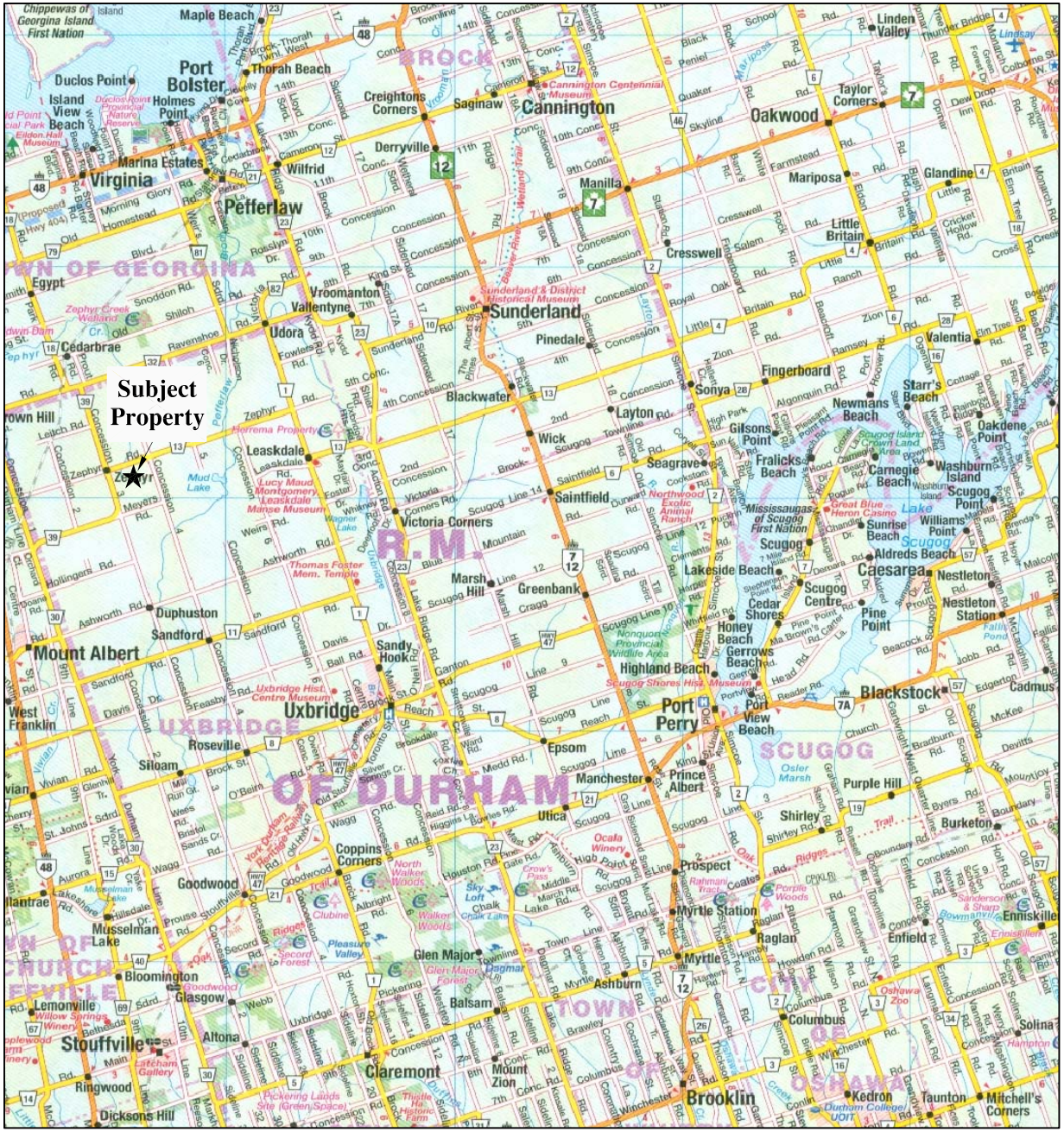
2.0 WORK PROGRAM

The following soil and hydrogeological work program has been completed:

1. *Compilation and review of local and regional geological and hydrogeological resources;*

2. *Excavation of six (6) test pits to explore shallow subsurface soils and groundwater conditions across the site and the monitoring of static water levels in test pit standpipes;*

3. *Laboratory analysis of four (4) representative soil samples for grain size distribution, moisture content; estimating percolation rate and T-time for tile bed sizing and design*



Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

★ Subject Property

Base Map: MapArt Ontario Back Road Atlas, 11th Edition.

TITLE

LOCATION MAP

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DATE	
September, 2012	

Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

- Property Boundary
- Proposed Lots
- Proposed Road
- DW-2 — Dug Well Location
- Shallow Groundwater Flow Direction

Property lot lines obtained from E.R.Garden Limited. Draft Plan of Subdivision Part of Lot 25, Concession 3 (Geographic Township of Scott), Township of Uxbridge, Regional Municipality of Durham. File number 12-5923.
Base Aerial photograph obtained from First Base Solutions, 2011. Orthophotograph date 2008.

TITLE

PROPOSED DEVELOPMENT

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R11-510.3	2
DATE	
September, 2012	

requirements;

4. *A door-to-door survey of neighbouring wells to document well owner's comments on quality and quantity and to collect water samples for nitrate testing;*

5. *Testing for nitrates in groundwater samples collected from on-site wells and test pit standpipes;*

6. *A 6 hour pumping test conducted on three (3) on-site drilled wells with monitoring for interference;*

7. *Water quality analyses of samples collected from the pumped wells in accordance with the MoEE Hydrogeological Technical Information Requirements for Land Development Applications;*

8. *Preparation of this report to present the data collected and provide conclusions and recommendations for the proposed residential development.*

3.0 PHYSICAL SETTING

3.1 Bedrock and Surficial Geology

The study area is underlain by thin-to medium-bedded, grey argillaceous limestone of the Middle Ordovician Lindsay Formation with a gentle regional dip to the south. Ontario Geological Survey Map 3 Bedrock Resources, reports an overburden thickness of about 50 metres overlying the bedrock within the study area.

The physiography of the area is reflected by landforms which were formed during glacial periods of the Pleistocene Epoch, 23,000 to 10,000 years before present. The area is covered by wet sand and swamp of the Lake Simcoe Basin of the Simcoe Lowlands, and the stony sand to silty sand till of the Peterborough Drumlin Field consisting of drumlinoid ridges of till surrounded by outwash sand plains. The Ontario Geological Survey Miscellaneous Release Data 228, identifies the development area is underlain by physiographic unit 17- Peak and Muck.

The Ontario Geological Survey Miscellaneous Release Data 128, identifies the development area is underlain by massive, silty sand to sandy silt matrix, with moderate to high matrix carbonate content, and clast content moderate to high of the Newmarket Till. The south-east portion of the development area is underlain by sand, minor silt; massive to laminated nearshore or deltaic bottomset glaciolacustrine deposits.

3.2 Hydrogeology

Hydrogeologic conditions in the area are inferred from surficial geology and topographical maps. The subject property slopes gently towards the north-east. The shallow groundwater flow direction, which typically forms a subdued replica of the surface topography, is inferred to be in a north-easterly direction towards Zephyr Creek.

Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
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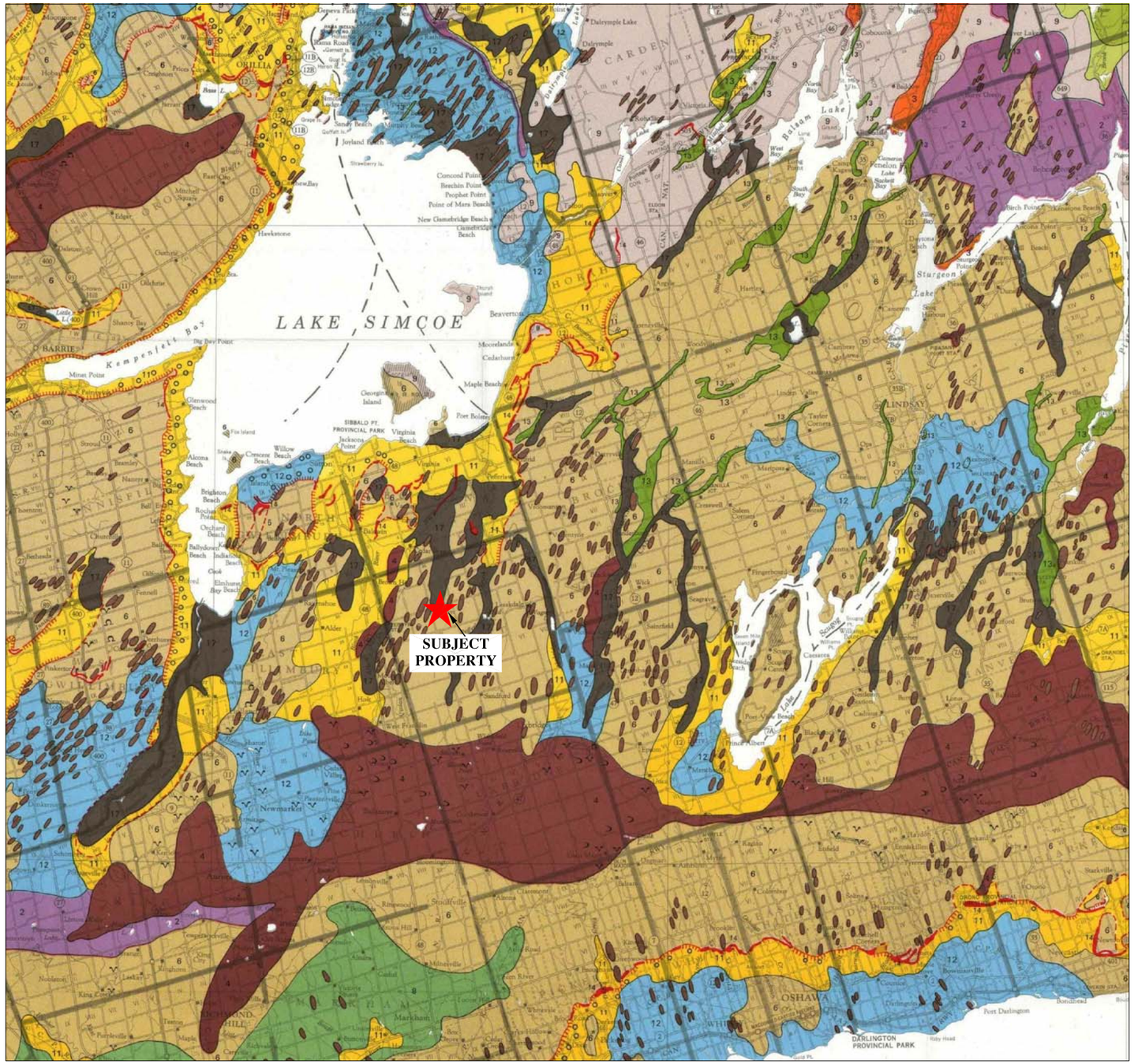
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario



LEGEND

1 ESCARPMENTS
2 TILL MORAINES
3 SPILLWAYS
4 KAME MORAINES
5 TILL PLAINS (UNDRUMLINIZED)
6 TILL PLAINS (DRUMLINIZED)
7 DRUMLINS
8 BEVELLED TILL PLAINS
9 LIMESTONE PLAINS
10 SHALE PLAINS
11 SAND PLAINS
12 CLAY PLAINS
13 ESKERS
14 BEACHES AND SHORECLIFFS
15 SHALLOW TILL AND ROCK RIDGES
16 BARE ROCK RIDGES AND SHALLOW TILL
17 PEAT AND MUCK
SYMBOLS
18 BOULDER PAVEMENT
19 SAND DUNES
20 DISSECTED TERRAIN
21 MUD FLOW SCARS

N

Source: Map 2226 Physiography of the South Central Portion of Southern Ontario, L.J. Chapman and D.F. Putnam. 1984.

TITLE

PHYSIOGRAPHY

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R11-510.3	3
DATE	
September, 2012	

3.3 Water Bodies and Areas of Natural Significance

Zephyr Creek, which eventually discharges into Lake Simcoe, is located approximately 250 metres east of the subject property. Two elongated drainage ponds are located along the eastern property boundary at the edge of the Hidden Ridge Golf Course. These discharge to less prominent drainage ditches located north of Zephyr Road. Two small ponds are located approximately 100 metres north-east and west of the site. The Zephyr-Egypt Wetland Complex Provincially Significant Wetland is located approximately 70 metres east of the subject property.

4.0 TEST PIT EXCAVATIONS

Grace & Associates Inc. explored shallow soil and groundwater conditions by excavating six (6) test pits to depths ranging from 2.7 to 3.0 metres below grade across the property on October 12, 2011 using a New Holland rubber tired backhoe. The test pits were systematically logged and representative soil samples were collected for laboratory analysis (Refer to Appendix B, Test Pit Logs and Grain Size Distribution Curves).

Each test pit, with the exception of test pit TP-2, was equipped with a slotted PVC standpipe to monitor the shallow groundwater flow zone (Refer to Figure 4, Test Pit Locations). The topographical relief across the site ranges from 256.9 metres asl at the south-west corner to a low of 244.4 metres asl at the north-east corner of the subject property.

4.1 Percolation Rates

Soil conditions were found to be generally uniform across the site (Refer to Appendix B, Test Pit Logs). A thin layer of organic rich soil (peat) was observed in test pits TP-1 and TP-2, which are situated in the general area of the former farm buildings. Test pits TP-3 to TP-6 inclusive, were located in the recently worked agricultural field. The upper 0.3 to 0.45 metres of these test pits contained dark brown to grey sandy topsoil.

TABLE 1
GRAIN SIZE DISTRIBUTION ANALYSES RESULTS

SAMPLE No.	DEPTH (m)	DESCRIPTION	K value (cm/sec)	T-Time (min/cm)
TP-1	1.75	SAND, Some Silt, Little Gravel	1.3×10^{-3}	10
TP-3	1.20	SAND, Some Silt, Trace Gravel	3.1×10^{-3}	15
TP-4	1.10	Fine SAND and SILT, Trace Gravel	2.4×10^{-3}	15
TP-5	1.50	Fine SAND, Trace Silt, Trace Gravel	7.7×10^{-3}	15

Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

- Property Boundary
- Proposed Lots
- Test Pit ID / Grade ELEV — Test Pit Location
- DW-2 — Dug Well Location
- Shallow Groundwater Flow Direction

Property lot lines obtained from E.R. Garden Limited. Draft Plan of Subdivision Part of Lot 25, Concession 3 (Geographic Township of Scott), Township of Uxbridge, Regional Municipality of Durham. File number 12-5923.
Base Aerial photograph obtained from First Base Solutions, 2011. Orthophotograph date 2008.

TITLE

TEST PIT LOCATIONS

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R11-510.3	4
DATE	
September, 2012	

The topsoil and peat layers were underlain by brown to grey, occasional weakly oxidized silty sand till with localized gravel to cobbles. Mottling occurred at depth in test pits TP-3 to TP-6 inclusive. Discontinuous, loose to compact fine sandy silt layers up to 0.25 metres in thickness were observed in the upper horizons of test pits TP-2, 5 and 6. Generally, the soil conditions beneath the site are representative of a loose to locally compact silty sand till with gravel and occasional cobble with depth.

Percolation rates (T-times) used for the leaching bed design were estimated by matching the grain size distribution curves with type curves in the *Ontario Building Code and Guide for Sewage Systems, June 1997 as periodically updated*. T-times for tested soil samples ranged between 10 and 15 min/cm across the site as presented in Table 1, Grain Size Distribution Analyses Results.

Percolation rates at other locations may vary from those estimated at test pit locations. Soil structure, as well as the grain size can significantly influence percolation rates due to density, layering, fissuring and biological activity.

4.2 Shallow Groundwater Flow Direction

Slotted standpipes were installed in each test pit, with the exception of test pit TP-2, to monitor the shallow water table. Monitoring was conducted throughout the Fall, 2011 and Spring 2012 periods to assess the seasonally low and high shallow water table conditions. The results are presented in Table 2, Static Water Level Results.

TABLE 2
STATIC WATER LEVEL RESULTS

Test Pit	[1.] Elevation (m)	Depth of Borehole (m)	Stick-up (m)	[2.] Static Level 10-13-11 (m)	Static Level 11-21-11 (m)	Static Level 04-10-12 (m)
TP-1	254.88	2.8	1.18	dry	dry	dry
TP-2[3]	255.06	2.7	-	-	-	-
TP-3	253.60	3.0	1.35	dry	dry	dry
TP-4	249.05	3.0	1.25	1.05	0.87	0.88
TP-5	246.20	2.8	1.15	1.08	0.96	0.65
TP-6	249.51	2.8	1.18	1.20	1.16	1.05

Notes:
1. Elevations obtained from E.R. Garden Limited Sketch Showing Elevations, September 2011.
2. Static water level measured in metres below grade.
3. No Standpipe installed in test pit TP-2.

Test pits TP-1 and TP-3 were reported to be dry during the test pit excavations, in addition to each of the monitoring periods. Test pits TP-4, 5 and 6 reported minor seasonal fluctuations of less than 0.15 metres in TP-6 to a maximum of 0.43 metres in TP-5.

The static levels reported on November 21, 2011 are considered representative of the fall conditions, with levels ranging between 0.87 and 1.16 metres below grade. Spring conditions measured on April 10, 2012 reported static water levels ranging between 0.65 metres and 1.05 metres below grade. Based on the topography and the monitored static water levels, the shallow groundwater flow direction on the site is east-northeasterly (Refer to Figure 4, Test Pit Locations).

5.0 HYDROGEOLOGY

General information regarding local hydrogeologic conditions was obtained from (i) a review of the published MOE water well records, (ii) a door-to-door survey of wells within 250 metres of the site, (iii) on-site test pit investigations, (iv) an on-site pumping test investigation, (v) collection and analysis of water samples to characterize groundwater quality, and (vi) published reports and maps on surficial geology, physiography, and regional groundwater resources.

MOE water well records within 250 metres of the site are presented in Appendix C. Wells were located based on their UTM coordinates provided on the records, and where practical, from the door-to-door well survey (Refer to Appendix D, Door-to-Door Well Survey Results). Selected well data are summarized in Table 3, and well locations are presented on Figure 5, Water Well Locations.

5.1 Water Well Survey Results

Table 3 summarizes the MOE water well records within 250 metres of the proposed development.

TABLE 3
WATER WELL SUMMARY

Number of Wells	Drilled	39	68%	
	Dug/Bored	18	32%	
	Data N/A	0	0%	
	Total	57	100%	
Aquifer Sources	Overburden	56	98%	
	Bedrock	1	2%	
	Dry	0	0%	
	Data N/A	0	0%	
Well Test Pumping Rate	Overburden	Average	49.5 L/min	(10.9 igpm)
		Range	8 -302.8 L/min	(1.8 - 66.6 igpm)
	Well Yield	Dry	6	11%
		< 9 L/min	1	2%
		9-22 L/min	11	20%
		23-45 L/min	13	23%
		> 45 L/min	20	36%
		Data N/A	5	9%
	Bedrock	Value	38 L/min	(8.4 igpm)
Static Water Level	Overburden	Average	3.0 m	(9.8 ft)
		Range	-2.4 - 8.5 m	(-7.9 - 27.9 ft)
	Bedrock	Value	19.8 m	(65 ft)

NOTE: Data from MOE well records and door-to-door survey.
Refer to Appendix D for Water Well Survey Results
N/A Data not available

Fifty-seven (57) wells were identified within 250 metres of the proposed residential development. Most wells obtain water from the overburden aquifer with yields ranging between 8 and 302.8 L/min. Static water levels in the overburden aquifer range between -2.4 and 8.5 metres, with an average of 3.0 metres below grade. The bedrock aquifer is encountered in one drilled well within the study area. Static water level is reported at 19.8 metres below grade and a well yield of 38 L/min.

A shallow dug well (DW-2) located immediately east of the entrance driveway is 7.16 metres deep with a static water level of 2.61 metres below grade, as measured on March 29, 2012.

Dug well (DW-1) is located off-site and serviced the former dwelling of Mr. John Lochie (former property owner). This shallow well is 10.8 metres deep with a static water level of 5.25 metres below grade, as measured on March 29, 2012.

Three (3) drilled wells (wells TW1 to TW3 inclusive) on the subject property are completed in the overburden aquifer at an average depth of 29.9 metres below grade and yields ranging from 30.3 to 37.8 L/min

Based on the MOE well data, it is anticipated that new drilled wells on the severed lots should obtain adequate potable water supplies at depths of 30 to 35 metres below grade.

5.2 Water Quality Results

Table 4 presents the nitrate sampling results from the test pit standpipes, on-site and neighbouring dug wells, and samples collected during the door-to-door well survey.

Six (6) samples were collected for laboratory analysis of nitrate from the neighbouring wells, during the door-to-door well survey conducted on December 7, 20011. Laboratory Certificates of Analyses are presented in Appendix G and the well locations are presented on Figure 5, Water Well Locations. Details of the wells are presented in Appendix C, MOE Water Well Records and Appendix D, Door-to-Door Well Survey Results. All samples met the Ontario Drinking Water Standards (ODWS).

Five (5) groundwater samples were collected for laboratory analysis of nitrate, from test pit monitors TP-4, 5, and 6, and from dug wells DW1 (GW1) and DW2 (GW2). Nitrate concentrations reported in the dug well samples ranged between 1.21 mg/L and 2.66 mg/L. These values are less than the maximum acceptable concentration of 10 mg/L in the (ODWS). Nitrate concentrations in the test pit samples ranged from 6.94 mg/L to 16.9 mg/L (Refer to Appendix G, Laboratory Certificate of Analyses). Nitrate concentrations in the three new test wells are presented in Section 10.

Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
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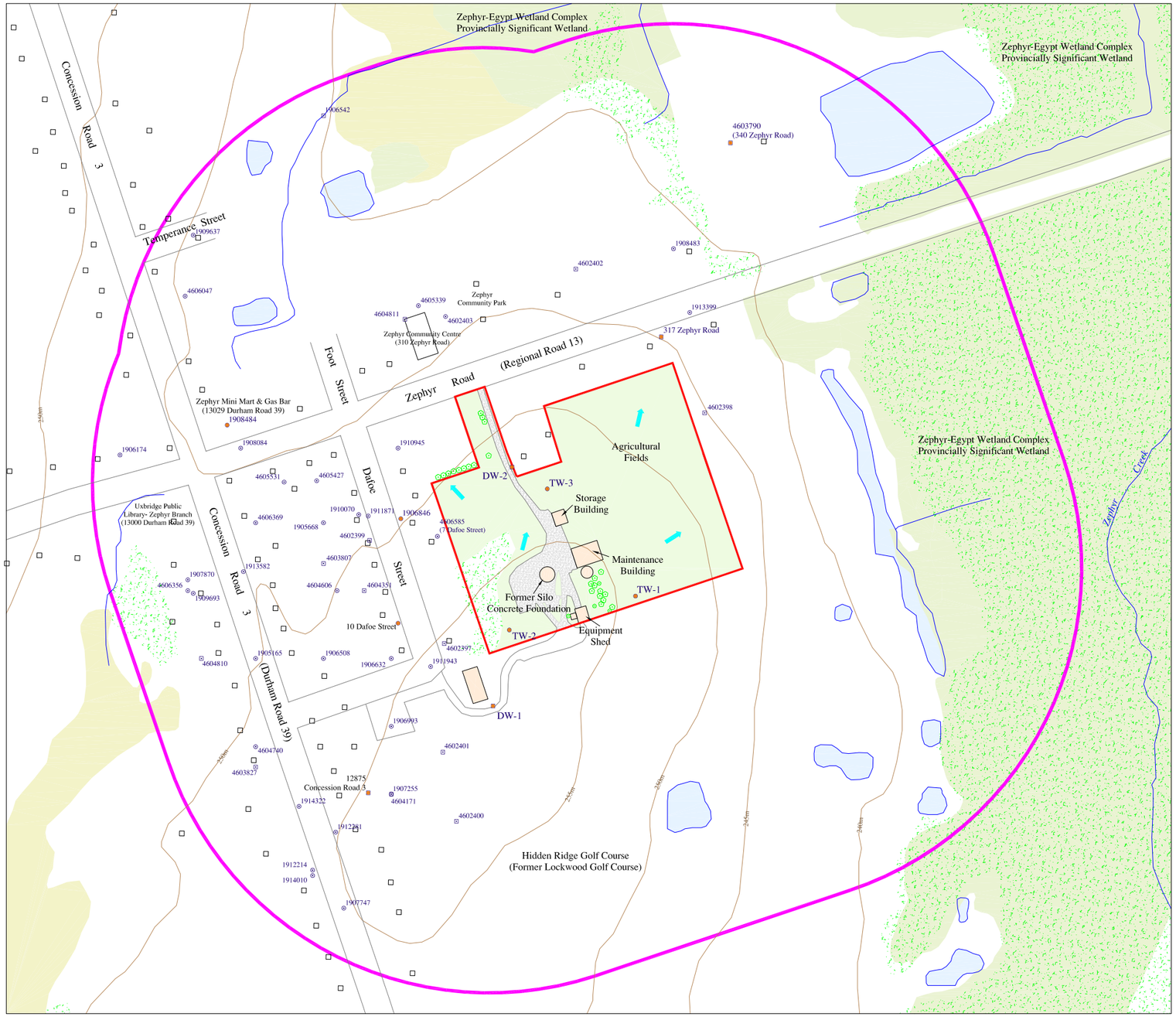
Township of Uxbridge, Ontario



LEGEND

- Property Boundary
- 250 metre Site Buffer
- *PSW
- Wetland- Non Significant
- Wooded Area
- Existing Structures
- ^Drilled Well
- Dug Well
- Nitrate Sampling Location
- Shallow Groundwater Flow Direction

**Provincially Significant Wetland (PSW) boundary under licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, May, 2012.*
^Water Well Record information provided by Ministry of the Environment and Door to Door Well Survey.

N

Scale: 1:3,400

0 50 100m

Base Data obtained from: Ontario Ministry of Natural Resources, © Queens Printer for Ontario, 2012. Additional water features obtained from Region of Durham - Map Durham.

TITLE

WATER WELL LOCATIONS

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DATE	
September, 2012	

6.0 NITRATE LOADING IMPACT ASSESSMENT

A nitrate loading impact assessment was conducted for the proposed residential development based on shallow groundwater analysis to confirm current background nitrate concentrations, the soil conditions observed during the subsurface soil investigation, and published surficial geology maps of the subject property.

Current MOE policy requires that sewage systems must meet the MOE's *Guideline B-7: Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities* and *Guideline B-7-1 Determination of Contaminant Limits and Attenuation Zones* with regard to nitrate, which is a critical health-related contaminant. The policy requires that effluent be sufficiently attenuated, such that nitrate (N) concentrations at the down-gradient property boundary, are less than 10 mg/L. Therefore, effluent requires dilution from natural recharge in order to adequately attenuate the nitrate.

6.1 Nitrate Sampling Results

In order to provide supporting documentation for the nitrate loading impact assessment, five (5) shallow groundwater samples were initially collected from the standpipe monitors in test pits TP-4, 5 and 6, in addition to the neighbouring well (DW-1) used for the golf course residence and the on-site dug well (DW-2), and submitted for laboratory analysis of nitrate.

The nitrate concentrations for the shallow flow zone beneath the site within the test pit standpipes were elevated, with concentrations ranging from 6.94 mg/L in test pit TP-4 to a high of 16.9 mg/L in test pit TP-6. The two dug well samples reported concentrations of 1.21 and 2.66 mg/L nitrate (Refer to Table 4, Nitrate Sampling Results).

It is apparent that elevated nitrate concentrations within the test pits are the result of on-going agricultural practices. While the nitrate concentrations are elevated, it is anticipated that these concentration levels will normalize to background levels similar to those observed in the two shallow dug wells tested (DW-1 and DW-2) once the agricultural practices have been terminated through the development of the proposed residential subdivision.

In order to ascertain a more representative nitrate concentration within the aquifer used by nearby residences for potable water supplies, nitrate samples were collected during the door-to-door well survey. The results of these are also presented in Table 4, Nitrate Sampling Results and the Laboratory Certificates of Analysis are presented in Appendix G.

TABLE 4
NITRATE SAMPLING RESULTS

Location	Well Type	Nitrate (mg/L)
340 Zephyr Road	dug	<0.05
317 Zephyr Road	dug	7.95
5 Dafoe Street	drilled	<0.05
10 Dafoe Street	drilled	<0.05
12875 Regional Road 39	drilled	2.53
13029 Regional Road 39	drilled	<0.05
DW-1	dug	1.21
DW-2	dug	2.66
TP-4	standpipe	6.94
TP-5	standpipe	12.1
TP-6	standpipe	16.9

The additional nitrate sampling conducted during the door-to-door well sampling, in conjunction with the shallow dug wells located at the site, indicate the nitrate concentrations range between <0.05 mg/L to 7.95 mg/L (shallow dug well), which arguably may be considered to be unrepresentative of the sample group. With the exception of the value encountered at 317 Zephyr Road, the anticipated average background nitrate concentration in the shallow flow zone in the area of the proposed development is anticipated to be less than 1 mg/L.

6.2 Recharge

The estimated recharge rate of the proposed subdivision is based on the soil conditions observed during the subsurface soil investigation and published surficial geology mapping of the area. The proposed development is located in the Peterborough Drumlin Field physiographic region, which is comprised primarily of Newmarket Glaciolacustrine Deposits and Till.

Generally, the soil conditions beneath the site are representative of a loose to locally compact silty sand till with gravel and occasional cobble with depth. By evaluating the soil type encountered on the subject property, an average estimated infiltration rate of 150 mm/yr is considered reasonable.

6.3 Nitrate Loading

The following provides an assessment of the nitrate impact on groundwater from the proposed 7 lot

residential subdivision from private sewage disposal systems on the lots to be created. For the purpose of the nitrate loading assessment, the proposed development area of 2.96 ha., in addition to a downgradient nitrate attenuation zone of 2.89 ha., for a total 5.85 ha (14.45 ac) land holdings has been used for attenuation purposes (Refer to Figure 6, Nitrate Attenuation Zone). A simple mass balance model is used to estimate the nitrate concentrations at the downgradient property boundary.

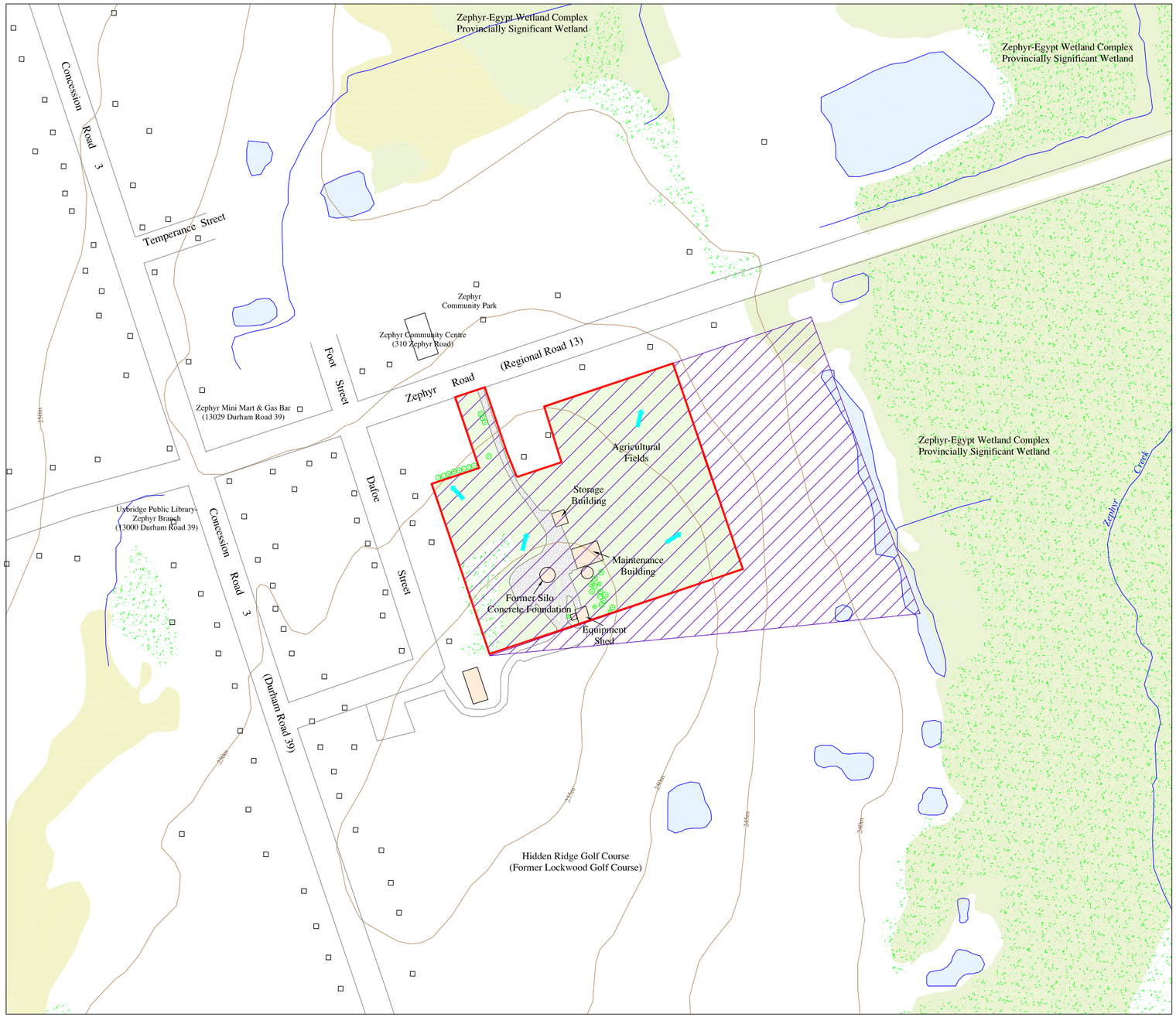
The following mass balance calculation is based on the MOE dilution model and employs a daily sewage volume of 1,000 L/day per lot with a nitrate concentration of 40 mg/L. The model assumes complete mixing of the sewage effluent with the on-site recharge.

The nitrate loading from the proposed residential lots will mix with the background nitrate concentration of about 1 mg/L in the groundwater, resulting in a nitrate loading at the downgradient boundary calculated to be about 10.0 mg/L. Based on the nitrate loading impact calculation, the subject property is capable of supporting the proposed creation of 7 new residential lots.

TABLE 5
NITRATE LOADING IMPACT MODEL ANALYSIS

DEVELOPMENT SITE	
- Representative Area of Proposed Development (7 created lots)	- 2.96 ha (7.31 acres)
Additional Lands for Nitrate Attenuation 2.89 ha (7.14 acres)	
Total Area for Nitrate Attenuation 5.85 ha (14.45 acres)	- 5.85 ha (14.45 acres)
SEPTIC EFFLUENT	
- Septic effluent 7 proposed lots @ 1,000 L/day	- 7,000 L/day
- Nitrates: 7,000 L/d x 40 mg/L x 365 d/yr x 10^{-6} kg/mg	- 102 kg/yr
Total Nitrates	**- 102 kg/yr**
DILUTION - DIRECT RECHARGE	
- Annual Precipitation (Uxbridge 2 Station)	- 799 mm/yr
- Infiltration / Recharge (Average based on test pit data & surficial geology)	- 150 mm/yr
- Dilution Ratio	- 3:1
- Total Annual Recharge 5.85 ha x 0.150 m/yr x 10,000 m^2/ha	- 8,775 m^3/yr
- Effluent Volume 7,000 L/day x 365 days/yr x 10^{-3} m^3	- 2,555 m^3/yr
Total Dilution Water Available	**- 11,330 m^3/yr**
IMPACT EVALUATION	
- Nitrate Concentration 102 kg /11,330 m^3/yr x 1000 mg/L m^3/kg	- 9.0 mg/L
- Background Nitrates: Average in shallow flow zone	- < 1.0 mg/L
Nitrate Concentration @ Down-Gradient Property Boundary	**- ~ 10.0 mg/L**

Based on this nitrate loading impact assessment, an 2.89 hectare area located downgradient of the proposed development has been designated as the nitrate attenuation zone in order to meet the MOE Reasonable Use Criteria of 10 mg/L nitrate at the downgradient property boundary (Refer to Figure 6, Nitrate Attenuation Zone).



Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

- Property Boundary
- Nitrate Attenuation Zone
- *PSW
- Wetland- Non Significant
- Wooded Area
- Existing Structures
- Shallow Groundwater Flow Direction

**Provincially Significant Wetland (PSW) boundary under licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, May, 2012.*

N

Scale: 1:3,400

0 50 100m

Base Data obtained from: Ontario Ministry of Natural Resources, © Queens Printer for Ontario, 2012. Additional water features obtained from Region of Durham - Map Durham.

TITLE

NITRATE ATTENUATION ZONE

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DATE	
September, 2012	

7.0 SEWAGE DISPOSAL SYSTEM DESIGN CONSIDERATIONS

According to the Region of Durham *Drilled Wells and Lot Sizing Policies as Applied to Consents (Severances) and Draft Plans of Subdivisions*, dated October 2010, subdivision applications will be assessed for the installation of a conventional Class 4 sewage disposal system. Any proposed lot must conform with Part 8 Sewage Systems under the Ontario Building Code based on the assumption that a maximum daily sewage flow of 3,000 L/day will be generated from the proposed residence.

Based on the grain size distribution and hydrometer analysis of the soil samples obtained during the subsurface soil investigation, the T-Times of the prevailing soil for the proposed lots and sewage disposal systems range between 10 and 15 min/cm for the upper soil horizon. As such, the required sewage system area is estimated to be 600 m^2 (prime and reserve). The dwelling and sewage disposal area for each proposed lot is illustrated on Figure 7, Conceptual Lot Configuration.

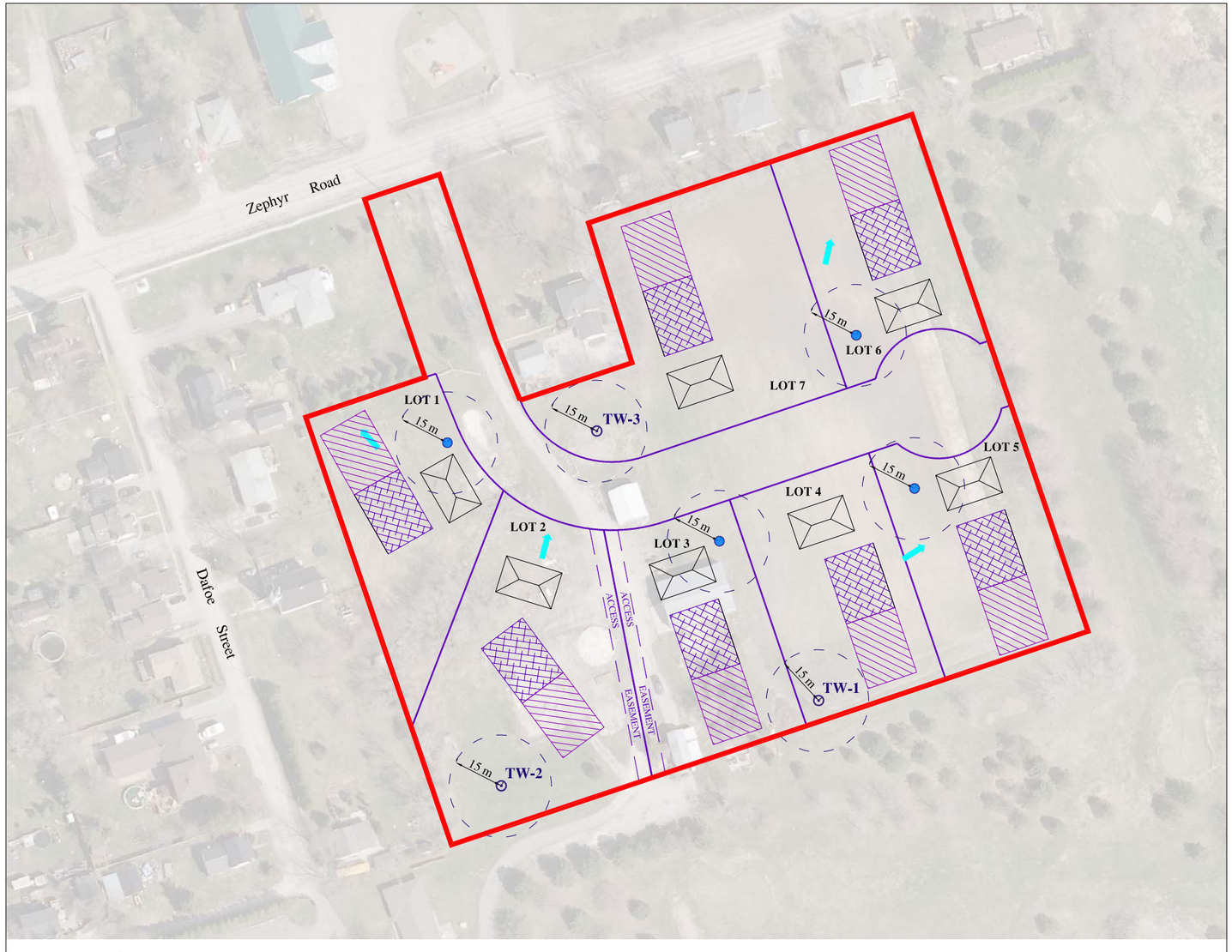
Test pits TP-1, 2, 3 and 6 all reported static water levels greater than 0.9 metres below grade, suggesting that based on the monitoring period, these lots could support in-ground sewage disposal systems (Refer to Table 2, Static Water Level Results). Partially raised beds will be required for Lots 5 and 6. Additional monitoring will be required in the spring to determine if this is considered reasonable during lot development.

Should a partially or fully raised sewage disposal systems be constructed due to site specific conditions, the distances presented above shall be increased by twice the height that the leaching bed is raised above the original grade in accordance with O.B.C. regulation 8.7.4.2(9). The minimum clearances for treatment units must conform to Ontario Building Code Table 8.2.1.6.A as follows:

Structure	1.5 m
Drilled well (water tight casing to 6 m)	15 m
Property Line	3 m

The minimum clearances for leaching bed distribution piping must conform to Ontario Building Code Table 8.2.1.6.B as follows:

Structure	5 m
Drilled well (water tight casing to 6 m)	15 m
Dug/Bored Well	30 m
Property Line	3 m



Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

- Property Boundary
- Proposed Lots
- Proposed Road
- 2000 ft² (185 m²) dwelling
- 300 m² Prime Sewage System Area
- 100% Reserve Sewage System Area
- TW-3 Drilled Well Location
- Proposed Well Location
- Shallow Groundwater Flow Direction

Property lot lines obtained from E.R.Garden Limited. Draft Plan of Subdivision Part of Lot 25, Concession 3 (Geographic Township of Scott), Township of Uxbridge, Regional Municipality of Durham. File number 12-5923.
Base Aerial photograph obtained from First Base Solutions, 2011. Orthophotograph date 2008.

TITLE

CONCEPUTAL
LOT CONFIGURATION

CLIENT

QSRP DEVELOPMENTS INC.

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants

DRAWN
R11-510.3

DATE
September, 2012

FIGURE NO.
7

8.0 TEST PUMPING

The *MOEE Hydrogeological Technical Information Requirements for Land Development Applications* (1995) states (i) that the minimum daily per-person water requirement is 450 litres, (ii) that the minimum peak demand is 3.75 L/min per person, and (iii) that the minimum peak requirement for a residence is 13.7 L/minute. The minimum peak requirement must be provided for 120 minutes each day (60 minutes in the morning and 60 minutes in the evening).

Test wells were subjected to a 6-hour pumping test. Temporary submersible test pumps were installed and operated by Herb Lang Well Drilling Ltd. and the test was supervised by Grace & Associates Inc. During the tests, water levels in the on-site test wells, two dug wells (DW-1 and DW-2), a neighbouring drilled well (7 Dafoe Street), and a standpipe (TP-5) were monitored.

Test well details are provided on the Water Well Records in Appendix C. Graphical presentations of the pumping tests are presented in Appendix F.

8.1 Test Wells

Three drilled wells, designated as TW-1, TW-2, and TW-3, were test pumped on April 2, 2012, March 30, 2012, and March 29, 2012 respectively. Test well TW-1 (MOE Well Number A123252), was drilled on February 13, 2012 (deepened on April 23, 2012) and is located approximately 96 metres east of test well TW-2 and approximately 102 metres south-east of test well TW-3 (Refer to Figure 8, Pumping Test Well Locations).

Selected information for the pumped wells is presented in Table 6, Selected Data for Test Wells.

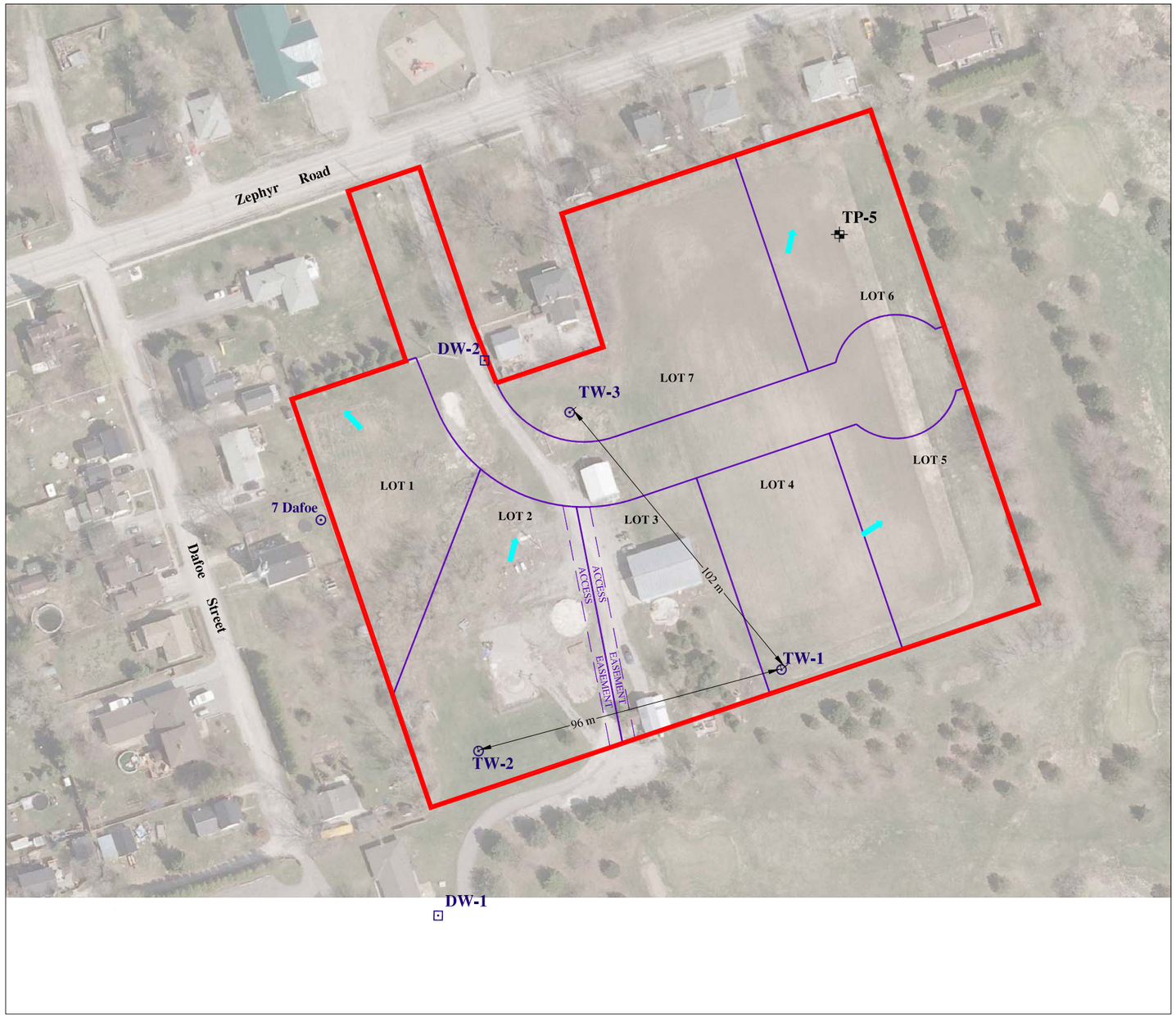
TABLE 6
SELECTED DATA FOR TEST WELLS

Test Well No.	Well Tag No.	Grade Elev (m asl)	Well Depth (m)	Aquifer Elevation (m asl)	SWL[1] (m BTC)	Pump Level (m BGL)	Casing Diam. (m)	Available Drawdown (m)
TW-1	A123252	254.23	29.57	29.57	6.87	27.43	0.16	20.56
TW-2	A123254	255.49	31.09	31.09	8.3	28.04	0.16	19.74
TW-3	A123253	252.15	28.96	28.96	5.09	26.52	0.16	21.43

Notes: 1 As measured on day of March 29, 2012 pumping test.
SWL Static water level.
BTC Below top of casing.
BGL Below ground level.

Available drawdown is the difference between the pump depth and the static water level.

All test wells terminate in an overburden aquifer.



Hydrogeological Assessment and Private Servicing Report

309 Zephyr Road
Part Lot 25, Concession 3
Former Scott Township, Hamlet of Zephyr
Township of Uxbridge, Ontario

LEGEND

- Property Boundary
- Proposed Lots
- Proposed Road
- Test Pit ID — Test Pit Location
- TW-3 — Drilled Well Location
- DW-2 — Dug Well Location
- Shallow Groundwater Flow Direction

N

Property lot lines obtained from E.R. Garden Limited. Draft Plan of Subdivision Part of Lot 25, Concession 3 (Geographic Township of Scott), Township of Uxbridge, Regional Municipality of Durham. File number 12-5923.
Base Aerial photograph obtained from First Base Solutions, 2011. Orthophotograph date 2008.

TITLE

PUMPING TEST
WELL LOCATIONS

CLIENT

QSRP DEVELOPMENTS INC.

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants

DRAWN	FIGURE NO.
R11-510.3	8
DATE	
September, 2012	

8.2 Monitored Wells

During the pumping tests, nearby wells were monitored for interference effects. The monitored wells are identified in Table 7, Monitored Wells During Pumping Test and the locations of the wells are presented in Figure 8, Pumping Test Well Locations.

TABLE 7
MONITORED WELLS DURING PUMPING TEST

Test Well No.	Monitored Wells						
	TW-1	TW-2	TW-3	DW-1	DW-2	TP-5	7 Dafoe
TW-1	-	✓	✓	✓	✓	✓	✓
TW-2	✓	-	✓	✓	✓	✓	✓
TW3	✓	✓	-	✓	✓	✓	✓

9.0 PUMPING TEST ASSESSMENT

TW-1, TW-2, and TW-3 were pumped continuously at rates of 15.6, 30, and 37.2 L/min respectively. Automatic water level measurements (i.e., datalogger) were augmented by manual measurements. Pumping rates were monitored using a totalizing flow metre.

9.1 Test Well TW-1

The 6-hour pumping test of TW-1 was conducted on April 2, 2012 at an average rate of 15.6 L/min (3.4 igpm) to assess the short-term yield and to estimate the aquifer coefficients. At that time, TW-2, TW-3, DW-1, DW-2, and 7 Dafoe served as observation wells. In addition, a nearby standpipe at TP-5 was also monitored to observe the effect of pumping on the shallow flow zone.

During the 6 hour test, approximately 5,500 L (~1,221 imperial gallons) were pumped from TW-1, exceeding the minimum D-5-5 criteria, without the need for supplementary water storage. Water takings during the test were more than double the peak rate for a 4-bedroom home according to Part 8 of the Code and Guide for Sewage Systems, Ontario Building Code and more than 5 times the average rate for a domestic residence (in comparison to the rate described in MOE Procedure D-5-4).

During the test, TW-1 exhibited a drawdown of approximately 12.9 metres with a rapid recovery upon cessation of pumping (Note: TW-1 has a total available drawdown of about 20.56 metres based on the driller's recommended pump setting).

The test curve for TW-1 is characteristic of a classic "leaky aquifer" condition. Based on a Cooper & Jacob analysis of the TW-1 drawdown (pumped) well data, the estimated transmissivity (T) of the aquifer is approximately 1.7 m^2/day.

We note that a small drawdown response may have occurred at observation well DW-1, being

< 0.2 metres. Domestic use may also have been occurring during the test, as several pumping cycles are evident in the recovery data. DW-1 is situated approximately 130 metres distance from the pumped well and as such, we would not have confidence in any analysis of the observation well data for DW-1 (which suggests a higher T value).

The pumping rate of 15.6 L/min exceeds the minimum residential rate of 13.7 L/min stated in the *MoE Hydrogeological Technical Information Requirements for Land Development Applications (1995)*, and the pumped volume of 5,500 litres exceeded the minimum daily residential requirement. TW-1 is considered capable of providing a sustainable domestic water supply.

9.2 Test Well TW-2

The 6-hour pumping test of TW-2 was conducted on March 30, 2012 at an average rate of 30 L/min (6.6 igpm). During the test, TW-1, TW-3, DW-1, DW-2, and 7 Dafoe served as observation wells. In addition, a nearby standpipe at TP-5 was also monitored to observe the effect of pumping on the shallow flow zone.

During the 6 hour test, approximately 10,800 L (~2,375 imperial gallons) were pumped from TW-2, exceeding the minimum D-5-5 criteria, without the need for supplementary water storage. Water takings during the test were more than five times the peak rate for a 4-bedroom home according to Part 8 of the Code and Guide for Sewage Systems, Ontario Building Code and more than 10 times the average rate for a domestic residence (in comparison to the rate described in MOE Procedure D-5-4).

During the test, TW-2 exhibited a drawdown of approximately 3.9 metres with a rapid recovery upon cessation of pumping (Note: TW-2 has a total available drawdown of about 19.74 metres based on the driller's recommended pump setting).

Similar to TW-1, the test curve for TW-2 is characteristic of a classic "leaky aquifer" condition. Based on a Cooper & Jacob analysis of the TW-1 drawdown (pumped) well data, the estimated transmissivity (T) of the aquifer is approximately 59 m^2/day, significantly higher than TW-1.

The observation well data indicate a tenuous interference effect of perhaps 0.07 metres at TW-1 (separation = 96 metres). Based on the separation distance and limited response, we would not have confidence in any analysis of the observation well data for TW-1 (which suggests a significantly higher T value).

The pumping rate of 30 L/min exceeded the minimum residential rate of 13.7 L/min stated in the *MoE Hydrogeological Technical Information Requirements for Land Development Applications (1995)* and the pumped volume of about 10,800 litres during the test exceeded the minimum daily residential requirement of 2,250 litres. TW-2 is considered capable of providing a sustainable domestic water supply.

9.3 Test Well TW-3

The 6-hour pumping test of TW-3 was conducted on March 29, 2012 at an average rate of 37.2 L/min (8.1 igpm). During the test, TW-1, TW-2, DW-1, DW-2,and 7 Dafoe served as observation wells. In addition, a nearby standpipe at TP-5 was also monitored to observe the effect of pumping on the

shallow flow zone.

During the 6 hour test, approximately 13,370 L (~2,940 imperial gallons) were pumped from TW-3, exceeding the minimum D-5-5 criteria, without the need for supplementary water storage. Water takings during the test were more than six times the peak rate for a 4-bedroom home according to Part 8 of the Code and Guide for Sewage Systems, Ontario Building Code and more than 13 times the average rate for a domestic residence (in comparison to the rate described in MOE Procedure D-5-4).

During the test, TW-3 exhibited a drawdown of approximately 1.02 m with a very rapid recovery upon cessation of pumping (Note: TW-3 has a total available drawdown of about 21.43 metres based on the driller's recommended pump setting).

Similar to TW-1 and TW-2, the test curve for TW-3 is characteristic of a classic "leaky aquifer" condition. Based on a Cooper & Jacob analysis of the TW-3 drawdown (pumped) well data, the estimated transmissivity (T) of the aquifer is approximately 44.3 m^2/day, similar to TW-2 and significantly higher than TW-1.

The observation well data indicate a fairly convincing interference response at TW-1 of approximately 0.07 metres (separation = 102metres). However, given the small response and the separation distance, we would not have confidence in any analysis of the observation well data for TW-1 due to scale effects that would likely over-estimate the T value. Notwithstanding, it is apparent that the transmissivity of the aquifer is likely somewhat higher than suggested by analysis of the pumped well data alone.

The pumping rate of 37.2 L/min exceeded the minimum residential rate of 13.7 L/min stated in the *MoE Hydrogeological Technical Information Requirements for Land Development Applications (1995)* and the pumped volume of about 13,370 litres during the test exceeded the minimum daily residential requirement of 2,250 litres. TW-3 is considered capable of providing a sustainable domestic water supply.

9.4 Distance to Monitoring Wells

The approximate separation distances between test wells and monitored wells is provided in Table 8, Distance to Monitoring Wells.

TABLE 8
DISTANCE BETWEEN MONITORING WELLS

Test Well No.	Monitored Wells (Distance in metres)						
	TW-1	**TW-2**	**TW-3**	**DW-1**	**DW-2**	**TP-5**	**7 Dafoe**
TW-1	-	96	102	130	132	135	149
TW-2	96	-	108	52	120	193	86
TW3	102	108	-	160	31	99	83

10.0 TEST PUMPING WATER QUALITY SAMPLING RESULTS

Two water samples were collected from each of the test wells (at the 3 hour mark and at the completion of pumping test) and submitted to AGAT Laboratories for chemical analysis of all parameters listed in Tables 1, 2 and 3 of *D-5-5 Private Wells: Water Supply Assessment*. Results of the samples collected at completion of pumping test are presented in Table 9 - Pumping Test Water Quality Sampling Results. Laboratory Certificates of Analyses are presented in Appendix G.

TABLE 9
PUMPING TEST WATER QUALITY SAMPLING RESULTS

Date Sampled:	**TW-1** Apr 2/12	**TW-2** Mar 30/12	**TW-3** Mar 29/12	**Units**	**Ontario Drinking Water Standards**
Parameter:					
pH	8.21	8.20	8.18	-log(H^+)	6.5-8.5 ^{O}
Alkalinity	235	215	215	mg/L	30-500 ^{O}
Conductivity	525	387	443	uS/cm	-
Nitrate (N)	<0.05	<0.05	<0.05	mg/L	10
Nitrite (N)	<0.05	<0.05	<0.05	mg/L	1
Sulphate	48.5	2.13	24.3	mg/L	500 ^{A}
Calcium	63.1	46.8	62.7	mg/L	-
Magnesium	23.6	16.3	16.2	mg/L	-
Sodium	9.70	13.2	6.82	mg/L	20** (200)
Ammonia (N)	1.55	1.30	0.03	mg/L	-
Total Dissolved Solids	302	236	262	mg/L	500 ^{A}
Total Hardness	255	184	223	mg/L	80-100 ^{O}
Colour	<5	9	12	Colour Units	5 ^{A}
Turbidity	0.8	1.0	11	NTU	5 ^{A}
Dissolved Organic Carbon (DOC)	2.2	1.3	1.4	mg/L	5 ^{A}
Chloride	10.1	1.83	9.00	mg/L	250 ^{A}
Iron	0.843	0.249	0.690	mg/L	0.3 ^{A}
Manganese	0.051	0.057	0.049	mg/L	0.05 ^{A}
Total Coliform (MF)	9	ND	ND	CFU/100ml	ND
Escherichia coli (E.Coli)	ND	ND	ND	CFU/100ml	ND
Fecal coliform	ND	ND	ND	CFU/100ml	-

NOTES:

^{A}	Aesthetic Objective
^{O}	Operational Guideline desirable range
**	Ministry of Health criteria
ND	Not Detected
1.	NTU - Nephelometric Turbidity Unit

Indicates level exceeds provincial objective (ODWS). Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, Revised June 2006. PIBS 4449e01.

10.1 Water Quality Sampling Results

All tested water quality parameters meet the Ontario Drinking Water Standards (ODWS), in TW-1, TW-2, and TW-3 with the exception of total hardness, colour, turbidity, iron, manganese, and Total Coliform (TW-1).

Overall, the water quality conditions as represented by the test wells is very good and within the expected range of values for groundwater in the study area. All of the test wells meet the *health related* quality criteria of D-5-5 and the Ontario Drinking Water Quality Standards (ODWS).

The laboratory data indicate that the sodium concentration in all test wells is within the ODWS limit of 200 mg/L and within the warning level of 20 mg/L. (Note: the warning level refers to water with sodium levels exceeding 20 mg/L, where persons on sodium restricted diets should be advised to consult with their physician regarding water consumption). The associated chloride concentrations in the groundwater are also very low, typically occurring at less than 10 mg/L, indicating that there is no significant salt content in the aquifer.

The nitrate concentrations in all wells was reported to be <0.05 mg/L (below laboratory reported detection limit), indicating that essentially pristine background concentrations prevail. The ODWS for nitrate in drinking water is 10 mg/L.

Sulphate concentrations are also low and variable, occurring up to 48.5 mg/L. The aesthetic objective for sulfate in drinking water is 500 mg/L.

No hydrogen sulphide odours were detected during any of the pumping tests. Methane was not observed during any of the pumping tests.

10.1.1 Hardness

The water is considered to be hard with concentrations of 255, 184, and 223 mg/L reported in TW-1, TW-2, and TW-3 respectively, which exceed the ODWS of 80 to100 mg/L; however, is below the upper limit of acceptability for most domestic purposes (500 mg/L). Hardness is an aesthetic parameter and elevated levels result in the formation of scale in kettles, hot water tanks and pipes. It requires large amounts of soap to produce lathering and may be responsible for undesirable tastes. Hardness is commonly resolved by treatment in a water softener.

For all of the test wells, the reported Total Dissolved Solids (TDS) concentrations are within the aesthetic limit of 500 mg/L. The corresponding hardness levels are elevated above the desired range, however, are consistent with groundwater in the area and well within the range considered reasonably treatable using commercially available treatment systems. As such, future groundwater users will likely find treatment to reduce hardness desirable. Treatment to reduce hardness is, however, not mandatory. Given the potential desire to utilize a water softener, the following notification and warning shall be registered on title in accordance with Ministry of Environment Procedure D-5-5:

> *"If a water softening system is to be utilized to reduce hardness, a separate tap (which by-passes the softener) must be installed to supply unsoftened drinking water."*

10.1.2 Iron and Manganese

The ODWS for iron in drinking water is 0.3 mg/L. TW-1 and TW-3 reported concentrations of 0.843 and 0.690 mg/L respectively. Excessive levels of iron in drinking water supplies may cause a brownish colour to laundered goods, plumbing fixtures and the water itself; it may produce a bitter,

astringent taste in water and beverages; and the precipitation of iron can also promote the growth of iron bacteria in water mains and service pipes. Iron based coagulants such as ferric sulfate can be highly effective in treatment processes at removing particles from water and leave very little residual iron in the treated water.

The colour related aesthetic objective for manganese in drinking water is 0.05 mg/L. TW-1 and TW-2 reported concentrations of 0.051 and 0.057 mg/L respectively. Similar to iron, excessive levels of manganese in water supplies results in black stains in laundry and fixtures and undesirable tastes in beverages. Manganese is present in some ground waters because of chemically reducing underground conditions coupled with presence of manganese mineral deposits. Manganese is also occasionally present, seasonally, in surface waters when anaerobic decay processes in sediments is occurring.

The observed concentrations are, however, well within the range considered reasonably treatable. At the observed concentrations, it is likely that a conventional water softener would be able to reduce the concentrations to an acceptable level. Based on these results, it is our expectation that some, although not all future wells in the development may exhibit elevated iron and/or manganese. As such, a water treatment specialist should be consulted as to the most appropriate treatment approach on a case by case basis.

10.1.3 Other Water Quality Comments

The aesthetic objective for colour in drinking water is 5 TCU (True Colour Units). TW-2 and TW-3 reported concentrations of 9 and 12 TCU respectively. Colour may be contributed to by iron and manganese compounds produced by processes occurring in natural sediments or in aquifers. TW-2 reported slightly elevated manganese levels.

Turbidity was reported in TW-3 to be 11 NTU (Nephelometric Turbidity Unit). An aesthetic objective of 5.0 NTU has been set for all waters at the point of consumption, as turbidity in excess of 5.0 NTU becomes visible to the naked eye. The elevated turbidity at TW-3 is believed to be associated with the natural development of iron precipitates in the water. As such, water treatment to reduce iron should also reduce turbidity. A water treatment expert should be consulted to select and install equipment to produce satisfactory water quality.

Bacteria samples were also obtained from each well during the pumping tests. Prior to all sampling, free chlorine concentrations were tested in the field to verify the absence of any chlorine residual. All tested bacteriological parameters meet the Ontario Drinking Water Standards (ODWS), in TW-1, TW-2, and TW-3 with the exception of Total Coliform (9 CFU/100 ml) in TW-1. The ODWS for Total Coliform is not detectable.

The well and water distribution system should be chlorinated, flushed and a water sample submitted to the Health Unit for bacteriological testing before the water is used for potable purposes. If bacteriological contamination is detected, the results should be discussed with the Health Unit. Chlorination instructions and other general information on water wells are available from the Ministry of the Environment and/or the Health Unit. Health-related questions regarding water quality should be directed to a physician or to the Medical Officer of Health.

Ontario Regulation 903 requires that well casings should be maintained at least 0.6 metres above grade. Pumps and materials should be disinfected before they are installed in wells.

11.0 CONCLUSIONS

QSRP Developments Inc, propose to develop a seven (7) lot residential subdivision with access to Zephyr Road (Regional Road 13). The proposed lots are compatible with other residential lots in the hamlet and will be privately serviced for water and sewage disposal.

Based on the hydrogeological and soils assessment conducted on the subject property, the following conclusions are presented:

1. Shallow soils identified in six (6) test pits between 2.7 to 3.0 metres deep were topsoil and peat layers were underlain by brown to grey, occasional weakly oxidized silty sand till with localized gravel to cobbles. Percolation rates of the tested soil samples ranged between 10 and 15 min/cm across the site.

2. The interpreted shallow groundwater flow direction is east-northeasterly beneath the site.

3. Fifty-seven (57) wells were identified within 250 metres of the proposed residential development. Most wells obtain water from the overburden aquifer with yields ranging between 8 and 302.8 L/min. Static water levels in the overburden aquifer range between -2.4 and 8.5 metres, with an average of 3.0 metres below grade. The bedrock aquifer is encountered in one drilled well within the study area. Static water level is reported at 19.8 metres below grade and a well yield of 38 L/min. It is anticipated that new wells in this proposed development will obtain adequate domestic water supplies from drilled wells at depths of 30 to 35 metres below grade.

4. Three (3) drilled wells (wells TW1 to TW3 inclusive) on the subject property are completed in the overburden aquifer at an average depth of 29.9 metres below grade and yields ranging from 30.3 to 37.8 L/min.

5. TW-1, TW-2, and TW3 were pumped continuously at rates of 15.6, 30, and 37.2 L/min for 6 hours respectively between March 29 and April 2, 2012. The amounts of water pumped during the test were 5,500 litres (TW-1), 10,800 litres (TW-2) and 13,370 litres (TW-3), which exceed the daily residential requirement of 2,250 litres. The test curve for all three wells is characteristic of a classic "leaky aquifer" condition. No interference was observed in the shallow monitors during the pumping test.

6. TW-1, TW-2, and TW-3 meet the minimum daily and minimum peak use requirements and are considered capable of providing a sustainable domestic water supply.

7. Water quality sampling conducted during the pumping tests indicate that Ontario Drinking Water Standards exceedences were reported for total hardness, colour, turbidity, iron, manganese, and Total Coliform (TW-1). Nitrate concentrations reported in the drilled wells were reported to be <0.05 mg/L. All sampled parameters are within treatable limits in the tested wells.

8. For the purpose of the nitrate loading impact assessment, the proposed development area of 2.96 ha., in addition to a downgradient nitrate attenuation zone of 2.89 ha., for a total 5.85 ha (14.45 ac) land holdings has been used for attenuation purposes. A nitrate loading mass balance calculation was based on the MOE dilution model and using a daily sewage volume of 1,000 L/day for each of the seven lots within the proposed subdivision. The theoretical nitrate concentration of about 10 mg/L indicates the subject property is capable of supporting the proposed 7 lot residential development.

9. Based on the T-Times between 10 and 15 min/cm for the prevailing soil for the development, the required sewage system area is estimated to be 600 m^2 (prime and reserve). Lots 1, 2, 3, 4 and 7 all reported static water levels greater than 0.9 metres below grade, suggesting that based on the monitoring period, these lots could support in-ground sewage disposal systems. Partially raised beds will be required for Lots 5 and 6. Additional monitoring will be required in the spring to determine if this is considered reasonable during lot development. All sewage systems are to be constructed in accordance with OBC *Code and Guide for Sewage Systems*, as periodically updated and best construction practices.

Based on the hydrogeological and soils assessment conducted, the proposed development is considered suitable for private servicing for the proposed seven lot residential development. Negligible interference or impact to the groundwater resources or the natural environment is anticipated as a result of the proposed development.

12.0 RECOMMENDATIONS

Based on the conclusions, the following recommendations are presented.

1. All new wells shall be properly constructed, developed and water quality samples collected in accordance with Ontario Regulation 903 of the *Ontario Water Resources Act*. All wells shall be continuously cased through non-water yielding formations. The on-site dug well (DW-2) shall be abandoned in accordance with O.Reg. 903.

2. It is recommended that pumps be located near the principal water-bearing zones. In addition, wells should be located to maximize their mutual separation distances. Well locations should also be selected to ensure that separation distances from sewage systems meet/exceed minimum standards. By locating future wells at alternating 'ends' of their lots, separation distances between the wells would be maximized at about 90 metres and interference effects would be minimized.

3. Before a well water supply is used for potable purposes, a water sample shall be submitted to the local Health Department for bacteriological testing. Should bacteriological contamination be detected, the results should be discussed with the Health Department. Chlorination instructions and other general information on water wells are available from the Ministry of the Environment and/or the Regional Municipality of Durham Health Department.

4. Should water treatment be desired, a specialist should be consulted to select and install the appropriate water treatment equipment.

5. All sewage disposal systems shall be designed in accordance with the *Ontario Building Code & Guide for Sewage Systems 1997, as updated,* and best construction practices, for the proposed dwelling to be constructed on each of the subject lots.

- o O o -

Should you have any questions regarding this report, or require any additional information, please do not hesitate to contact the undersigned.

Respectfully Submitted,
GRACE & ASSOCIATES INC.

Thomas P. Grace C.E.T., B.Sc., P.Geo.
Environmental Geologist
Principal

Report Distribution: 9 copies Region of Durham/Township of Uxbridge
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1 copy Martindale Planning Services
1 file copy Grace & Associates Inc.

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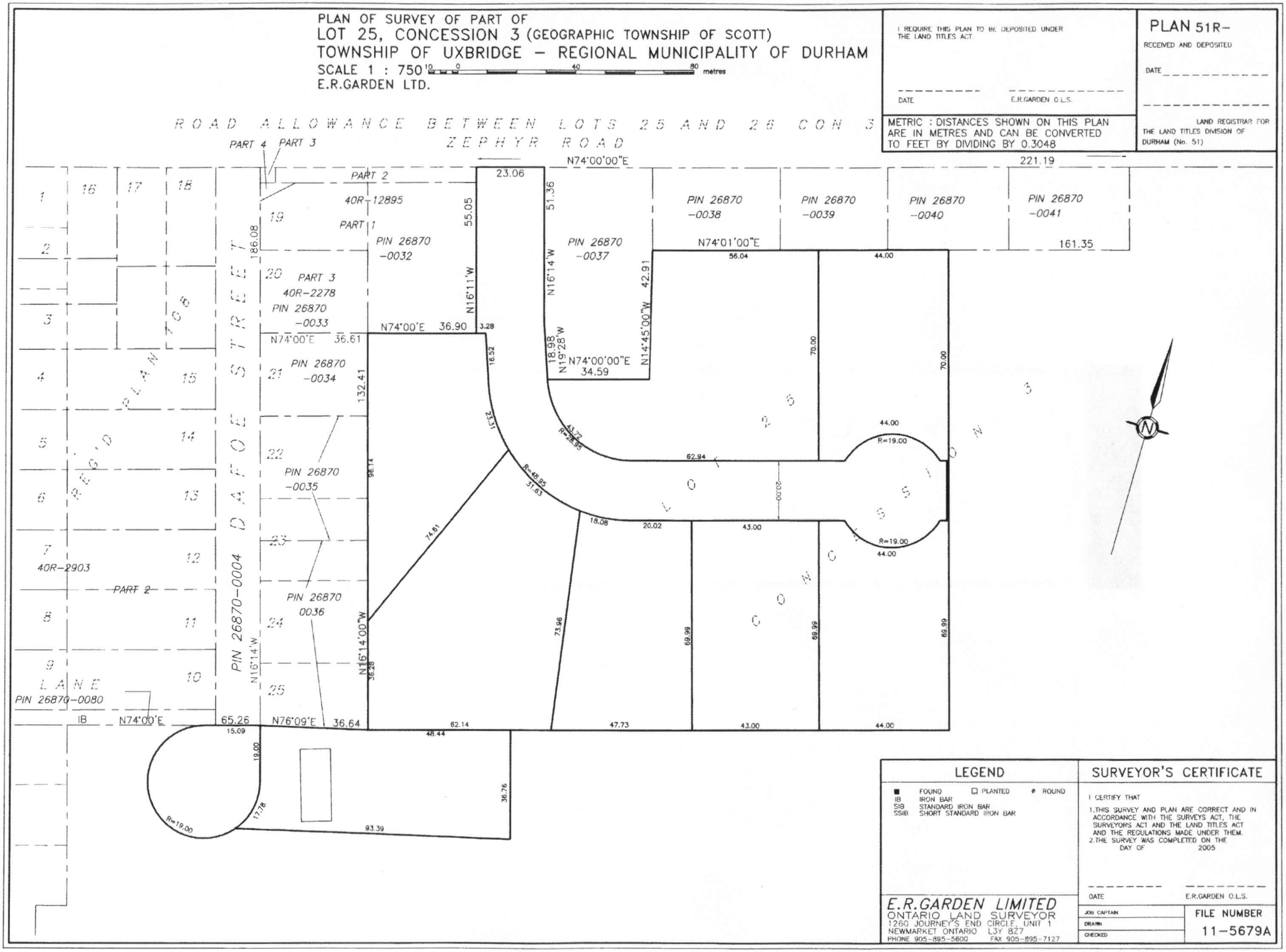
APPENDIX A

SURVEY MAP


PLAN OF SURVEY OF PART OF
LOT 25, CONCESSION 3 (GEOGRAPHIC TOWNSHIP OF SCOTT)
TOWNSHIP OF UXBRIDGE – REGIONAL MUNICIPALITY OF DURHAM
SCALE 1 : 750 10 0 40 80 metres
E.R.GARDEN LTD.
I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.
DATE
E.R.GARDEN O.L.S.
PLAN 51R–
RECEIVED AND DEPOSITED
DATE
LAND REGISTRAR FOR THE LAND TITLES DIVISION OF DURHAM (No. 51)
METRIC : DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048
ROAD ALLOWANCE BETWEEN LOTS 25 AND 26 CON 3
ZEPHYR ROAD
PART 4
PART 3
PART 2
40R–12895
PART 1
PIN 26870 –0032
PIN 26870 –0037
PIN 26870 –0038
PIN 26870 –0039
PIN 26870 –0040
PIN 26870 –0041
PART 3
40R–2278
PIN 26870 –0033
PIN 26870 –0034
PIN 26870 –0035
PIN 26870 0036
PIN 26870–0004
DAFOE STREET
REG'D PLAN 108
40R–2903
PART 2
LANE
PIN 26870–0080
IB
N74°00'00"E
221.19
23.06
55.05
51.36
N74°01'00"E
161.35
186.08
N16°11'W
N16°14'W
42.91
N14°45'00"W
N74°00'E 36.90
N74°00'E 36.61
18.98
N19°28'W
N74°00'00"E
34.59
132.41
N16°14'00"W
N16°14'W
N74°00'E
65.26
N76°09'E
36.64
LOT 25
CONCESSION 3
LEGEND
FOUND
PLANTED
ROUND
IB IRON BAR
SIB STANDARD IRON BAR
SSIB SHORT STANDARD IRON BAR
SURVEYOR'S CERTIFICATE
I CERTIFY THAT
1.THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2.THE SURVEY WAS COMPLETED ON THE DAY OF 2005
DATE
E.R.GARDEN O.L.S.
E.R.GARDEN LIMITED
ONTARIO LAND SURVEYOR
1260 JOURNEY'S END CIRCLE, UNIT 1
NEWMARKET ONTARIO L3Y 8Z7
PHONE 905-895-5600 FAX 905-895-7127
JOB CAPTAIN
DRAWN
CHECKED
FILE NUMBER
11–5679A

APPENDIX B

TEST PIT LOGS &
GRAIN SIZE DISTRIBUTION CURVES

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% of material is **larger** than No. 200 (75um) sieve size	GRAVEL AND GRAVELLY SOILS More than 50% of coarse fraction **retained** on No. 4 (4.75mm) sieve	CLEAN GRAVELS Little or No Fines (<5%)		GW	Well Graded Gravels, Gravel-Sand Mixtures, Little or No Fines (C_u>4)
				GP	Poorly Graded Gravels, Gravel-Sand Mixtures, Little or No Fines (C_u<4)
		GRAVELS WITH FINES Appreciable Amount of Fines (>12%)		GM	Silty Gravels, Gravel-Sand-Silt Mixtures (PI<4)
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures (PI>7)
	SAND AND SANDY SOILS More than 50% of coarse fraction **passing** No. 4 (4.75mm) sieve	CLEAN SANDS Little or No Fines (<5%)		SW	Well Graded Sands, Gravelly Sands, Little or No Fines (C_u>6)
				SP	Poorly Graded Sands, Gravelly Sands, Little or No Fines (C_u<6)
		SANDS WITH FINES Appreciable Amount of Fines (>12%)		SM	Silty Sands, Sand-Silt Mixtures (PI<4)
				SC	Clayey Sands, Sand-Clay Mixtures (PI>7)
FINE GRAINED SOILS More than 50% of material is **smaller** than No. 200 (75um) size	SILTS AND CLAYS	Liquid Limit **Less** than 50		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity
				CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS	Liquid Limit **Greater** than 50		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts
				CH	Inorganic Clays of High Plasticity, Fat Clays
				OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS				PT	Peat, Humus, Swamp And Other Highly Organic Soils

Note: Dual Symbols Are Used To Indicate Borderline Soil Classifications

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL DESCRIPTION

GRANULAR SOILS		COHESIVE SOILS			GRADATION	
RELATIVE DENSITY	STANDARD PENETRATION RESISTANCE (N-VALUE) Blows/300mm	CONSISTENCY	APPROX. UNDRAINED SHEAR STRENGTH (C_u) kPa	PSF	% Finer By Weight	
Very Loose	0 - 4	Very Soft	<12	<250	Trace	<10%
Loose	4 - 10	Soft	12 - 25	250 - 500	Little	10 - 20%
Compact	10 - 30	Firm	25 - 50	500 - 1000	Some	20 - 35%
Dense	30 - 50	Stiff	50 - 100	1000 - 2000	And	35 - 50%
Very Dense	>50	Very Stiff	100 - 200	2000 - 4000		
		Hard	>200	>4000		

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-1

TOTAL DEPTH: **2.8 m**

UTM Coordinates :	Elevation (masl) :
638860.3, 4895584.0	254.88

PROJECT INFORMATION

PROJECT NO: **R11-510.2**

SITE LOCATION: **Zephyr, Ontario**

LOGGED BY: **DM**

DATES ASSESSED: **October 12, 2011**

BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**

BACKHOE TYPE: **New Holland**

STICK-UP: **1.18 m**

SAMPLING METHODS: **Composite Grab**

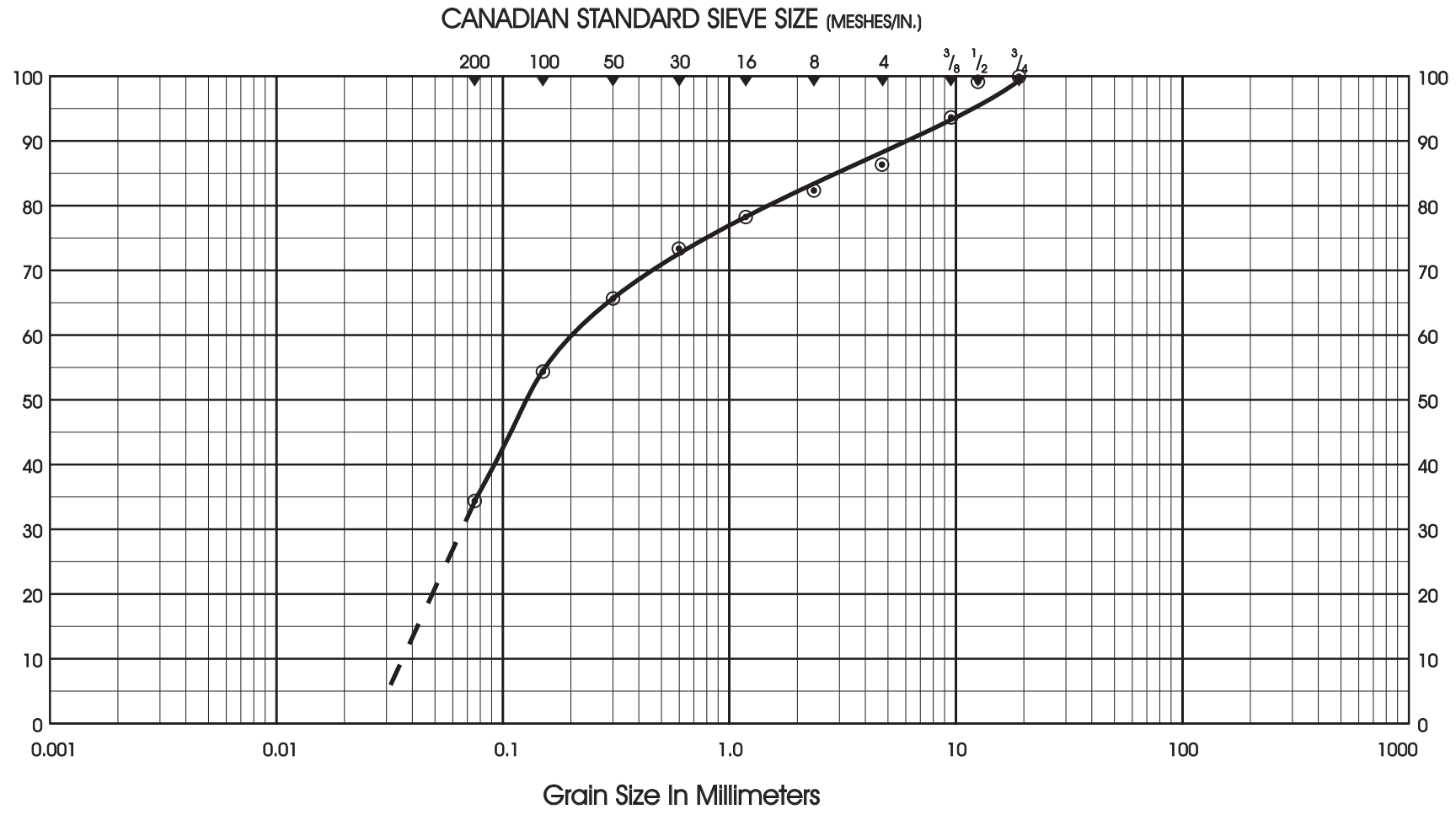
▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG

Depth	Stand-pipe Installation	Special Notes	Sample #	Vapour ppm	Depth	Soil Symbol	Soil Description
0.00 – 2.75		Test pit dry prior to backfilling	TP-1 0.3 m TP-1 0.5 m TP-1 1.5 m		0.31 m 0.7 m		SW (FILL): Brown/grey poorly sorted sand with gravel fill. Dry with occasional rootlets to 0.08 m. TOPSOIL/PEAT: Black silty organic layer. Dry with no visible rootlets or gravel. ML (TILL): Brown/grey sandy silt with gravel and cobble. Dry with low plasticity. Increased gravel/cobble content and occasional boulders encountered with depth. Dry upon completion. END @ 2.8 m

NOTES: Overcast and warm

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

BORING	SAMPLE	DEPTH	MOISTURE	SOIL TYPE	CLASSIFICATION	K (cm/sec)	T-Time
TP-1	1	1.75 m	7.6%	SM	SAND, Some Silt, Little Gravel	1.3×10^{-3}	10 min/cm

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants

QSRP DEVELOPMENTS INC. R11-510.2 PLATE 1

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-2

TOTAL DEPTH: **2.7 m**

UTM Coordinates :	Elevation (masl) :
638890.2, 4895583.6	255.06

PROJECT INFORMATION

PROJECT NO: **R11-510.2**
SITE LOCATION: **Zephyr, Ontario**
LOGGED BY: **DM**
DATES ASSESSED: **October 12, 2011**

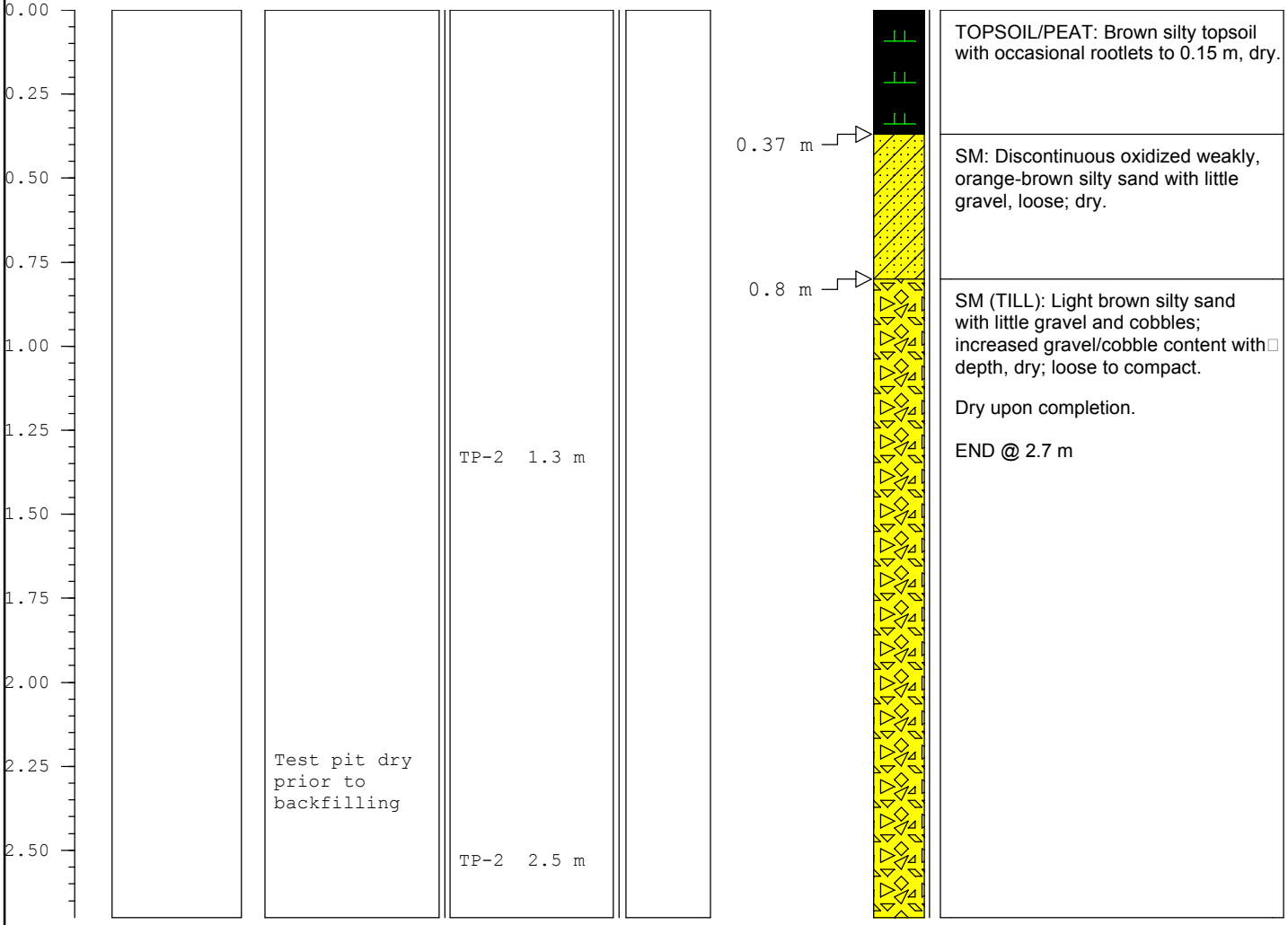
BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**
BACKHOE TYPE: **New Holland**
STICK-UP: **No standpipe installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG

Depth	Stand-pipe Installation	Special Notes	Sample #	Vapour ppm	Depth	Soil Symbol	Soil Description
0.00 – 2.50		Test pit dry prior to backfilling	TP-2 1.3 m TP-2 2.5 m		0.37 m 0.8 m		TOPSOIL/PEAT: Brown silty topsoil with occasional rootlets to 0.15 m, dry. SM: Discontinuous oxidized weakly, orange-brown silty sand with little gravel, loose; dry. SM (TILL): Light brown silty sand with little gravel and cobbles; increased gravel/cobble content with depth, dry; loose to compact. Dry upon completion. END @ 2.7 m



NOTES: Overcast and warm

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-3

TOTAL DEPTH: **3.0 m**

UTM Coordinates :	Elevation (masl) :
638950.2, 4895597.0	253.60

PROJECT INFORMATION

PROJECT NO: **R11-510.2**

SITE LOCATION: **Zephyr, Ontario**

LOGGED BY: **DM**

DATES ASSESSED: **October 12, 2011**

BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**

BACKHOE TYPE: **New Holland**

STICK-UP: **1.35 m**

SAMPLING METHODS: **Composite Grab**

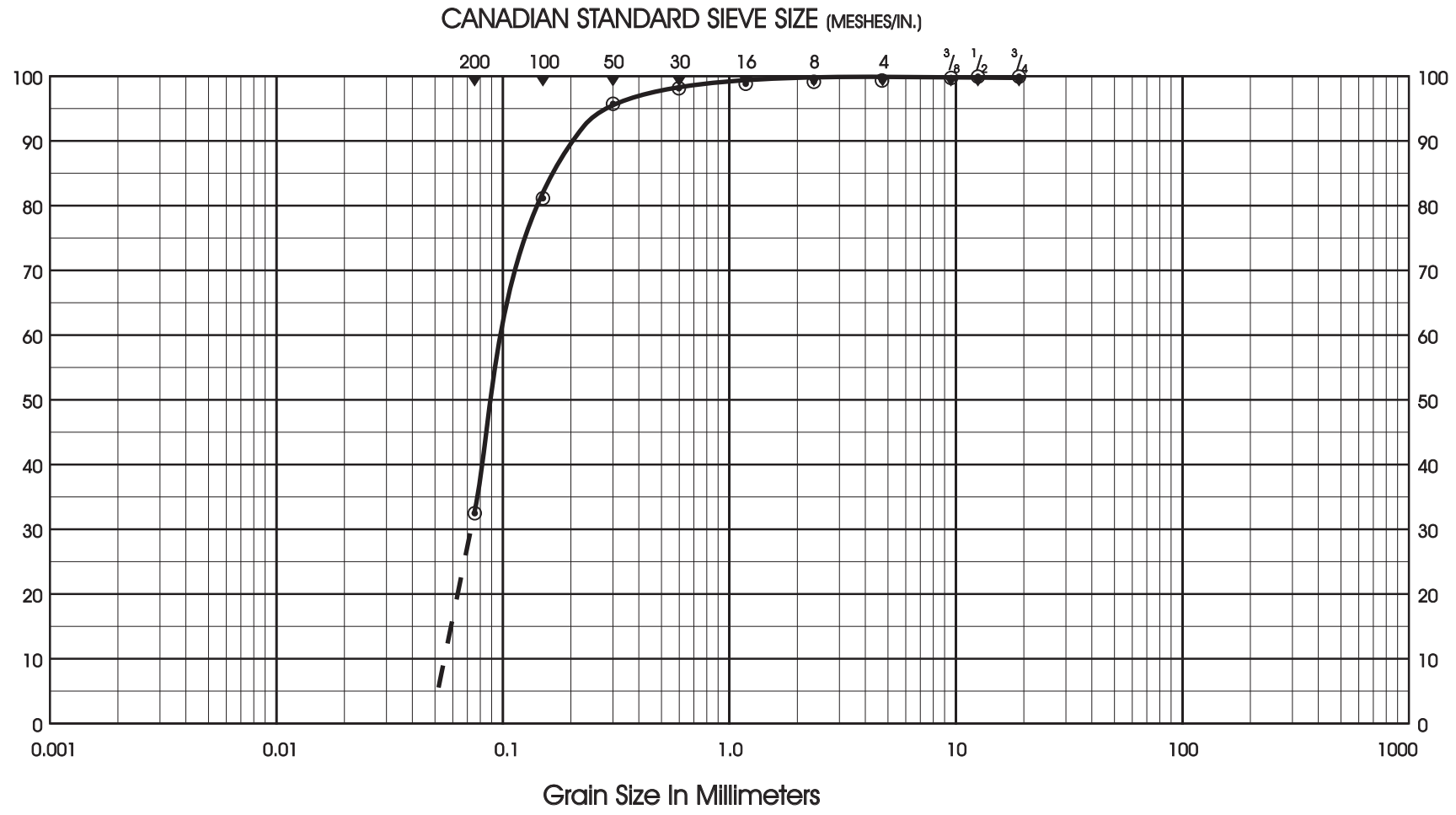
▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG

Depth	Stand-pipe Installation	Special Notes	Sample #	Vapour ppm	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Brown/grey sandy topsoil. Rootlets to 0.2 m; dry.
0.25							
0.50					0.46 m		SM (TILL): Grey silty sand with little gravel, cobbles, minor mottling with depth. Occasional boulder below 1.5 m; loose to compact; dry.
0.75							
1.00							
1.25			TP-3 1.2 m				Dry upon completion.
1.50							END @ 3.0 m
1.75							
2.00		Test pit dry prior to backfilling					
2.25							
2.50		Cave to 2.84 m prior to stand-pipe installation					
2.75			TP-3 2.7 m				
3.00							

NOTES: Overcast and warm

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

BORING	SAMPLE	DEPTH	MOISTURE	SOIL TYPE	CLASSIFICATION	K (cm/sec)	T-Time
TP-3	1	1.2 m	4.9%	SM/SP	SAND, Some Silt, Trace Gravel	3.1×10^{-3}	15 min/cm

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants

QSRP DEVELOPMENTS INC. R11-510.2 PLATE 2

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-4

TOTAL DEPTH: **3.0 m**

UTM Coordinates :	Elevation (masl) :
638994.4, 4895609.8	249.05

PROJECT INFORMATION

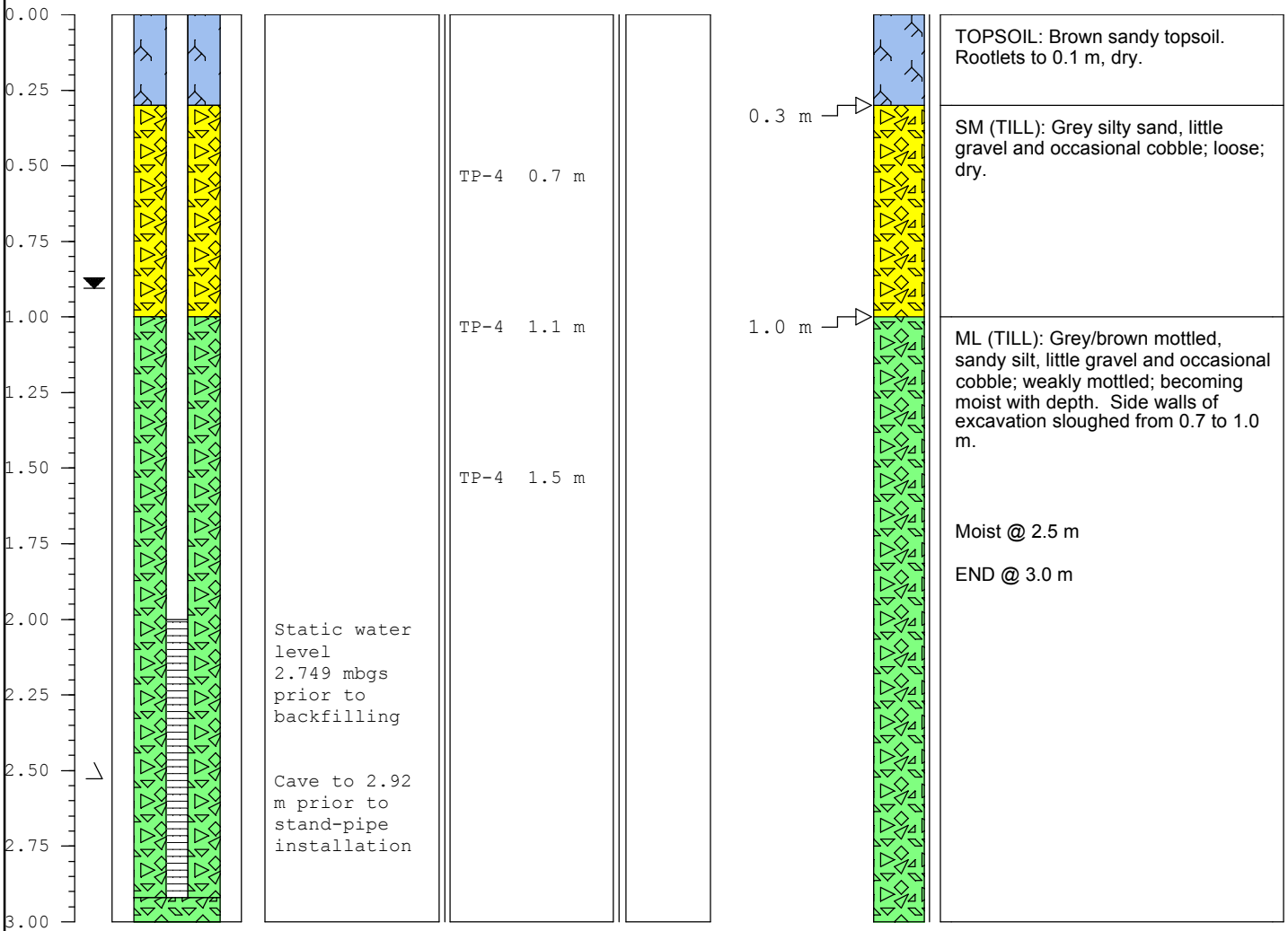
PROJECT NO: **R11-510.2**
SITE LOCATION: **Zephyr, Ontario**
LOGGED BY: **DM**
DATES ASSESSED: **October 12, 2011**

BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**
BACKHOE TYPE: **New Holland**
STICK-UP: **1.25 m**
SAMPLING METHODS: **Composite Grab**

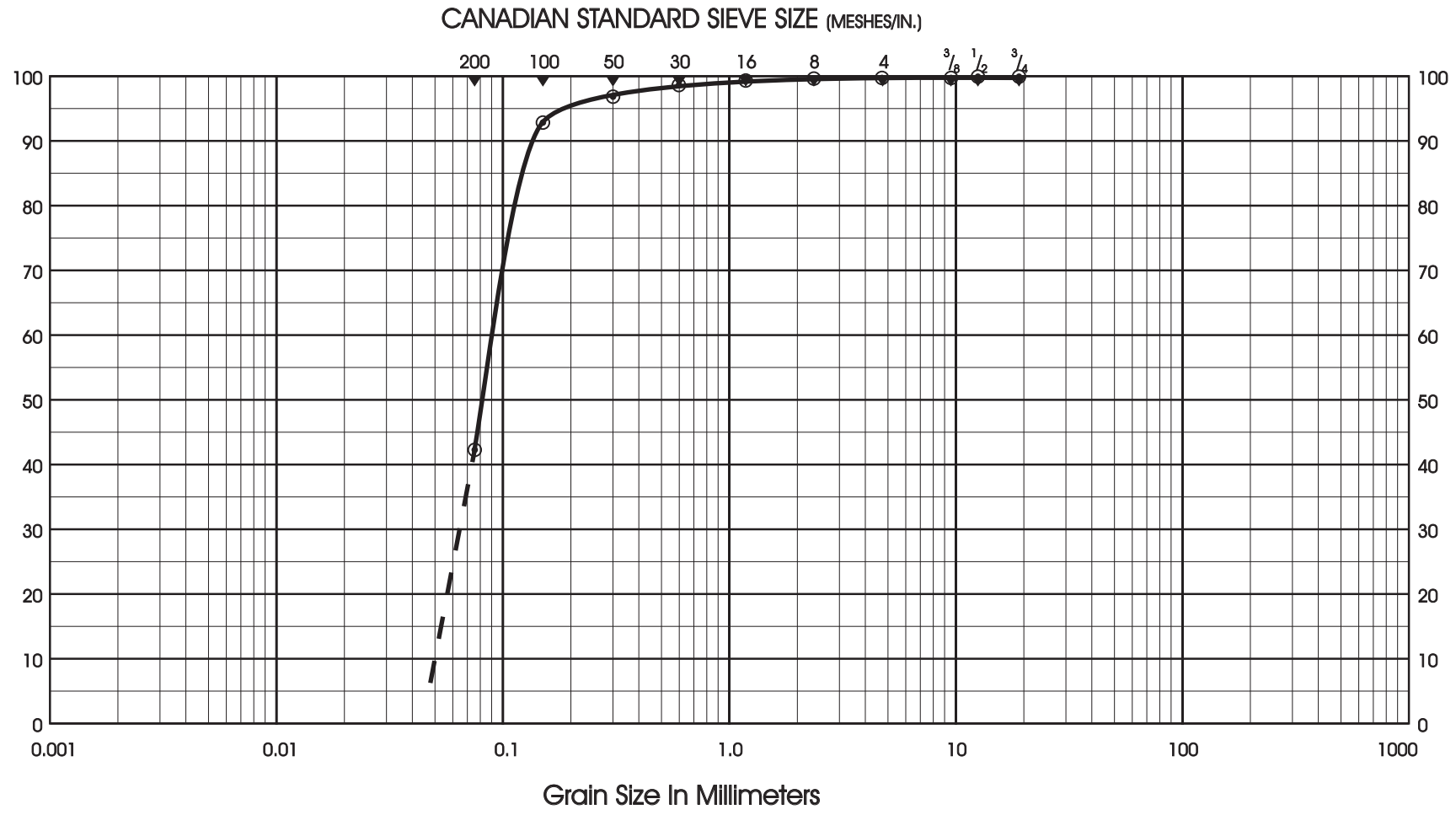
▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG



NOTES: Overcast and warm

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

BORING	SAMPLE	DEPTH	MOISTURE	SOIL TYPE	CLASSIFICATION	K (cm/sec)	T-Time
TP-4	1	1.1 m	17.2%	SM/SP	Fine SAND and SILT, Trace Gravel	2.4×10^{-3}	15 min/cm

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Geological & Environmental Consultants

QSRP DEVELOPMENTS INC. R11-510.2 PLATE 3

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-5

TOTAL DEPTH: **2.8 m**

UTM Coordinates :	Elevation (masl) :
638962.8, 4895702.6	246.20

PROJECT INFORMATION

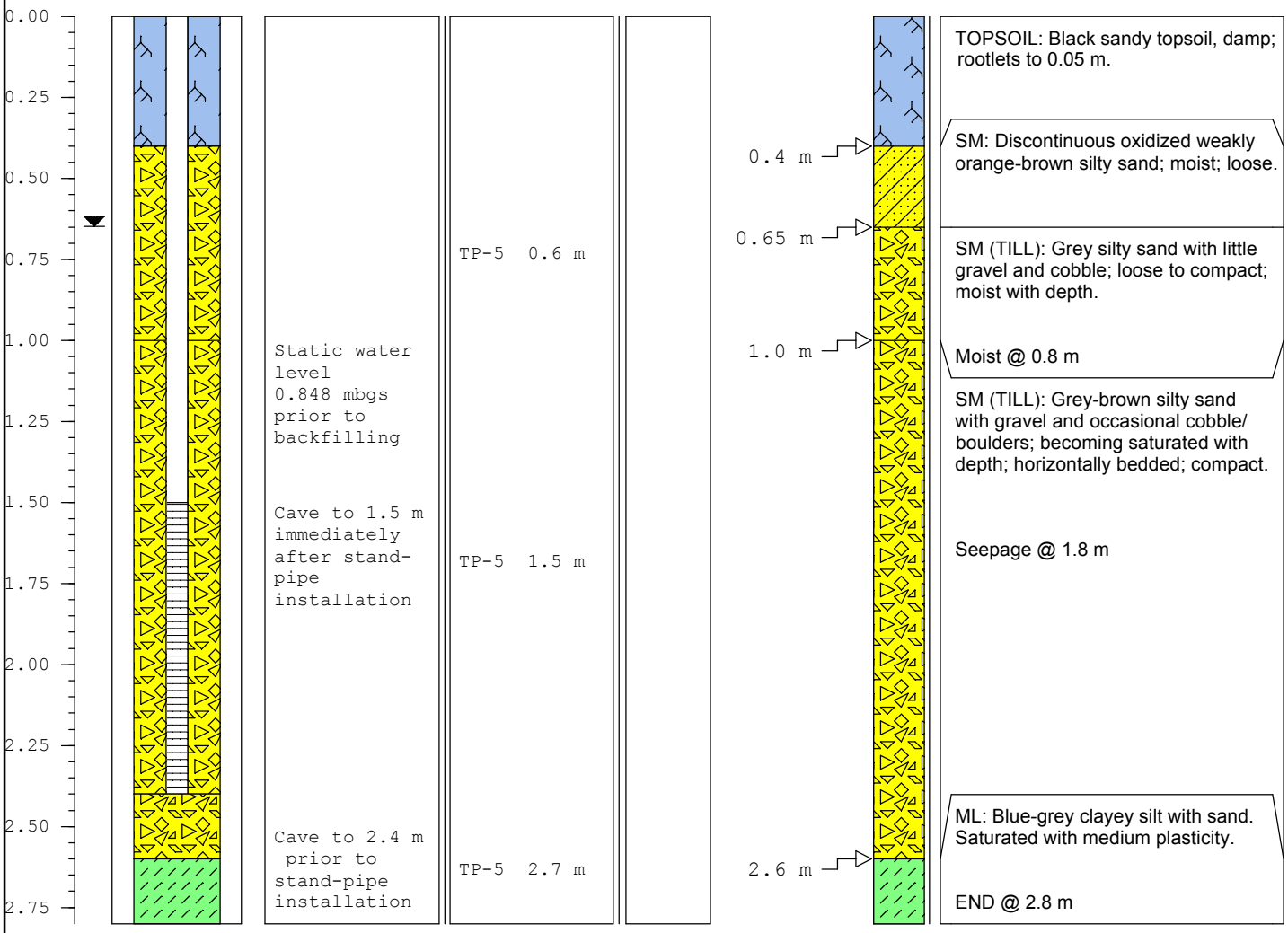
PROJECT NO: **R11-510.2**
SITE LOCATION: **Zephyr, Ontario**
LOGGED BY: **DM**
DATES ASSESSED: **October 12, 2011**

BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**
BACKHOE TYPE: **New Holland**
STICK-UP: **1.15 m**
SAMPLING METHODS: **Composite Grab**

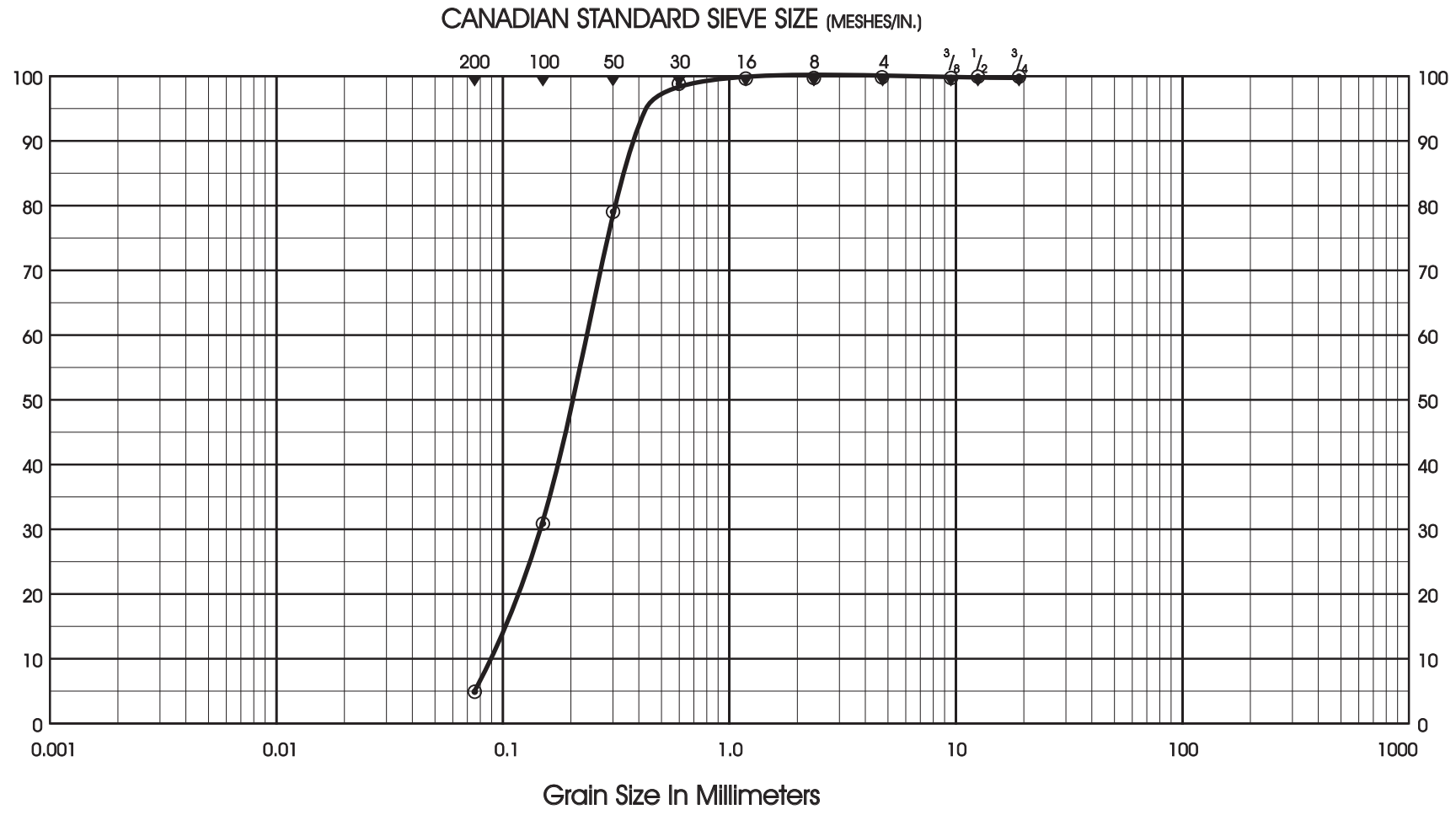
▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG



NOTES: Overcast and warm

GRAIN SIZE DISTRIBUTION



SILT OR CLAY	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

BORING	SAMPLE	DEPTH	MOISTURE	SOIL TYPE	CLASSIFICATION	K (cm/sec)	T-Time
TP-5	1	1.5 m	11.1%	SM	Fine SAND, Trace Silt, Trace Gravel	7.7×10^{-3}	15 min/cm

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Geological & Environmental Consultants

QSRP DEVELOPMENTS INC. R11-510.2 PLATE 4

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants
16 Glenelg Street East
Lindsay, Ontario, K9V 1Y6
Phone: (705) 324-5408 Facsimile: (705) 324-2081

TESTPIT NO.: TP-6

TOTAL DEPTH: **2.8 m**

UTM Coordinates :	Elevation (masl) :
638918.2, 4895682.5	249.51

PROJECT INFORMATION

PROJECT NO: **R11-510.2**
SITE LOCATION: **Zephyr, Ontario**
LOGGED BY: **DM**
DATES ASSESSED: **October 12, 2011**

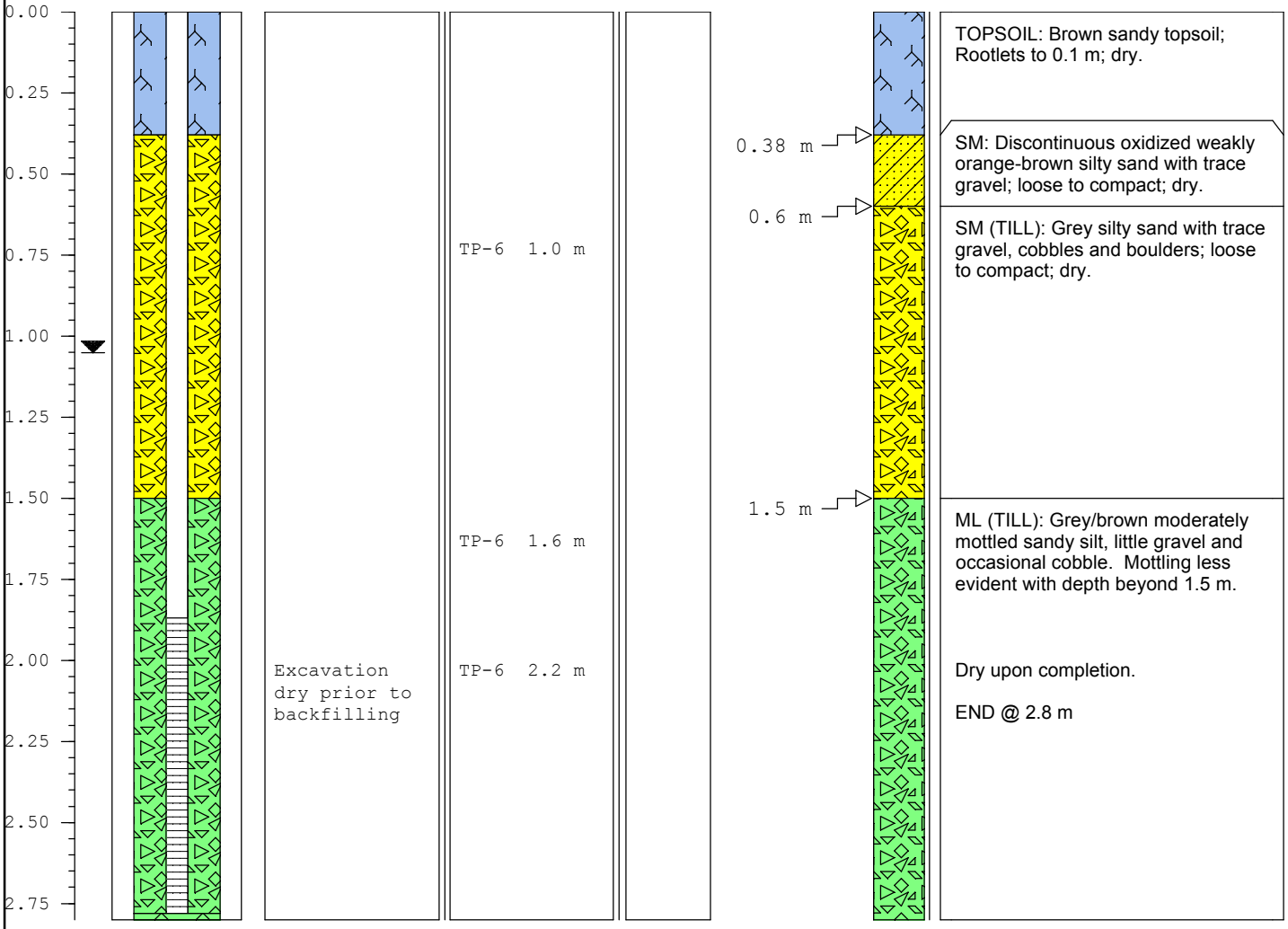
BACKHOE INFORMATION

EXCAVATION CO.: **Whitton Sand & Gravel Ltd.**
BACKHOE TYPE: **New Holland**
STICK-UP: **1.18 m**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD TEST PIT LOG

Depth	Stand-pipe Installation	Special Notes	Sample #	Vapour ppm	Depth	Soil Symbol	Soil Description
0.00 – 2.75		Excavation dry prior to backfilling	TP-6 1.0 m TP-6 1.6 m TP-6 2.2 m		0.38 m 0.6 m 1.5 m		TOPSOIL: Brown sandy topsoil; Rootlets to 0.1 m; dry. SM: Discontinuous oxidized weakly orange-brown silty sand with trace gravel; loose to compact; dry. SM (TILL): Grey silty sand with trace gravel, cobbles and boulders; loose to compact; dry. ML (TILL): Grey/brown moderately mottled sandy silt, little gravel and occasional cobble. Mottling less evident with depth beyond 1.5 m. Dry upon completion. END @ 2.8 m



NOTES: Overcast and warm

APPENDIX C

MINISTRY OF THE ENVIRONMENT
WATER WELL RECORDS

WATER WELL RECORDS WITHIN 250 METRE RADIUS OF SITE
QSRP DEVELOPMENTS INC.

MOE WELL NUMBER	EASTING	NORTHING	DATE COMPLETED	MONITOR DEPTH (m)	STATIC LEVEL (m)	PUMPING RATE (L/min)	PUMP LEVEL (m)	TIME HOUR	TIME MINUTE	DEPTH TO BEDROCK (m)	STRATIGRAPHY	NOTES
1905165	638665	4895523	27/10/1978	27.7	0.6	53	6	1	30	OB	gravel, clay, sand, clay, stones, gravel	
1905668	638715	4895623	20/07/1979	23.5	4.0	38	21	1	0	OB	clay, gravel, clay, gravel, sand	
1906174	638565	4895673	08/10/1981	19.2	-1.2	57	6	1	0	OB	sand, clay	
1906508	638715	4895523	10/10/1982	27.1	3.7	30	21	3	0	OB	clay, sand, clay, stones, sand, gravel	
1906542	638715	4895923	06/08/1982	10.4	1.5	0	9	8	0	OB	topsoil, clay, gravel, clay	
1906632	638765	4895523	09/05/1983	29.6	4.6	38	12	3	30	OB	sand, clay, gravel	
*1906846	638772	4895626	26/10/1983	25.3	4.3	76	15	1	0	OB	clay, gravel, sand, gravel	Drilled Well at 5 Dafoe Street
1906993	638765	4895473	27/07/1984	29.0	7.6	45	15	2	30	OB	clay, stones, gravel, sand	Drilled Well at 12897 Concession Road 3
1907255	638765	4895423	06/12/1984	27.4	4.6	57	24	2	0	OB	topsoil, clay, stones, sand	
1907747	638730	4895339	09/06/1986	19.8	5.5	38	12	1	30	OB	clay, sand, clay, stones, gravel	
1907870	638615	4895581	12/08/1986	22.9	0.0	76	6	1	0	OB	clay, sand, silt, sand, clay, gravel	
1908084	638654	4895678	19/12/1986	25.3	0.0	57	5	1	15	OB	sand, clay, boulders, gravel	
1908483	638973	4895825	29/07/1987	7.6	1.8	57	5	2	0	OB	topsoil, clay, gravel, sand	
1908484	638644	4895695	28/07/1987	21.3	0.0	57	5	3	0	OB	clay, gravel, sand	Drilled Well at 13029 Concession Road 3
1909637	638619	4895835	10/01/1989	24.4	1.8	19	23	2	30	OB	clay, sand, clay, gravel	
1909693	638619	4895571	13/03/1989	23.8	0.3	76	18	1	30	OB	clay, sand, gravel	
1910070	638741	4895629	17/08/1989	26.2	3.0	151	23	1	0	OB	topsoil, clay, stones, sand, clay	
1910945	638770	4895678	10/12/1990	23.8	0.6	57	20	1	0	OB	clay, stones, gravel	Drilled Well at 1 Dafoe Street
1911871	638748	4895628	05/11/1993	25.3	4.9	57	14	2	20	OB	clay, boulders, sand, gravel	
1911943	638794	4895517	25/04/1994	28.0	6.1	76	21	1	0	OB	topsoil, clay, sand, silt, clay, sand, gravel	
1912214	638707	4895367	28/10/1994	19.5	6.1	23	18	2	30	OB	clay, gravel	
1912281	638724	4895395	13/12/1994	29.0	8.5	95	18	1	0	OB	sand, clay, stones, sand	
1913399	638985	4895778	14/08/1997	17.4	0.0	303	9	1	0	OB	gravel, sand, clay	
1913582	638656	4895587	10/02/1998	^77.4	^19.8	^38	0	8	0	4.6	topsoil, clay, stones, gravel, sand, clay, stones	
1914010	638707	4895363	13/05/1999	29.9	8.5	114	3	1	30	OB	clay, sand,	
1914322	638697	4895414	12/10/1999	27.4	6.1	227	15	1		OB	sand, gravel, clay, sand	
4602397	638804	4895534	02/10/1961	9.1	4.0	15	0			OB	topsoil, clay, sand, hardpan, clay	
4602398	638996	4895704	28/10/1962	7.6	3.0	11	7			OB	clay, sand	
4602399	638749	4895610	25/10/1963	11.6	7.0	23	11			OB	clay, sand	
4602400	638813	4895403	29/01/1964	4.6	1.8	11	4			OB	clay, gravel	
4602401	638803	4895454	07/04/1964	9.1	3.7	11	8			OB	topsoil, clay, sand, clay, gravel, sand	
4602402	638901	4895810	12/12/1959	8.5	1.8	15	0			OB	clay, stones	
4602403	638805	4895775	23/01/1962	15.2	1.8	19	6	1	0	OB	previously dug, clay, gravel	
4603790	639015	4895903	28/06/1968	12.2	2.4	0	12			OB	topsoil, clay, gravel, sand	Dug Well at 340 Zephyr Road
4603807	638715	4895593	22/11/1968	6.4	2.4	19	6			OB	topsoil, sand, clay	
4603827	638665	4895443	19/08/1968	5.2	1.8	8	5			OB	topsoil, clay, sand	
4604171	638765	4895423	06/08/1969	7.9	3.7	0	7			OB	topsoil, clay, sand, clay, stones	
4604351	638745	4895573	29/10/1969	10.7	3.4	0	10			OB	topsoil, clay, stones, sand	
4604606	638725	4895573	25/07/1970	19.8	0.0	15	6	6	0	OB	previously dug, clay, silt, clay, gravel, sand	
4604740	638665	4895458	21/05/1971	27.7	-0.6	95	6	1	30	OB	clay, topsoil, sand, clay, silt, clay, gravel	
4604810	638625	4895523	12/03/1970	10.7	4.6	0	9			OB	clay, stones	
4604811	638775	4895773	15/03/1970	5.8	2.4	0	5			OB	topsoil, clay, stones, hardpan	
4605339	638785	4895783	22/12/1972	19.2	-1.5	26	6	1	0	OB	gravel, sand, clay, gravel, sand, boulders	
4605427	638710	4895654	11/04/1973	28.0	-2.4	38	6	2	0	OB	clay, stones, gravel, sand	
4605531	638686	4895653	28/08/1973	34.4	5.5	38	15	2	0	OB	clay, stones, sand, gravel	
4606047	638613	4895790	15/08/1974	24.1	1.8	19	22	4	0	OB	sand, clay, gravel	
4606356	638615	4895573	16/10/1975	12.2	1.2	11	9	6	0	OB	sand, clay, stones, clay, gravel, sand	
4606369	638665	4895623	06/11/1975	23.8	0.0	76	9	1	0	OB	topsoil, clay, sand, gravel	
*4606585	638799	4895613	11/06/1976	21.3	0.0	95	9	2	30	OB	topsoil, clay, stones, sand	Drilled Well at 7 Dafoe Street
A123252	638945	4895569	23/04/2012	29.6	7.0	38	27	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-1
A123253	638880	4895648	14/03/2012	29.0	4.9	38	27	1	0	OB	topsoil, sand, clay, coarse sand	Test Well TW-3
A123254	638852	4895544	28/02/2012	31.1	8.4	30	28	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-2
	638770	4895549								OB		Drilled Well at 10 Dafoe Street
	638840	4895488	1982	10.8	5.3					OB		(DW-1) Dug Well at former Lockie residence
	638854	4895664		7.2	2.6					OB		(DW-2) Dug Well east of entrance driveway
	638964	4895760	1955	9.1						OB		Dug Well at 317 Zephyr Road
	638748	4895424		7.6						OB		Dug Well at 12875 Concession Road 3

Overburden	**AVERAGE**	**19.1**	**3.0**	**49.5**
	MAX	**34.4**	**8.5**	**302.8**
	MIN	**4.6**	**-2.4**	**8.0**

Notes:

Ministry of the Environment Water Well Information System (DURHAM)

* MOE Water Well Record UTM adjusted to GPS field location

^ Bedrock Aquifer

OB Refers to Overburden

DRILLED WATER WELL RECORDS WITHIN 250 METRE RADIUS OF SITE
QSRP DEVELOPMENTS INC.

MOE WELL NUMBER	EASTING	NORTHING	DATE COMPLETED	MONITOR DEPTH (m)	STATIC LEVEL (m)	PUMPING RATE (L/min)	PUMP LEVEL (m)	TIME HOUR	TIME MINUTE	DEPTH TO BEDROCK (m)	STRATIGRAPHY	NOTES
1905165	638665	4895523	27/10/1978	27.7	0.6	53	6	1	30	OB	gravel, clay, sand, clay, stones, gravel	
1905668	638715	4895623	20/07/1979	23.5	4.0	38	21	1	0	OB	clay, gravel, clay, gravel, sand	
1906174	638565	4895673	08/10/1981	19.2	-1.2	57	6	1	0	OB	sand, clay	
1906508	638715	4895523	10/10/1982	27.1	3.7	30	21	3	0	OB	clay, sand, clay, stones, sand, gravel	
1906632	638765	4895523	09/05/1983	29.6	4.6	38	12	3	30	OB	sand, clay, gravel	
*1906846	638772	4895626	26/10/1983	25.3	4.3	76	15	1	0	OB	clay, gravel, sand, gravel	Drilled Well at 5 Dafoe Street
1906993	638765	4895473	27/07/1984	29.0	7.6	45	15	2	30	OB	clay, stones, gravel, sand	Drilled Well at 12897 Concession Road 3
1907255	638765	4895423	06/12/1984	27.4	4.6	57	24	2	0	OB	topsoil, clay, stones, sand	
1907747	638730	4895339	09/06/1986	19.8	5.5	38	12	1	30	OB	clay, sand, clay, stones, gravel	
1907870	638615	4895581	12/08/1986	22.9	0.0	76	6	1	0	OB	clay, sand, silt, sand, clay, gravel	
1908084	638654	4895678	19/12/1986	25.3	0.0	57	5	1	15	OB	sand, clay, boulders, gravel	
1908483	638973	4895825	29/07/1987	7.6	1.8	57	5	2	0	OB	topsoil, clay, gravel, sand	
1908484	638644	4895695	28/07/1987	21.3	0.0	57	5	3	0	OB	clay, gravel, sand	Drilled Well at 13029 Concession Road 3
1909637	638619	4895835	10/01/1989	24.4	1.8	19	23	2	30	OB	clay, sand, clay, gravel	
1909693	638619	4895571	13/03/1989	23.8	0.3	76	18	1	30	OB	clay, sand, gravel	
1910070	638741	4895629	17/08/1989	26.2	3.0	151	23	1	0	OB	topsoil, clay, stones, sand, clay	
1910945	638770	4895678	10/12/1990	23.8	0.6	57	20	1	0	OB	clay, stones, gravel	Drilled Well at 1 Dafoe Street
1911871	638748	4895628	05/11/1993	25.3	4.9	57	14	2	20	OB	clay, boulders, sand, gravel	
1911943	638794	4895517	25/04/1994	28.0	6.1	76	21	1	0	OB	topsoil, clay, sand, silt, clay, sand, gravel	
1912214	638707	4895367	28/10/1994	19.5	6.1	23	18	2	30	OB	clay, gravel	
1912281	638724	4895395	13/12/1994	29.0	8.5	95	18	1	0	OB	sand, clay, stones, sand	
1913399	638985	4895778	14/08/1997	17.4	0.0	303	9	1	0	OB	gravel, sand, clay	
1913582	638656	4895587	10/02/1998	^77.4	^19.8	^38	0	8	0	4.6	topsoil, clay, stones, gravel, sand, clay, stones	
1914010	638707	4895363	13/05/1999	29.9	8.5	114	3	1	30	OB	clay, sand,	
1914322	638697	4895414	12/10/1999	27.4	6.1	227	15	1		OB	sand, gravel, clay, sand	
4602403	638805	4895775	23/01/1962	15.2	1.8	19	6	1	0	OB	previously dug, clay, gravel	
4604606	638725	4895573	25/07/1970	19.8	0.0	15	6	6	0	OB	previously dug, clay, silt, clay, gravel, sand	
4604740	638665	4895458	21/05/1971	27.7	-0.6	95	6	1	30	OB	clay, topsoil, sand, clay, silt, clay, gravel	
4605339	638785	4895783	22/12/1972	19.2	-1.5	26	6	1	0	OB	gravel, sand, clay, gravel, sand, boulders	
4605427	638710	4895654	11/04/1973	28.0	-2.4	38	6	2	0	OB	clay, stones, gravel, sand	
4605531	638686	4895653	28/08/1973	34.4	5.5	38	15	2	0	OB	clay, stones, sand, gravel	
4606047	638613	4895790	15/08/1974	24.1	1.8	19	22	4	0	OB	sand, clay, gravel	
4606356	638615	4895573	16/10/1975	12.2	1.2	11	9	6	0	OB	sand, clay, stones, clay, gravel, sand	
4606369	638665	4895623	06/11/1975	23.8	0.0	76	9	1	0	OB	topsoil, clay, sand, gravel	
*4606585	638799	4895613	11/06/1976	21.3	0.0	95	9	2	30	OB	topsoil, clay, stones, sand	Drilled Well at 7 Dafoe Street
A123252	638945	4895569	23/04/2012	29.6	7.0	38	27	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-1
A123253	638880	4895648	14/03/2012	29.0	4.9	38	27	1	0	OB	topsoil, sand, clay, coarse sand	Test Well TW-3
A123254	638852	4895544	28/02/2012	31.1	8.4	30	28	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-2
	638770	4895549								OB		Drilled Well at 10 Dafoe Street

Overburden	**AVERAGE**	**24.2**	**2.9**	**65.2**
	MAX	**34.4**	**8.5**	**302.8**
	MIN	**7.6**	**-2.4**	**11.4**

Notes:

Ministry of the Environment Water Well Information System (DURHAM)

* MOE Water Well Record UTM adjusted to GPS field location

^ Bedrock Aquifer

OB Refers to Overburden

DUG WATER WELL RECORDS WITHIN 250 METRE RADIUS OF SITE
QSRP DEVELOPMENTS INC.

MOE WELL NUMBER	EASTING	NORTHING	DATE COMPLETED	MONITOR DEPTH (m)	STATIC LEVEL (m)	PUMPING RATE (L/min)	PUMP LEVEL (m)	TIME HOUR	TIME MINUTE	DEPTH TO BEDROCK (m)	STRATIGRAPHY	NOTES
1906542	638715	4895923	06/08/1982	10.4	1.5	0	9	8	0	OB	topsoil, clay, gravel, clay	
4602397	638804	4895534	02/10/1961	9.1	4.0	15	0			OB	topsoil, clay, sand, hardpan, clay	
4602398	638996	4895704	28/10/1962	7.6	3.0	11	7			OB	clay, sand	
4602399	638749	4895610	25/10/1963	11.6	7.0	23	11			OB	clay, sand	
4602400	638813	4895403	29/01/1964	4.6	1.8	11	4			OB	clay, gravel	
4602401	638803	4895454	07/04/1964	9.1	3.7	11	8			OB	topsoil, clay, sand, clay, gravel, sand	
4602402	638901	4895810	12/12/1959	8.5	1.8	15	0			OB	clay, stones	
4603790	639015	4895903	28/06/1968	12.2	2.4	0	12			OB	topsoil, clay, gravel, sand	Dug Well at 340 Zephyr Road
4603807	638715	4895593	22/11/1968	6.4	2.4	19	6			OB	topsoil, sand, clay	
4603827	638665	4895443	19/08/1968	5.2	1.8	8	5			OB	topsoil, clay, sand	
4604171	638765	4895423	06/08/1969	7.9	3.7	0	7			OB	topsoil, clay, sand, clay, stones	
4604351	638745	4895573	29/10/1969	10.7	3.4	0	10			OB	topsoil, clay, stones, sand	
4604810	638625	4895523	12/03/1970	10.7	4.6	0	9			OB	clay, stones	
4604811	638775	4895773	15/03/1970	5.8	2.4	0	5			OB	topsoil, clay, stones, hardpan	
	638840	4895488	1982	10.8	5.3					OB		(DW-1) Dug Well at former Lockie residence
	638854	4895664		7.2	2.6					OB		(DW-2) Dug Well east of entrance driveway
	638964	4895760	1955	9.1						OB		Dug Well at 317 Zephyr Road
	638748	4895424		7.6						OB		Dug Well at 12875 Concession Road 3

Overburden	**AVERAGE**	**4.3**	**3.2**	**8.1**
	MAX	**12.2**	**7.0**	**22.7**
	MIN	**4.6**	**1.5**	**8.0**

Notes:

Ministry of the Environment Water Well Information System (DURHAM)

* MOE Water Well Record UTM adjusted to GPS field location

OB Refers to Overburden

ON-SITE DRILLED WATER WELL RECORDS
QSRP DEVELOPMENTS INC.

MOE WELL NUMBER	EASTING	NORTHING	DATE COMPLETED	MONITOR DEPTH (m)	WATER FOUND (m)	STATIC LEVEL (m)	PUMPING RATE (L/min)	PUMP LEVEL (m)	TIME HOUR	TIME MINUTE	DEPTH TO BEDROCK (m)	STRATIGRAPHY	NOTES
A123252	638945	4895569	23/04/2012	29.6	29.57	7.0	38	27.43	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-1
A123253	638880	4895648	14/03/2012	29.0	28.96	4.9	38	26.52	1	0	OB	topsoil, sand, clay, coarse sand	Test Well TW-3
A123254	638852	4895544	28/02/2012	31.1	31.09	8.4	30	28.04	1	0	OB	topsoil, clay, sand, coarse sand	Test Well TW-2

Overburden	**AVERAGE**	**29.9**	**29.9**	**6.8**	**35.3**	
	MAX	**31.1**	**31.1**	**8.4**	**37.8**	
	MIN	**29.0**	**29.0**	**4.9**	**30.3**	

Notes:

Ministry of the Environment Water Well Information System (DURHAM)
OB Refers to Overburden

TW-1

Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. (Place Sticker and Print Below) Tag#: A123252

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	QSRP DEVELOPMENTS		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
318 FEASBY RD	UXBRIDGE	ON	L9P1Z1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
309 ZEPHYR RD	Uxbridge (Scott)	25	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Durham Region	Zephyr	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	638945	4895569	SUBLOT 4	

Overburden and Bedrock Materials/Abandonment Record (Type or Print)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	TOP SOIL		SOFT	0	6"
BROWN	CLAY-SAND	STONES	PACKED	6"	21
GREY	CLAY-GRAVEL		HARD PACKED	21	75
GREY	SAND		LOOSE	75	77
GREY	SAND		LOOSE WITH PRESSURE	77	81

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
20	15	1½ BAGS QUICK GROUTE	40 GAL
5	0	2 BAGS HOLE PLUG	100 LBS

Method of Construction

☒ Cable Tool	☐ Diamond	☐ Public	☐ Commercial	☐ Not used
☐ Rotary (Conventional)	☐ Jetting	☒ Domestic	☐ Municipal	☐ Dewatering
☐ Rotary (Reverse)	☐ Driving	☐ Livestock	☐ Test Hole	☐ Monitoring
☐ Boring	☐ Digging	☐ Irrigation	☐ Cooling & Air Conditioning	
☐ Air percussion		☐ Industrial		
☐ Other, specify		☐ Other, specify		

Well Construction

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Well Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6¼	STEEL	.188	+2	77

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
5"	STAINLESS	#6	77	81

☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Water Found

Water found at Depth	Kind of Water	Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
81' (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, specify	0	20	8"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0	81	6¼"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

Pump Testing

After test of well yield, water was: ☒ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason: /

Pump intake set at (m/ft): 79'

Pumping rate (l/min / GPM): 4 GPM

Duration of pumping: 1 hrs + 00 min

Final water level end of pumping (m/ft): 61.90

If flowing give rate (l/min / GPM): /

Recommended pump depth (m/ft): 71'

Recommended pump rate (l/min / GPM): 4 GPM

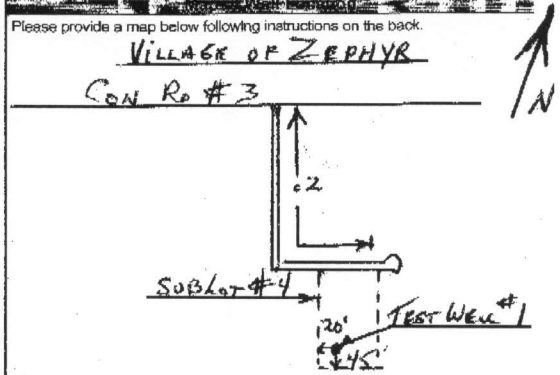
Well production (l/min / GPM): 5 GPM

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	22.00		
1	26.70	1	60.10
2	28.90	2	57.50
3	30.65	3	55.80
4	32.75	4	54.20
5	34.60	5	52.80
10	42.75	10	45.15
15	48.26	15	40.40
20	53.55	20	36.35
25	55.30	25	34.10
30	57.40	30	30.65
40	59.92	40	26.25
50	61.40	50	24.30
60	61.90	60	23.00

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
HERB LANG WELL DRILLING LTD	3367

Business Address (Street Number/Name)	Municipality
4852 HWY #7	OMEMEE

Province	Postal Code	Business E-mail Address
ON	K0L2W0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
	RICHARD ALLAN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1868		2012 02 08

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	2012 02 17	Audit No: Z139825
	Date Work Completed: 2012 02 08	Received

0506E (2007/12) © Queen's Printer for Ontario, 2007

Ministry's Copy

Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)* TAG# A 123252

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☒ Imperial

TW1 Deepened

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	QSRP DEVELOPMENTS		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (Inc. area code)
318 FEASBY RD	UXBRIDGE	ON	L9P 1Z1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
309 ZEPHYR RD	UXBRIDGE (SCOTT)	25	3

County/District/Municipality	City/Town/Village	Province	Postal Code
DURHAM REGION	ZEPHYR	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	638945	4895569	SUBLOT 4	

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Grey	WATER SAND		Loose w/ pressure	81'	97'

Note : This well was deepened 16' and re-screened.
Previous well record audit # -Z139625

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
20	85	Bentonite slurry 20%	40 gal
5	0	Bentonite chips 100%	100 lbs

Method of Construction

☒ Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used
☐ Rotary (Conventional) ☐ Jetting ☒ Domestic ☐ Municipal ☐ Dewatering
☐ Rotary (Reverse) ☐ Driving ☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Boring ☐ Digging ☐ Irrigation ☐ Cooling & Air Conditioning
☐ Air percussion ☐ Industrial
☐ Other, specify ____ ☐ Other, specify ____

Well Use

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6¼"	steel	.188	+2'	93'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
5"	stainless steel	14	93'	97'

Water Found

Water found at Depth	Kind of Water	Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
97 (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, specify	0	20'	8"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0	97'	6"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

Pumping Test

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft): 90'

Pumping rate (l/min / GPM): 7 gpm

Duration of pumping: 1 hrs + 00 min

Final water level end of pumping (m/ft): 32.9'

If flowing give rate (l/min / GPM): ____

Recommended pump depth (m/ft): 90'

Recommended pump rate (l/min / GPM): 10 gpm

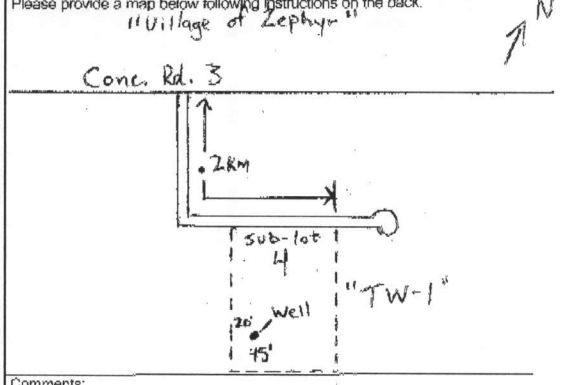
Well production (l/min / GPM): 10 gpm

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	23		
1	27-5	1	27-4
2	29-7	2	25-8
3	30-8	3	24-7
4	31-6	4	24-10
5	32-3	5	23-7
10	32-8	10	23-2
15	32-9	15	23-2
20	↓	20	23-10
25	↓	25	23-05
30	↓	30	23
40	↓	40	↓
50	↓	50	↓
60	↓	60	↓

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
HERB LANG WELL DRILLING LTD	3367

Business Address (Street Number/Name)	Municipality
4852 HWY #7	OMEMEE

Province	Postal Code	Business E-mail Address
ON	K0L2W0	

Bus. Telephone No. (Inc. area code)	Name of Well Technician (Last Name, First Name)
7057979088	RICHARD ALLAN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1866	Richard Allan	2012 04 23

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2012 04 17	2012 04 23

Ministry Use Only
Audit No. Z 149995
Received

Ontario Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below)
Tag#: A123254

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

TW-2

Measurements recorded in: ☐ Metric ☒ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	QSRP Developments		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
318 Feasby Rd.	Uxbridge	ON		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
# 309 Zephyr Rd.	Uxbridge (Scott)	25	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Durham Region	Zephyr	Ontario	

UTM Coordinates: Zone 17, Easting 638852, Northing 4895544; NAD 83
Municipal Plan and Sublot Number:
Other:

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Topsoil		Soft	0	1
Brown	Clay	Sand Stones	Packed	1	28
Grey	Clay	Gravel	Packed	28	81
Grey	Sand	Clay	Fine	81	98
Brown	Coarse water sand		Loose w/ pressure	98	102

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	5	Bentonite chips 100%	100 lbs
5	20	Bentonite slurry 20%	50 gal

Method of Construction

☒ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Other, specify ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging

Well Use

☐ Public ☒ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify ☐ Commercial ☐ Municipal ☐ Test Hole ☐ Cooling & Air Conditioning ☐ Not used ☐ Dewatering ☐ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
6¼"	steel	.188	+2'	98'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
5"	Stainless	16	98'	102'

Status of Well

☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Water Details

Water found at Depth 102 (m/ft) ☐ Gas — Kind of Water: ☒ Fresh ☒ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft) ☐ Gas — Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0'	20'	8"
20'	102'	6⅞"

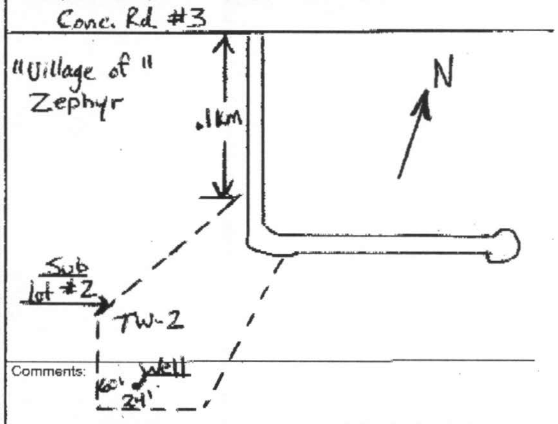
Results of Well Yield Testing

After test of well yield, water was: ☒ Clear and sand free ☐ Other, specify
If pumping discontinued, give reason:
Pump intake set at (m/ft): 100'
Pumping rate (l/min / GPM): 7 gpm
Duration of pumping: 1 hrs +00 min
Final water level end of pumping (m/ft): 44'
If flowing give rate (l/min / GPM): —
Recommended pump depth (m/ft): 92'
Recommended pump rate (l/min / GPM): 8 gpm
Well production (l/min / GPM): 10 gpm
Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	27-5		
1	33-8	1	38-7
2	36-8	2	35-9
3	38-7	3	34-2
4	40	4	32-9
5	41-15	5	31-8
10	43-1	10	30
15	43-6	15	29-7
20	43-7	20	29-6
25	43-8	25	29-5
30	44	30	28-9
40	↓	40	28-5
50		50	28
60		60	27-8

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Herb Lang Well Drilling Ltd.	3367

Business Address (Street Number/Name)	Municipality
4852 Hwy #7 RR 1	OMEMEE

Province	Postal Code	Business E-mail Address
ON	K0L 2W0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7057997088	Richard, Allen

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1868	[signature]	20120229

Well owner's information package delivered: ☒ Yes ☐ No
Date Package Delivered: 20120117
Date Work Completed: 20120228

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TW-3

Ontario Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Well Tag No. (Place Sticker and/or Print Below): Tag#: A123253

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	QSRP Developments		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
318 Feasby Road	Uxbridge	ON		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
309 Zephyr Rd.	Uxbridge (Scott)	25	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Durham Region	Zephyr.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	638850	4895648		

Overburden and Bedrock Materials/Abandonment Sealing Record

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
Brown	Topsoil	Sand	Soft	0	1
Brown	Sand	Clay	Soft	1	12
Brown	Clay	Gravel	Packed	12	32
Grey	Clay		Dense	32	69
Grey	Clay	Silt	water bearing	69	89
Brn	Water sand	Gravel	Layered Loose w/pressure	89	95

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20'	Bentonite slurry 20%	55 gal
		Bentonite chips 100%	100 lbs

Method of Construction

☒ Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used
☐ Rotary (Conventional) ☐ Jetting ☒ Domestic ☐ Municipal ☐ Dewatering
☐ Rotary (Reverse) ☐ Driving ☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Boring ☐ Digging ☐ Irrigation ☐ Cooling & Air Conditioning
☐ Air percussion ☐ Industrial
☐ Other, specify ☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
6"/4	Steel	.188	0	91'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
5"	Stainless	18	91'	95'

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Record

Water found at Depth	Kind of Water	Depth From	To	Diameter (cm/in)
95' (m/ft) ☐ Gas	☒ Fresh ☒ Untested ☐ Other, specify			
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify	0	20	8"
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify	0	95	6"

Pumping Test

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason: /

Pump intake set at (m/ft): 92'

Pumping rate (l/min / GPM): 10 GPM

Duration of pumping: 1 hrs + 00 min

Final water level end of pumping (m/ft): 21'25

If flowing give rate (l/min / GPM): -

Recommended pump depth (m/ft): 87'

Recommended pump rate (l/min / GPM): 10 GPM

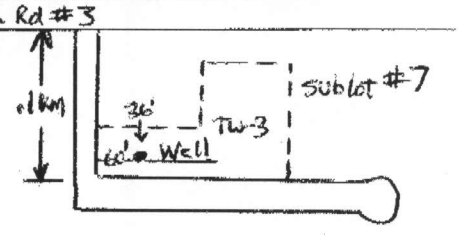
Well production (l/min / GPM): 10 GPM

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		16'20		16'20
1	1	18'35	1	18'00
2	2	18'75	2	16'80
3	3	18'90	3	16'40
4	4	19'00	4	16'30
5	5	19'10	5	16'29
10	10	19'80	10	16'27
15	15	20'00	15	16'25
20	20	20'25	20	16'24
25	25	20'40	25	16'23
30	30	20'57	30	16'22
40	40	20'89	40	16'22
50	50	21'00	50	16'22
60	60	21'25	60	16'22

Well Location

Please provide a map below following instructions on the back.



"Village of Zephyr"

Comments:

Contractor and Well Technician Information

Business Name of Well Contractor: HERB LANG WELL DRILLING LTD
Well Contractor's Licence No.: 3367

Business Address (Street Number/Name): 4852 HWY #7
Municipality: OMEMEE

Province: ON
Postal Code: K0L2W0
Business E-mail Address:

Bus. Telephone No. (inc. area code): 705 799 7088
Name of Well Technician (Last Name, First Name): MILLER SCOTT

Well Technician's Licence No.: 2338
Signature of Technician and/or Contractor:
Date Submitted: 2012 08 04

Well owner's information package delivered: ☒ Yes ☐ No
Date Package Delivered: 2012 08 04
Date Work Completed: 2012 08 14

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APPENDIX D

DOOR-TO-DOOR
WELL SURVEY RESULTS

GRACE & ASSOCIATES INC.
Geological & Environmental Consultants

16 Glenelg Street East
Lindsay, Ontario
K9V 1Y6

Telephone: (705) 324-5408
Facsimile: (705) 324-2081

November 24th, 2011

Dear Home Owner or Occupant:

On November 24th, 2011, a Grace and Associates staff member visited your property while conducting a door-to-door well survey. Our study is part of groundwater supply investigation being commissioned by a neighbouring property owner for a small residential development near the Lockwood Golf Club..

Through this study, we are collecting data regarding water supplies and sewage treatment in the area. If you would like to participate, we would like to include information about your well and septic system in our study. If you are in receipt of this letter, it means that we attempted to contact you and you were unavailable. We have a brief questionnaire that we can complete with you by telephone, fax or e-mail (whichever is most convenient).

The success of our survey depends on obtaining accurate information. We view your water supply and sewage treatment system information as an important part of our survey. You are under no obligation to participate in our survey, however if you are interested in participating, please contact our office at your earliest convenience using the information provided at the top of this page.

Should you have any questions, or require additional information on this survey, please do not hesitate to contact our office.

Yours very truly,
GRACE & ASSOCIATES INC.

Thomas P. Grace

Thomas P. Grace C.E.T. BSc. PGeo
Environmental Geologist

Door to Door Water Well Survey
QSRP Developments Inc.

House/Fire No.	Street Name	Response	Resident	Phone No.	Notes
340	Zephyr Road	Yes	Mary Takki	905-473-7250	Had no information about well or septic
5	Dafoe Street	Yes	Edward McGillivray	905-473-3647	90 ft drilled well constructed 30 years ago, sump continuously pumps from basement, septic replaced 6 years ago due to breakouts/flooding, iron problem effects taste
10	Dafoe Street	Yes	Al Strawbridge	416-577-0911	Drilled well, unkown depth, never dry, iron problematic, no problems with septic
13029	Concession Road 3 (Durham Road 39)	Yes	Tom Choi	905-473-9977	Zephyr Mini Mart, drilled well of unknown depth, iron problematic, no problems with septic installed in 1986, signs posted in public washroom not to drink water
12875	Concession Road 3 (Durham Road 39)	Yes	Jansen (spoke to Mrs.)	905-473-3429	Dug well, 25 ft deep, occasionally dry 3 years ago, tests for bacteria with no detect, no other problems with well or septic
340	Zephyr Road	No			Left letter
328	Zephyr Road	No			Left letter
319	Zephyr Road	No			Left letter
320	Zephyr Road	No			Left letter
317	Zephyr Road	Yes	Dwayne Bell	905-473-5112	Dug well (1955), 30 ft deep, purchased dwelling 15 years ago and never dry well, never hauled water. No odour, taste and bacteria issues; well scrubbed, disinfected & resealed. No water treatment. No septic system issues or problems.
315	Zephyr Road	No			Left letter
313	Zephyr Road	No			Left letter
310	Zephyr Road	No			Left letter with employees, Scott Zephyr Hall
311	Zephyr Road	No			Left letter
306	Zephyr Road	No			Left letter
304	Zephyr Road	No			Left letter
302	Zephyr Road	No			Left letter
301	Zephyr Road	No			Left letter
303	Zephyr Road	No			Left letter
1	Foot Street	No			Left letter
2	Foot Street	No			Left letter
9	Dafoe Street	No			Left letter
12	Dafoe Street	No			Left letter
7	Dafoe Street	Yes	Alan McGillivray	905-473-3398	1881 former church. Drilled well (1975-1980), ~92 ft depth, went dry when last subdivision was developed; several wells in Zephyr burnt out pumps as a result of west subdivision pumping tests. High water table. UV system, iron (bacteria).
8	Dafoe Street	No			Left letter
6	Dafoe Street	No			Left letter
4	Dafoe Street	No			Left letter
3	Dafoe Street	Yes	Dave Deneve	905-473-7560	Drilled well, unkown depth, never dry, iron problematic, no problems with septic, water softener
2	Dafoe Street	No			Left letter
1	Dafoe Street	Yes	Mrs. Riddall	905-473-7459	Drilled well (1991), 75ft deep. No issues with well or septic. UV & reverse osmosis water treatment. Test every 3 montsh for TC & E.Coli
12887	Concession Road 3 (Durham Road 39)	No			Left letter
12897	Concession Road 3 (Durham Road 39)	Yes	Janice Norton	905-473-6606	Heritage House. Drilled well (1984) 87 ft depth, never dry, iron staining, water softener. Pumping test for subdivision north of village resulted in problems with wells in Zephyr. Has not had any well problems in the past 20 years.
12907	Concession Road 3 (Durham Road 39)	No			Left letter
12913	Concession Road 3 (Durham Road 39)	No			Left letter
12919	Concession Road 3 (Durham Road 39)	No			Left letter
12939	Concession Road 3 (Durham Road 39)	No			Left letter
12945	Concession Road 3 (Durham Road 39)	No			Left letter
12955	Concession Road 3 (Durham Road 39)	No			Left letter
12965	Concession Road 3 (Durham Road 39)	No			Left letter
12969	Concession Road 3 (Durham Road 39)	No			Left letter
12973	Concession Road 3 (Durham Road 39)	No			Left letter

APPENDIX E

WATER SURPLUS
& INFILTRATION FACTORS

Stormwater Management Planning and Design Manual

March 2003

Ministry of the Environment

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

* *This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2

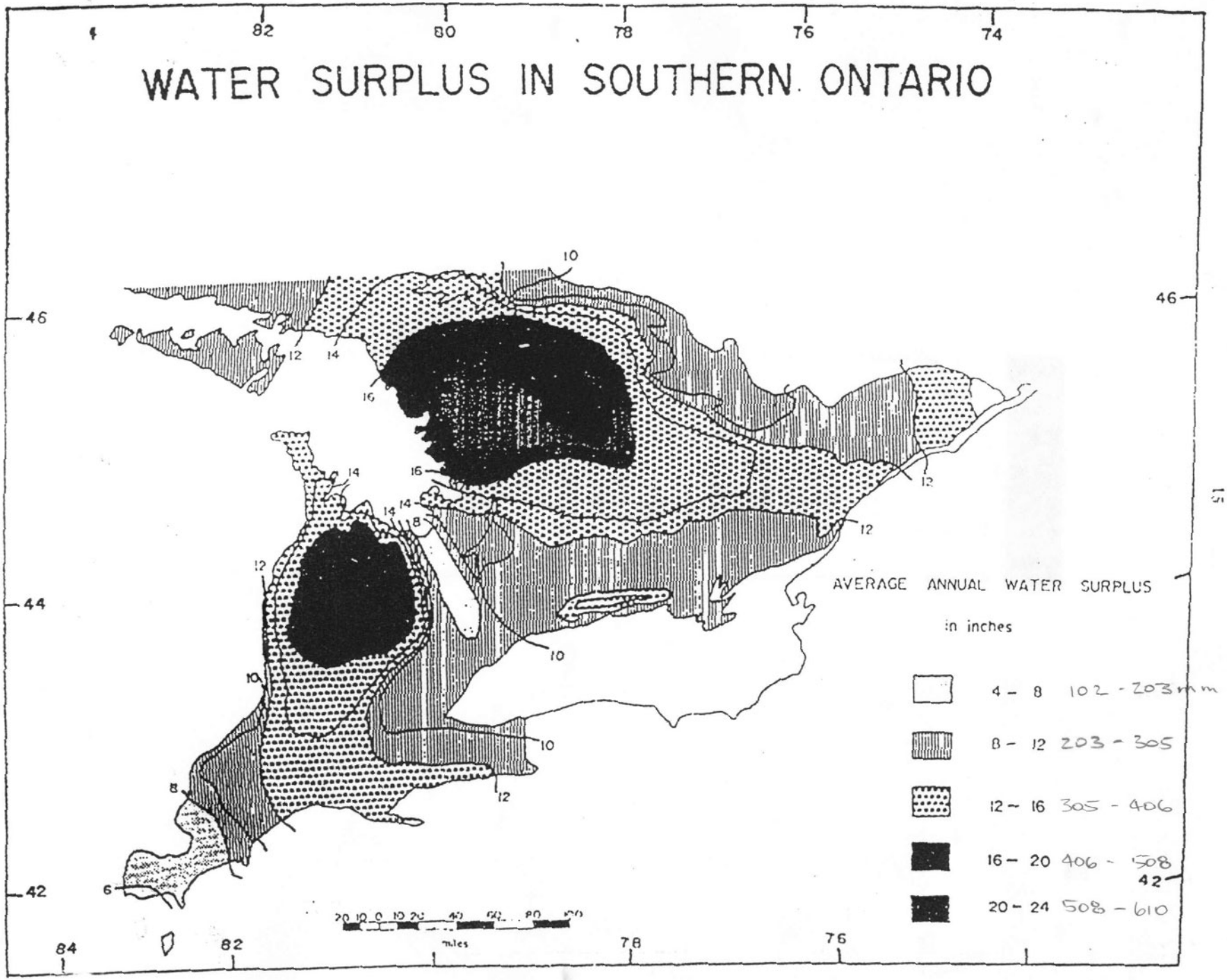

WATER SURPLUS IN SOUTHERN ONTARIO
82
80
78
76
74
46
44
42
84
AVERAGE ANNUAL WATER SURPLUS
in inches
4 – 8 102 - 203 mm
8 – 12 203 - 305
12 – 16 305 - 406
16 – 20 406 - 508
20 – 24 508 - 610
miles

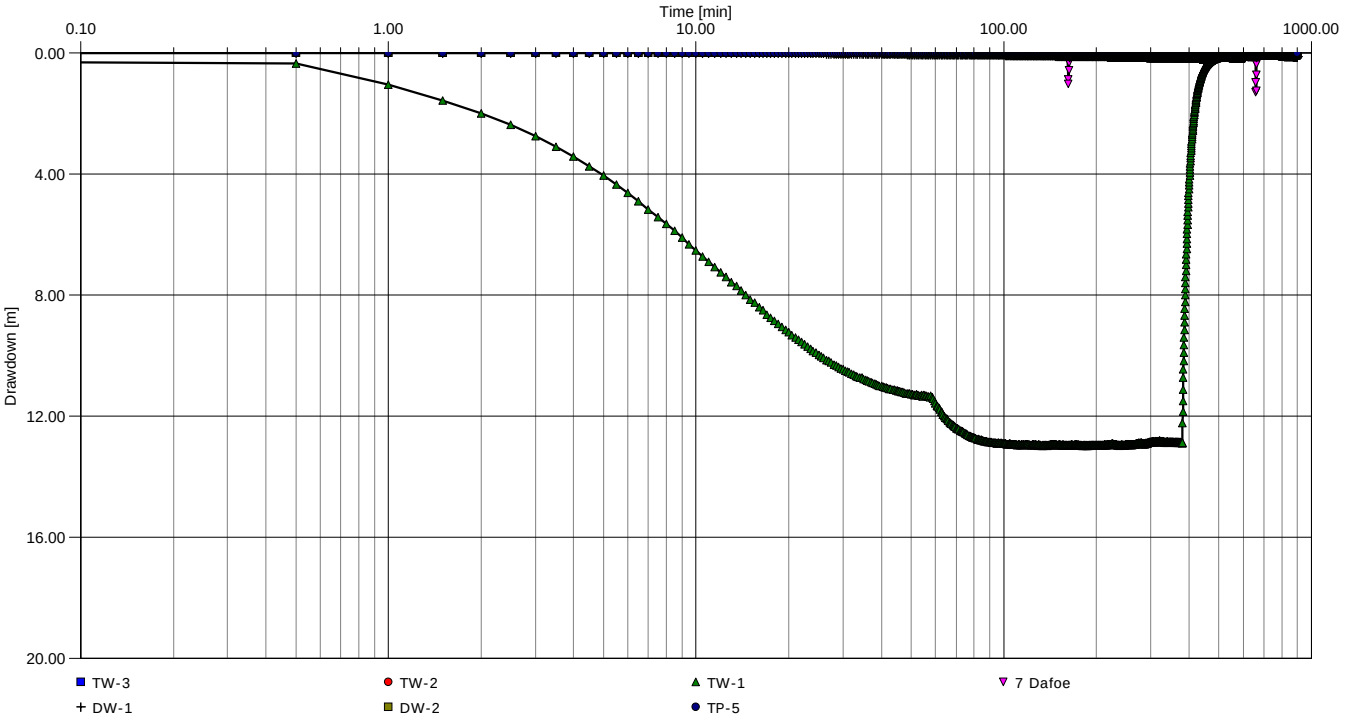
Figure 10

APPENDIX F

PUMPING TEST RAW DATA

Grace & Associates Inc. 16 Glenelg Street East Lindsay, Ontario L9V 1Y6	**Hydrogeological and Soil Assessment Report**
	Pumping Test Analysis
	Project: R11-510.3
	Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-1 Pumping Test	Pumping well: TW-1
Test conducted by: DM		Test date: 4/2/2012
Analysis performed by:	Time - Drawdown	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.25706 [l/s]	



Grace & Associates Inc.
16 Glenelg Street East
Lindsay, Ontario
L9V 1Y6

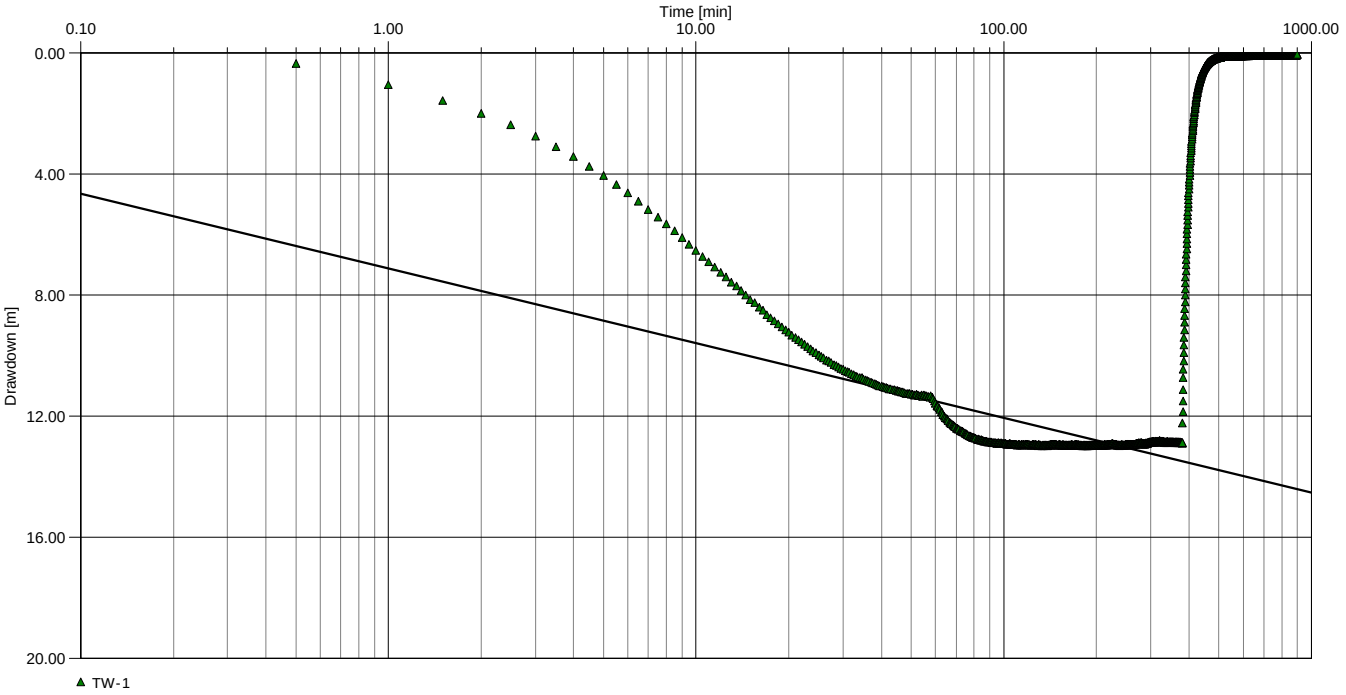
Hydrogeological and Soil Assessment Report

Pumping Test Analysis

Project: R11-510.3

Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-1 Pumping Test	Pumping well: TW-1
Test conducted by: DM		Test date: 4/2/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.25706 [l/s]	

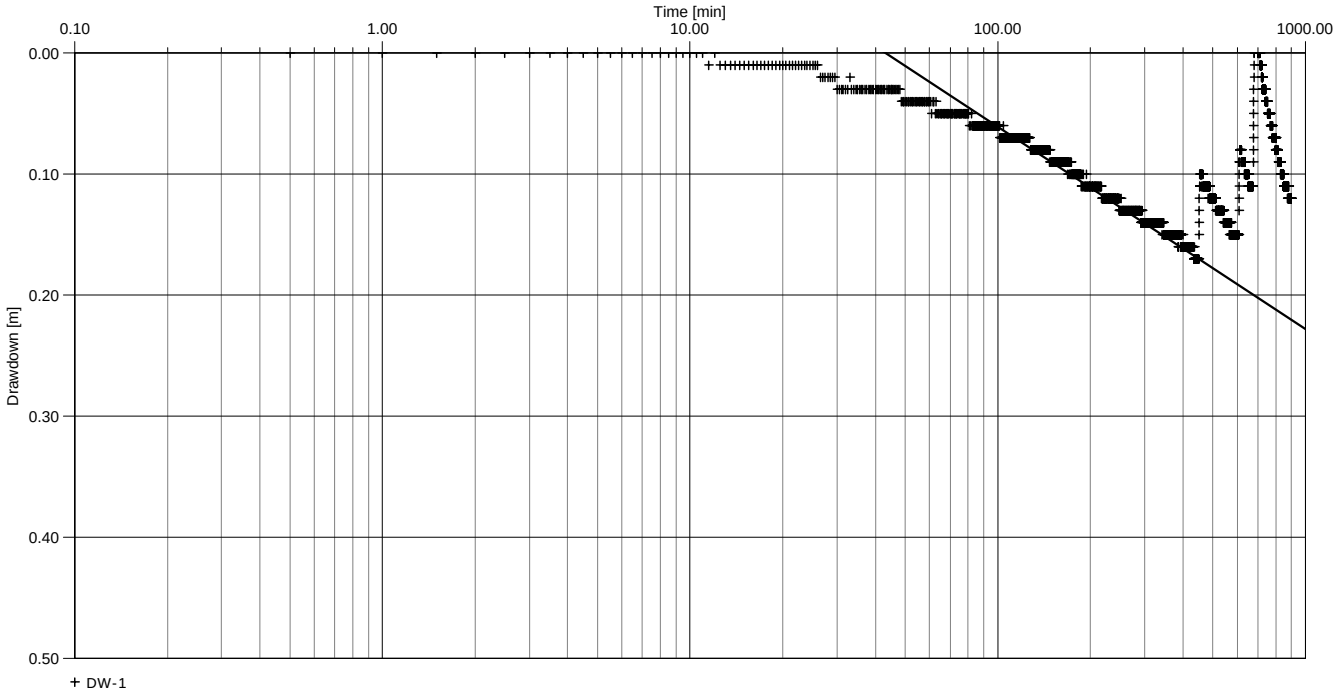


Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
TW-1	1.65×10^{0}			

Grace & Associates Inc. **16 Glenelg Street East** **Lindsay, Ontario** **L9V 1Y6**	**Hydrogeological and Soil Assessment Report** Pumping Test Analysis Project: R11-510.3 Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-1 Pumping Test	Pumping well: TW-1
Test conducted by: DM		Test date: 4/2/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.25706 [l/s]	

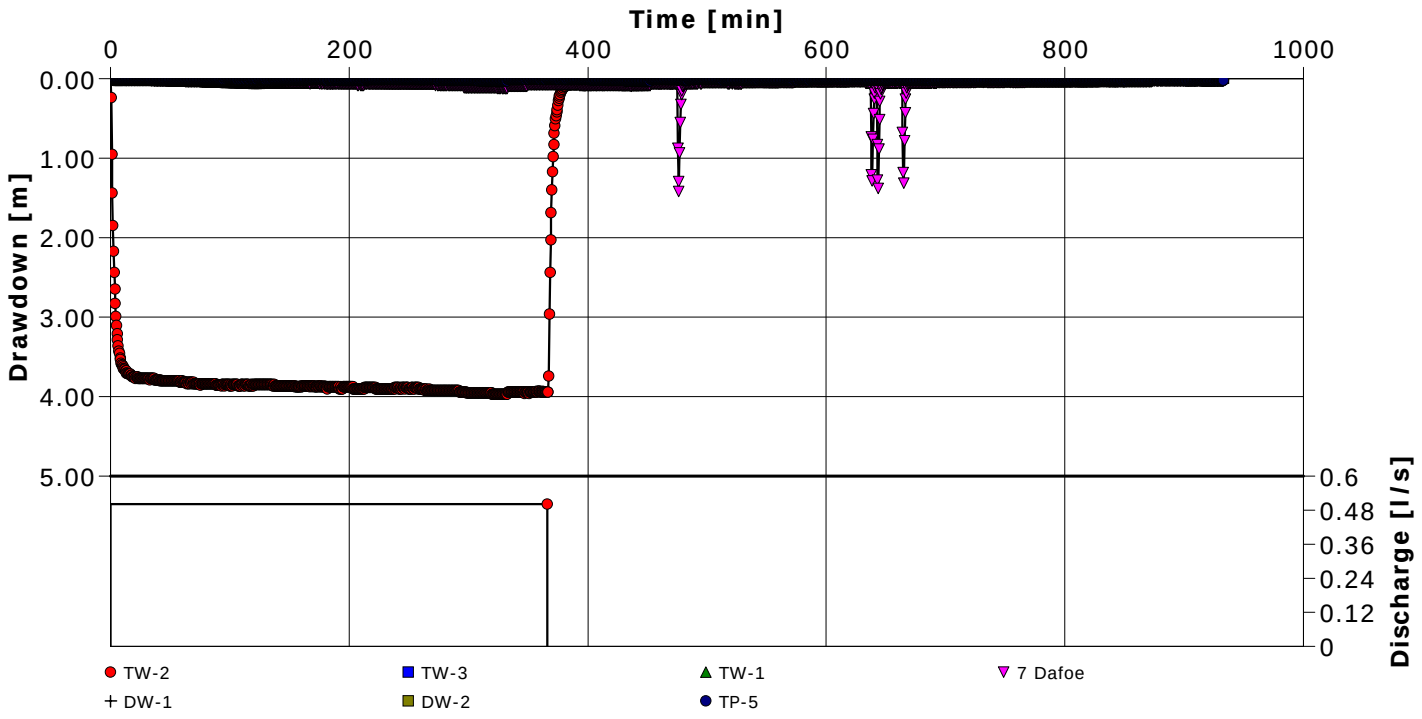


Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
DW-1	2.44×10^{1}	1.10×10^{-4}	122.18	

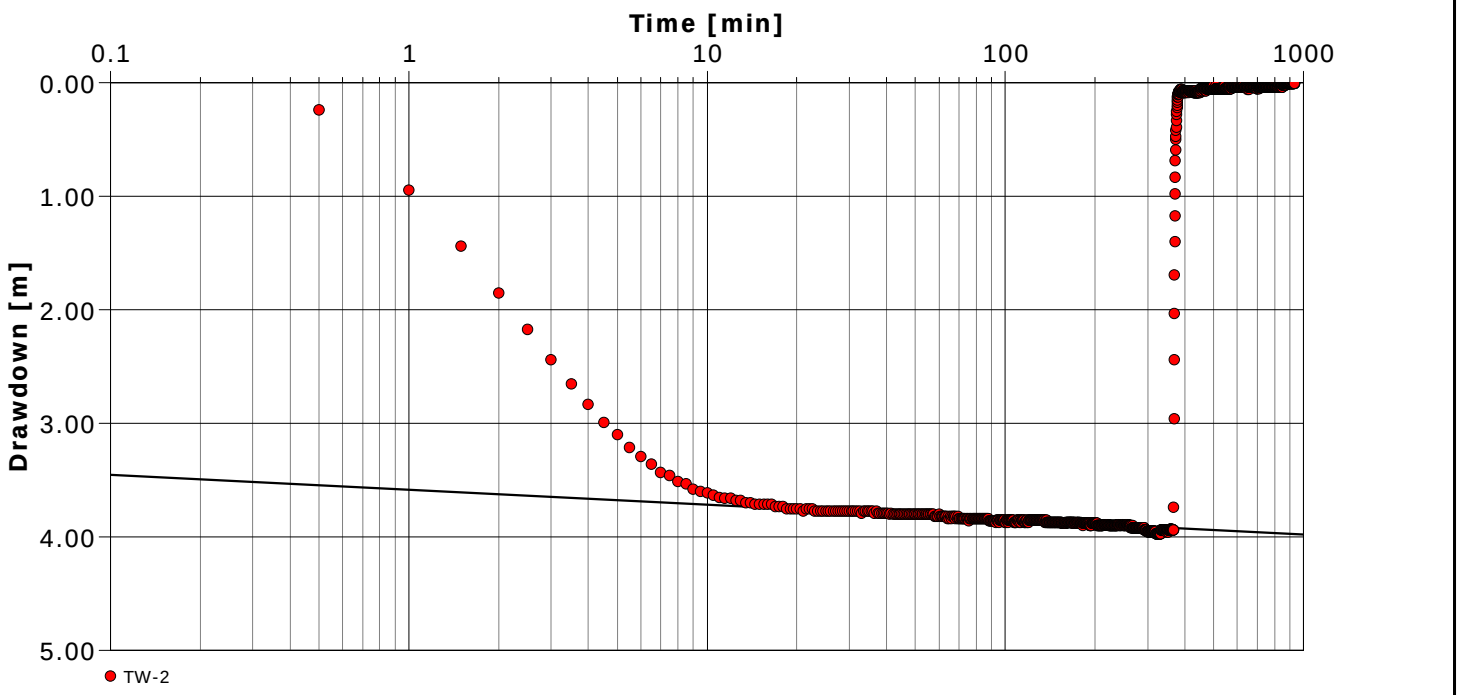
Grace & Associates Inc. **16 Glenelg Street East** **Lindsay, Ontario** **L9V 1Y6**	**Hydrogeological and Soil Assessment Report** Pumping Test Analysis Project: R11-510.3 Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-2 Pumping Test	Pumping well: TW-2
Test conducted by: DM		Test date: 3/30/2012
Analysis performed by:	Time-Drawdown	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.5 [l/s]	



Grace & Associates Inc. 16 Glenelg Street East Lindsay, Ontario L9V 1Y6	**Hydrogeological and Soil Assessment Report**
	Pumping Test Analysis
	Project: R11-510.3
	Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-2 Pumping Test	Pumping well: TW-2
Test conducted by: DM		Test date: 3/30/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.5 [l/s]	

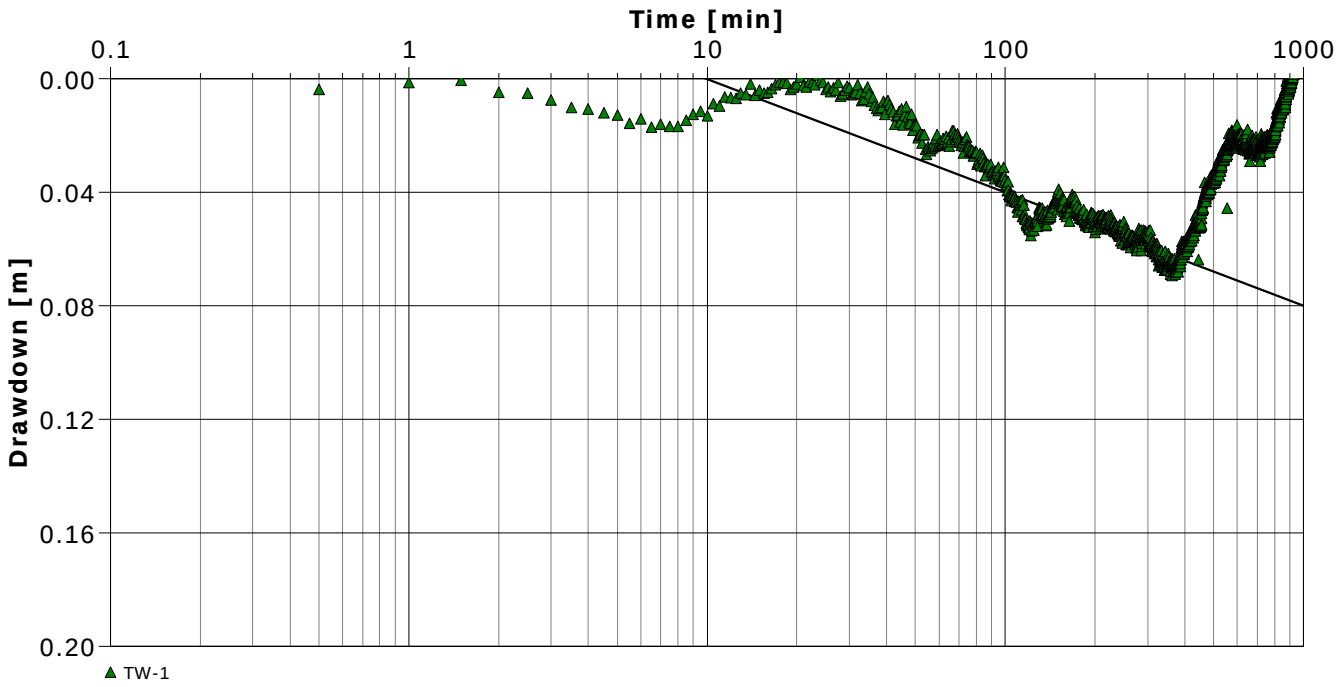


Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
TW-2	5.98×10^{1}			

Grace & Associates Inc. 16 Glenelg Street East Lindsay, Ontario L9V 1Y6	**Hydrogeological and Soil Assessment Report**
	Pumping Test Analysis
	Project: R11-510.3
	Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-2 Pumping Test	Pumping well: TW-2
Test conducted by: DM		Test date: 3/30/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.5 [l/s]	

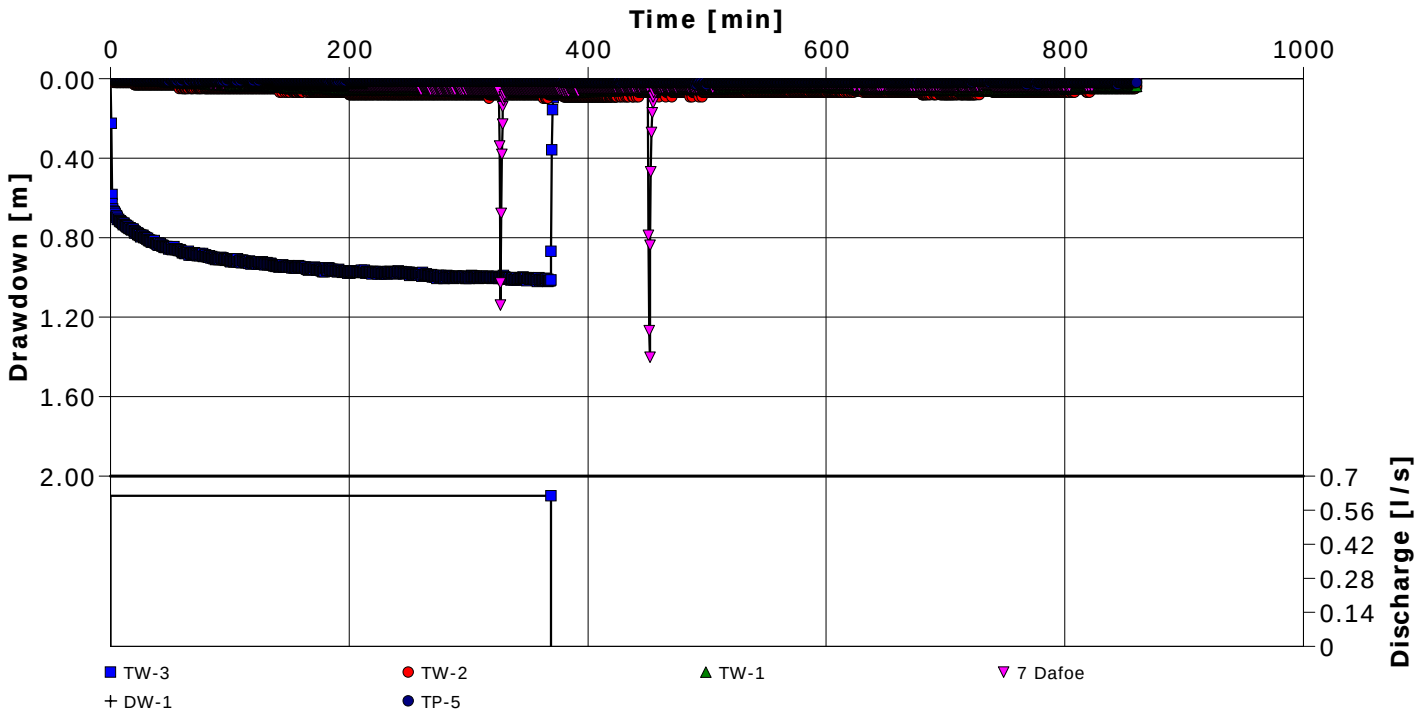


Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
TW-1	1.98×10^{2}	3.48×10^{-4}	93.95	

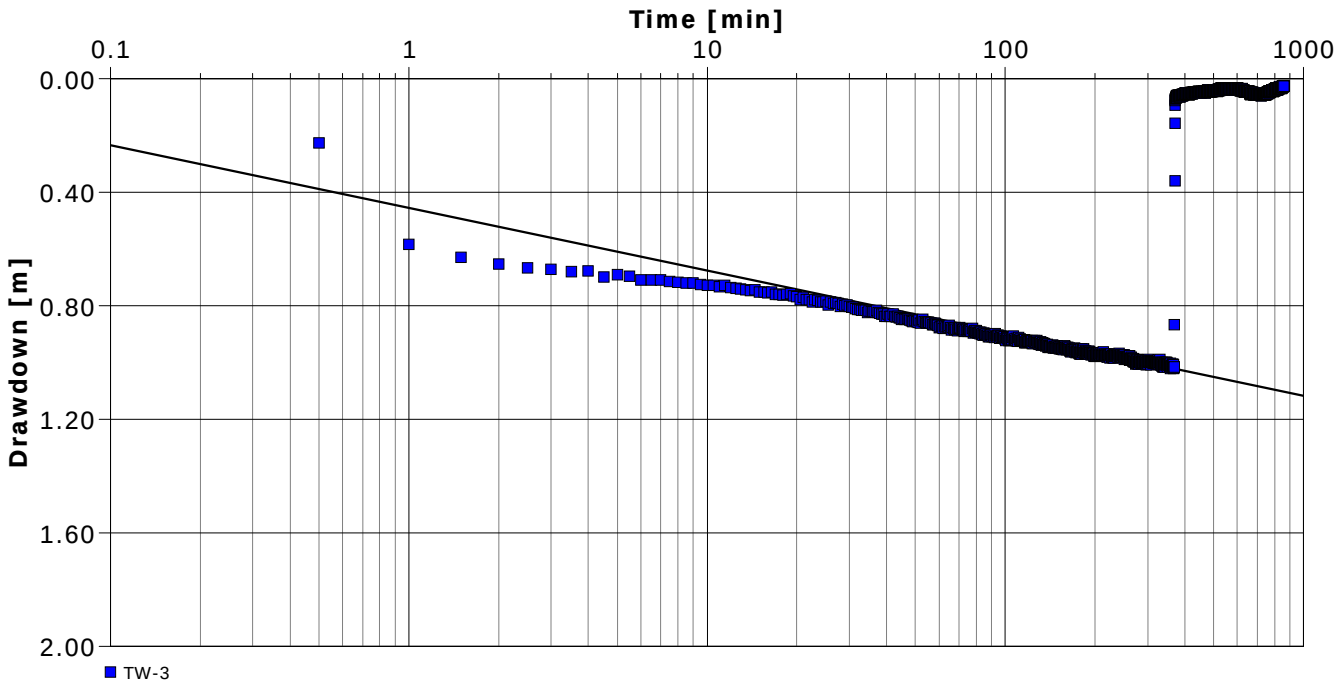
Grace & Associates Inc. **16 Glenelg Street East** **Lindsay, Ontario** **L9V 1Y6**	**Hydrogeological and Soil Assessment Report**	
	Pumping Test Analysis	
	Project: R11-510.3	
	Client: QSRP Developments Inc.	

Location: Zephyr, Ontario	Pumping Test: TW-3 Pumping Test	Pumping well: TW-3
Test conducted by: DM		Test date: 3/29/2012
Analysis performed by:	Time-Drawdown	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.619 [l/s]	



Grace & Associates Inc. 16 Glenelg Street East Lindsay, Ontario L9V 1Y6	**Hydrogeological and Soil Assessment Report**
	Pumping Test Analysis
	Project: R11-510.3
	Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-3 Pumping Test	Pumping well: TW-3
Test conducted by: DM		Test date: 3/29/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.619 [l/s]	

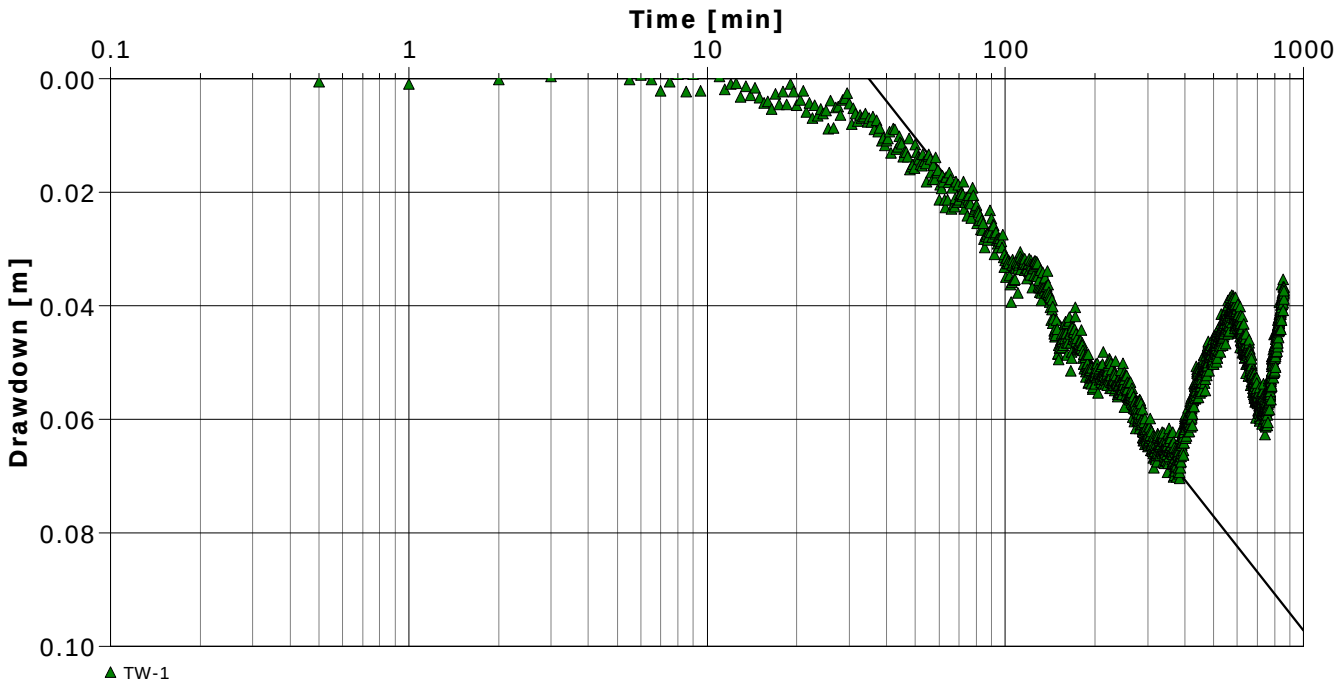


Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
TW-3	4.43×10^{1}			

Grace & Associates Inc. 16 Glenelg Street East Lindsay, Ontario L9V 1Y6	**Hydrogeological and Soil Assessment Report**
	Pumping Test Analysis
	Project: R11-510.3
	Client: QSRP Developments Inc.

Location: Zephyr, Ontario	Pumping Test: TW-3 Pumping Test	Pumping well: TW-3
Test conducted by: DM		Test date: 3/29/2012
Analysis performed by:	Cooper & Jacob I	Analysis date: 4/5/2012
Aquifer Thickness:	Discharge: variable, average rate 0.619 [l/s]	



Calculation after Cooper & Jacob

Observation well	Transmissivity [m²/d]	Storage coefficient	Radial distance to PW [m]	
TW-1	1.47×10^{2}	6.75×10^{-4}	108.78	

APPENDIX G

LABORATORY
CERTIFICATES OF ANALYSES

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: BEATRIZE VITORINO

PROJECT NO: R11-510.2

AGAT WORK ORDER: 12T588369

MICROBIOLOGY ANALYSIS REVIEWED BY: Inesa Alizarchyk, Inorganic Lab Supervisor

WATER ANALYSIS REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

DATE REPORTED: Apr 12, 2012

PAGES (INCLUDING COVER): 8

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
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Certificate of Analysis

AGAT WORK ORDER: 12T588369
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Microbiological Analysis (water)

DATE SAMPLED: Apr 02, 2012 | DATE RECEIVED: Apr 03, 2012 | DATE REPORTED: Apr 12, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	TW-1 (6Hrs) 3237731
Escherichia coli	CFU/100mL	0	1	ND
Total Coliforms	CFU/100mL	0	1	9
Fecal Coliform	CFU/100mL		1	ND
Heterotrophic Plate Count	CFU/1mL		10	45
Coliform Background Count	CFU/100mL		1	15

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O.Reg.169/03
3237731 ND - Not Detected.

Certified By:

Results relate only to the items tested

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Certificate of Analysis

AGAT WORK ORDER: 12T588369
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Inorganic Chemistry (Water)

DATE SAMPLED: Apr 02, 2012 | DATE RECEIVED: Apr 03, 2012 | DATE REPORTED: Apr 12, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW-1 (3Hrs) 3237726
Electrical Conductivity	uS/cm			2	529
pH	pH Units	6.5-8.5	(6.5-8.5)	NA	8.32
Total Hardness (as CaCO3)	mg/L		(80-100)	0.5	260
Total Dissolved Solids	mg/L		(500)	20	324
Alkalinity (as CaCO3)	mg/L		(30-500)	5	239
Chloride	mg/L		(250)	0.10	10.9
Nitrate as N	mg/L		10.0	0.05	<0.05[<B]
Nitrite as N	mg/L		1.0	0.05	<0.05[<B]
(Nitrate + Nitrite) as N	mg/L		10.0	0.07	<0.07[<B]
Sulphate	mg/L		(500)	0.10	51.1
Ammonia as N	mg/L			0.02	0.22
Dissolved Organic Carbon	mg/L		(5)	0.5	2.4
Colour	TCU		(5)	5	<5
Turbidity	NTU		(5)	0.5	19.6
Calcium	mg/L			0.05	66.6
Magnesium	mg/L			0.05	22.7
Sodium	mg/L		20 (200)	0.05	8.72
Iron	mg/L	0.3	(0.3)	0.010	1.35[>A]
Manganese	mg/L		(0.05)	0.002	0.059

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to PWQO (mg/L), B Refers to O.Reg.169/03

Certified By: Elizabeth Rolakowska

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Certificate of Analysis

AGAT WORK ORDER: 12T588369
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Inorganic Chemistry + Total Sulphur) (Water)

DATE SAMPLED: Apr 02, 2012 | DATE RECEIVED: Apr 03, 2012 | DATE REPORTED: Apr 12, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW-1 (6Hrs) 3237731
Electrical Conductivity	uS/cm			2	525
pH	pH Units	6.5-8.5	(6.5-8.5)	NA	8.21
Total Hardness (as CaCO3)	mg/L		(80-100)	0.5	255
Total Dissolved Solids	mg/L		(500)	20	302
Alkalinity (as CaCO3)	mg/L		(30-500)	5	235
Chloride	mg/L		(250)	0.10	10.1
Nitrate as N	mg/L		10.0	0.05	<0.05[<B]
Nitrite as N	mg/L		1.0	0.05	<0.05[<B]
(Nitrate + Nitrite) as N	mg/L		10.0	0.07	<0.07[<B]
Sulphate	mg/L		(500)	0.10	48.5
Ammonia as N	mg/L			0.02	1.55
Dissolved Organic Carbon	mg/L		(5)	0.5	2.2
Colour	TCU		(5)	5	<5
Turbidity	NTU		(5)	0.5	0.8
Calcium	mg/L			0.05	63.1
Magnesium	mg/L			0.05	23.6
Sodium	mg/L		20 (200)	0.05	9.70
Iron	mg/L	0.3	(0.3)	0.010	0.843[>A]
Manganese	mg/L		(0.05)	0.002	0.051
Hydrogen Sulphide	mg/L	0.002		0.05	<0.05[<A]
Total Sulphur	mg/L			0.3	18.2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to PWQO (mg/L), B Refers to O.Reg.169/03
3237731 Note: Value reported for Hydrogen Sulphide was calculated from the Sulphide concentration determined in the samples.

Certified By: Elizabeth Rolokowska

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Guideline Violation

AGAT WORK ORDER: 12T588369

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
3237726	TW-1 (3Hrs)	O.Reg.169/03	Inorganic Chemistry (Water)	Total Hardness (as CaCO3)	(80-100)	260
3237726	TW-1 (3Hrs)	PWQO (mg/L)	Inorganic Chemistry (Water)	Iron	0.3	1.35
3237731	TW-1 (6Hrs)	O.Reg.169/03	Inorganic Chemistry + Total Sulphur) (Water)	Total Hardness (as CaCO3)	(80-100)	255
3237731	TW-1 (6Hrs)	O.Reg.169/03	Microbiological Analysis (water)	Total Coliforms	0	9
3237731	TW-1 (6Hrs)	PWQO (mg/L)	Inorganic Chemistry + Total Sulphur) (Water)	Iron	0.3	0.843

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T588369

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

Microbiology Analysis

RPT Date: Apr 12, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Microbiological Analysis (water)															
Escherichia coli	1		ND	ND	NA	< 1									
Total Coliforms	1		ND	ND	NA	< 1									
Fecal Coliform	1		2	2	0.0%	< 1									
Heterotrophic Plate Count	1		ND	ND	0.0%	< 10									
Coliform Background Count	1		ND	ND	NA	< 1									

Comments: ND - Not Detected ; NA - % RPD Not Applicable

Certified By:

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T588369

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

Water Analysis

RPT Date: Apr 12, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (Water)															
Electrical Conductivity	1		451	451	0.0%	< 2	100%	80%	120%						
pH	1		8.21	8.21	0.0%	N/A	101%	90%	110%						
Total Dissolved Solids	1		3050	3100	1.6%	< 20	92%	80%	120%						
Alkalinity (as CaCO3)	1		231	232	0.4%	< 5	99%	80%	120%						
Chloride	1		23.3	22.9	1.7%	< 0.10	95%	90%	110%	95%	90%	110%	99%	80%	120%
Nitrate as N	1		0.29	0.32	9.8%	< 0.05	99%	90%	110%	98%	90%	110%	102%	80%	120%
Nitrite as N	1		< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	100%	90%	110%	108%	80%	120%
Sulphate	1		45.8	45.1	1.5%	< 0.10	95%	90%	110%	97%	90%	110%	97%	80%	120%
Ammonia as N	1		< 0.02	< 0.02	0.0%	< 0.02	101%	90%	110%	93%	90%	110%	105%	80%	120%
Dissolved Organic Carbon	1	3237726	2.4	2.2	8.7%	< 0.5	91%	90%	110%	98%	90%	110%	99%	80%	120%
Colour	1	3237726	< 5	< 5	0.0%	< 5	101%	90%	110%						
Turbidity	1	3237726	19.6	19.0	3.1%	< 0.5	99%	90%	110%						
Calcium	1		123	122	0.8%	< 0.05	97%	90%	110%	97%	90%	110%	96%	70%	130%
Magnesium	1		27.2	27.1	0.4%	< 0.05	97%	90%	110%	97%	90%	110%	95%	70%	130%
Sodium	1		4.49	4.47	0.4%	< 0.05	98%	90%	110%	97%	90%	110%	97%	70%	130%
Iron	1	3237726	1.35	1.27	6.1%	< 0.010	105%	90%	110%	104%	90%	110%	96%	70%	130%
Manganese	1	3237726	0.059	0.057	3.4%	< 0.002	107%	90%	110%	106%	90%	110%	102%	70%	130%
Inorganic Chemistry + Total Sulphur) (Water)															
Total Sulphur	1	3237731	18.2	18.1	0.6%	< 0.3	101%	90%	110%	100%	80%	120%	92%	70%	130%

Certified By: Elizabeth Rolakowska

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Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T588369

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration
Fecal Coliform	MIC-93-7000	SM 9222 D	MF/INCUBATOR
Heterotrophic Plate Count	MIC-93-7020	SM 9215C	Spread Plate
Coliform Background Count			Membrane Filtration
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR 1028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR 1028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Hydrogen Sulphide	INOR-93-6045	SM 4500 S2- D	SPECTROPHOTOMETER
Total Sulphur	MET-93-6105	EPA SW-846 3010A & 6010C	ICP/OES

Results relate only to the items tested

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http://www.agatlabs.com

CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: Thomas Grace

PROJECT NO: R11-510.2

AGAT WORK ORDER: 12T587853

MICROBIOLOGY ANALYSIS REVIEWED BY: Inesa Alizarchyk, Inorganic Lab Supervisor

WATER ANALYSIS REVIEWED BY: Mike Muneswar, BSc (Chem), Senior Inorganic Analyst

DATE REPORTED: Apr 10, 2012

PAGES (INCLUDING COVER): 8

VERSION*: 1

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Certificate of Analysis

AGAT WORK ORDER: 12T587853

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: Thomas Grace

Microbiological Analysis (water)

DATE SAMPLED: Mar 30, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	TW - 2 (3hrs.) 3232233	TW - 2 (6hrs.) 3232236
Escherichia coli	CFU/100mL	0	1	ND	ND
Total Coliforms	CFU/100mL	0	1	ND	ND
Fecal Coliform	CFU/100mL		1	ND	ND
Heterotrophic Plate Count	CFU/1mL		10	30	10
Coliform Background Count	CFU/100mL		1	40	24

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to SDWA - Microbiology

3232233-3232236 ND - Not Detected.

Certified By:

Results relate only to the items tested

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Certificate of Analysis

AGAT WORK ORDER: 12T587853
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: Thomas Grace

Inorganic Chemistry (Water)

DATE SAMPLED: Mar 30, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW - 2 (3hrs.) 3232233
Electrical Conductivity	uS/cm			2	385
pH	pH Units	(6.5-8.5)	6.5-8.5	NA	8.20
Total Hardness (as CaCO3)	mg/L	(80-100)		10	183
Total Dissolved Solids	mg/L	(500)		20	224
Alkalinity (as CaCO3)	mg/L	(30-500)		5	215
Chloride	mg/L	(250)		0.10	1.83
Nitrate as N	mg/L	10.0		0.05	<0.05[<A]
Nitrite as N	mg/L	1.0		0.05	<0.05[<A]
(Nitrate + Nitrite) as N	mg/L	10.0		0.07	<0.07[<A]
Sulphate	mg/L	(500)		0.10	1.73
Colour	TCU	(5)		5	11
Turbidity	NTU	(5)		0.5	1.4
Ammonia as N	mg/L			0.02	0.07
Dissolved Organic Carbon	mg/L	(5)		0.5	1.3
Calcium	mg/L			0.05	46.5
Magnesium	mg/L			0.05	16.2
Sodium	mg/L	20 (200)		0.05	13.1
Iron	mg/L	(0.3)	0.3	0.010	0.270[<B]
Manganese	mg/L	(0.05)		0.002	0.060

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O.Reg.169/03, B Refers to PWQO (mg/L)

Certified By:

Results relate only to the items tested

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 12T587853
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: Thomas Grace

Inorganic Chemistry (incl. Hydrogen Sulphide) (Water)

DATE SAMPLED: Mar 30, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW - 2 (6hrs.) 3232236
Electrical Conductivity	uS/cm			2	387
pH	pH Units	(6.5-8.5)	6.5-8.5	NA	8.20
Total Hardness (as CaCO3)	mg/L	(80-100)		10	184
Total Dissolved Solids	mg/L	(500)		20	236
Alkalinity (as CaCO3)	mg/L	(30-500)		5	215
Chloride	mg/L	(250)		0.10	1.83
Nitrate as N	mg/L	10.0		0.05	<0.05[<A]
Nitrite as N	mg/L	1.0		0.05	<0.05[<A]
(Nitrate + Nitrite) as N	mg/L	10.0		0.07	<0.07[<A]
Sulphate	mg/L	(500)		0.10	2.13
Colour	TCU	(5)		5	9
Turbidity	NTU	(5)		0.5	1.0
Ammonia as N	mg/L			0.02	1.30
Dissolved Organic Carbon	mg/L	(5)		0.5	1.3
Calcium	mg/L			0.05	46.8
Magnesium	mg/L			0.05	16.3
Sodium	mg/L	20 (200)		0.05	13.2
Iron	mg/L	(0.3)	0.3	0.010	0.249[<B]
Manganese	mg/L	(0.05)		0.002	0.057
Hydrogen Sulphide	mg/L		0.002	0.1	<0.1[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O.Reg.169/03, B Refers to PWQO (mg/L)

3232236 Note: Values reported for Hydrogen Sulphide were calculated from the Sulphide concentration determined in the samples.

Certified By:

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Guideline Violation

AGAT WORK ORDER: 12T587853

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: Thomas Grace

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
3232233	TW - 2 (3hrs.)	O.Reg.169/03	Inorganic Chemistry (Water)	Total Hardness (as CaCO3)	(80-100)	183
3232236	TW - 2 (6hrs.)	O.Reg.169/03	Inorganic Chemistry (incl. Hydrogen Sulphide) (Water)	Total Hardness (as CaCO3)	(80-100)	184

Results relate only to the items tested

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587853

PROJECT NO: R11-510.2

ATTENTION TO: Thomas Grace

Microbiology Analysis

RPT Date: Apr 10, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Microbiological Analysis (water)															
Escherichia coli	1	2322233	ND	ND	NA	< 1									
Total Coliforms	1	3232233	ND	ND	NA	< 1									
Fecal Coliform	1	3232236	ND	ND	NA	< 1									
Heterotrophic Plate Count	1		150	145	3.4%	< 10									
Coliform Background Count	1	3232233	40	36	10.5%	< 1									

Comments: ND - Not Detected ; NA - % RPD Not Applicable

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587853

PROJECT NO: R11-510.2

ATTENTION TO: Thomas Grace

Water Analysis

RPT Date: Apr 10, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (Water)															
Electrical Conductivity	1		1720	1720	0.0%	< 2	102%	80%	120%						
pH	1		7.94	7.94	0.0%		100%	90%	110%						
Total Dissolved Solids	1		400	428	6.8%	< 20	100%	80%	120%						
Alkalinity (as CaCO3)	1		430	434	0.9%	< 5	99%	80%	120%						
Chloride	1		87.6	85.3	2.7%	< 0.10	98%	90%	110%	99%	90%	110%	109%	80%	120%
Nitrate as N	1		0.53	0.50	5.8%	< 0.05	99%	90%	110%	101%	90%	110%	103%	80%	120%
Nitrite as N	1		< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	100%	90%	110%	97%	80%	120%
Sulphate	1		124	121	2.4%	< 0.10	101%	90%	110%	104%	90%	110%	98%	80%	120%
Colour	1		< 5	5	NA	< 5	101%	90%	110%						
Turbidity	1		568	576	1.4%	< 0.5	99%	90%	110%						
Dissolved Organic Carbon	1		19.9	19.5	2.0%	< 0.5	96%	90%	110%	103%	90%	110%	88%	80%	120%
Calcium	1		76.5	76.3	0.3%	< 0.05	95%	90%	110%	95%	90%	110%	98%	70%	130%
Magnesium	1		35.2	35.5	0.8%	< 0.05	96%	90%	110%	96%	90%	110%	98%	70%	130%
Sodium	1		4.84	4.84	0.0%	< 0.05	96%	90%	110%	96%	90%	110%	101%	70%	130%
Iron	1		0.319	0.282	12.3%	< 0.010	94%	90%	110%	104%	90%	110%	96%	70%	130%
Manganese	1		0.990	0.954	3.7%	< 0.002	96%	90%	110%	104%	90%	110%	87%	70%	130%

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Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587853

PROJECT NO: R11-510.2

ATTENTION TO: Thomas Grace

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration
Fecal Coliform	MIC-93-7000	SM 9222 D	MF/INCUBATOR
Heterotrophic Plate Count	MIC-93-7020	SM 9215C	Spread Plate
Coliform Background Count			Membrane Filtration
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Hydrogen Sulphide	INOR-93-6045	SM 4500 S2- D	SPECTROPHOTOMETER

Results relate only to the items tested

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CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: BEATRIZE VITORINO

PROJECT NO: R11-510.2

AGAT WORK ORDER: 12T587424

MICROBIOLOGY ANALYSIS REVIEWED BY: Inesa Alizarchyk, Inorganic Lab Supervisor

WATER ANALYSIS REVIEWED BY: Inesa Alizarchyk, Inorganic Lab Supervisor

DATE REPORTED: Apr 10, 2012

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 12T587424
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Microbiological Analysis (water)

DATE SAMPLED: Mar 29, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	TW-3 (3hrs) 3229344	TW-3 (6hrs) 3229392
Escherichia coli	CFU/100mL	0	1	ND	ND
Total Coliforms	CFU/100mL	0	1	ND	ND
Fecal Coliform	CFU/100mL		1	ND	ND
Heterotrophic Plate Count	CFU/1mL		10	ND	ND

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to SDWA - Microbiology
3229344-3229392 ND - Not Detected.

Certified By:

Results relate only to the items tested

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AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Inorganic Chemistry (Water) (mg/L)

DATE SAMPLED: Mar 29, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW-3 (3hrs) 3229344
pH	pH Units	(6.5-8.5)	6.5-8.5	NA	8.17
Total Hardness (as CaCO3)	mg/L	(80-100)		10	217
Total Dissolved Solids	mg/L	(500)		20	254
Dissolved Organic Carbon	mg/L	(5)		0.5	1.7
Alkalinity (as CaCO3)	mg/L	(30-500)		5	207
Chloride	mg/L	(250)		0.10	8.71
Nitrate as N	mg/L	10.0		0.05	<0.05[<A]
Nitrite as N	mg/L	1.0		0.05	<0.05[<A]
Sulphate	mg/L	(500)		0.10	23.4
Ammonia as N	mg/L			0.02	0.02
Colour	TCU	(5)		5	13
Turbidity	NTU	(5)		0.5	12
Magnesium	mg/L			0.05	15.9
Sodium	mg/L	20 (200)		0.05	7.06
Iron	mg/L	(0.3)	0.3	0.010	0.789[>B]
Manganese	mg/L	(0.05)		0.002	0.051
Electrical Conductivity	uS/cm			2	439

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O.Reg.169/03, B Refers to PWQO (mg/L)

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 12T587424
PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Inorganic Chemistry (Water) (mg/L)

DATE SAMPLED: Mar 29, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S: A	G / S: B	RDL	TW-3 (6hrs) 3229392
pH	pH Units	(6.5-8.5)	6.5-8.5	NA	8.18
Total Hardness (as CaCO3)	mg/L	(80-100)		10	223
Total Dissolved Solids	mg/L	(500)		20	262
Dissolved Organic Carbon	mg/L	(5)		0.5	1.4
Alkalinity (as CaCO3)	mg/L	(30-500)		5	215
Chloride	mg/L	(250)		0.10	9.00
Nitrate as N	mg/L	10.0		0.05	<0.05[<A]
Nitrite as N	mg/L	1.0		0.05	<0.05[<A]
Sulphate	mg/L	(500)		0.10	24.3
Ammonia as N	mg/L			0.02	0.03
Colour	TCU	(5)		5	12
Turbidity	NTU	(5)		0.5	11
Magnesium	mg/L			0.05	16.2
Sodium	mg/L	20 (200)		0.05	6.82
Iron	mg/L	(0.3)	0.3	0.010	0.690[>B]
Manganese	mg/L	(0.05)		0.002	0.049
Electrical Conductivity	uS/cm			2	443
Hydrogen Sulphide	mg/L		0.002	0.02	<0.02[<B]
Calcium	mg/L			0.05	62.7

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O.Reg.169/03, B Refers to PWQO (mg/L)

Certified By:

Results relate only to the items tested

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

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CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Total Sulphur

DATE SAMPLED: Mar 29, 2012 | DATE RECEIVED: Mar 30, 2012 | DATE REPORTED: Apr 10, 2012 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	TW-3 (3hrs) 3229344	TW-3 (6hrs) 3229392
Total Sulphur	mg/L		0.3	7.5	7.4

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

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Guideline Violation

AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
3229344	TW-3 (3hrs)	O.Reg.169/03	Inorganic Chemistry (Water) (mg/L)	Total Hardness (as CaCO3)	(80-100)	217
3229344	TW-3 (3hrs)	PWQO (mg/L)	Inorganic Chemistry (Water) (mg/L)	Iron	0.3	0.789
3229392	TW-3 (6hrs)	O.Reg.169/03	Inorganic Chemistry (Water) (mg/L)	Total Hardness (as CaCO3)	(80-100)	223
3229392	TW-3 (6hrs)	PWQO (mg/L)	Inorganic Chemistry (Water) (mg/L)	Iron	0.3	0.690

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

Microbiology Analysis

RPT Date: Apr 10, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Microbiological Analysis (water)															
Escherichia coli	1		ND	ND	NA	< 1									
Total Coliforms	1		ND	ND	NA	< 1									
Fecal Coliform	1		ND	ND	NA	< 1									
Heterotrophic Plate Count	1	3229392	ND	ND	NA	< 10									

Comments: ND - Not Detected ; NA - % RPD Not Applicable

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

Water Analysis

RPT Date: Apr 10, 2012			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (Water) (mg/L)															
pH	1		7.94	7.94	0.0%		100%	90%	110%						
Total Dissolved Solids	1		400	428	6.8%	< 20	100%	80%	120%						
Dissolved Organic Carbon	1		< 0.5	< 0.5	0.0%	< 0.5	101%	90%	110%	101%	90%	110%	89%	80%	120%
Alkalinity (as CaCO3)	1		430	434	0.9%	< 5	99%	80%	120%						
Chloride	1	3229392	9.00	9.03	0.3%	< 0.10	94%	90%	110%	95%	90%	110%	104%	80%	120%
Nitrate as N	1	3229392	< 0.05	< 0.05	0.0%	< 0.05	98%	90%	110%	99%	90%	110%	105%	80%	120%
Nitrite as N	1	3229392	< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	97%	90%	110%	105%	80%	120%
Sulphate	1	3229392	24.3	24.4	0.4%	< 0.10	95%	90%	110%	97%	90%	110%	91%	80%	120%
Ammonia as N	1		< 0.02	< 0.02	0.0%	< 0.02	97%	90%	110%	90%	90%	110%	93%	80%	120%
Colour	1		< 5	5	NA	< 5	101%	90%	110%						
Turbidity	1		< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%						
Magnesium	1	3229344	15.9	16.1	1.3%	< 0.05	96%	90%	110%	96%	90%	110%	97%	70%	130%
Sodium	1	3229344	7.06	7.18	1.7%	< 0.05	96%	90%	110%	96%	90%	110%	98%	70%	130%
Iron	1		0.140	0.164	15.8%	< 0.010	93%	90%	110%	106%	90%	110%	108%	70%	130%
Manganese	1		0.762	0.849	10.8%	< 0.002	96%	90%	110%	103%	90%	110%	102%	70%	130%
Electrical Conductivity	1		1720	1720	0.0%	< 2	102%	80%	120%		0%	0%		0%	0%
Total Sulphur															
Total Sulphur	1		340	337	0.9%	< 0.3	95%	90%	110%	97%	80%	120%	94%	70%	130%

Certified By:

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Results relate only to the items tested

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 12T587424

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration
Fecal Coliform	MIC-93-7000	SM 9222 D	MF/INCUBATOR
Heterotrophic Plate Count	MIC-93-7020	SM 9215C	Spread Plate
Water Analysis			
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Alkalinity (as CaCO3)	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Alkalinity (as CaCO3)	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6002	AQ2 EPA-103A & SM 4500 NH3-F	AQ-2 DISCRETE ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
Hydrogen Sulphide	INOR-93-6045	SM 4500 S2- D	SPECTROPHOTOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Sulphur	MET-93-6105	EPA SW-846 3010A & 6010C	ICP/OES

Results relate only to the items tested

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: BEATRIZE VITORINO

PROJECT NO: R11-510.2

AGAT WORK ORDER: 11T543759

WATER ANALYSIS REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

DATE REPORTED: Nov 07, 2011

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

Member of: Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 11T543759

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

Nitrate/Nitrite (Water)

DATE SAMPLED: Oct 27, 2011 | DATE RECEIVED: Oct 28, 2011 | DATE REPORTED: Nov 07, 2011 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	TP-4.510.2 2853027	TP-5.510.2 2853029	TP-6.510.2 2853030
Nitrate as N	mg/L	10.0	0.05	6.94	12.1	16.9
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05	<0.05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O.Reg.169/03

Certified By: Elizabeth Rolakowska

Results relate only to the items tested

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Guideline Violation

AGAT WORK ORDER: 11T543759

PROJECT NO: R11-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
2853029	TP-5.510.2	O.Reg.169/03	Nitrate/Nitrite (Water)	Nitrate as N	10.0	12.1
2853030	TP-6.510.2	O.Reg.169/03	Nitrate/Nitrite (Water)	Nitrate as N	10.0	16.9

Results relate only to the items tested

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T543759

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

Water Analysis

RPT Date: Nov 07, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitrate/Nitrite (Water)															
Nitrate as N	1		1.39	1.40	0.7%	< 0.05	92%	90%	110%	96%	90%	110%	105%	80%	120%
Nitrite as N	1		< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	94%	90%	110%	98%	80%	120%

Certified By: Elizabeth Pokokowska

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Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T543759

PROJECT NO: R11-510.2

ATTENTION TO: BEATRIZE VITORINO

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

Results relate only to the items tested

AGAT Laboratories

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CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: Thomas Grace

PROJECT NO: Zephyr

AGAT WORK ORDER: 11T557458

WATER ANALYSIS REVIEWED BY: Inesa Alizarchyk, Inorganic Lab Supervisor

DATE REPORTED: Dec 15, 2011

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Results relate only to the items tested

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Certificate of Analysis

AGAT WORK ORDER: 11T557458
PROJECT NO: Zephyr

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: Thomas Grace

SDWA Schedule 23 - Nitrate and Nitrite

DATE SAMPLED: Dec 07, 2011 | DATE RECEIVED: Dec 08, 2011 | DATE REPORTED: Dec 15, 2011 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	340 Zephyr 2989896	5 Dafoe 2989898	10 Dafoe 2989899	12875 Reg. Rd 39 2989900	13029 Reg. Rd 39 2989901	317 Zephyr 2989902
Nitrate as N	mg/L	10.0	0.05	<0.05	<0.05	<0.05	2.53	<0.05	7.95
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
(Nitrate + Nitrite) as N	mg/L	10.0	0.07	<0.07	<0.07	<0.07	2.53	<0.07	7.95

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to SDWA -Schedule 23

Certified By:

Results relate only to the items tested

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T557458

PROJECT NO: Zephyr

ATTENTION TO: Thomas Grace

Water Analysis

RPT Date: Dec 15, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
SDWA Schedule 23 - Nitrate and Nitrite															
Nitrate as N	1		1.06	0.98	7.8%	< 0.05	99%	80%	120%	101%	90%	110%	103%	70%	130%
Nitrite as N	1		< 0.05	< 0.05	0.0%	< 0.05	NA	80%	120%	102%	90%	110%	117%	70%	130%

Certified By:

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Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T557458

PROJECT NO: Zephyr

ATTENTION TO: Thomas Grace

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

Results relate only to the items tested

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CLIENT NAME: GRACE & ASSOCIATES INC
16 GLENELG STREET EAST
LINDSAY, ON K9V1Y6

ATTENTION TO: BEATRIZE VITORINO

PROJECT NO: 511-510.2

AGAT WORK ORDER: 11T543785

WATER ANALYSIS REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

DATE REPORTED: Nov 04, 2011

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Western Enviro-Agricultural Laboratory Association (WEALA)
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Certificate of Analysis

AGAT WORK ORDER: 11T543785
PROJECT NO: 511-510.2

CLIENT NAME: GRACE & ASSOCIATES INC

ATTENTION TO: BEATRIZE VITORINO

SDWA Schedule 23 - Nitrate and Nitrite

DATE SAMPLED: Oct 27, 2011 | DATE RECEIVED: Oct 28, 2011 | DATE REPORTED: Nov 04, 2011 | SAMPLE TYPE: Water

Parameter	Unit	G / S	RDL	GW1.510.2 2851171	GW2.510.2 2851195
Nitrate as N	mg/L	10.0	0.05	1.21	2.66
Nitrite as N	mg/L	1.0	0.05	<0.05	0.10
(Nitrate + Nitrite) as N	mg/L	10.0	0.07	1.21	2.76

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O.Reg.169/03

Certified By: Elizabeth Rolakowska

Results relate only to the items tested

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T543785

PROJECT NO: 511-510.2

ATTENTION TO: BEATRIZE VITORINO

Water Analysis

RPT Date: Nov 04, 2011			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
SDWA Schedule 23 - Nitrate and Nitrite															
Nitrate as N	1		0.14	0.14	0.0%	< 0.05	95%	90%	110%	95%	90%	110%	106%	70%	130%
Nitrite as N	1		< 0.05	< 0.05	0.0%	< 0.05	NA	90%	110%	99%	90%	110%	104%	70%	130%

Certified By: Elizabeth Rolakowska

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Results relate only to the items tested

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Method Summary

CLIENT NAME: GRACE & ASSOCIATES INC

AGAT WORK ORDER: 11T543785

PROJECT NO: 511-510.2

ATTENTION TO: BEATRIZE VITORINO

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH

Results relate only to the items tested

APPENDIX H

CORRESPONDENCE

DURHAM REGION

The Regional Municipality of Durham

Planning and Economic Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
PO BOX 623
WHITBY ON L1N 6A3
CANADA
905-668-7711
1-800-372-1102
Fax: 905-666-6208
Email: planning@durham.ca

www.durham.ca

A.L. Georgieff, MCIP, RPP
Commissioner of Planning and Economic Development

June 22, 2011

Mr. Ken Sherwood
Penta Homes
83 Galaxy Blvd., Unit 17
Toronto ON M9W 5X6

Dear Mr. Sherwood:

Re: **Record of Pre-consultation for Plan of Subdivision**

Proponent:	Penta Homes
Property Location:	Part of Lot 25, Con. 3 (former Scott Twp.) South side of Zephyr Rd., East of Conc. Rd. 3 (Hamlet of Zephyr)
Municipality:	Township of Uxbridge

In accordance with By-law 2-2008 of the Regional Municipality of Durham, this letter will confirm that a pre-consultation meeting was conducted in accordance with the provisions of the By-law. The details of the meeting are as follows:

Pre-Consultation Date: Tuesday June 14, 2011

Parties in Attendance:

Mr. Ken Sherwood, Penta Homes (applicant)
Mr. Robert Martindale, Martindale Planning Services
Mr. Richard Vandezande, Manager of Dev. Services, Twp. of Uxbridge
Mayor O'Connor, Township of Uxbridge
Councillor Gord Highet, Township of Uxbridge
Councillor Pat Molloy, Township of Uxbridge
Mr. Brian Pigozzo, CBO, Township of Uxbridge
Mr. Richard Szarek, Project Planner, Region of Durham
Mr. Karl Kiproff, Senior Public Health Inspector, Region of Durham
Ms. Jackie Burkart, Senior Planner, Lake Simcoe Region Conservation
Mr. Mark Kchik, Burnside & Associates
Mr. Tom Richardson, Stantec Consulting
Mr. John Coffey, Real Estate Agent
Mr. Glen Buchanan, Real Estate Agent

Location of Site: Lockwood Golf Course, Southeast of Regional Rd. 13 (Zephyr Road) and Regional Road 39 (Conc. Rd. 3), Hamlet of Zephyr

Description of Proposal: To permit a 6 lot plan of subdivision containing single detached dwellings on private services. Two other lots are proposed, one at the easterly edge of Zephyr, on the south side of Regional Road 13; and one with access onto Dafoe St.

"Service Excellence for our Communities"

100% Post Consumer

Regional Official Plan: Hamlet

Township of Uxbridge Official Plan: Hamlet (Area Proposed for Residential Expansion)

Conformity Details:

The proposed plan of subdivision development is permitted by the Regional Official Plan and the Township of Uxbridge Official Plan.

The subject site is designated "Hamlet" in the Regional Official Plan. The site is within the Hamlet boundary and is within an "Area Proposed for Residential Expansion" in the Hamlet Plan for Zephyr.

Policy 9.B.2.3 of the Regional Official Plan states that Hamlets shall be developed pre-dominantly for single detached housing. Policy 9.B.2.5 indicates that Hamlets shall be developed in contiguous phases, in depth rather than strips. Further, Policy 9.B.2.6 states that development is to be individually serviced with private drilled wells and private sewage disposal systems, where groundwater quality and quantity permits, and in compliance with the standards of the Region and the MOE. The proposed development would appear to satisfy these Policies.

The subject site abuts Regional Road 13, which is designated as a Type 'B' arterial road in the Regional Official Plan. There is no traffic impact anticipated as a result of this development.

Other Issues

The proposed development will require drilled wells and private sewage systems. The Health Department requires assurances that there would be no impacts on-site and off-site. The policies with respect to drilled wells and septic systems were discussed, including the Regional Lot Sizing Policy.

The proposed development may eliminate the present access to the existing Golf Course clubhouse. An alternate access to the clubhouse from Regional Road 39 (Concession Road 3) was suggested. Township staff indicated that they will investigate an entrance from Dafoe Street and access onto Regional Road 39, in consultation with the Regional Works Dept.

The Lake Simcoe Region Conservation Authority indicated that if there are any lots proposed along Regional Road 13, east of the existing easterly homes, they will be within the Regulated Area of the C.A. An Environmental Impact Study or Natural Heritage Study will be required, to be scoped by the L.S.R.C.A. A Stormwater Management Study will also be required by the L.S.R.C.A.

Other Applications for the Site:

A Hamlet Plan Amendment and a Zoning By-law Amendment application will be required from the Township to implement the draft plan of subdivision. A Site Plan Amendment application will also be required by the Township for the proposed relocation of the clubhouse and additional access to the site.

Information and studies required to deem the proposal a "Complete" application:

- **Application for Plan of Subdivision** (10 copies)

- **Application Fees**
  A Regional fee of $4,500 plus $100 per unit in excess of 50 units for a non-delegated plan of subdivision is required. A Township application fee will also be required. Also, review fees will be required for the lake Simcoe Region Conservation Authority.

- **Proposed Plans** (25 copies)
  In addition, 10 copies of the plan are required on an 8.5" by 11" or 14" sheet of paper.

- **An Environmental Site Assessment (ESA)**
  A Phase 1 or Phase 2 ESA shall be submitted along with the application, signed by a qualified person, along with a statement that the Region and the Township can rely on the information and findings.

- **Hydro-Geological Report**
  This report shall address water quality and water quantity issues and will examine potential impacts on-site and off-site. This report will be peer reviewed by a qualified consultant from the Region's roster to confirm the results and to identify any deficiencies in the report.

- **Planning Justification Report**
  This report shall address Provincial, Regional and area municipal planning policies and requirements.

- **Environmental Impact Report (EIS)**
  This report shall address the impact of the proposed development on the adjacent natural environment, identifying natural features, rare and threatened species and recommend appropriate buffers to protect the natural environment from adverse impacts of development. The LSRCA will determine whether an EIS is required, depending on the scope and design of the proposed development.

- **Noise Impact Study**
  This study shall address the impact of vehicular noise on the proposed development, recommending mitigation measures, if required, to ensure sound levels are at an acceptable level.

Upon receipt of a complete plan of subdivision application the Region will circulate the application and supporting documentation to the Township and various public bodies and agencies for review. The Township of Uxbridge will provide notice for a complete application and arrange to hold a public meeting.

In accordance with our procedures, please advise whether or not you concur with the above noted information and study requirements. Should you not agree with the above noted requirements or if sufficient time has lapsed since the application submission, another pre-consultation meeting may be required.

Please feel free to contact me at this office should you have any questions regarding this matter.

Yours truly,

Richard Szarek

Project Planner, Current Planning
Region of Durham

Richard Vandezande, MCIP, RPP

Manager, Development Services
Township of Uxbridge

Encl: Township of Uxbridge Pre-consultation Form

cc: Karl Kiproff – Regional Health Department
Jackie Burkart – Lake Simcoe Region Conservation Authority
Robert Martindale – Martindale Planning Services
Mark Kchik – R.J. Burnside & Associates Ltd.
Tom Richardson – Stantec Consulting