HYDROGEOLOGICAL ASSESSMENT
CORK STREET RESIDENTIAL DEVELOPMENT
MOUNT FOREST

Prepared for:
Sunvale Homes

December 2021

File 21002.00

Distribution:
1 c Client (PDF)
1 c Cobide Engineering Inc. (PDF)

December 31, 2021

Sunvale Homes
685 Riddell Road, Unit 106
Orangeville, Ontario
L9W 4Z5

Attention: Mr. John Welton, President

Dear sirs:

Re: Hydrogeological Assessment Cork Street Residential Development
Mount Forest
File 21002.00

GAMAN Consultants Inc. is pleased to submit this hydrogeological assessment to address the Saugeen Valley Conservation Authority comments in a letter dated January 21, 2021.

The work was initiated to assess the potential impact of development on groundwater seeps and watercourses at the site. The results of this evaluation show development should be feasible with the implementation of mitigation measures intended to supplement recharge to the seeps.

We trust that this report satisfies your requirements.

Yours truly,
GAMAN Consultants Inc.

Gary R. Hendy, P.Eng.
Consulting Engineer

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1.0 INTRODUCTION

1.1 BACKGROUND

This report provides the results of a hydrogeological assessment carried out by GAMAN Consultants Inc. (GAMAN) to evaluate the potential effects of development on groundwater seeps that support fish habitat and ecological functions south of the site.

The proposed residential development is located on the southwest side of Mount Forest as shown in Figure 1. The residential portion of the development covers a 9.793-hectare parcel of land illustrated in Figure 2. The proposed Plan of Subdivision comprises:

- 63 single family lots,
- 30 semi-detached lots,
- 36 Street Townhouses,
- One cluster Townhouse Block on Block 130,
- One open space block for stormwater conveyance and sewage pumping station, and
- One walkway block.

This development will be on full municipal services. Stormwater management at the site consists of concrete HDPE storm sewers that discharge to a proposed unlined stormwater pond constructed above the groundwater table. A perforated storm sewer system (PSS) will be installed in the area where the drainage pit is located. The groundwater table is close to grade and fill will be used in select low-lying areas of the site.

In a letter dated January 22, 2021, the Saugeen Valley Conservation Authority requested the preparation of a hydrogeological report to address the potential impact of development on groundwater seeps and water courses. Page 7, Bullets 7 and 8 state:

"That a Hydrogeologist provide SVCA staff with a letter/study advising the proposed development will not impact the hydrologic/hydrogeologic functions to these features and that,

A Condition of Draft Plan Approval be that SVCA must be satisfied with a hydrogeologic report/letter advising that the proposed development will not impact source flow to the seep and to both water courses on-site and on the adjacent lands."

This report addresses the potential effects on development on the seeps. Source flows to the water courses will be addressed through stormwater management.

1.2 STUDY METHODOLOGY

The study methodology for this work program consisted of reviewing background information about the site and relying on soil and groundwater data provided by other project team members to understand and interpret subsurface conditions. GAMAN completed in-situ hydraulic conductivity tests on groundwater monitors and the data was interpreted as input to an assessment of groundwater movement beneath the site.

The tasks required to complete the work program included:

- Background review of the physical setting of the site including physiography, surficial geology and groundwater.
- Review of soil and groundwater data completed by others during the installation of 7 groundwater monitors and two drive points.
- A site inspection of the site and surrounding area.
- A review of local water well records and existing services around the site.
- Carry out and analyze in-situ hydraulic conductivity tests to assess hydraulic properties.
- Assessment of effects to nearby receptors.
- Preparation of a hydrogeological report to address the SVCA concerns.

2.0 PHYSICAL SETTING

2.1 PHYSIOGRAPHY, SURFICIAL GEOLOGY AND DRAINAGE

The Dundalk Till Plain Physiographic Region as described by Chapman and Putnam (1984), forms the watershed for headwaters to several rivers including the Saugeen River. The Mount Forest area appears to be located within the southwest boundary of this physiographic, near the Teeswater Drumlin Field to the west.

The Saugeen Valley Source Protection Area Approved Assessment Report describes surficial geology at the watershed scale to be comprised of till. The drumlinized till plain extending east of Mount Forest to Dundalk was formed from repeated advances and retreats of lobes of glacial ice. The till is thick and extends from bedrock to surface in the study area.

Towards the end of glaciation and during a warming climate, the Huron-Georgian Bay lobe stagnated and released outwash and ice-contact deposits of sand and gravel in the form of long-sinuous eskers. The Aggregate Resources Inventory for Wellington County documents outwash deposits, eskers and ice-contact deposits as three common sources of sand and gravel in the area.

Figure 3 illustrates the surficial geology around the study area. This figure shows much of the site is covered with outwash deposits and with till present beyond the site boundary. This illustration differs from the borehole logs in Appendix B. The logs reflect a physical setting that matches the regional setting comprised of till as documented in the SVCA Assessment Report. The till deposits are present at all seven (7) boreholes. Boreholes BH2, BH3 and BH7 provide evidence of coarse-grained sediments that are buried and sandwiched between the till at boreholes illustrated in Figure 4.

2.2 HYDROGEOLOGY

The water well record database and observation wells drilled at the site were reviewed and interpreted to present the following understanding of hydrostratigraphic units beneath the site. Figure 5 illustrates the locations of local water wells. Water well records are presented in Appendix A.

There are three (3) main hydrostratigraphic units within the immediate area of the site as follows:

- The Upper Aquifer
- Aquitard
- Bedrock Aquifer

The Upper Aquifer is comprised of saturated sands and gravels that form the outwash deposits as described in Section 2.1. There are no active water wells documented in the MECP water well record database near the site that use this shallow groundwater. Rural properties might use this water table aquifer where there is sufficient amounts of saturated sediments. This aquifer is buried beneath a shallow layer of till at the site and is of limited lateral extent, possibly 100 metres wide and oriented from northwest to southeast through boreholes BH2, BH3, BH7 and MECP well 6712905 (Figures 5 & 6).

The Aquitard is comprised of till and extends from surface down to bedrock. The till appears to be comprised of heterogeneous mixtures of sandy-silt, silty-sand or clayey-silty soils as described in borehole logs and interpreted from water well record data. The aquitard is about 40 to 45 metres thick based on two nearby MECP well records.

The Bedrock Aquifer is capped by the thick aquitard and is encountered at depths below 40 metres north of the Saugeen River and about 5 metres below grade south of the river. The Mount Forest municipal wells extract groundwater from this deep aquifer, but they are not within the study area, nor are they influenced by this development.

2.3 GROUNDWATER MOVEMENT

The movement of groundwater is influenced by regional and local topographic features and drainage patterns.

Groundwater levels monitored at seven boreholes confirms the movement of shallow groundwater is influenced by local topography and drainage features. The interpreted movement of shallow groundwater at the site is illustrated in Figure 6. Groundwater flows southeast from BH3 towards the seeps and northwest from BH3 to BH2 where the lowest groundwater elevation was observed at the site. This low groundwater elevation is consistent with the low topographic elevation in this area of the site. The water course on the southeast side of the site shows a slight upward hydraulic head at DP21-1. The Saugeen River is the main discharge feature in the study area.

Horizontal groundwater gradients vary across the site. The horizontal gradient from BH1 to BH3 is about 0.017 m/m and about 0.010 m/m from BH1 to BH7.

2.4 LOCAL WATER SUPPLIES

The domestic wells appearing in Figure 5 are not near the site and the municipal wells are located beyond the study area. Our review of the source water protection assessment report and maps for this area show the site is located beyond the Wellhead Protection Areas for Mount Forest.

2.5 WATER BUDGET

As precipitation falls to the ground in the form of rainfall or snow, it is subject to components of the hydrological cycle. Water will generally runoff, infiltrate, evaporate or be subject to transpiration from plant uptake. Evaporation and transpiration are commonly

grouped together as evapotranspiration while runoff and infiltration are grouped together as water surplus. The water budget is represented in a simple form as follows:

Water In = water Out

P + EI = ET + IR + RO + EO

Where:

P = Precipitation

EI = External Inputs (Run-on, irrigation and vertical/lateral transfers)

ET = Evapotranspiration from plant uptake and evaporation.

IR = Infiltration Recharge

RO = Run-off

EO = External Outputs (water taking and vertical/lateral transfers)

Precipitation data is available from the Environment Canada website for climatic stations across the country. The Glen Allan Climatic Station provides climatic data temperature and precipitation for the period 1981 to 2010. The station is located about 32 km southwest of the site and was chosen because the elevation range of this station was similar to the site. The Hanover Climatic Station is located about 27km northwest of Mount Forest; however, the site is more than 100 metres lower in elevation.

Thornthwaite (1948) developed a mathematical method for analyzing precipitation data and calculating evapotranspiration and water surplus. Average monthly temperature and precipitation data were analyzed using the method provided by Thornthwaite. The evaluation presented in Table D-1 show the 30-year normal annual precipitation at 1,015 mm/yr. with a resultant water surplus of 429 mm/yr.

The MECP Hydrogeological Technical Information Requirements For Land Development Applications (1995) included Table 2 derived from hydrologic analysis for assessing peak runoff for storm water management. The method considers topography, soil type and vegetation cover on the site as summarized in the following table.

Infiltration Factors	Range of Values	Assessment of Site	Selected Factor
Topography	0.1-0.3	Hilly	0.1
Soil Type	0.1-0.4	Open sandy loam	0.2
Cover	0.1-0.2	Woodland	0.1
Total Infiltration Factor			0.4

The rationale for selecting infiltration factors from this table is as follows:

- The infiltration factor for topography was estimated at 0.1 to reflects hilly topography.
- The soil infiltration factor was estimated at 0.2 to reflect the sandy-silty till texture.
- The cover factor of 0.1 reflects open fields.

The infiltration factor for this site is estimated at 0.40. The infiltration rate associated for the site is the product of the infiltration factor (0.40) and the water surplus (429 mm/yr.) and results in 172 mm/yr./ha.

3.0 SITE INVESTIGATIONS

This section provides a description of the soils and groundwater investigations completed at the site to assist in characterizing the physical and hydraulic properties of the principal soil units below the site.

CMT Engineering Inc. was retained by the developer to carry out geotechnical investigations. The firm completed a geotechnical investigation and documented the findings in a report titled “Geotechnical Investigation Proposed Residential Subdivision, Cork Street, Mount Forest”. Seven groundwater monitors were installed as part of the program and the borehole logs are included in Appendix B. Groundwater monitor details and water levels are detailed in Tables B-1 and B-2, Appendix B respectively.

Two drive points designated DP21-01 and DP21-02 were installed below the drainage course on the east side of the site. The purpose of the drive points was to provide an

understanding of groundwater and surface water interaction to assess effects from constructing this residential development. Water levels in the drive point and the surface water level beside it are documented in Table B-2. Water levels monitored from the February to September 2021 consistently showed an upward hydraulic head in the unnamed tributary near Martin Street at DP21-1. The water levels at DP21-2 consistently show a downward hydraulic head.

The area around the seeps was snow covered and the ground was likely frozen around at the seeps because there was no evidence of flowing water through a depression towards the unnamed drainage course on that day. Groundwater monitoring on September 29, 2021 also showed no evidence of water from the seeps reaching the water course.

In-situ falling head hydraulic conductivity (slug) tests were completed at boreholes designated BH3 and BH4. The data was analyzed using Aquifer Test Pro (Version 9.0) software. BH3 was chosen because the monitor screen extended through the gravel and sand layer that is likely a source of groundwater to the seeps. BH4 was selected because the monitor is screened entirely in the till and provides a comparison of hydraulic conductivity between the gravel-sand zone and the till. BH2 is also screened within the gravel and sand zone and was proposed as a test monitor. However, the well was damaged and water levels could not be measured due to an obstruction in the well casing.

The results of the single well response tests are documented in Figures C-1 to C-5, Appendix C. The hydraulic conductivity of the gravel and sand zone ranged from 4.77×10^{-6} to 9.67×10^{-6} m/sec. The hydraulic conductivity of the till zone ranged from 7.27×10^{-8} to 8.28×10^{-8} m/sec. The hydraulic conductivity of the gravel/sand zone is about two orders of magnitude (100 times) greater than the surrounding till.

4.0 GROUNDWATER SEEP ASSESSMENT

4.1 CONCEPTUAL MODEL

The site is characterized by a thick layer of till with a wedge of gravel and sand oriented from northwest to southeast. This gravel and sand zone is interpreted to behave as a partially confined aquifer beneath the till because groundwater levels are above the top of the aquifer. The till is interpreted to behave as an aquitard relative to the gravel and sand aquifer based on the differences in hydraulic conductivity.

As groundwater infiltrates through the till, it is expected to transmit groundwater slowly through the till and recharge the gravel and sand aquifer from above and from the sides of the aquifer. Groundwater flows southeast through the aquifer from a local divide in the middle of the site near BH3 towards the seeps. This thin wedge of gravel and sand likely needs recharge to sustain the seeps post-development. The recharge area extends from the interpreted groundwater divide near BH3 on this site southeast towards the seep as shown in Figure 6. It is not clear from this illustration if the gravel and sand layer extends to surface near the seeps or if water is transmitted only through the till. The conservative approach to protecting the seeps is to assume there is direct hydraulic connection with the permeable gravel and sand layer.

The following sections provide quantitative estimates of groundwater flow to the seeps and how development could impact on this groundwater flow assuming the gravel and sand zone recharges the seeps.

4.2 AQUIFER RECHARGE

The movement of groundwater towards the narrow aquifer was calculated using two sources of water:

1) Vertical recharge from ground surface through the till.
2) Darcy's formula for lateral flow through the till aquitards towards the aquifer:

Recharge to the aquifer was calculated using the infiltration from the water surplus described in Section 2.5. The infiltration rate through the till is 172 mm/yr. The contributing areal extent of the aquifer to the Seep assumes the aquifer is about 100 metres wide and 125 metres long from BH3 to the Seep. The annual vertical recharge rate to the aquifer is estimated at 2,150 m^3/yr. or 5,890 L/day.

Lateral recharge is influenced by the hydraulic conductivity of the till because the till ultimately limits the rate of recharge to this small aquifer. This seems reasonable based on visual evidence of the Seep showing limited amounts of flow during the summer and fall of 2021. Lateral recharge to the aquifer from the two sides was calculated using Darcy's Formula:

$Q = K \times i \times A$

Where

K = average hydraulic conductivity of the till estimated at 7.55×10^{-8} m/sec

i = horizontal groundwater gradient of 0.017 m/m based on the lateral gradient from BH1 to BH3 and is a conservative value compared with the gentle gradient from BH3 towards the seeps.

A = cross-sectional area assuming the aquifer is 2.37m thick and 125 metres wide from BH3 to the Seep and flow occurs from both sides providing a total area, 593 m^2.

Lateral flow (Q) into the aquifer from BH3 to the Seep (Figure 6) is estimated at 24 m^3/yr. or about 66 L/day. The total annual recharge rate to this narrow aquifer was calculated at 2,216 m^3/year (6,071 L/day).

4.3 POTENTIAL SOURCES OF IMPACTS AND MITIGATION MEASURES

The proposed development will have hard cover surfaces constructed above the sand and gravel recharge area to the seeps. Hard cover surfaces include: roads, dwellings and driveways. These surfaces will reduce recharge to the gravel and sand aquifer over its footprint. The area of the aquifer affected by hard cover surfaces is shown in Figure 6. Maintenance of recharge to the aquifer depends on hard cover areas affecting flow to the aquifer. The recharge rate to the aquifer was calculated at 2,216 m^3/year. There are several ways of collecting fresh runoff at the site to mitigate the loss of recharge from impermeable surfaces. The contribution of recharge from each source is described below.

Roof Runoff is a common source of water to mitigate a deficit in recharge. The volume of water potentially available from rooftops was calculated using the following assumptions and inputs:

- Proposed residential lots 80-96 and 102 to 112 would be sources of roof runoff for either a common infiltration basin or individual soak away pits (Figure 6).
- Each roof has an estimated contributing surface area of 100 m^2.
- 90% of the total precipitation (1015mm total) would be available for recharge to the infiltration system. This would provide 913mm of runoff per roof top.

The total volume of water potentially available from 28 rooftops is 2,466 m^3/yr. or more than 100% of the makeup water needed to maintain recharge.

Rear Lot Runoff could be directed towards a common infiltration system along the rear of the lots.

- The water surplus for the site between March and November is 300 mm based on climatic data in Table D-1. Runoff accounts for 60% of the water surplus and provides about 180 mm of water potentially available for infiltration into trenches.
- We understand there will be about 15 metres of rear yard runoff directed towards the rear lot lines from the above noted lots (27 total) that could provide recharge to

the infiltration trench. This strip of land at the rear of the lots mentioned above is 120 metres long and provides an additional area of 3,600 m^2.

- The total volume of water potentially available from collecting water along the rear lots is estimated at (3,600 x 0.18) 648 m^3/yr.

Collecting runoff from rooftops (2,471 m^3/yr) and rear lots (648 m^3/yr.) provides 3,119 m^3 to mitigate the loss of 2,174 m^3 of recharge from hard cover surfaces. These two methods of mitigation should provide more than enough recharge to maintain flow to the Seep post-development.

Underground services present a potential short-circuit for groundwater movement along the service trench. Sanitary sewers will extend below the water table in some areas of the site. Mitigation measures will be needed to prevent the loss of recharge along the service alignment. This could include the addition of clay-plugs in the service trenches to minimize and eliminate conduits for groundwater movement through the service trench.

4.4 GROUNDWATER QUALITY

The use of fresh sources of water to maintain recharge to the seeps should not threaten groundwater water quality. Runoff along the roadways will be directed to a stormwater system and this should reduce the risk of affecting groundwater quality towards the seeps.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented below are premised on the study findings.

- The study area and site are located within the Dundalk Till Plain Physiographic Region.

- The site is overlain with dominantly till. There is a narrow sliver of saturated gravel and sand oriented from northwest to southeast across the site that is partially

confined beneath the till. This granular zone is interpreted as the source of water to the seeps at the southeast side of the site.

- The hydraulic conductivity of the gravel and sand zone is about 2 orders of magnitude greater than the surrounding till. This granular zone is interpreted as an aquifer compared with the till that behaves as an aquitard. Though the granular zone should transmit groundwater faster than the till aquitard, flow into this aquifer will be influenced by the hydraulic conductivity of the till.

- Groundwater levels at the site range from about 0.7 to 1.3 metres below grade. Underground services to depths up to 1.5 metres below proposed grade necessitates the need to temporarily lower the water table up to 1.3 metres.

- Infiltration above the gravel and sand aquifer illustrated in Figure 6 provides the bulk of recharge to the Seep. Recharge through the shallow aquifer to the Seep could be in the range of 2,200 m^3/year.

- Mitigation will be needed to maintain recharge to the aquifer above its footprint. This could be achieved by directing roof runoff into soakaway pits and directing rear lot runoff to infiltration trenches described in Section 4.3.

Respectfully Submitted,
GAMAN CONSULTANTS INC.

Gary R. Hendy, P.Eng.
Consulting Engineer

6.0 LIMITATIONS AND USE

This report has been prepared for the exclusive use of Sunvale Homes for their exclusive use in the evaluation of the area for the proposed development. GAMAN Consultants Inc. accepts no responsibility for any damages incurred by any third party resulting from decisions made, or actions taken based upon the information contained within this report.

All background information used in the preparation of this report has been relied upon in good faith, and GAMAN does not accept any responsibility for any misstatements, inaccuracies, or deficiencies contained in those documents or records. The information contained in this report should be evaluated, interpreted and implemented only in the context of the assignment.

The findings and conclusions included in this report reflect our best judgement in light of the information available at the time of report preparation and site inspection and are valid only at the date of issuance. If additional information is provided in the future, such as the results of additional site-specific assessments or monitoring, GAMAN will be pleased to re-evaluate our conclusions contained within this report, and issue amendments, as required.

7.0 REFERENCES

AWS Environmental Consulting Inc., 2020

Natural Heritage Environmental Impact Assessment,

Chapman L.J. and Putnam, D.F., 1984

The Physiography of Southern Ontario, 3rd edition,

Ontario Geological Survey Special Volume 2; Ministry of Natural Resources.

CMT Engineering Inc., 2020

Geotechnical Investigation Proposed Residential Subdivision, Cork Street, Mount Forest

Cobide Engineering Inc. 2020

Functional Servicing Report, Mount Forest, Township of Wellington North

Ministry of Environment Climatic & Parks

Water Well Records

Ontario Geology Survey, 1999

Aggregates Resources Inventory Paper 162, Wellington County

Saugeen Valley Conservation Authority, 2015

Saugeen Valley Source Protection Approved Assessment Report

FIGURES

NOTES

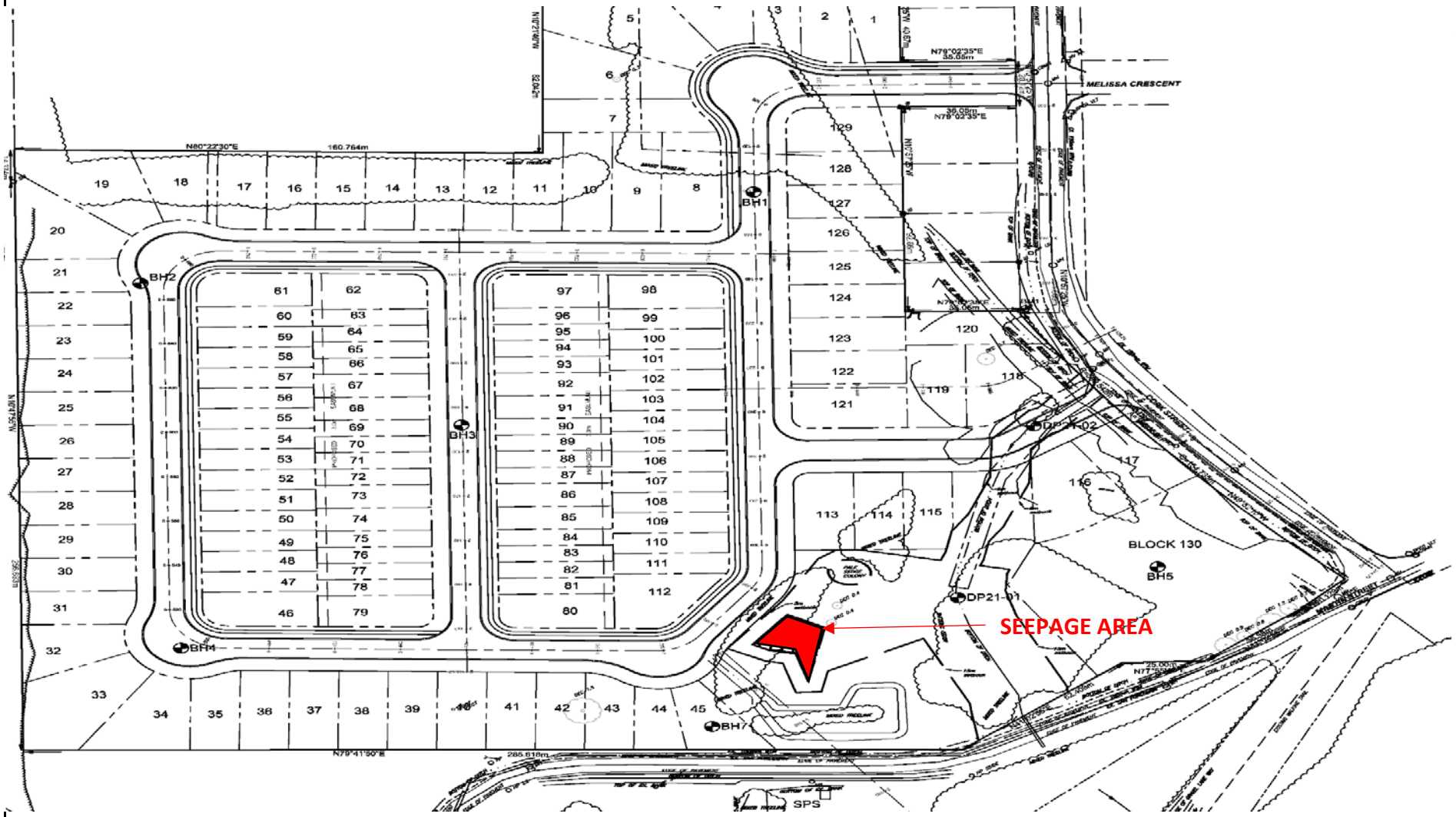
SITE LOCATION

Hydrogeological Assessment Cork Street Residential Development Mount Forest
for Sunvale Homes

Date:	Dec-21	Scale:	as shown
Project:	21002.00	Ref No:	

GAMAN Consultants Inc.

Figure 1



NOTES

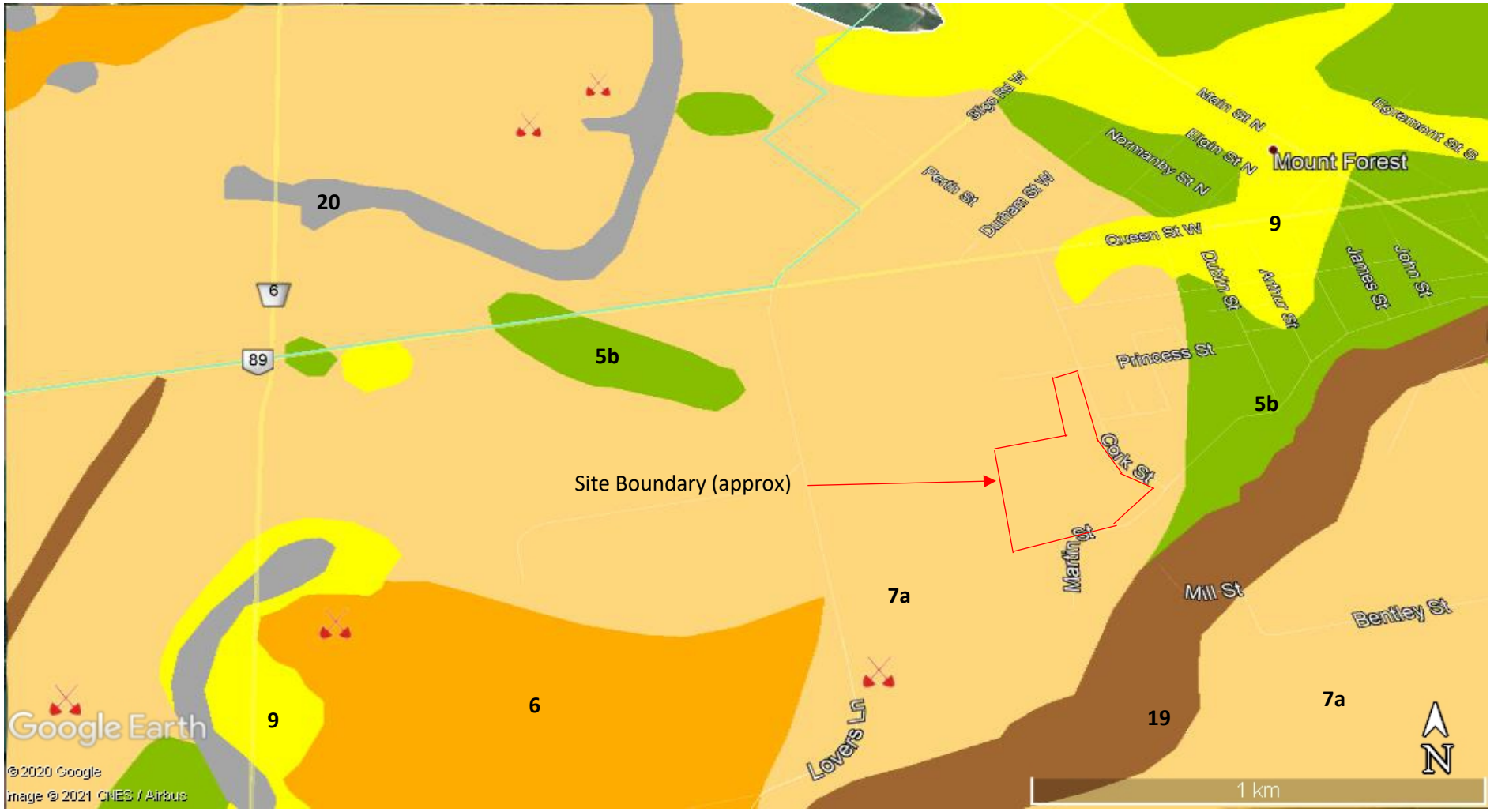
SITE LOCATION

Hydrogeological Assessment Cork Street Residential Development Mount Forest
for Sunvale Homes

Date:	Dec-21	Scale:	as shown
Project:	21002.00	Ref No:	

GAMAN Consultants Inc.

Figure 2



NOTES

5b	sandy silt to silty sand till
6	Ice-contact stratified deposits (sand & gravel)
7a	Glaciolfluvial deposits (sandy)
8a	Fine Textured Glaciolacustrine Deposits (silt & clay)
9	Coarse Textured Glaciolacustrine Deposits
19	Modern Alluvial Deposits (gravel sand, silt, clay)
20	Organic Deposits (peat, muck marl)

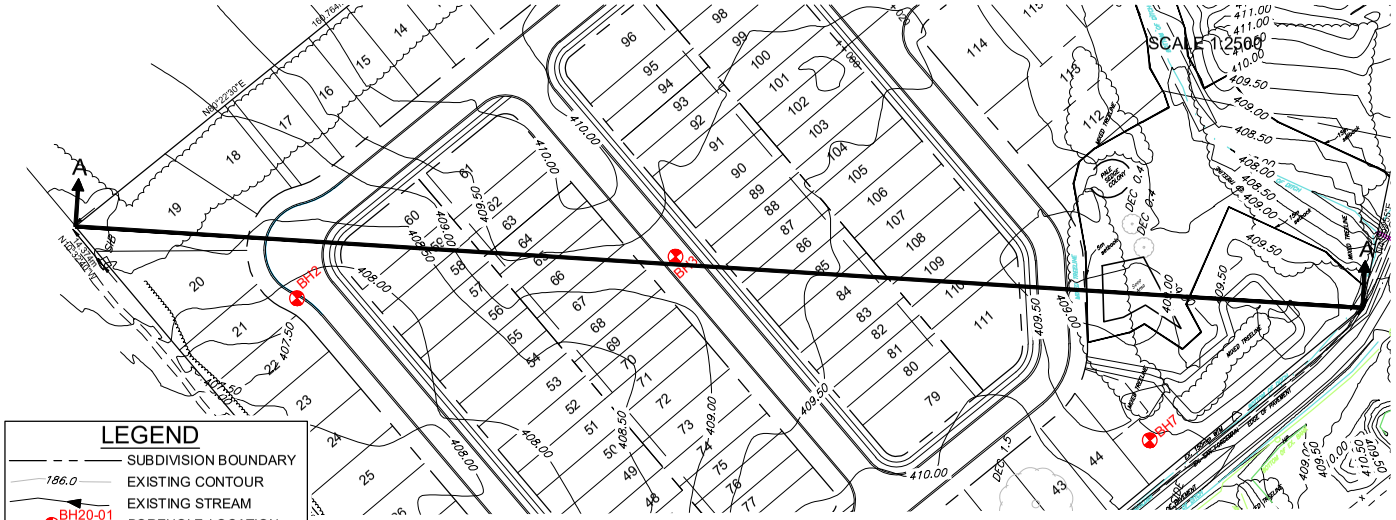
Surficial Geology

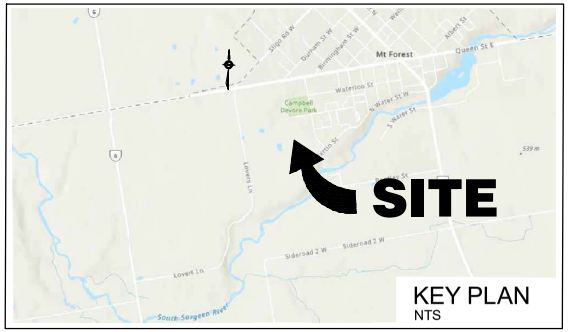
Hydrogeological Assessment Cork Street Residential Development Mount Forest
for Sunvale Homes

Date:	Dec-21	Scale:	as shown
Project:	21002.00	Ref No:	

GAMAN Consultants Inc.

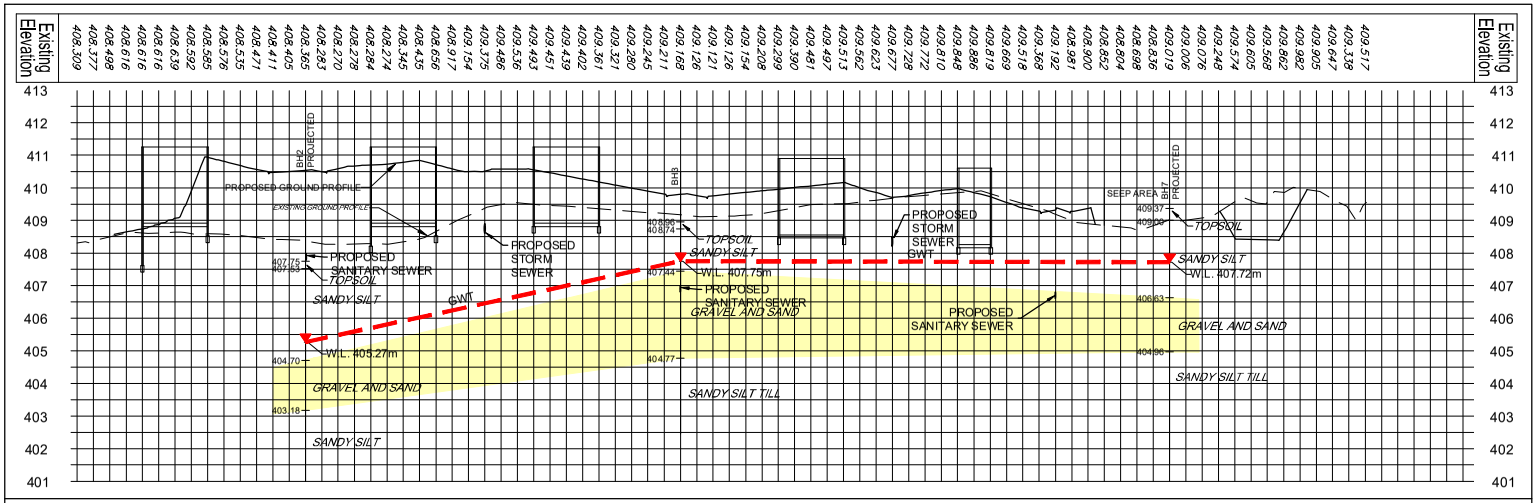
Figure 3





LEGEND

- SUBDIVISION BOUNDARY
- 186.0 EXISTING CONTOUR
- EXISTING STREAM
- BH20-01 BOREHOLE LOCATION
- GWT GROUNDWATER TABLE
- W.L.275.9m WATER LEVEL ELEVATION



SECTION A - A'
SCALE
HORZ 1:1500
VERT 1:150

No.	DATE	DESCRIPTION	BY	APPD
1	FEB 12/21	PRELIMINARY SUBMISSION	TLB	SJC

REVISION / ISSUE

Title:
INTERPRETED HYDROSTRATIGRAPHY
SECTION A-A'
SUNVALE HOMES
PROPOSED SUBDIVISION
Township of Wellington North

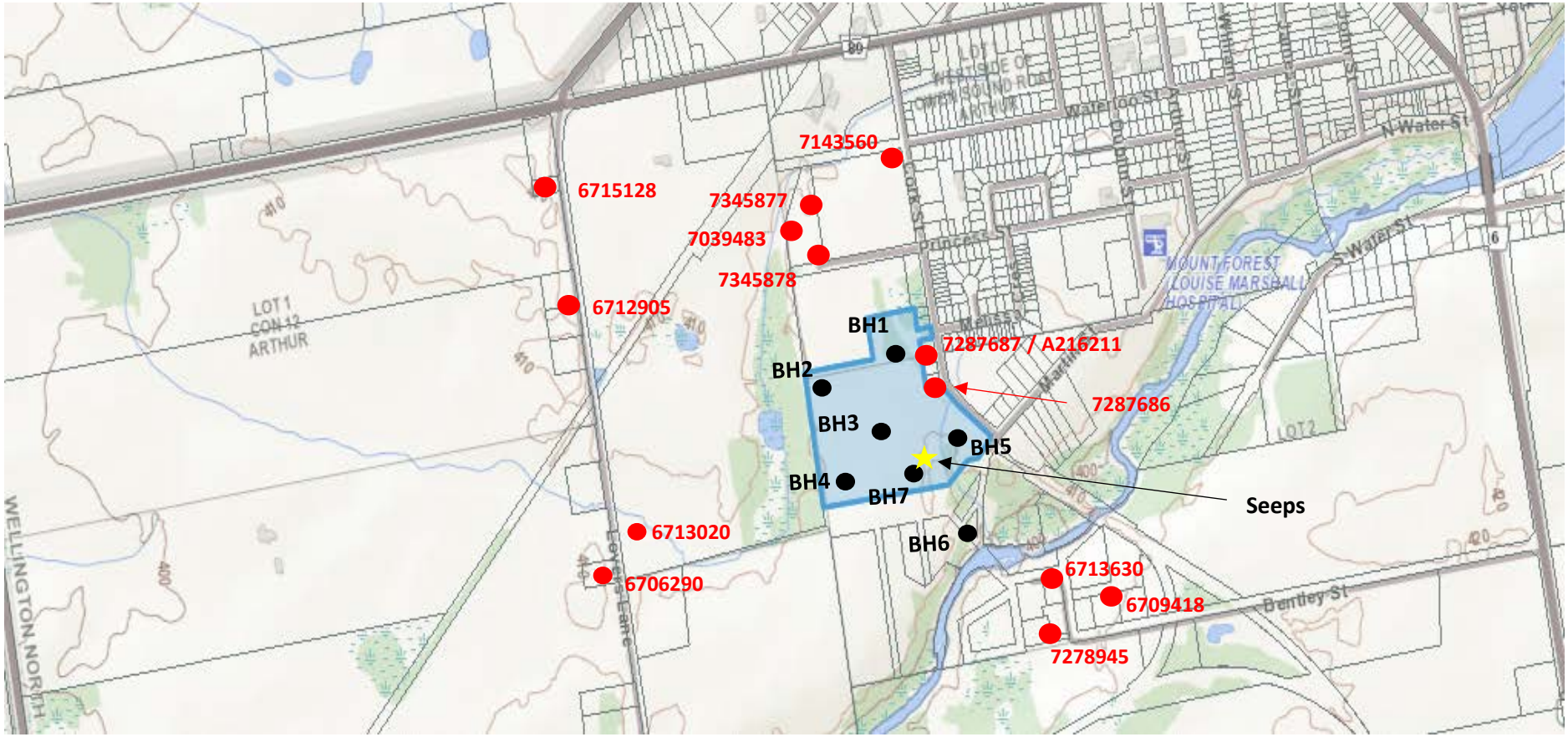
SVCA RESPONSE LETTER

Client:
SUNVALE HOMES

COBIDE ENGINEERING INC
517 10th St, Hanover, ON N4N 1R4
Telephone: (519) 506-5959
www.cobideeng.com

Design:	TLB	Scale:	AS SHOWN
Drawn:	TLB	Approved:	
Checked:	TLB		
Date:	DEC 2020		Design Engineer

DRAWING No. 00703-FIG1



NOTES

7278949 MECP Water Well & Designation

BH2 CMT Borehole

Property Boundary

WATER WELL LOCATION MAP

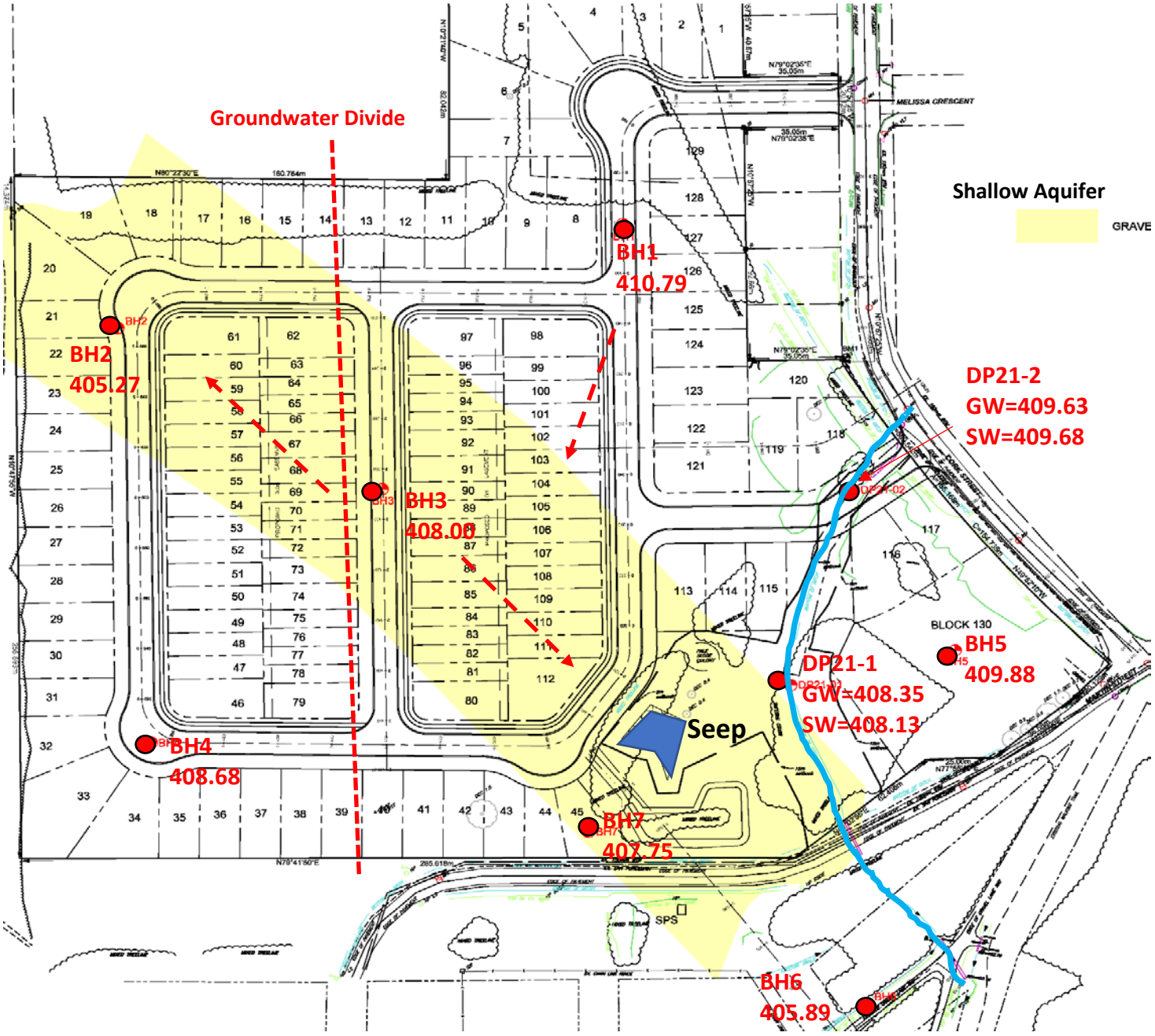
Hydrogeological Assessment Cork Street Residential Development

For Sunvale Homes

Date:	Dec-21	Scale:	NTS
Project:	21002.00	Ref No:	

GAMAN Consultants Inc.

Figure 5



NOTES

Inferred Groundwater Flow Direction

Water Level Elevations March 10, 2021 except for BH2 on June 17 2020

Interpreted Boundary Shallow Aquifer

Hydrogeological Assessment, Cork Street Residential Development, Mount Forest

For Sunvale Homes

Date:	Dec-21	Scale:	AS SHOWN
Project:	21002.00	Ref No:	

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Figure 6

APPENDIX A

WATER WELL RECORDS

Ministry of Environment and Energy — Ontario

99-02-181

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 6712905 — Municipality 6700 1 — Con. CON 12

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
WELLINGTON	ARTHUR TWP	CON 12	PART 1

Address: RR #6 MT FOREST

Date completed: 17 day 01 month 99 year

21 — T/M — Northing — RC — Elevation — RC — Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	SANDY CLAY			0	5
BROWN	SAND	GRAVEL		5	16
BROWN	SAND	GRAVEL - CLAY		16	28
GREY	GRAVEL	CLAY		28	105
GREY	CLAY	STONES		105	118
GREY	CLAY	GRAVEL		118	150
GREEN	SHALE	BROWN LIMESTONE	SOFT	150	194
BROWN	LIMESTONE			194	209

31

32

41 WATER RECORD

Water found at – feet	Kind of water
209	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6 1/4	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+2	198
6 1/8	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		198	209
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet
Material and type	Depth at top of screen feet	

61 PLUGGING & SEALING RECORD

☑ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0	20	BENTONITE

71 PUMPING TEST

Pumping test method: 1 ☑ Pump 2 ☐ Bailer

Pumping rate: 10 GPM

Duration of pumping: 1 Hours 0 Mins

25 Water levels during: 1 ☑ Pumping 2 ☐ Recovery

Static level	Water level end of pumping	15 minutes	30 minutes	45 minutes	60 minutes
40 ' 7 " feet	42 ' 8 " feet	42 ' 4 " feet	42 ' 6 " feet	42 ' 7 " feet	42 ' 8 " feet

If flowing give rate: GPM

Pump intake set at: 60 feet

Water at end of test: ☑ Clear ☐ Cloudy

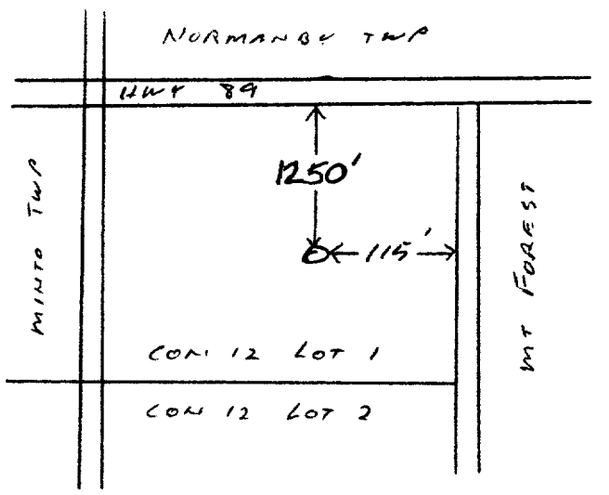
Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump setting: 60 feet

Recommended pump rate: 10 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



199099

FINAL STATUS OF WELL

54

1 ☑ Water supply
2 ☐ Observation well
3 ☐ Test hole
4 ☐ Recharge well
5 ☐ Abandoned, insufficient supply
6 ☐ Abandoned, poor quality
7 ☐ Abandoned (Other)
8 ☐ Dewatering
9 ☐ Unfinished
10 ☐ Replacement well

WATER USE

55-56

1 ☑ Domestic
2 ☐ Stock
3 ☐ Irrigation
4 ☐ Industrial
5 ☐ Commercial
6 ☐ Municipal
7 ☐ Public supply
8 ☐ Cooling & air conditioning
9 ☐ Not used
10 ☐ Other

METHOD OF CONSTRUCTION

57

1 ☐ Cable tool
2 ☑ Rotary (conventional)
3 ☐ Rotary (reverse)
4 ☐ Rotary (air)
5 ☐ Air percussion
6 ☐ Boring
7 ☐ Diamond
8 ☐ Jetting
9 ☐ Driving
10 ☐ Digging
11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
MEADOWBANK DRILLING SERVICES	6865
Address: BOX 416 ELORA ONT N0B 1S0	
Name of Well Technician: JIM BRADFOOT	Well Technician's Licence No.: T0370
Signature of Technician/Contractor: Jim Bradfoot	Submission date: day mo yr

MINISTRY USE ONLY

Data source 58	Contractor 59-62: 6865	Date received 63-68: MAR 0 8 1999
Date of inspection	Inspector	
Remarks: CSS.ES9		

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 (1 2) 6713020 Municipality 67001 (10 14) Con. CON (15 22 23 24)

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
WELLINGTON	ARTHUR	11	2

Address: Mount Forest

Date completed (48-53): 02 day 06 month 99 year

21 (1 2) UTM (10) Northing (12 17) RC (18) Elevation (24) RC (25) Basin Code (26 30) ii (31) iii iv (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
		Topsoil		0	2
		Clay & Stones		2	134
		Limestone	Med	134	176

31 (10 14 15 21 32 43 54 65 75 80)

32 (10 14 15 21 32 43 54 65 75 80)

41 WATER RECORD

Water found at - feet	Kind of water
176 (10-13)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (14)
(15-18)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (19)
(20-23)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (24)
(25-28)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (29)
(30-33)	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (34) (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 (10-11)	1 ☑ Steel (12) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	0	136 (13-16)
(17-18)	1 ☐ Steel (19) 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		136	176 (20-23)
(24-25)	1 ☐ Steel (26) 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			(27-30)

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet
Material and type	**Depth at top of screen (41-44) feet**	(39)

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
(10-13)	(14-17)	
(18-21)	(22-25)	
(26-29)	(30-33) (60)	

71 PUMPING TEST

Pumping test method (10): 1 ☐ Pump 2 ☐ Bailer AIR

Pumping rate (11-14): 15 GPM

Duration of pumping (15-16 Hours, 17-18 Mins): 1 Hours

Static level (19-21): 43 feet

Water level end of pumping (22-24): 80 feet

Water levels during (25): 1 ☐ Pumping 2 ☐ Recovery

15 minutes (26-28)	30 minutes (29-31)	45 minutes (32-34)	60 minutes (35-37)
43 feet	43 feet	43 feet	43 feet

If flowing give rate (38-41): GPM

Pump intake set at: AIR 176 feet

Water at end of test (42): ☐ Clear ☐ Cloudy

Recommended pump type: ☐ Shallow ☑ Deep

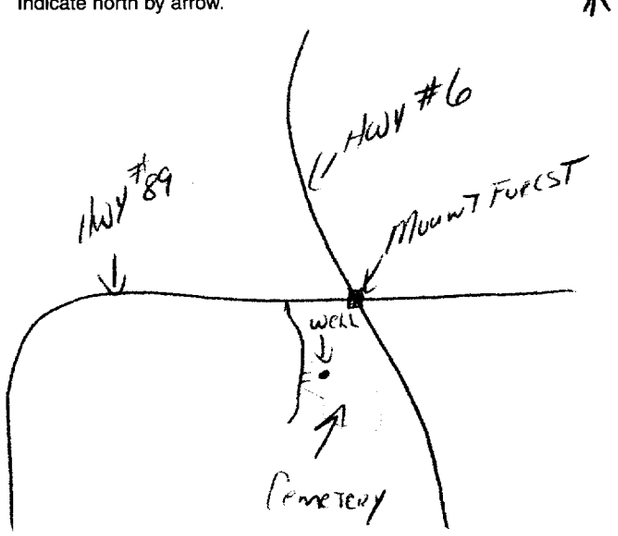
Recommended pump setting (43-45): 95 feet

Recommended pump rate (46-49): 10 GPM

(50-53)

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



205274

FINAL STATUS OF WELL (54)

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE (55-56)

1 ☑ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION (57)

1 ☐ Cable tool 2 ☑ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
KAUFFMAN INVESTMENTS LTD.	6634
Address RR#3 ELMWOOD ONTARIO	
Name of Well Technician KAUFFMAN & KINGSTON	**Well Technician's Licence No.** T-1922
Signature of Technician/Contractor Paul Kaufman	**Submission date** 24 day 06 mo 99 yr

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	6634	JUL 06 1999
Date of inspection	**Inspector**	
Remarks		

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (11/98) Front Form 9

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 6713630 Municipality 67603 Con

WELLINGTON

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
[redacted]	N. WELLINGTON	BENTLEY ST.				

Address: 525 SILVER ST. MT. FOREST ONT.

Date completed: 07 day 06 month 00 year

Northing | RC | Elevation | RC | Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BLACK	TOPSOIL			0	1
BROWN	GRAVEL	BROWN SAND		1	8
BROWN	CLAY	SMALL STONES		8	17
BROWN	LIMESTONE		BROKEN	17	23
GREY	SHALE		SOFT	23	29
BROWN	LIMESTONE		BROKEN	29	32½
BROWN	LIMESTONE		HARD	32½	39
GREY	SHALE			39	40
BROWN	LIMESTONE			40	45
GREY	SHALE			45	47
BROWN	LIMESTONE			47	53
GREY	SHALE			53	58
GREY	LIMESTONE			58	60
GREY	SHALE			60	62

WATER RECORD

Water found at - feet	Kind of water					
42'	1 ☐ Fresh	2 ☐ Salty (NOT TESTED)	3 ☐ Sulphur	4 ☐ Minerals	5 ☐ Gas	15gpm
	1 ☐ Fresh	2 ☐ Salty	3 ☐ Sulphur	4 ☐ Minerals	5 ☐ Gas	
59'	1 ☐ Fresh	2 ☐ Salty (NOT TESTED)	3 ☐ Sulphur	4 ☐ Minerals	5 ☐ Gas	6½gpm
	1 ☐ Fresh	2 ☐ Salty	3 ☐ Sulphur	4 ☐ Minerals	5 ☐ Gas	
	1 ☐ Fresh	2 ☐ Salty	3 ☐ Sulphur	4 ☐ Minerals	5 ☐ Gas	

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	43	32½
6	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		32½	62
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet
Material and type	Depth at top of screen feet	

PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	16	BENSEAL

PUMPING TEST

71 Pumping test method: 1 ☐ Pump 2 ☐ Bailer 3 AIR

Pumping rate: 8 GPM

Duration of pumping: 1 Hours ..... Mins

Static level	Water level end of pumping	Water levels during: 1 ☐ Pumping 2 ☐ Recovery	15 minutes	30 minutes	45 minutes	60 minutes
4½ feet	32 feet		4½ feet	4½ feet	4½ feet	4½ feet

If flowing give rate: GPM

Pump intake set at: feet

Water at end of test: ☑ Clear ☐ Cloudy

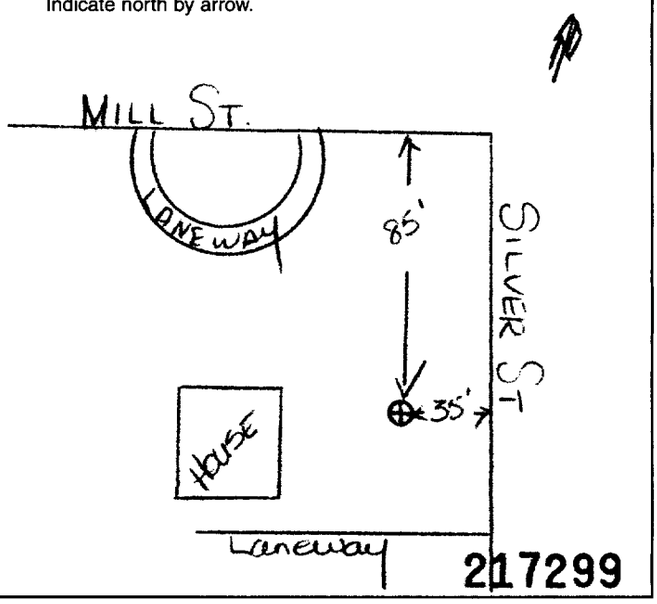
Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump setting: 50 feet

Recommended pump rate: 8 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



217299

FINAL STATUS OF WELL

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☑ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other .....

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☑ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other .....

LUNNEY WELL DRILLING DIV. of

Name of Well Contractor: GERRITSWELL DRILLING INC. | Well Contractor's Licence No.: 3406

Address: RR#1 GRAND VALLEY ONT.

Name of Well Technician: TERRY THOMPSON | Well Technician's Licence No.: T2836

Signature of Technician/Contractor: Gerritswell Drilling Inc | Submission date: day 07 mo 06 00

MINISTRY USE ONLY

Data source | Contractor: 3406 | Date received: MAR 22 2001

Date of inspection | Inspector

Remarks

CSS.ES1

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (11/98) Front Form 9

Ontario Ministry of the Environment

Well Tag (Number below) A 009270

A 009270

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN 67007 CON CON LOT 27

Well Owner's Information and Location of Well Information

[redacted]

Wellington	Arthur	1	12

RR#/Street Number/Name: 430 Parside Drive

City/Town/Village: Mt. Forest

Site/Compartment/Block/Tract etc.:

GPS Reading: Elev 401M | NAD: 83 | Zone: 17 | Easting: 0519676 | Northing: 4869163

Unit Make/Model: Garmin/etrex

Mode of Operation: [X] Undifferentiated [ ] Averaged [ ] Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
Brown	Clay	Silt		0	22.87
Grey	Hardpan	Gritty		22.87	33.54
Grey	Hardpan	Shale		22.87	43.29
Brown	Limestone			22.87	44.21

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	22.87	24.13

Water Record

Water found at Metres: 44.21 — Kind of Water: [X] Fresh [ ] Sulphur [ ] Gas [ ] Salty [X] Minerals [ ] Other:

[ ] m [ ] Fresh [ ] Sulphur [ ] Gas [ ] Salty [ ] Minerals [ ] Other:

[ ] m [ ] Fresh [ ] Sulphur [ ] Gas [ ] Salty [ ] Minerals [ ] Other:

After test of well yield, water was: [X] Clear and sediment free [ ] Other, specify

Chlorinated [X] Yes [ ] No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.558	[X] Steel [ ] Fibreglass [ ] Plastic [ ] Concrete [ ] Galvanized	0.48	+0.61	22.87
	[ ] Steel [ ] Fibreglass [ ] Plastic [ ] Concrete [ ] Galvanized			
	[ ] Steel [ ] Fibreglass [ ] Plastic [ ] Concrete [ ] Galvanized			
Screen				
Outside diam	[ ] Steel [ ] Fibreglass [ ] Plastic [ ] Concrete [ ] Galvanized	Slot No.		
No Casing or Screen				
	[X] Open hole		22.87	44.21

Test of Well Yield

Pumping test method: Pump

Pump intake set at - (metres): 15.24

Pumping rate - (litres/min): 90.92

Duration of pumping: 2 hrs + 00 min

Final water level end of pumping: 15.24 metres

Recommended pump type: [ ] Shallow [X] Deep

Recommended pump depth: 15.24 metres

Recommended pump rate: 90.92 (litres/min)

If flowing give rate - (litres/min):

If pumping discontinued, give reason: Clear

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		9.15		
1		15.24	1	9.15
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60	15.24		60	9.15

Plugging and Sealing Record [X] Annular space [ ] Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	22.87	See Above	0.96

Method of Construction

[ ] Cable Tool [X] Rotary (air) [ ] Diamond [ ] Digging
[X] Rotary (conventional) [ ] Air percussion [ ] Jetting [ ] Other
[ ] Rotary (reverse) [ ] Boring [ ] Driving

Water Use

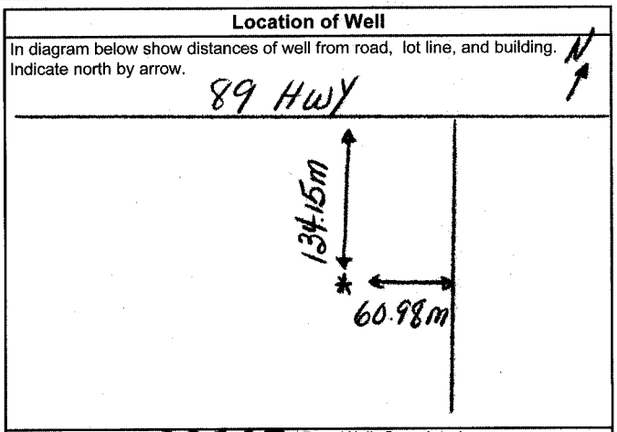
[X] Domestic [ ] Industrial [ ] Public Supply [ ] Other
[ ] Stock [ ] Commercial [ ] Not used
[ ] Irrigation [ ] Municipal [ ] Cooling & air conditioning

Final Status of Well

[X] Water Supply [ ] Recharge well [ ] Unfinished [ ] Abandoned, (Other)
[ ] Observation well [ ] Abandoned, insufficient supply [ ] Dewatering
[ ] Test Hole [ ] Abandoned, poor quality [ ] Replacement well

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 09347

Date Well Completed: YYYY 2004 MM 09 DD 21

Was the well owner's information package delivered? [X] Yes [ ] No

Date Delivered: YYYY 2004 MM 09 DD 27

Well Contractor/Technician Information

Name of Well Contractor: Mc Leod Well Drilling Ltd

Well Contractor's Licence No.: 3563

Business Address (street name, number, city etc.): R.R. 4, 293810 Culloden Line, INGERSOLL, Ont N5C 3J7

Name of Well Technician (last name, first name): Ralph H, Mc Leod

Well Technician's Licence No.: T-0073

Signature of Technician/Contractor: x Ralph H Mc Leod

Date Submitted: YYYY MM DD

Ministry Use Only

Data Source

Contractor: 3563

Date Received: YYYY MM DD NOV 01 2004

Date of Inspection: YYYY MM DD

Remarks

Well Record Number: 6715128

0506E (09/03)

Contractor's Copy [ ] Ministry's Copy [X] Well Owner's Copy [ ]

Cette formule est disponible en français

Ontario Ministry of the Environment

Well Tag No. for Master Well *(Place Sticker and/or Print Below)*
A 083509

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page _____ of _____

Master Well Owner's and Land Owner's Information

First Name	Last Name	E-mail Address
Township of	Wellington North	

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
7490 Sideroad 7, PO Box 125 Kenilworth	Wellington	ON	N0G2L3	5198483620

Location and Construction of the Master Well in the Cluster

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
Cork St			

County/District/Municipality	City/Town/Village	Province	Postal Code
Wellington	Mount Forest	Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation
NAD	8	3	517520	4869208	Garmin	E-Trex

Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify _____

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	Depth (Metres) To
BROWN	FILL	STONES	LOOSE	0	.9
BROWN	SAND	SILT	SOFT	.9	3.9
BROWN	SILT	SAND	LAYARD	3.9	5.9

Hole Details

Depth (Metres) From	Depth (Metres) To	Diameter (Centimetres)
0	5.9	10

Water Use

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

Method of Construction

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

Status of Well

☐ Test Hole ☐ Abandoned, Insufficient Supply
☐ Replacement Well ☐ Abandoned, Poor Water Quality
☐ Dewatering Well ☐ Other, specify
☐ Alteration (Construction) ☐ Abandoned, other, specify

Construction Details

Inside Diameter (Centimetres)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (Metres) From	Depth (Metres) To
3.8	PLASTIC		0	5.9

No Casing and Screen Used

Open Hole ☐ Yes ☐ No

Static Water Level Test

_____ Metres

Screen

☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Concrete ☑ Plastic

Outside Diameter (Centimetres)	Slot No.
4	10

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	Depth Set at (Metres) To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	1.5	BENTONITE 3/8 CHIP	1
1.5	5.9	#2 SAND	1

Water Details

Water found at Depth	Kind of Water
_____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
_____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
_____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Disinfected ☐ Yes ☐ No If no, provide reason:

Date Master Well Completed (yyyy/mm/dd): 2010/4/1

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluster.)*

Total Wells in Cluster	Please indicate Number of Cluster Well Information Log Sheets Submitted
5	1
Total Wells on this Property: 5	

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.

☑ Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the cluster to the Director upon request

[redacted]

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
CMT Eng Inc	7366

Business Address (Street No./Name, number, RR)	Municipality
1011 Industrial Cres unit 1	Waterloo

Province	Postal Code	Business E-mail Address
ON	N0B2M0	CMT@Golden.net

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	
5196995775	DAVIES	BUD

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
3458		2010/4/1

Ministry Use Only

Audit No.	Well Contractor No.
M 04748	
Date Received (yyyy/mm/dd): APR 16 2010	Date of Inspection (yyyy/mm/dd)

Remarks

1992 (11/2006)

Ministry's Copy

Ontario Ministry of the Environment

Well Tag No. for Master Well *(Print Well Tag No.)*: A 083509.

Cluster Well Information for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Property Owner's Information

First Name	Last Name	Mailing Address (Street No./Name, RR)	Municipality
TOWNSHIP OF	WELLINGTON NORTH	KENILWORTH 7490 SIDEROAD 7 WEST, PO BOX 125	WELLINGTON

Province	Postal Code	E-mail Address	Telephone No. (inc. area code)
ON	N0G 2E0		519 848 3620

[redacted]

Signature of Technician/Contractor: [signature]

Date *(yyyy/mm/dd)*: 2010/4/1

Cluster Well Information

Address of Well Location (Street Number/Name, RR)	Lot	Concession	Township	County/District/Municipality
COOK ST				WELLINGTON

City/Town/Village	Province	Postal Code	GPS Unit Make	Model	Unit Mode of Operation
MOUNT FOREST	Ontario	N0G 2L3	GARMIN	ETREX	☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify:

Well # on Sketch	UTM Zone	UTM Easting	UTM Northing	Full Depth of Hole (metres)	Hole Diameter (cm)	Method of Construction	Casing Material	Casing Length (metres)	Screen Interval (metres) From	Screen Interval To	Annular Space Sealant Used	Static Water Level (metres)	Abandonment Sealant Used	Comments	Date of Completion (yyyy/mm/dd)
	17	520481	4869208	4.5	10	DRIVING	PLASTIC	1.5	1.5	4.5	BENTONITE				2010/3/25
	17	520487	4869237	4.5	10	↓	↓	1.5	1.5	4.5	3/8				↓
	17	520495	4869480	3.9	10	↓	↓	.9	.9	3.9	↓				↓
	17	520449	4869256	5.9	13	BORING.	↓	± 3.7	± 3.7	5.9	CHIP				↓
	17	520465	4869250	5.9.	13	↓	↓	± 3.7	± 3.7	5.9	↓				↓

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
CMT ENG INC	1011 INDUSTRIAL CRES UNIT 1	WATERLOO	ON

Postal Code	Business Telephone No. *(inc. area code)*	Well Contractor's Licence No.	Business E-mail Address
N0B 2M0	519 699 5775	7366	CMT@GOLDEN.NET.

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Date Submitted *(yyyy/mm/dd)*	Signature of Technician
BUD DAVIES	3458	2010/4/1	[signature]

Date 1st Well in Cluster Constructed *(yyyy/mm/dd)*	Date Last Well in Cluster Constructed *(yyyy/mm/dd)*
2010/3/25	2010/3/25

Ministry Use Only

Date Received *(yyyy/mm/dd)*	Date Inspected *(yyyy/mm/dd)*
APR 16 2010	

Audit No.	Remarks
C05410	[handwritten initials]

1991 (11/2006)

Ministry's Copy

C-7366 M04748 C05410

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Plate-Sticker ... below)
Tag#: A 213712
TAG # A 213712

Well Record
Regulation 903 Ontario Water Resources Act
Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
501 SILVER STREET	ARTHUR	4	1 ASRD.

County/District/Municipality	City/Town/Village	Province	Postal Code
WELLINGTON	MOUNT FOREST	Ontario	N0G2L0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	508164	4868276		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	FILL			0	3FT
	CLAY & STONES			3	39FT
BROWN	LIMESTONE		MED-HARD	39	65FT

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20FT	50gal Grout Slurry 50LBS 3/8 Holeplug	

Method of Construction

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

Well Use

☐ Public ☐ Commercial ☐ Not used
☑ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ 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
6inch	STEEL	.188	+2	41FT
6inch	OPEN		41	65FT

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

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 (m/ft)	Gas	Kind of Water	Other, specify
65	☐	☑ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20FT	10inch
20	41FT	9inch
41	65	6inch

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)
AIR-PUMP 65'

Pumping rate (l/min / GPM)
14 G.P.M

Duration of pumping
2 hrs + ____ min

Final water level end of pumping (m/ft)
18FT

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)
30 FT

Recommended pump rate (l/min / GPM)
10 G.P.M

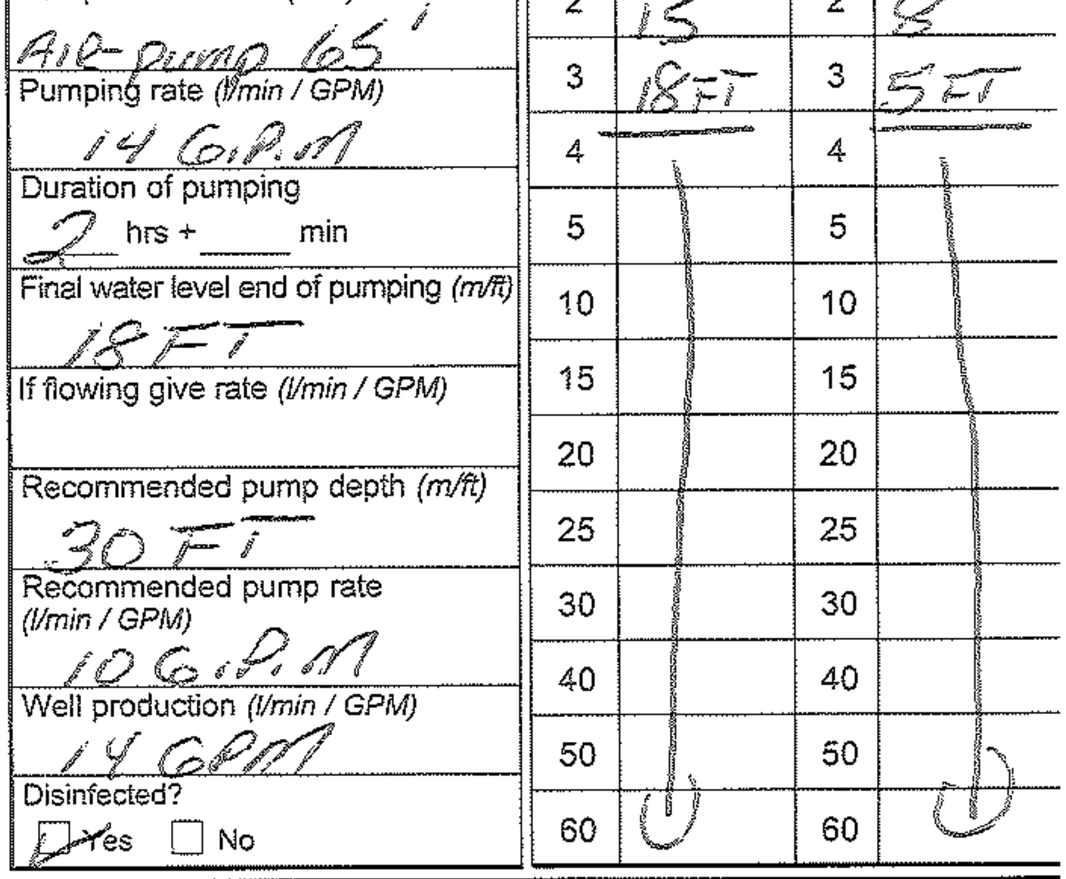
Well production (l/min / GPM)
14 GPM

Disinfected?
☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	5		18FT
1	10	1	13
2	15	2	8
3	18FT	3	5FT
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

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.
KAUFMAN INVESTMENTS LTD.	6634

Business Address (Street Number/Name)	Municipality
314023 HWY #6 RR#1 DURHAM	WESTGREY

Province	Postal Code	Business E-mail Address
ONTARIO	N0G1R0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5198693344	KAUFMAN, PAUL

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
19252		20161230

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No	20161116	20161103

Ministry Use Only
Audit No. Z243684
Rec'd JAN 12 2017

0506E (2014/11) — Ministry's Copy

7287686

Ontario | Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Tag#: A 216585 (Print Below)

A 216585

Well Record

Regulation 903 Ontario Water Resources Act

SOUTH SAUGEEN DEVELPOMENTS LTD.

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
YORK STREET, SW of MELISSA CR.	Part Lot 10, ... Part Park Lot "1", MacDonald's Survey, Part Div 1, Lot 3, W of Owen Sound Rd		

County/District/Municipality	City/Town/Village	Province	Postal Code
WELLINGTON COUNTY	MT Forest	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	520554	4868810		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BL	Top soil		Loose moist	0	2
Br	sand/silt	Till	dry hard	2	10
Gr	Sand/silt	Till	dry-moist hard	10	20
GPS	17T	520554, 4868810			

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	1'	Concrete	
1'	9'	Bentonite Grout	
9'	20	#1 sand	

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)

Pumping rate (l/min / GPM)

Duration of pumping ___ hrs + ___ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☒ No

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	15'		
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Method of Construction

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

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ 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
1.61"	Plastic	0.145"	+32"	10'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
1.9"	Plastic	.010	10'	20'

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

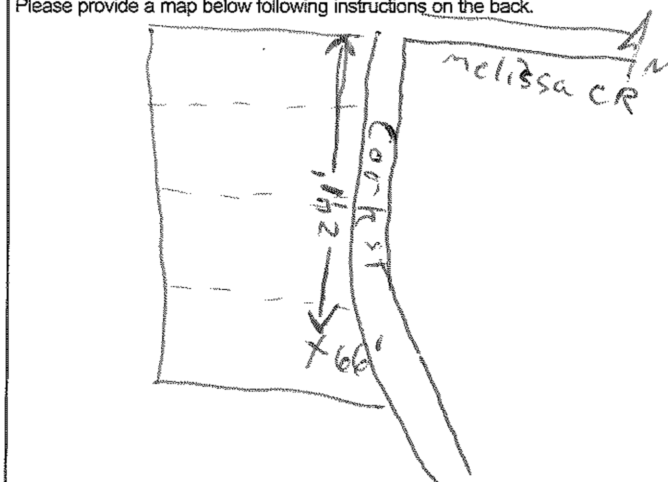
Water found at Depth	Kind of Water
15 (m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	4"

Map of Well Location

Please provide a map below following instructions on the back.



Comments: Stick up casing

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
LONDON SOIL TEST LTD.	7190

Business Address (Street Number/Name)	Municipality
R.R.6	DUNDALK

Province	Postal Code	Business E-mail Address
ON	N0C 1B0	info@londonsoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5194555777	Dan Thomson

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3934		20170519

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered Y Y Y Y M M D D

Date Work Completed 20170424

Ministry Use Only

Audit No. Z246482

Received JUN 05 2017

0506E (2014/11)

Ministry's Copy

7287687

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Tag#: A 216611 (Put Label Below)

A216611

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

SOUTH SAUGEEN DEVELOPMENTS LTD.

Address of Well Location (Street Number/Name)	Township	Lot	Concession
ERIC STREET, SW of MELISSA CR.	Part Park Lot "1", MacDonald's Survey Part Div 1, Lot 2, W. of Owen Sound Road		
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
WELLINGTON COUNTY	MT Forest	Ontario	
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 83 17 520543 4868830			

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Bl	Top soil		Loose moist	0	2
Br	Sand some gravel	silt Till	dry ~~wet~~ hard	2'	10'
Gr	Sand silt	Till	dry moist hard	10'	20'

GPS 17T 520543, 4868830

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	1	concrete	~~1.0~~
1	9	Bentonite ~~clay~~ Grout	~~2.0~~
9	20	#1 Sand	

Method of Construction

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

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☒ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ 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
1.61"	Plastic	0.145"+32"	10'	

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.9"	Plastic	010	10'	20'

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 (m/ft)	Gas	Kind of Water: Fresh / Untested / Other, specify
15'	☐	☐ / ☒ /
	☐	☐ / ☐ /
	☐	☐ / ☐ /

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	4"

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

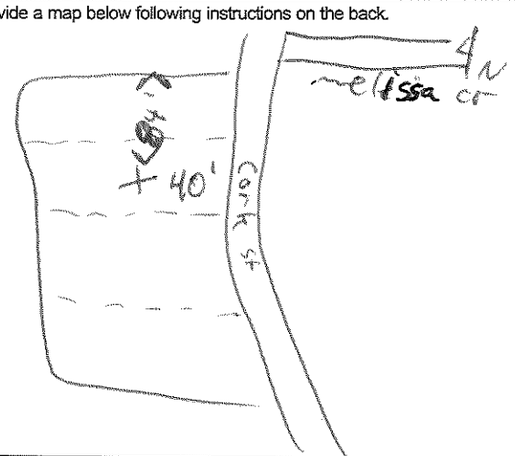
Well production (l/min / GPM)

Disinfected? ☐ Yes ☒ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	15'			
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: stick up casing

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
LONDON SOIL TEST LTD.	7190
Business Address (Street Number/Name)	**Municipality**
R.R.6	DUNDALK
Province	**Postal Code**
ON	N0C1B0
Business Email Address	info@londonsoil.com
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
5194555777	Dan Thomson
Well Technician's Licence No.	**Signature of Technician and/or Contractor**
3934	
Date Submitted	20170519

Well owner's information package delivered: ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 20170424

Ministry Use Only

Audit No. Z246481

JUN 05 2017

Received

0506E (2014/11)

Ministry's Copy

Ontario

Map: Well records

This map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available in the Open Data catalogue.

Go Back to Map

Well ID

Well ID Number: 7345878
Well Audit Number: *Z316575*
Well Tag Number: *A217384*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	590 Queen St. W
Township	MOUNT FOREST TOWN
Lot	
Concession	
County/District/Municipality	WELLINGTON
City/Town/Village	Mount Forest
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 520283.00 Northing: 4869026.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	SAND	GRVL		0 ft	2 ft
BRWN	CLAY			2 ft	7 ft
GREY	SAND	SILT		7 ft	15 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
0 ft	.5 ft	CONCRETE	
.5 ft	4 ft	HOLEPLUG	
4 ft	15 ft	SAND	

Method of Construction & Well Use

Method of Construction	Well Use
Direct Push	
	Monitoring and Test Hole

Status of Well

Monitoring and Test Hole

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
2 Inch	PLASTIC	0 ft	5 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
2.25 inch	PLASTIC	5 ft	15 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7241

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level

If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
45		45	
50		50	
60		60	

Water Details

Water Found at Depth	Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	15 ft	3.75 Inch

Audit Number: Z316575

Date Well Completed: September 23, 2019

Date Well Record Received by MOE: October 30, 2019

Updated: January 24, 2020

APPENDIX B

BOREHOLE LOGS

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH1

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-3-20
GROUND ELEVATION: 411.05 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)	WELL DIAGRAM
0		**TOPSOIL:** Loose, dark brown, silty organic topsoil, moist (175mm)	0.00, 411.05						38mm Riser
		SANDY SILT : Compact, brown, sandy silt, trace clay and gravel, moist	0.18, 410.88	SPT 1	49	5	14.4		Bentonite Seal
1				SPT 2	87	14	9.7		Groundwater was measured at 0.92 m (El. 410.13 m) June 17, 2020
2				SPT 3	100	19	9.6		
		SANDY SILT TILL: Dense, brown, sandy silt till, some gravel and clay, moist with wet seams	2.29, 408.76	SPT 4	100	40	9.3		
3				SPT 5	100	31	10.1		#3 Sand Pack
4				MC5 6	100		10.7		38mm Screen
		CLAYEY SANDY SILT TILL: Dense, grey, clayey sandy silt till, trace gravel, moist	4.42, 406.63						
5				SPT 7	87	38	13.5		

Groundwater was measured at approximately 0.92 m (El. 410.13 m) on June 17, 2020.

Bottom of borehole at 5.18 m, Elevation 405.87 m.

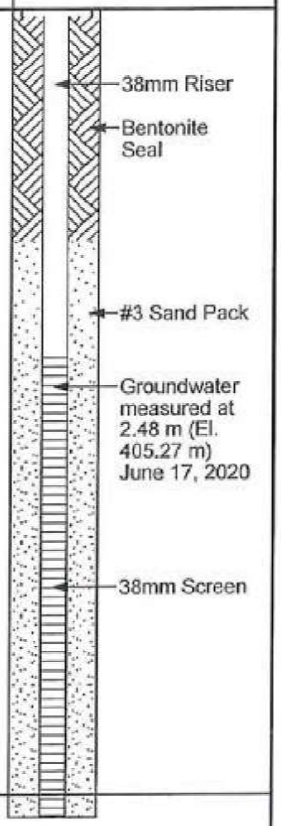
CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH2

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-3-20
GROUND ELEVATION: 407.75 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)
		TOPSOIL: Loose, dark brown, silty organic topsoil, moist (225mm)	0.00, 407.75					
		SANDY SILT: Loose to compact, brown, sandy silt, trace clay and gravel, moist to wet	0.23, 407.53	SPT 1	87	4	17.9	
1				SPT 2	100	4	22.4	
2				SPT 3	100	15	18.5	
				SPT 4	87	14	20.9	
3		**GRAVEL AND SAND:** Compact, brown, gravel and sand, trace silt and clay, wet to saturated becoming grey	3.05, 404.70 3.37, 404.38	SPT 5	67	27	20.7	
4				MC5 6	87		6.4	
5		**SANDY SILT:** Compact, brown, sandy silt, some gravel and clay, saturated	4.57, 403.18	SPT 7	87	23	20.6	

WELL DIAGRAM



Groundwater was measured at approximately 2.48 m (El. 405.27 m) on June 17, 2020.

Bottom of borehole at 5.18 m, Elevation 402.57 m.

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH3

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-3-20
GROUND ELEVATION: 408.96 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)	WELL DIAGRAM
		TOPSOIL: Loose, dark brown, silty organic topsoil, moist (225mm)	0.00, 408.96						
		SANDY SILT: Loose, brown, sandy silt, trace clay and gravel, moist to wet	0.23, 408.74	SPT 1	100	5	21.2		38mm Riser
1				SPT 2	13	4	17.8		Bentonite Seal
									Groundwater measured at 1.21 m (El. 407.75 m) June 17, 2020
2		**GRAVEL AND SAND:** Compact to very dense, brown, gravel and sand, trace silt and clay, saturated	1.52, 407.44	SPT 3	33	14	6.5		
				SPT 4	87	21	12.9		
3									#3 Sand Pack
				SPT 5	75	58	8.1		
									38mm Screen
4				MC5 6	87		17.3		
		SANDY SILT TILL: Dense, brown, sandy silt till, some gravel and clay, saturated	4.19, 404.77						
5		**CLAYEY SANDY SILT TILL:** Dense, grey, clayey sandy silt till, trace gravel, moist	4.57, 404.39	SPT 7	100	38	11.7		

Groundwater was measured at approximately 1.21 m (El. 407.75 m) on June 17, 2020.

Bottom of borehole at 5.18 m, Elevation 403.78 m.

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH4

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-3-20
GROUND ELEVATION: 409.39 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)	WELL DIAGRAM
		TOPSOIL: Loose, dark brown, silty organic topsoil, moist (250mm)	0.00, 409.39						
		SANDY SILT: Very loose to compact, brown, sandy silt, trace clay and gravel, moist to saturated	0.25, 409.14	SPT 1	70	3	14.1		38mm Riser
1				SPT 2	87	4	17.0		Bentonite Seal
2				SPT 3	0	2			Groundwater measured at 1.60 m (El. 407.79 m) June 17, 2020
3				SPT 4	70	14	14.3		#3 Sand Pack
				SPT 5	87	18			
4		becoming grey	4.32, 405.07	MC5 6	89		14.7		38mm Screen
5				SPT 7	100	14	28.2		

Groundwater was measured at approximately 1.60 m (El. 407.79 m) on June 17, 2020.

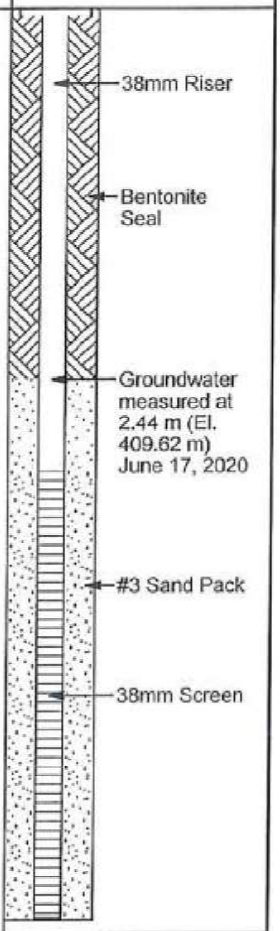
Bottom of borehole at 5.18 m, Elevation 404.21 m.

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH5

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-4-20
GROUND ELEVATION: 412.06 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)
0	**TOPSOIL:** Loose, dark brown, silty organic topsoil, moist (175mm)	0.00, 412.06					
	SAND AND GRAVEL FILL: Compact, brown, sand and gravel fill, with organics, moist	0.18, 411.89	SPT 1	100	10	11.7	
1	**TOPSOIL:** Compact, black, silty organic topsoil, moist	0.76, 411.30	SPT 2	13	9	8.9	
	SILTY SAND FILL: Very loose, brown, silty sand fill, moist	1.52, 410.54					
2	**TOPSOIL:** Very loose, black/grey, silty organic topsoil, moist to wet	1.80, 410.26	SPT 3	33	3	24.6	
			SPT 4	87	5	11.6	
3							
	SANDY SILT: Compact, brown, sandy silt, trace clay and gravel, moist to wet	3.05, 409.01	SPT 5	75	10	11.0	
4			MC5 6	87			
	CLAYEY SANDY SILT TILL: Dense, brown, clayey sandy silt till, trace gravel, wet	4.57, 407.49	SPT 7	100	36	12.2	
5	becoming grey	5.18, 406.88	MC5 8			13.2	
6							



Groundwater was measured at approximately 2.44 m (El. 409.62 m) on June 17, 2020.

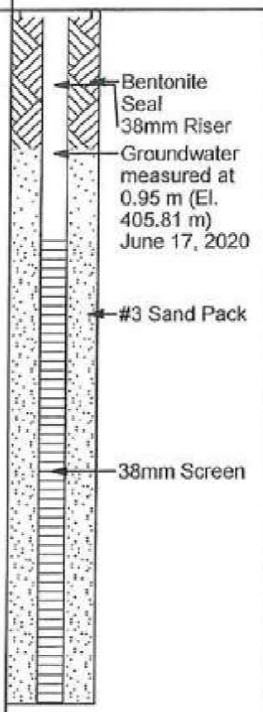
Bottom of borehole at 6.10 m, Elevation 405.96 m.

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH6

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-4-20
GROUND ELEVATION: 406.76 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)	WELL DIAGRAM
		TOPSOIL: Loose, dark brown, silty organic topsoil, moist (125mm)	0.00, 406.76						
		SAND AND GRAVEL FILL: Compact, brown, sand and gravel fill, moist	0.13, 406.64						
		TOPSOIL: Compact, black, silty organic topsoil, moist	0.33, 406.43						
			0.43, 406.33						
1		**SILTY SAND FILL:** Compact, brown, silty sand fill, moist		SPT 1	100	14	22.7		
				SPT 2	13	27	6.8		
2		**SANDY SILT:** Compact, brown, sandy silt, trace clay and gravel, with sand and gravel seam, wet	1.52, 405.24	SPT 3	33	17	15.4		
				SPT 4	87	15	17.0		
3		**CLAYEY SANDY SILT TILL:** Compact, grey, clayey sandy silt till, trace gravel, with wet sand seams, wet	2.49, 404.27	SPT 5	75	29	14.4		
4				MC5 6	87		16.1		
5				SPT 7	100	29	14.0		



Groundwater was measured at approximately 0.95 m (El. 405.81 m) on June 17, 2020.

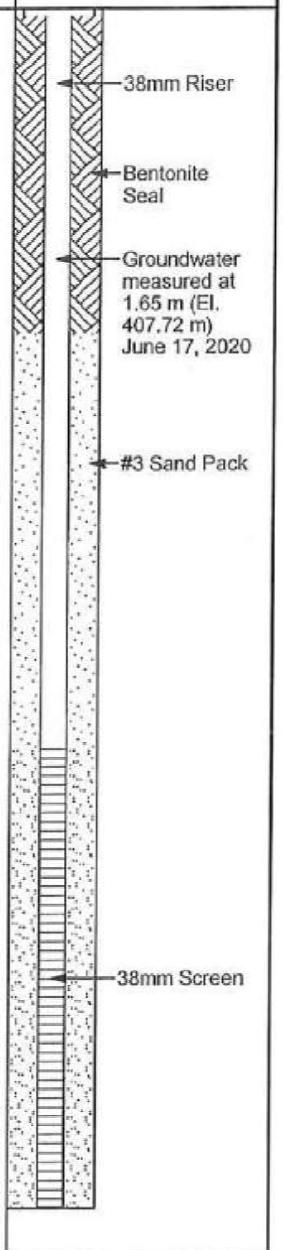
Bottom of borehole at 5.18 m, Elevation 401.58 m.

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

BOREHOLE NUMBER BH7

PROJECT: Proposed Mount Forest Subdivision
PROJECT ADDRESS: Cork Street
PROJECT LOCATION: Mount Forest, ON
PROJECT NUMBER: 20-202
DRILLING DATE: 6-4-20
GROUND ELEVATION: 409.37 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: BRF
DRILLING METHOD: SPT/MC5

DEPTH (m)	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	MOISTURE CONTENT (%)	POCKET PEN. (kPa)
	TOPSOIL: Loose, dark brown, silty organic topsoil, moist (375mm)	0.00, 409.37	SPT 1	100	3	22.7	
	SANDY SILT: Loose to compact, brown, sandy silt, trace clay and gravel, moist to wet	0.38, 409.00	SPT 2	100	6	16.3	
1							
			SPT 3	87	13	18.0	
2			SPT 4	100	15		
	GRAVEL AND SAND: Compact, brown, gravel and sand, trace silt and clay, saturated	2.74, 406.63					
3			SPT 5	100	14	12.2	
			MC5 6	100		12.1	
4							
	SANDY SILT TILL: Compact, brown, sandy silt till, some gravel and clay, with wet sand seams, moist to saturated	4.41, 404.96					
	CLAYEY SANDY SILT TILL: Compact, grey, clayey sandy silt till, trace gravel, moist to saturated	4.57, 404.80	SPT 7	92	37	12.0	
5							
			MC5 8	100		18.2	
6							
			SPT 9	87	29	26.9	
7			MC5 10	100		30.3	
			SPT	100	22		
8							



Groundwater was measured at approximately 1.65 m (El. 407.72 m) on June 17, 2020.

Bottom of borehole at 8.23 m, Elevation 401.14 m.

BOREHOLE LOG WITH WELL 20-202 BH LOGS.GPJ CMT_TEMPLATE_2020-05-15.GDT 7-3-20

TABLE B-1: MONITOR CONSTRUCTION DETAILS

Cork Street Residential Development Hydrogeological Report (21002.00)

MONITOR CONSTRUCTION DETAILS									
Monitor	Depth (mbgl)	BH Dia. (mm)	Monitor Dia. (mm)	Screen Length (m)	Sand Pack	Casing Elev. (masl)	casing stickup (magl)	ground Elev. (masl)	Creek Bed Elev (masl)
BH20-01	5.18	200	38	3	#3	412.03	0.98	411.05	
BH20-02	5.18	200	38	3	#3	408.9	1.15	407.75	
BH20-03	5.18	200	38	3	#3	410.15	0.90	409.25	
BH20-04	5.18	200	38	3	#3	410.34	0.86	409.48	
BH20-05	6.00	200	38	3	#3	413.05	0.99	412.06	
BH20-06	4.5	200	38	3	#3	407.83	1.07	406.76	
BH20-07	7.8	200	38	3	#3	410.27		409.37	
DP20-01		38	38	0.9	none	408.93	408.93	407.96	407.96
DP20-02		38	38	0.9	none	410.43	410.43	409.60	409.60

TABLE B-2: WATER LEVELS

Cork Street Residential Development Hydrogeological Report (21002.00)

Groundwater and Surface Water Levels																						
Date	BH20-01		BH20-02		BH20-03		BH20-04		BH20-05		BH20-06		BH20-07		DP21-01 GW		DP21-01 SW		DP21-02 GW		DP21-02 SW	
	Water Level		Water Level		Water Level		Water Level		Water Level		Water Level		Water Level		Water Level		Water Level		Water Level		Water Level	
	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)	(mbtoc)	(masl)
17-Jun-20	1.90	410.13	3.63	405.27	2.11	408.04	2.46	407.88	3.43	409.62	2.02	405.81		407.72	na		na		na		na	
4-Feb-21		412.03			2.11	408.04	1.72	408.62		413.05		407.83		410.27	0.73	408.20	0.82	408.11	1.55	408.88	0.79	409.64
12-Feb-21	1.67	410.36			2.20	407.95	1.81	408.53	3.40	409.65	2.05	405.78	2.57	407.70	0.71	408.22	0.82	408.11	0.90	409.53	0.79	409.64
10-Mar-21	1.24	410.79			2.15	408.00	1.66	408.68	3.17	409.88	1.94	405.89	2.52	407.75	0.58	408.35	0.80	408.13	0.80	409.63	0.75	409.68
5-May-21	1.42	410.61	na		2.06	408.09	1.93	408.41	3.25	409.80	1.70	406.13	2.18	408.09	0.48	408.45	0.80	408.13	0.79	409.64	0.77	409.66
29-Sep-21															0.45	408.48	0.79	408.14	0.76	409.67	0.74	409.69
21-Dec-21	1.35	410.68	na		1.82	408.33	1.34	409.00	2.97	410.08	1.64	406.19	1.90	408.37	0.48	408.45	0.78	408.15	0.78	409.65	0.74	409.69

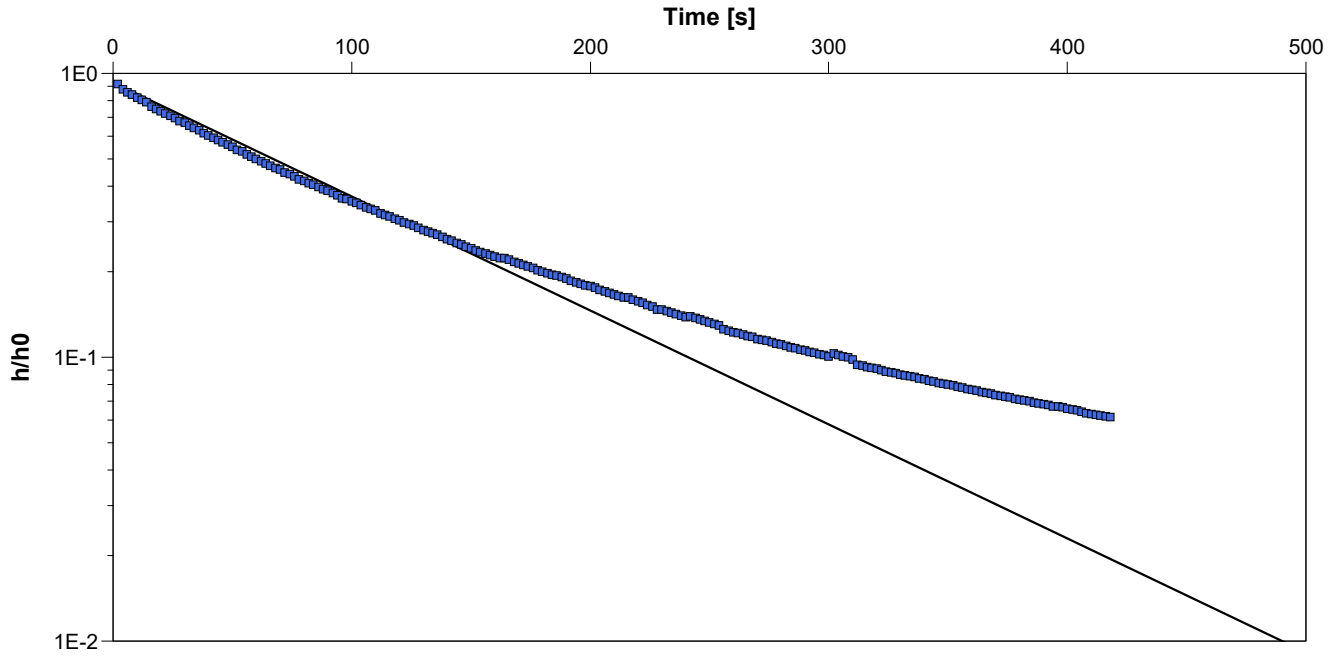
Notes: BH20-02 is blocked with an obstruction, water levels not available.

APPENDIX C

HYDRAULIC CONDUCTIVITY TESTS

	Slug Test Analysis Report
	Project:
	Number: 21002.00
	Client: Sunvale Homes

Location: Mount Forest	Slug Test: BH3 Test 1	Test Well: BH3
Test Conducted by: grh		Test Date: 2021-02-04
Analysis Performed by: grh	BH3 Test 1 Hvorslev	Analysis Date: 2021-02-05
Aquifer Thickness: 2.67 m		



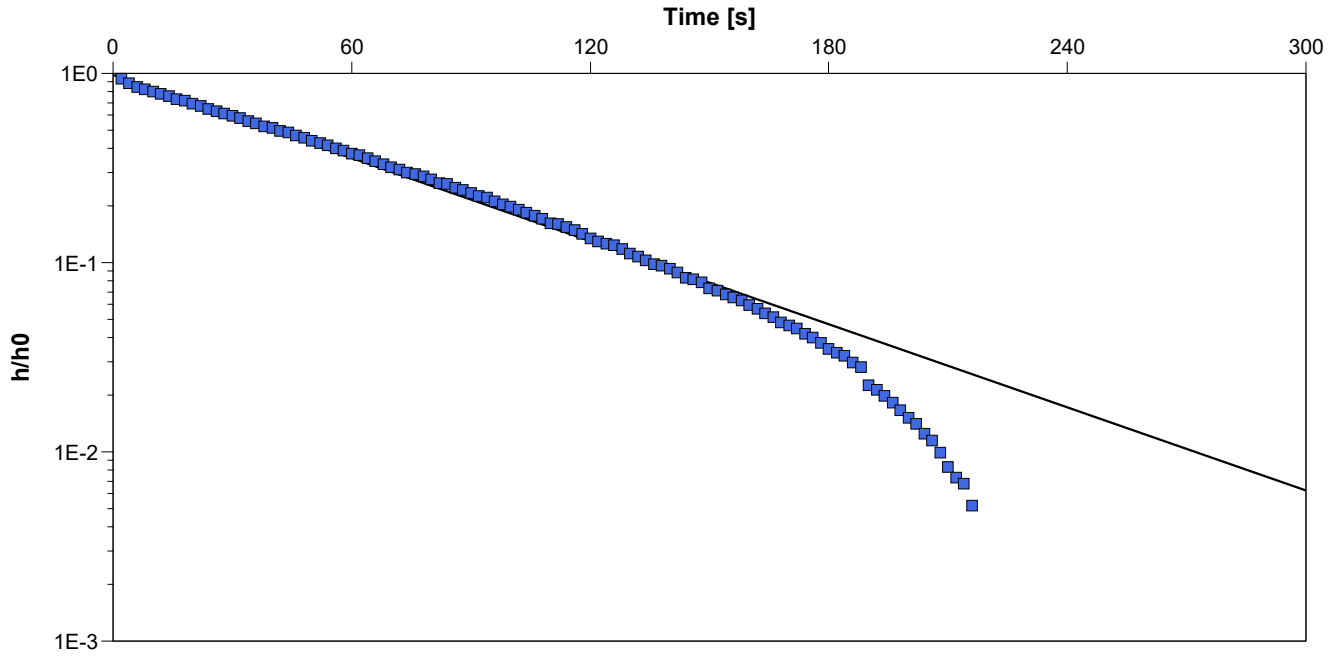
Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH3	4.77×10^{-6}	

Figure C-1 BH3 Test 1 Hvorslev

	Slug Test Analysis Report
	Project:
	Number: 21002.00
	Client: Sunvale Homes

Location: Mount Forest	Slug Test: BH3 Test 2	Test Well: BH3
Test Conducted by: grh		Test Date: 2021-02-04
Analysis Performed by: grh	BH3 Test 2 Hvorslev	Analysis Date: 2021-02-05
Aquifer Thickness: 2.67 m		



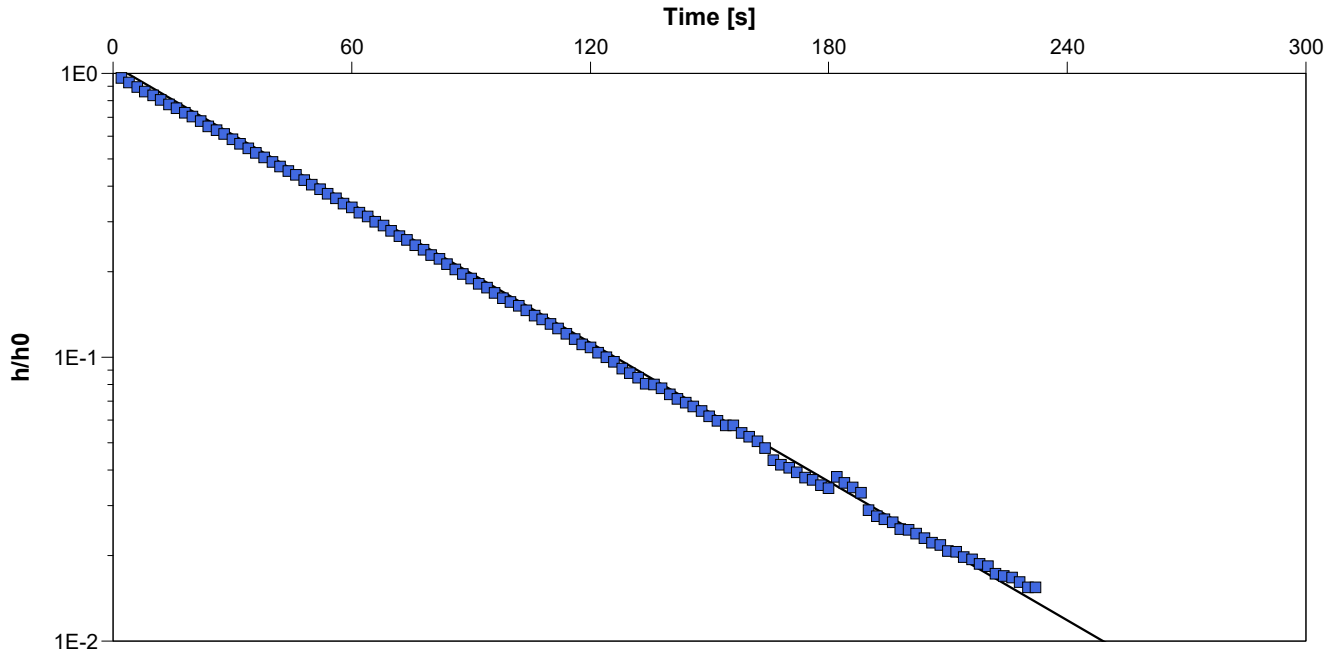
Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH3	8.69×10^{-6}	

Figure C-2 BH3 Test 2

	Slug Test Analysis Report
	Project:
	Number: 21002.00
	Client: Sunvale Homes

Location: Mount Forest	Slug Test: BH3 Test 3	Test Well: BH3
Test Conducted by: grh		Test Date: 2021-02-04
Analysis Performed by: grh	BH3 Test 3	Analysis Date: 2021-02-05
Aquifer Thickness: 2.67 m		



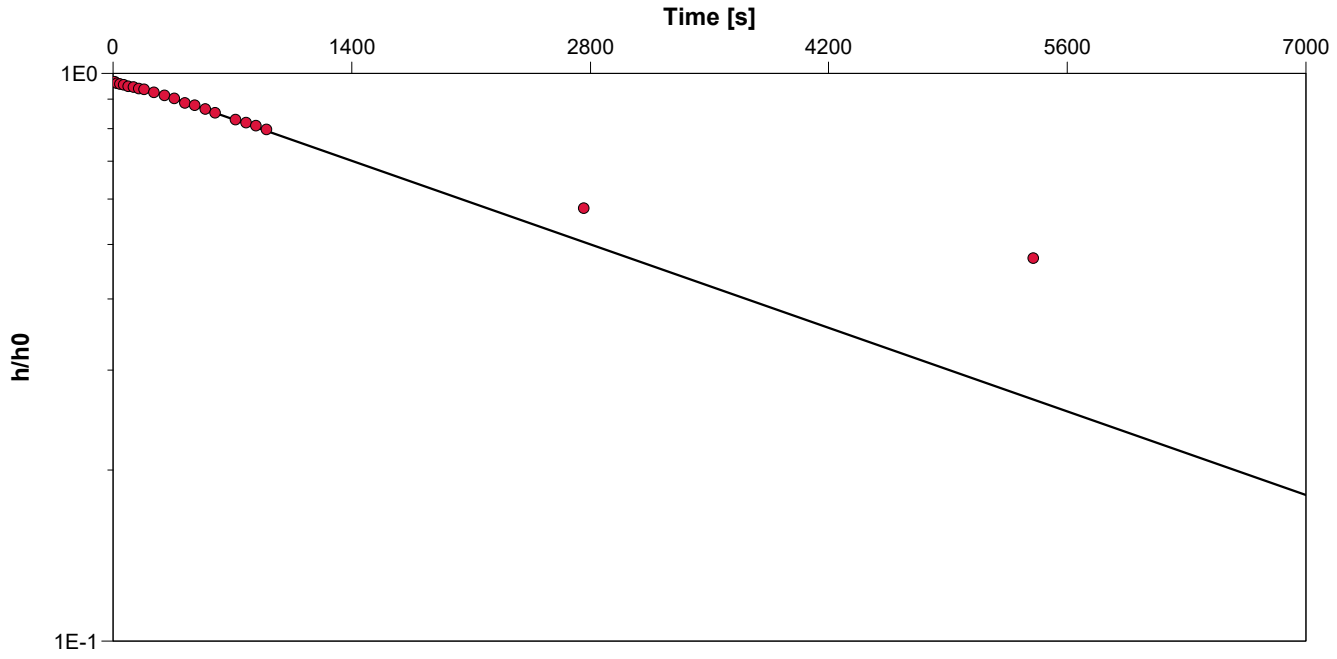
Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH3	9.67×10^{-6}	

Figure C-3 BH3 Test 3

	Slug Test Analysis Report
	Project: Sunvale Mt Forest Seep Assessment
	Number: 21002.00
	Client: Sunvale Homes

Location: Mount Forest	Slug Test: BH4 Test 1	Test Well: BH4
Test Conducted by: grh		Test Date: 2021-02-04
Analysis Performed by: grh	BH4 Test 1	Analysis Date: 2021-02-05
Aquifer Thickness: 4.35 m		



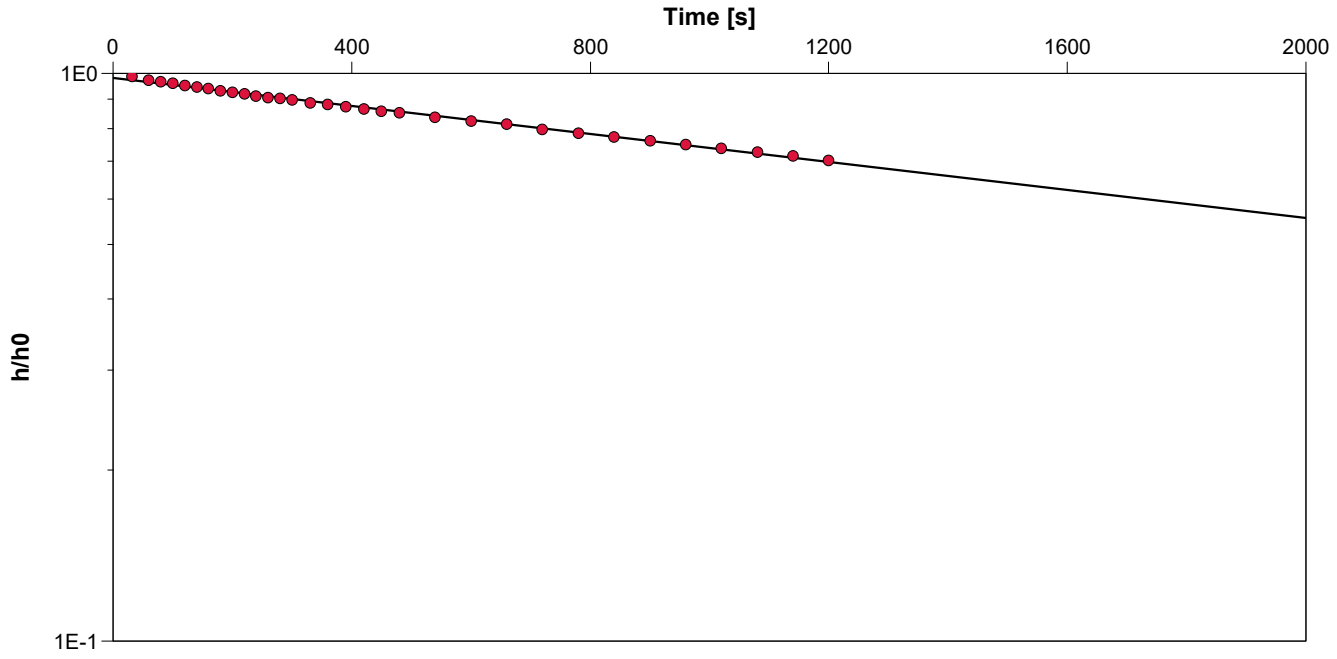
Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH4	7.07×10^{-8}	

Figure C-4 BH4 Test 1

	Slug Test Analysis Report
	Project: Sunvale Mt Forest Seep Assessment
	Number: 21002.00
	Client: Sunvale Homes

Location: Mount Forest	Slug Test: BH4 Test 2	Test Well: BH4
Test Conducted by: grh		Test Date: 2021-02-05
Analysis Performed by: grh	BH4 Test 2	Analysis Date: 2021-02-05
Aquifer Thickness: 4.35 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
BH4	8.28×10^{-8}	

Figure C-5 BH4 Test 2

APPENDIX D

CLIMATE DATA

TABLE D-1
CLIMATIC WATER BUDGET: CLIMATE NORMAL 1981-2010 (Glen Allan)
Potential Evapotranspiration
Hydrogeological Assessment Cork Street Residential Development Mount Forest (21002.00)

	Thornthwaite (1948)							
Month	**Mean Temperature (°C)**	**Heat Index**	**Potential Evapo-transpiration (mm)**	**Daylight Correction Value**	**Adjusted Potential Evapo-transpiration (mm)**	**Total Precipitation (mm)**	**Surplus (mm)**	**Deficit (mm)**
January	-7.2	0.0	0.0	0.81	0.0	74.8	74.8	0.0
February	-6.2	0.0	0.0	0.81	0.0	62.7	62.7	0.0
March	-1.8	0.0	0.0	1.02	0.0	63.6	63.6	0.0
April	5.8	1.3	27.6	1.12	30.9	76.7	45.8	0.0
May	12.2	3.9	60.0	1.27	76.2	96.2	20.0	0.0
June	17.4	6.6	87.0	1.29	112.2	83.1	0.0	29.1
July	19.8	8.0	99.5	1.30	129.4	89.8	0.0	39.6
August	18.9	7.5	94.8	1.20	113.8	99.6	0.0	14.2
September	14.8	5.2	73.4	1.04	76.4	102.4	26.0	0.0
October	8.3	2.2	40.1	0.95	38.1	87.0	48.9	0.0
November	2.2	0.3	10.0	0.80	8.0	99.4	91.4	0.0
December	-3.9	0.0	0.0	0.74	0.0	79.3	79.3	0.0
TOTALS	**6.7**	**34.9**			**585.0**	**1014.6**	**512.5**	**82.9**

TOTAL WATER SURPLUS **429.6** **mm**

NOTES:

1) Water budget adjusted for latitude and daylight.

2) (°C) - Represents calculated mean of daily temperatures for the month.

3) Precipitation and Temperature data from the Glen Allan Climatic Station latitude 43°41'02.058" N, longitude 80°42'37.086" W, elevation 400 masl

4) Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapotranspiration.